United States Coast Guard

MISLE Incident Investigation Report
For
SLNC GOODWILL / Loss of Life

On 05Aug2020 00:42:00 EDT

MISLE Activity Number: 7025155
MISLE Case Number: 1229748

I. INCIDENT INVESTIGATION – GENERAL INFORMATION

On 05Aug21, the SLNC GOODWILL (ON 1266919) was underway en route to Busan, Republic of Korea. At approx. 1342 Japan Standard time (Zulu +9), the #1 ship's service diesel generator (SSDG), hereafter referred to as DG#1, was being restarted following a change-out of the generator's governor; this restart was being conducted by the Chief Engineer (CE), 1st Assistant Engineer (1/AE), and 3rd Assistant Engineer (3/AE). The first attempt to restart DG #1 resulted in the rpms increasing to the point that the overspeed protection device tripped the engine offline. The governor was visually examined for loose connections, leaks, or other signs of malfunction; none were identified. The overspeed protection device was reset and DG #1 was restarted a second time. Again, the rpms steadily increased past the normal operating speed of 900 rpms, but this time the overspeed protection device didn't trip. The 1/AE quickly attempted to manually stop the engine at the governor, but was unsuccessful. While the 1/AE ran to the aft of the generator to manually activate the overspeed protection device and with the CE shouting for everyone to get back, the generator's flywheel broke apart at high speed sending large sections of the component hurtling through the surrounding area. One such section struck the 3/AE, who was still standing in the vicinity of the engine at the time, in the neck and upper torso.

The 1/AE ran to the engine control room to notify the bridge of the casualty while the CE attempted to render first aid to the 3/AE. The vessel's Fire Team arrived on scene within minutes and transported the 3/AE to the vessel's hospital space. The Medical Officer supervised the treatment of the 3/AE along with support from other crewmembers as well as a shoreside medical advisory service. The 3/AE was semi-conscious during initial treatment, but later lost consciousness and died as a result of the injuries sustained from being struck by the flywheel section.

As a result of this investigation, the U.S. Coast Guard has determined that the initiating event for this casualty was a mechanical failure of the governor recently installed on DG #1. This failure resulted in an uncontrolled supply of fuel to the engine which in turn resulted in an uncontrolled increase of the engine's rpms. The overspeed protection device failed to trip and the rpms increased to the point that the flywheel fractured, fatally striking the 3/AE and damaging the vessel's electrical and propulsion control systems. The causal factors that contributed to this casualty include: (1) mechanical damage to internal components of the governor installed on DG #1, (2) improper storage of the governor, (3) failure to verify internal condition of the governor, (4) governor storage procedures and recommendations, (5) inability to confirm the governor's maintenance history, (6) improper recordkeeping of governor, (7) failure of the engine's overspeed protection device, (8) inadequate mechanical properties of DG #1 flywheel, (9) inadequate chemical composition of DG#1 flywheel, (10) no reasonable PPE exists to prevent loss of life, (11) inability to conduct visual teleconferencing during medical treatment, (12) significant damage to vessel's electrical generation/distribution system, and (13) significant damage to the vessel's propulsion control systems.

Personnel Casualty Summary

Total Missing = 0

Total Dead = 1

Total Injured = 0

Total At Risk, Not Injured = 2

Total People At Risk = 3

Vessel(s) Status Summary

Actual Total Loss = 0

Total Constructive Loss Salvaged = 0

Total Constructive Loss Unsalvaged = 0

Damaged = 0

Undamaged = 1

Property Damage Summary

Vessel(s) = $ 0

Cargo = $ 0

Facility(s) = $ 0

Other = $ 0

* Includes estimates

II. LOCATIONS

Description	Latitude	Longitude
Sea of Japan, approx.74 NM southwest of the port of Sasebo, Japan	32°29.0 N	128°29.0 E

III. INVOLVED PERSONNEL

Name: (b) (6), (b) (7)(C)

Team Lead: No
Point Of Contact: No
Role: Investigating Officer - Field Investigation
Status: Assigned
Department Id: 000599
Type/Rank: (b) (6), (b) (7)(C)
Agency Type/Agency: Federal - DHS/Federal - DHS
Source Id/Source: (b) (6), (b) (7)(C) /Direct Access Personnel
Comments:

Name (b) (6), (b) (7)(C) .

Team Lead: Yes
Point Of Contact: Yes
Role: Investigating Officer - Field Investigation
Status: Assigned
Department Id: 000599
Type/Rank: Officer - (b) (6), (b) (7)(C)
Agency Type/Agency: Federal - DHS/Federal - DHS
Source Id/Source: (b) (6), (b) (7)(C) /Direct Access Personnel
Comments:

Name: (b) (6), (b) (7)(C)

Team Lead: No
Point Of Contact: No
Role: Investigating Officer - Field Investigation
Status: Assigned
Department Id: 000599
Type/Rank: (b) (6), (b) (7)(C)
Agency Type/Agency: Federal - DHS/Federal - DHS
Source Id/Source: (b) (6), (b) (7)(C) /Direct Access Personnel
Comments:

Name: (b) (6), (b) (7)(C)

Team Lead: No
Point Of Contact: No

Role: Investigation Administration/Review
Status: Assigned
Department Id: 000599
Type/Rank: Officer - (b) (6), (b) (7)(C)
Agency Type/Agency: Federal - DHS/Federal - DHS
Source Id/Source: (b) (6), (b) (7)(C) /Direct Access Personnel
Comments:

IV. INVOLVED TEAM

V. INVOLVED SUBJECTS

Involved Vessels

Name:	SLNC GOODWILL
Flag:	UNITED STATES
Primary VIN:	1266919
Call Sign:	WDI5693
Damage Status:	Undamaged
Role:	Involved in a Marine Casualty
Classification, Type, Subtype:	Tank Ship, Chemical Tank Ship, Oil & Chemical Tank Ship
Gross Tonnage:	
Net Tonnage:	
Dead Wt. Tonnage:	50326
Length:	580.4
Home/Hailing Port:	WILMINGTON
Keel Laid Date:	21Nov2008
Delivery Date:	08May2009
Place of Construction:	CHINA
Builder Name:	
Propulsion Type:	Diesel Direct
Ahead HP:	12712
Master:	(b) (6), (b) (7)(C)
Classification Society:	DET NORSKE VERITAS
Owner:	NORD GOODWILL LLC
Operator:	SCHUYLER LINE NAVIGATION CORP
Inspection Subchapter:	OD
Most Recent Vessel Inspection Activity:	7014645, 23Jul2020 20:32:44 EDT
Current Certificate of Inspection:	Issued On: 28Jan2016 by Activities Far East

Name:	SLNC GOODWILL
Flag:	UNITED STATES
Primary VIN:	1266919
Call Sign:	WDI5693
Damage Status:	Undamaged
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Home/Hailing Port:	WILMINGTON
Keel Laid Date:	21Nov2008
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Place of Construction:	CHINA

Builder Name:
Propulsion Type: Diesel Direct
Ahead HP: 12712
Master: (b) (6), (b) (7)(C)
Classification Society: DNV
Owner: NORD GOODWILL LLC
Operator: SCHUYLER LINE NAVIGATION CORP
Inspection Subchapter: OD
Most Recent Vessel Inspection Activity: 7014645, 23Jul2020 20:32:44 EDT
Current Certificate of Inspection: Issued On: 28Jan2016 by Activities Far East

Involved Persons

(b) (6), (b) (7)(C)
Status: Not at Risk
Role: Witness
Gender:
Age:
SSN: (b) (6), (b) (7)(C)
Birth Date:
Email Address:
Phone Number (Primary): (b) (6), (b) (7)(C)
Address (Home/Primary Residence): (b) (6), (b) (7)(C)

(b) (7)(C), (b) (6)

Comments:

(b) (6), (b) (7)(C)
Status: Not at Risk
Role: Witness
Gender:
Age:
SSN: (b) (6), (b) (7)(C)
Birth Date:
Email Address:
Phone Number:
Address (Home/Primary Residence): (b) (6), (b) (7)(C)

(b) (7)(C), (b) (6)

Comments:

(b) (6), (b) (7)(C)
Status: Not at Risk
Role: Other
Gender:
Age:
SSN:
Birth Date:
Email Address:
Phone Number:
Address: (b) (6), (b) (7)(C)

(b) (7)(C), (b) (6)

Comments:

(b) (6), (b) (7)(C)
Status: Not at Risk
Role: Witness
Gender:
Age:
SSN:
Birth Date: (b) (6), (b) (7)(C)
Email Address: (b) (7)(C), (b) (6)

Phone Number (Phone Number): (b) (6), (b) (7)(C)
Address (Home/Primary Residence): (b) (6), (b) (7)(C)
(b) (7)(C), (b) (6)

Comments:
(b) (6), (b) (7)(C)
Status: Not at Risk
Role: Medical Review Officer
Gender: (b) (6), (b) (7)(C)
Age:
SSN:
Birth Date:
Email Address: (b) (6), (b) (7)(C)
Phone Number (Work): (b) (6), (b) (7)(C)
Address (Primary): (b) (6), (b) (7)(C)
(b) (7)(C), (b) (6)

Comments:
LLOYD-REES, TRENTON
Status: Dead
Role: Subject of Investigation
Gender: (b) (6), (b) (7)(C)
Age: (b) (6)
SSN: (b) (6), (b) (7)(C)
Birth Date: (b) (6), (b) (7)(C)
Email Address:
Phone Number:
Address (Home/Primary Residence): (b) (6), (b) (7)(C)
(b) (7)(C), (b) (6)

Comments:
(b) (6), (b) (7)(C)
Status: Not at Risk
Role: Witness
Gender: (b) (6), (b) (7)(C)
Age: (b) (6)
SSN: (b) (6), (b) (7)(C)
Birth Date: (b) (6), (b) (7)(C)
Email Address: (b) (6), (b) (7)(C)
Phone Number (Phone Number): (b) (6), (b) (7)(C)
Address (Home/Primary Residence): (b) (6), (b) (7)(C)
(b) (7)(C), (b) (6)

Comments:
(b) (6), (b) (7)(C)
Status: At Risk, Not Injured
Role: Witness
Gender: (b) (6), (b) (7)(C)
Age: (b) (6)
SSN: (b) (6), (b) (7)(C)
Birth Date: (b) (6), (b) (7)(C)
Email Address:
Phone Number:
Address (Home/Primary Residence): (b) (6), (b) (7)(C)
(b) (7)(C), (b) (6)

Comments:
(b) (6), (b) (7)(C)

Status: Not at Risk
Role: Witness
Gender:
Age:
SSN:
Birth Date:
Email Address:
Phone Number:
Address:
Comments: Mechanical Engineer & Principal Specialist of the Classification Society's Failure Investigation Team

(b) (6), (b) (7)(C)
Status: At Risk, Not Injured
Role: Witness
Gender:
Age:
SSN: (b) (6), (b) (7)(C)
Birth Date: (b) (6), (b) (7)(C)
Email Address:
Phone Number (Phone Number): (b) (6), (b) (7)(C)
Address (Home/Primary Residence): (b) (6), (b) (7)(C)
(b) (7)(C), (b) (6)
Comments: (b) (6), (b) (7)(C)

Drug and Alcohol Testing. The following people have been determined by the Coast Guard, Law Enforcement Personnel, and/or the Marine Employer to have been directly involved in a Serious Marine Incident as defined in 46 CFR 4.03-2:

(b) (6), (b) (7)(C) (b) (6), (b) (7)(C) Witness
(b) (6), (b) (7)(C) Witness
(b) (6), (b) (7)(C) (b) (6), (b) (7)(C) Witness
(b) (6), (b) (7)(C) (b) (6), (b) (7)(C) Witness
(b) (6), (b) (7)(C) Witness

Involved Organizations

Lloyd's Register Europe, Middle East, and Africa (EMEA)
Role: Other
Email Address:
Phone Number:
Address (Primary): Lloyd’s Register EMEA
Global Technology Centre
Southampton SO16 7QF
United Kingdom
Comments: conducted post-casualty analysis of flywheel

NORD GOODWILL LLC
Role: Other
Email Address:
Phone Number:
Address (Primary Place of Business): 130 SEVERN AVENUE SUITE 201
ANNAPOLIS, Maryland 21403
UNITED STATES
Comments:

R-Tech Materials
Role: Other
Email Address: info@r-techmaterials.com
Phone Number:

Address (Primary): Testing House,
Kenfig Industrial Estate,
Margam,
Port Talbot, UK.
SA13 2PE
Comments: conducted post-casualty analysis of flywheel

SCHUYLER LINE NAVIGATION CORP
Role: Other
Email Address:
Phone Number (NVDC Phone Number): 410-216-6020
Address (Primary Place of Business): 130 SEVERN AVENUE SUITE 201
ANNAPOLIS, Maryland 21403
UNITED STATES
Comments:

Woodward Inc.
Role: Witness
Email Address:
Phone Number (Work): 800-543-5811
Address (Work): 1081 Woodward Way
Fort Collins, Colorado 80524
UNITED STATES
Comments: manufacturer of the governor installed on DG #1 at the time of the casualty (Governor C)

Involved Facilities: None

Involved Waterways

EAST CHINA SEA
Role: Location
Description: Sea of Japan, approx.74 NM southwest of the port of Sasebo, Japan

Involved Other Subjects: None

VI. EVIDENCE

Control Number: 7025155 - MISLE - 0
Description: MISLE Notification #963833 for a report of an incident received by Cellular phone call to Coast Guard
Evidence Type: Misle Notification
Collection Information
Date/Time: 05Aug2020 18:32:09 EDT
Location: Activities Far East
Collected By: (b) (6), (b) (7)(C) ; U. S. Coast Guard

Attachments

Control Number: 7025155-[redacted]001
Description: CG_2692
Evidence Type: Standard

Collection Information
Date/Time: 16Sep2021 20:53:55 EDT
Location:
Collected By: (b) (6), (b) (7)(C) U. S. Coast Guard

Attachments

CG2692; CG-2692-Rpt of Marine, Comm Dive, or OCS Casualty;
24Oct2021 20:59:03 EDT; No

Control Number: 7025155-[redacted]002
Description: CG_2692B with test results
Evidence Type: Standard

Collection Information
Date/Time: 16Sep2021 20:54:19 EDT
Location:
Collected By: (b) (6), (b) (7)(C) U. S. Coast Guard

Attachments

CG02-CG2692B, results; CG-2692B-Rpt of Mandatory Chem Test Following SMI;
09Dec2021 00:28:17 EST; No

Control Number: 7025155-[redacted]003
Description: CG_2692C
Evidence Type: Standard

Collection Information
Date/Time: 16Sep2021 20:54:57 EDT
Location:
Collected By: (b) (6), (b) (7)(C) U. S. Coast Guard

Attachments

CG2692C; CG-2692C-Personnel Casualty Addendum;
24Oct2021 21:00:07 EDT; No

Control Number: 7025155-[redacted]004
Description: Deck logbook entries, SLNC GOODWILL
Evidence Type: Standard

Collection Information
Date/Time: 16Sep2021 20:55:16 EDT
Location:
Collected By: (b) (6), (b) (7)(C) U. S. Coast Guard

Attachments

deck logbook; Documentary Evidence;
24Oct2021 21:00:31 EDT; No

Control Number: 7025155-[redacted]005
Description: Activity Timeline (provided by Master)
Evidence Type: Standard

Collection Information
Date/Time: 16Sep2021 20:55:52 EDT
Location:
Collected By: [redacted] U. S. Coast Guard

Attachments

deck timeline; Documentary Evidence;
24Oct2021 21:00:57 EDT; No

Control Number: 7025155-[redacted]006
Description: Witness statement, Chief Engineer
Evidence Type: Standard

Collection Information
Date/Time: 16Sep2021 20:56:38 EDT
Location:
Collected By: [redacted] U. S. Coast Guard

Attachments

Witness statement, [redacted]; Witness Statement/Interview Record;
24Oct2021 21:01:40 EDT; No

Control Number: 7025155-[redacted]007
Description: Audio recording, Chief Engineer interview
Evidence Type: Standard

Collection Information
Date/Time: 16Sep2021 20:57:30 EDT
Location:
Collected By: [redacted] U. S. Coast Guard

Attachments

audio recording of interview, [redacted]; Witness Statement/Interview Record;
24Oct2021 21:02:06 EDT; No

Control Number: 7025155-[redacted]008
Description: Witness statement, Chief Mate
Evidence Type: Standard

Collection Information
Date/Time: 16Sep2021 20:57:57 EDT
Location:
Collected By: [redacted] U. S. Coast Guard

Attachments

witness statement, [redacted] Witness Statement/Interview Record;
24Oct2021 21:02:33 EDT; No

Control Number: 7025155-[redacted]009
Description: Audio recording, Chief Mate interview
Evidence Type: Standard

Collection Information
Date/Time: 16Sep2021 20:58:15 EDT
Location:
Collected By: (b) (6), (b) (7)(C) U. S. Coast Guard

Attachments

audio recording of interview, [redacted] Witness Statement/Interview Record;
24Oct2021 21:02:55 EDT; No

Control Number: 7025155-[redacted]010
Description: Witness statement, Second Mate
Evidence Type: Standard

Collection Information
Date/Time: 16Sep2021 20:58:42 EDT
Location:
Collected By: (b) (6), (b) (7)(C) U. S. Coast Guard

Attachments

witness statement, 2M; Witness Statement/Interview Record;
24Oct2021 21:03:55 EDT; No

Control Number: 7025155-[redacted]011
Description: Audio recording, Second Mate interview
Evidence Type: Standard

Collection Information
Date/Time: 16Sep2021 20:59:27 EDT
Location:
Collected By: (b) (6), (b) (7)(C) U. S. Coast Guard

Attachments

witness statement, 2M; Witness Statement/Interview Record;
24Oct2021 21:10:19 EDT; No

Control Number: 7025155-[redacted]012
Description: Audio recording, Fourth Mate interview
Evidence Type: Standard

Collection Information
Date/Time: 16Sep2021 21:03:11 EDT
Location:
Collected By: (b) (6), (b) (7)(C) U. S. Coast Guard

Attachments

audio recording of interview, 4M [redacted] Witness Statement/Interview Record;
24Oct2021 21:13:51 EDT; No

Control Number: 7025155-[redacted]013
Description: Audio recording, First Assistant Engineer interview
Evidence Type: Standard

Collection Information
Date/Time: 16Sep2021 21:03:37 EDT
Location:
Collected By: (b) (6), (b) (7)(C) U. S. Coast Guard

Attachments

audio recording of interview, 1AE, [redacted] Witness Statement/Interview Record;
24Oct2021 21:14:21 EDT; No

Control Number: 7025155-[redacted]014
Description: Audio recording, Master interview
Evidence Type: Standard

Collection Information
Date/Time: 16Sep2021 21:04:08 EDT
Location:
Collected By: (b) (6), (b) (7)(C) U. S. Coast Guard

Attachments

audio recording of interview, Master; Witness Statement/Interview Record;
24Oct2021 21:18:32 EDT; No

Control Number: 7025155-[redacted]015
Description: Sign on paperwork, Third Assistant Engineer
Evidence Type: Standard

Collection Information
Date/Time: 16Sep2021 21:04:23 EDT
Location:
Collected By: (b) (6), (b) (7)(C) U. S. Coast Guard

Attachments

sign on paperwork, 3AE; Documentary Evidence;
24Oct2021 21:23:36 EDT; No

Control Number: 7025155-[redacted]016
Description: Photo index, engine room alarm log
Evidence Type: Standard

Collection Information
Date/Time: 16Sep2021 22:25:05 EDT
Location:
Collected By: (b) (6), (b) (7)(C) U. S. Coast Guard

Attachments

photo index, alarm log; Documentary Evidence;
24Oct2021 21:27:26 EDT; No

IMG_0124; Photograph;
24Oct2021 21:28:09 EDT; No

IMG_0125; Photograph;
24Oct2021 21:28:25 EDT; No

IMG_0126; Photograph;
24Oct2021 21:28:40 EDT; No

IMG_0127; Photograph;
24Oct2021 21:28:57 EDT; No

Control Number: 7025155-[redacted]017
Description: Photo index, engine room logbook entries
Evidence Type: Standard

Collection Information
Date/Time: 16Sep2021 22:25:40 EDT
Location:
Collected By: (b) (6), (b) (7)(C) U. S. Coast Guard

Attachments

photo index, engine logbook; Documentary Evidence;
24Oct2021 21:29:46 EDT; No

IMG_0129; Photograph;
24Oct2021 21:30:29 EDT; No

IMG_0130; Photograph;
24Oct2021 21:30:45 EDT; No

IMG_0131; Photograph;
24Oct2021 21:31:03 EDT; No

IMG_0132; Photograph;
24Oct2021 21:31:19 EDT; No

IMG_0133; Photograph;
24Oct2021 21:31:33 EDT; No

IMG_0135; Photograph;
24Oct2021 21:31:48 EDT; No

Control Number: 7025155-[redacted]018
Description: Photo index, debris in engine room between DG#1 and DG#2
Evidence Type: Standard

Collection Information
Date/Time: 17Sep2021 01:29:07 EDT
Location:
Collected By: (b) (6), (b) (7)(C) U. S. Coast Guard

Attachments

photo index, debris between DG#1 and DG#2; Documentary Evidence;
24Oct2021 21:32:28 EDT; No

IMG_0042; Photograph;
24Oct2021 21:32:59 EDT; No

IMG_0043; Photograph;
24Oct2021 21:33:11 EDT; No

IMG_0044; Photograph;
24Oct2021 21:33:25 EDT; No

IMG_0047; Photograph;
24Oct2021 21:34:06 EDT; No

Control Number: 7025155-[redacted]019
Description: Photo index, debris between DG#1 and DG#2
Evidence Type: Standard

Collection Information
Date/Time: 19Oct2021 20:07:08 EDT
Location:
Collected By: (b) (6), (b) (7)(C) U. S. Coast Guard

Attachments

photo index, DG#1; Documentary Evidence;
24Oct2021 21:34:43 EDT; No

IMG_0045; Photograph;
24Oct2021 21:35:14 EDT; No

IMG_0049; Photograph;
24Oct2021 21:35:30 EDT; No

IMG_0060; Photograph;
24Oct2021 21:35:46 EDT; No

IMG_0065; Photograph;
24Oct2021 21:36:00 EDT; No

IMG_0066; Photograph;
24Oct2021 21:36:16 EDT; No

IMG_0074; Photograph;
24Oct2021 21:36:39 EDT; No

Control Number: 7025155-[redacted]020
Description: Photo index, undamaged DG#2 for reference
Evidence Type: Standard

Collection Information
Date/Time: 19Oct2021 20:08:15 EDT
Location:
Collected By: (b) (6), (b) (7)(C) U. S. Coast Guard

Attachments

photo index, DG#2, undamaged; Documentary Evidence;
24Oct2021 21:37:24 EDT; No

IMG_0082; Photograph;
24Oct2021 21:38:01 EDT; No

IMG_0083; Photograph;
24Oct2021 21:38:16 EDT; No

IMG_0085; Photograph;
24Oct2021 21:38:31 EDT; No

IMG_0099; Photograph;
24Oct2021 21:38:47 EDT; No

Control Number: 7025155-[redacted]021
Description: Photo index, governor
Evidence Type: Standard

Collection Information
Date/Time: 19Oct2021 20:09:03 EDT
Location:
Collected By: (b) (6), (b) (7)(C) U. S. Coast Guard

Attachments

photo index, governor; Documentary Evidence;
24Oct2021 21:53:06 EDT; No

IMG_0161; Photograph;
24Oct2021 21:53:42 EDT; No

IMG_0162; Photograph;
24Oct2021 21:54:05 EDT; No

IMG_0163; Photograph;
24Oct2021 22:23:04 EDT; No

IMG_0165; Photograph;
24Oct2021 22:23:26 EDT; No

IMG_0184; Photograph;
24Oct2021 22:23:44 EDT; No

IMG_0193; Photograph;
24Oct2021 22:24:03 EDT; No

Control Number: 7025155-[redacted]022
Description: Photo index, flywheel pieces
Evidence Type: Standard

Collection Information
Date/Time: 19Oct2021 20:18:23 EDT
Location:
Collected By: (b) (6), (b) (7)(C) U. S. Coast Guard

Attachments

photo index, flywheel pieces; Documentary Evidence;
24Oct2021 22:33:53 EDT; No

IMG_0208; Photograph;
25Oct2021 01:12:43 EDT; No

IMG_0209; Photograph;
25Oct2021 01:13:03 EDT; No

IMG_0211; Photograph;
25Oct2021 01:13:17 EDT; No

Control Number: 7025155-[redacted]023
Description: Photo, depiction of the 1/AE's position at the time of the casualty
Evidence Type: Standard

Collection Information
Date/Time: 19Oct2021 20:18:50 EDT
Location:
Collected By: (b) (6), (b) (7)(C) U. S. Coast Guard

Attachments

photo, position of 3AE; Photograph;
25Oct2021 01:16:02 EDT; No

Control Number: 7025155-[redacted]024
Description: Photo index, engine room damage
Evidence Type: Standard

Collection Information
Date/Time: 19Oct2021 20:19:37 EDT
Location:
Collected By: (b) (6), (b) (7)(C) U. S. Coast Guard

Attachments

photo index, damage to engine room; Documentary Evidence;
25Oct2021 01:18:04 EDT; No

IMG_0067; Photograph;
25Oct2021 01:22:21 EDT; No

IMG_0068; Photograph;
25Oct2021 01:22:34 EDT; No

IMG_0069; Photograph;
25Oct2021 01:22:48 EDT; No

IMG_0114; Photograph;
25Oct2021 01:23:05 EDT; No

Control Number: 7025155-[redacted]025
Description: Work/Rest history, 1AE
Evidence Type: Standard

Collection Information
Date/Time: 20Oct2021 21:55:04 EDT
Location:
Collected By: (b) (6), (b) (7)(C) U. S. Coast Guard

Attachments

work-rest, 1AE; Documentary Evidence;
25Oct2021 01:30:29 EDT; No

Control Number: 7025155-[redacted]026
Description: Work/Rest history, 2AE
Evidence Type: Standard

Collection Information
Date/Time: 20Oct2021 21:55:40 EDT
Location:
Collected By: (b) (6), (b) (7)(C) U. S. Coast Guard

Attachments

work-rest, 2AE; Documentary Evidence;
25Oct2021 01:41:21 EDT; No

Control Number: 7025155-[redacted]027
Description: Work/Rest history, 3AE
Evidence Type: Standard

Collection Information
Date/Time: 20Oct2021 21:56:04 EDT
Location:
Collected By: (b) (6), (b) (7)(C) U. S. Coast Guard

Attachments

work-rest, 3AE; Documentary Evidence;
25Oct2021 01:41:57 EDT; No

Control Number: 7025155-[redacted]028
Description: Work/Rest history, Chief Engineer
Evidence Type: Standard

Collection Information
Date/Time: 20Oct2021 21:56:27 EDT
Location:
Collected By: (b) (6), (b) (7)(C) U. S. Coast Guard

Attachments

CG28 - Work-rest, CE; Documentary Evidence;
25Oct2021 01:42:21 EDT; No

Control Number: 7025155-[redacted]029
Description: Work/Rest history: Oiler #1, Oiler #2, QMED
Evidence Type: Standard

Collection Information
Date/Time: 20Oct2021 21:56:51 EDT
Location:
Collected By: (b) (6), (b) (7)(C) U. S. Coast Guard

Attachments

work-rest - Oiler1, Oiler2, QMED; Documentary Evidence;
25Oct2021 01:42:56 EDT; No

Control Number: 7025155-[redacted]030
Description: Excerpt from ops manual regarding 3AE duties
Evidence Type: Standard

Collection Information
Date/Time: 21Oct2021 01:21:21 EDT
Location:
Collected By: (b) (6), (b) (7)(C) U. S. Coast Guard

Attachments

exerpt, description of duties, 3AE; Documentary Evidence;
25Oct2021 01:43:32 EDT; No

Control Number: 7025155-[redacted]031
Description: Excerpt from ops manual regarding emergency procedures
Evidence Type: Standard

Collection Information
Date/Time: 21Oct2021 01:58:15 EDT
Location:
Collected By: (b) (6), (b) (7)(C) U. S. Coast Guard

Attachments

exerpt, emergency procedures; Documentary Evidence;
25Oct2021 02:05:42 EDT; No

Control Number: 7025155-[redacted]032
Description: Report of Death, 3AE
Evidence Type: Standard

Collection Information
Date/Time: 21Oct2021 01:58:59 EDT
Location:
Collected By: (b) (6), (b) (7)(C) U. S. Coast Guard

Attachments

3AE, report of death; Documentary Evidence;
25Oct2021 02:06:21 EDT; No

Control Number: 7025155-[redacted]033
Description: Excerpt from ops manual regarding DG#1 particulars
Evidence Type: Standard

Collection Information
Date/Time: 21Oct2021 01:59:16 EDT
Location:
Collected By: (b) (6), (b) (7)(C) U. S. Coast Guard

Attachments

excerpt, engine particulars; Documentary Evidence;
25Oct2021 02:06:46 EDT; No

Control Number: 7025155-[redacted]034
Description: Excerpt from ops manual regarding DG#1 maintenance schedule
Evidence Type: Standard

Collection Information
Date/Time: 21Oct2021 02:00:30 EDT
Location:
Collected By: (b) (6), (b) (7)(C) U. S. Coast Guard

Attachments

exceprt from ops manual, maintenance schedule; Documentary Evidence;
25Oct2021 02:10:20 EDT; No

Control Number: 7025155-[redacted]035
Description: Excerpt from ops manual regarding DG#1 maintenance
Evidence Type: Standard

Collection Information
Date/Time: 21Oct2021 02:02:52 EDT
Location:
Collected By: (b) (6), (b) (7)(C) U. S. Coast Guard

Attachments

excerpt, engine maintenance; Documentary Evidence;
25Oct2021 02:12:12 EDT; No

Control Number: 7025155-[redacted]036
Description: Excerpt from ops manual showing fly wheel diagram
Evidence Type: Standard

Collection Information
Date/Time: 21Oct2021 02:03:32 EDT
Location:
Collected By: (b) (6), (b) (7)(C) U. S. Coast Guard

Attachments

excerpt, fly wheel diagram; Documentary Evidence;
25Oct2021 02:14:04 EDT; No

Control Number: 7025155-[redacted]037
Description: Excerpt from ops manual regarding DG#1 operation
Evidence Type: Standard

Collection Information
Date/Time: 21Oct2021 02:04:08 EDT
Location:
Collected By: (b) (6), (b) (7)(C) U. S. Coast Guard

Attachments

excerpt, operating the engine; Documentary Evidence;
25Oct2021 02:14:59 EDT; No

Control Number: 7025155-[redacted]038
Description: Excerpt from ops manual regarding DG#1 overhaul recommendations
Evidence Type: Standard

Collection Information
Date/Time: 21Oct2021 02:05:05 EDT
Location:
Collected By: (b) (6), (b) (7)(C) U. S. Coast Guard

Attachments

excerpt, overhaul recommendation; Documentary Evidence;
25Oct2021 02:15:34 EDT; No

Control Number: 7025155-[redacted]039
Description: Excerpt from ops manual regarding disturbances while running DG#1
Evidence Type: Standard

Collection Information
Date/Time: 21Oct2021 02:07:57 EDT
Location:
Collected By: (b) (6), (b) (7)(C) U. S. Coast Guard

Attachments

excerpt, disturbances during running; Documentary Evidence;
25Oct2021 02:16:11 EDT; No

Control Number: 7025155-[redacted]040
Description: Rough log of DG#1 maintenance
Evidence Type: Standard

Collection Information
Date/Time: 21Oct2021 02:08:51 EDT
Location:
Collected By: (b) (6), (b) (7)(C) U. S. Coast Guard

Attachments

rough log, DG#1 maintenance; Documentary Evidence;
25Oct2021 02:16:47 EDT; No

Control Number: 7025155-[redacted]041
Description: DG#1 maintenance data
Evidence Type: Standard

Collection Information
Date/Time: 21Oct2021 02:09:17 EDT
Location:
Collected By: (b) (6), (b) (7)(C) U. S. Coast Guard

Attachments

DG#1 maintenance spreadsheet; Documentary Evidence;
25Oct2021 02:17:54 EDT; No

Control Number: 7025155-[redacted]042
Description: DG#1 service reports, 2019
Evidence Type: Standard

Collection Information
Date/Time: 21Oct2021 02:09:48 EDT
Location:
Collected By: (b) (6), (b) (7)(C) U. S. Coast Guard

Attachments

DG#1 service reports, 2019; Documentary Evidence;
25Oct2021 02:19:11 EDT; No

Control Number: 7025155-[redacted]043
Description: DG#1 - 200 hour service report, 23Jul20
Evidence Type: Standard

Collection Information
Date/Time: 21Oct2021 02:10:31 EDT
Location:
Collected By: (b) (6), (b) (7)(C) U. S. Coast Guard

Attachments

DG#1, 2000 HR service, 23Jul20; Documentary Evidence;
25Oct2021 02:21:47 EDT; No

Control Number: 7025155-[redacted]044
Description: Excerpt from ops manual regarding DG#1 governor
Evidence Type: Standard

Collection Information
Date/Time: 21Oct2021 02:12:07 EDT
Location:
Collected By: (b) (6), (b) (7)(C) U. S. Coast Guard

Attachments

exerpt, governor info; Documentary Evidence;
25Oct2021 02:22:13 EDT; No

Control Number: 7025155-[redacted]045
Description: Excerpt from ops manual regarding a tool used for adjusting governor overspeed stop
Evidence Type: Standard

Collection Information
Date/Time: 21Oct2021 02:12:45 EDT
Location:
Collected By: (b) (6), (b) (7)(C) U. S. Coast Guard

Attachments

CG45 - excerpt, tool for adjusting overspeed stop; Documentary Evidence;
25Oct2021 02:24:00 EDT; No

Control Number: 7025155-[redacted]046
Description: Product manual, UG-8 Speed Adjusting Devices
Evidence Type: Standard

Collection Information
Date/Time: 21Oct2021 02:13:35 EDT
Location:
Collected By: (b) (6), (b) (7)(C) U. S. Coast Guard

Attachments

governor manual; Documentary Evidence;
25Oct2021 02:24:35 EDT; No

Control Number: 7025155-[redacted]047
Description: Product manual, Shutdown Solenoid for UG Governor
Evidence Type: Standard

Collection Information
Date/Time: 21Oct2021 02:15:02 EDT
Location:
Collected By: (b) (6), (b) (7)(C) U. S. Coast Guard

Attachments

shutdown solenoid manual; Documentary Evidence;
25Oct2021 02:25:24 EDT; No

Control Number: 7025155-[redacted]048
Description: Product manual, Speed Adjusting (Synchronizing) Motor
Evidence Type: Standard

Collection Information
Date/Time: 21Oct2021 02:16:07 EDT
Location:
Collected By: (b) (6), (b) (7)(C) U. S. Coast Guard

Attachments

sync motor manual; Documentary Evidence;
25Oct2021 02:26:08 EDT; No

Control Number: 7025155-[redacted]049
Description: Company procedures for governor testing
Evidence Type: Standard

Collection Information
Date/Time: 21Oct2021 02:17:11 EDT
Location:
Collected By: (b) (6), (b) (7)(C) U. S. Coast Guard

Attachments

governor testing instructions, company; Documentary Evidence;
25Oct2021 02:26:50 EDT; No

Control Number: 7025155-[redacted]050
Description: Excerpt from ops manual regarding preventative maintenance plan
Evidence Type: Standard

Collection Information
Date/Time: 21Oct2021 02:18:21 EDT
Location:
Collected By: (b) (6), (b) (7)(C) U. S. Coast Guard

Attachments

excerpt, preventative maintenance plan; Documentary Evidence;
25Oct2021 02:28:22 EDT; No

Control Number: 7025155-[redacted]051
Description: Annual service reports, governor
Evidence Type: Standard

Collection Information
Date/Time: 24Oct2021 20:41:01 EDT
Location:
Collected By: (b) (6), (b) (7)(C) U. S. Coast Guard

Attachments

governor, annual servicing reports; Documentary Evidence;
25Oct2021 02:29:59 EDT; No

Control Number: 7025155-[redacted]052
Description: Quarterly safety checks, DG#1
Evidence Type: Standard

Collection Information
Date/Time: 24Oct2021 20:42:26 EDT
Location:
Collected By: (b) (6), (b) (7)(C) U. S. Coast Guard

Attachments

quarterly safety checks, 13Jul20.pdf; Documentary Evidence;
25Oct2021 02:30:20 EDT; No

Control Number: 7025155-[redacted]053
Description: Work report, governor A overhaul
Evidence Type: Standard

Collection Information
Date/Time: 24Oct2021 20:43:19 EDT
Location:
Collected By: (b) (6), (b) (7)(C) U. S. Coast Guard

Attachments

work report, governor A (8521-0047DC) overhaul; Documentary Evidence;
25Oct2021 02:31:35 EDT; No

Control Number: 7025155-[redacted]054
Description: Work report, governor B overhaul
Evidence Type: Standard

Collection Information
Date/Time: 24Oct2021 20:43:47 EDT
Location:
Collected By: (b) (6), (b) (7)(C) U. S. Coast Guard

Attachments

CG54a - work report, governor B (8520-0041) overhaul; Documentary Evidence;
25Oct2021 02:32:45 EDT; No

CG54b - work report, governor B overhaul; Documentary Evidence;
25Oct2021 02:33:04 EDT; No

Control Number: 7025155-[redacted]055
Description: Preliminary report issued by Classification Society
Evidence Type: Standard

Collection Information
Date/Time: 24Oct2021 20:44:15 EDT
Location:
Collected By: (b) (6), (b) (7)(C) U. S. Coast Guard

Attachments

CG55 - Class preliminary report; Documentary Evidence;
25Oct2021 02:33:20 EDT; No

Control Number: 7025155-[redacted]056
Description: Technical report
Evidence Type: Standard

Collection Information
Date/Time: 24Oct2021 20:44:49 EDT
Location:
Collected By: (b) (6), (b) (7)(C) U. S. Coast Guard

Attachments

CG56 - technical report, flywheel failure; Documentary Evidence; 25Oct2021 02:33:35 EDT; No

Control Number: 7025155-[redacted]057
Description: Final summary issued by Classification Society
Evidence Type: Standard

Collection Information
Date/Time: 03Nov2021 20:46:34 EDT
Location:
Collected By: (b) (6), (b) (7)(C) U. S. Coast Guard

Attachments

CG57 - Class Final Report Summary; Documentary Evidence; 03Nov2021 20:48:29 EDT; No

Control Number: 7025155-[redacted]058
Description: Email correspondence regarding governor
Evidence Type: Standard

Collection Information
Date/Time: 18Nov2021 18:08:40 EST
Location:
Collected By: (b) (6), (b) (7)(C) U. S. Coast Guard

Attachments

CG58 - Email, governor info; Documentary Evidence; 18Nov2021 18:10:05 EST; No

Control Number: 7025155-[redacted]059
Description: Governor storage instructions
Evidence Type: Standard

Collection Information
Date/Time: 28Nov2021 20:45:43 EST
Location:
Collected By: (b) (6), (b) (7)(C) U. S. Coast Guard

Attachments

CG59 - Governor storage; Documentary Evidence; 28Nov2021 20:50:12 EST; No

Control Number: 7025155-[redacted]060
Description: Email regarding storage of governor
Evidence Type: Standard

Collection Information
Date/Time: 29Nov2021 18:54:51 EST
Location:
Collected By: (b) (6), (b) (7)(C) U. S. Coast Guard

Attachments

CG60 - Email, storage; Documentary Evidence;
29Nov2021 18:56:58 EST; No

Control Number: 7025155-[redacted]061
Description: Email regarding testing of mechanical & electrical governors
Evidence Type: Standard

Collection Information
Date/Time: 09Dec2021 00:53:24 EST
Location:
Collected By: (b) (6), (b) (7)(C) U. S. Coast Guard

Attachments

CG61 - Email, testing; Documentary Evidence;
09Dec2021 00:54:32 EST; No

Control Number: 7025155-[redacted]062
Description: Periodic Safety Test Procedures, Rev. 6
Evidence Type: Standard

Collection Information
Date/Time: 09Dec2021 01:34:35 EST
Location:
Collected By: (b) (6), (b) (7)(C) U. S. Coast Guard

Attachments

CG62 - PSTP Rev. 6; Documentary Evidence;
09Dec2021 01:35:23 EST; No

VII. TIMELINE

30Jun1981 19:00:00 EDT to 30Jun1981 19:00:00 EDT (Estimated): The First Assistant Engineer (1/AE), [redacted] graduated from the Philippine Merchant Marine Academy in 1981 and has been in the maritime industry since that time. He was hired by SLNC in April 2016 and has only sailed on the SLNC GOODWILL since that time totaling five - six assignments.
Timeline Type: Condition
Timeline Subtype: Person - Person Condition
Location: Unknown

Subject(s) and Details

Name	Type	Status	Role
(b) (6), (b) (7)(C) (b) (6), (b) (7)(C)	Person	At Risk, Not Injured	Witness

System: Personnel
Subsystem: Work Experience
Component: Total Time in Industry (Years and Months)
Cite:
Involves CG Approved Equipment: No
Security Violation: No
Deficiency: No

31May2002 23:00:00 EDT to 31May2002 23:00:00 EDT (Estimated): The Chief Engineer (CE), (b) (6), (b) (7)(C) (b) (6), (b) (7)(C) had been sailing since 2002. He had been employed by Schuyler Line Navigation Company (SLNC) since November 2019; this was his third assignment aboard the SLNC GOODWILL.
Timeline Type: Condition
Timeline Subtype: Person - Person Condition
Location: Unknown

Subject(s) and Details

Name	Type	Status	Role
(b) (6), (b) (7)(C) (b) (6), (b) (7)(C)	Person	At Risk, Not Injured	Witness

System: Personnel
Subsystem: Work Experience
Component: Total Time in Industry (Years and Months)
Cite:
Involves CG Approved Equipment: No
Security Violation: No
Deficiency: No

31May2004 23:00:00 EDT to 31May2004 23:00:00 EDT (Estimated): The Second Mate (2M), (b) (6), (b) (7)(C) (b) (6), (b) (7)(C) had been sailing since 2004. He had completed two previous trips on another vessel owned by SLNC. This was his first assignment to the SLNC GOODWILL.
Timeline Type: Condition
Timeline Subtype: Person - Person Condition
Location: Unknown

Subject(s) and Details

Name	Type	Status	Role
(b) (6), (b) (7)(C) (b) (6), (b) (7)(C)	Person	Not at Risk	Witness

System: Personnel
Subsystem: Work Experience
Component: Total Time in Industry (Years and Months)
Cite:
Involves CG Approved Equipment: No
Security Violation: No
Deficiency: No

31May2004 23:01:00 EDT to 31May2004 23:01:00 EDT (Estimated): The 2M was also the vessel's Medical Officer. He had completed a full Medical Officer course three (03) times and had served in this position on other vessels.
Timeline Type: Condition
Timeline Subtype: Person - Person Condition
Location: Unknown

Subject(s) and Details

Name	Type	Status	Role
(b) (6), (b) (7)(C) (b) (6), (b) (7)(C)	Person	Not at Risk	Witness

System: Personnel
Subsystem: Training
Component: Medical, Person in Charge/Management
Cite:
Involves CG Approved Equipment: No
Security Violation: No
Deficiency: No

31May2007 23:00:00 EDT to 31May2007 23:00:00 EDT (Estimated): The Master, (b) (6), (b) (7)(C) (b) (6), (b) (7)(C) had been sailing as an officer since 2007. He had worked for SLNC since 2016 and had been the Master of the SLNC GOODWILL since 2018.
Timeline Type: Condition
Timeline Subtype: Person - Person Condition
Location: Unknown

Subject(s) and Details

Name	Type	Status	Role
(b) (6), (b) (7)(C)	Person	Not at Risk	Witness

System: Personnel
Subsystem: Work Experience
Component: Total Time in Industry (Years and Months)
Cite:
Involves CG Approved Equipment: No
Security Violation: No
Deficiency: No

20Nov2008 22:00:00 EST to 20Nov2008 22:00:00 EST (Estimated): The SLNC GOODWILL (ON 1266919) was a 580.4 ft, 30,241 GT chemical/tank ship of steel construction with a keel laid date of 21Nov2008. It had diesel direct propulsion on an oceans/SOLAS route owned by Nord Goodwill LLC and operated by Schuyler Line Navigation Company, LLC. The vessel's initial COI was issued IAW MSP on 29Jan2016 (reflagged); most recent COI annual inspection was conducted remotely from 01 to 27Apr20 with 00 deficiencies noted and 00 outstanding.
Timeline Type: Condition
Timeline Subtype: Vessel - Material/Equipment Condition
Location: Unknown

Subject(s) and Details

Name	Type	Status	Role
SLNC GOODWILL	Vessel	Undamaged	Involved in a Marine Casualty

System: Operations/Management
Subsystem: Vessel Activity
Component: Construction/Repair
Cite:
Involves CG Approved Equipment: No
Security Violation: No
Deficiency: No

20Nov2008 22:01:00 EST to 20Nov2008 22:01:00 EST (Estimated): Electrical services for the SLNC GOODWILL were provided by three (03) auxiliary generating sets each with a MAN B&W - ZJMD 6L23/30H type prime mover rated to deliver 960 KW at 900 rpm.
Timeline Type: Condition
Timeline Subtype: Vessel - Material/Equipment Condition
Location: Unknown

Subject(s) and Details

Name	Type	Status	Role
SLNC GOODWILL	Vessel	Undamaged	Involved in a Marine Casualty

System: Electrical
Subsystem: Electric Generation Source (service)
Component: Generator
Cite:
Involves CG Approved Equipment: No
Security Violation: No
Deficiency: No

20Nov2008 22:02:00 EST to 20Nov2008 22:02:00 EST (Estimated): Each generator was equipped with a governor. The purpose of the governor was to regulate the flow of fuel to the engine in order to maintain a relatively constant speed (rpm) independent of the electrical load placed on the generator.
Timeline Type: Condition
Timeline Subtype: Vessel - Material/Equipment Condition
Location: Unknown

Subject(s) and Details

Name	Type	Status	Role
SLNC GOODWILL	Vessel	Undamaged	Involved in a Marine Casualty

System: Engineering
Subsystem: Diesel Engine (auxiliary)
Component: Governor
Cite:
Involves CG Approved Equipment: No
Security Violation: No
Deficiency: No

20Nov2008 22:03:00 EST to 20Nov2008 22:03:00 EST (Estimated): Each generator was equipped with a flywheel. The flywheel was a component mounted to the engine's crank shaft and designed to store the mechanical energy of the engine during power stroke and imparts that stored energy to the preparatory strokes in an effort to keep shaft rotation uniform.
Timeline Type: Condition
Timeline Subtype: Vessel - Material/Equipment Condition
Location: Unknown

Subject(s) and Details

Name	Type	Status	Role
SLNC GOODWILL	Vessel	Undamaged	Involved in a Marine Casualty

System: Engineering
Subsystem: Diesel Engine (auxiliary)
Component: Crankshaft
Cite:
Involves CG Approved Equipment: No
Security Violation: No
Deficiency: No

31May2012 23:00:00 EDT to 31May2012 23:00:00 EDT (Estimated): The Chief Mate (CM), [redacted] had been sailing 2012 and had been employed by SLNC since 2018. He had completed four assignments onboard the SLNC GOODWILL; this was his second time sailing with the 3/AE.
Timeline Type: Condition
Timeline Subtype: Person - Person Condition
Location: Unknown

Subject(s) and Details

Name	Type	Status	Role
[redacted]	Person	Not at Risk	Witness

System: Personnel
Subsystem: Work Experience
Component: Total Time in Industry (Years and Months)
Cite:
Involves CG Approved Equipment: No
Security Violation: No
Deficiency: No

28Feb2015 22:00:00 EST to 28Feb2015 22:00:00 EST (Estimated): The manufacturer of Governor C, Woodward Inc., released instructions for the storage of mechanical-hydraulic controls (governors). These instructions included that oil meeting the US MIL-H-17672 standard should be used to coat the internal surfaces of the device.
Timeline Type: Condition
Timeline Subtype: Organization - Organization Condition
Location: Unknown

Subject(s) and Details

Name	Type	Status	Role
Woodward Inc.	Organization		Witness

31May2017 23:00:00 EDT to 31May2017 23:00:00 EDT (Estimated): The Fourth Mate (4M), [redacted] had been sailing since 2017. This was his first assignment on any SLNC vessel.
Timeline Type: Condition
Timeline Subtype: Person - Person Condition
Location: Unknown

Subject(s) and Details

Name	Type	Status	Role
[redacted]	Person	Not at Risk	Witness

System: Personnel
Subsystem: Work Experience
Component: Total Time in Industry (Years and Months)
Cite:
Involves CG Approved Equipment: No
Security Violation: No
Deficiency: No

30Mar2019 19:00:00 EDT to 30Mar2019 19:00:00 EDT (Estimated): The DG#1 connecting rod calibration was conducted by a third-party vendor.
Timeline Type: Condition
Timeline Subtype: Vessel - Material/Equipment Condition
Location: Unknown

Subject(s) and Details

Name	Type	Status	Role
SLNC GOODWILL	Vessel	Undamaged	Involved in a Marine Casualty

System: Engineering
Subsystem: Diesel Engine (auxiliary)
Component: Connecting Rod
Cite:
Involves CG Approved Equipment: No
Security Violation: No
Deficiency: No

21May2019 19:00:00 EDT to 21May2019 19:00:00 EDT (Estimated): The governor installed on DG #1 prior to the casualty, Governor B (Part # 8520-0041, Serial # 15592175), was serviced in place by third party contractors licensed by the governor's manufacturing company.
Timeline Type: Condition
Timeline Subtype: Vessel - Material/Equipment Condition
Location: Unknown

Subject(s) and Details

Name	Type	Status	Role
SLNC GOODWILL	Vessel	Undamaged	Involved in a Marine Casualty

System: Engineering
Subsystem: Diesel Engine (auxiliary)
Component: Governor
Cite:
Involves CG Approved Equipment: No
Security Violation: No
Deficiency: No

21May2019 19:01:00 EDT to 21May2019 19:01:00 EDT (Estimated): A third governor, Governor C, arrived onboard the vessel for use as a spare; it was a rebuilt governor, not brand new, and had not been installed on any generator onboard the vessel prior to DG #1 on 04Aug21.
Timeline Type: Condition
Timeline Subtype: Vessel - Material/Equipment Condition
Location: Unknown

Subject(s) and Details

Name	Type	Status	Role
SLNC GOODWILL	Vessel	Undamaged	Involved in a Marine Casualty

System: Engineering
Subsystem: Diesel Engine (auxiliary)
Component: Governor
Cite:
Involves CG Approved Equipment: No
Security Violation: No
Deficiency: No

21May2019 19:02:00 EDT to 21May2019 19:02:00 EDT (Estimated): The data plate installed on Governor C included the same serial # and part # as Governor B. Although the numbers were the same at the time of the casualty, the operating company believes the original serial # for Governor C was 16178255.
Timeline Type: Condition
Timeline Subtype: Vessel - Material/Equipment Condition
Location: Unknown

Subject(s) and Details

Name	Type	Status	Role
SLNC GOODWILL	Vessel	Undamaged	Involved in a Marine Casualty

System: Engineering
Subsystem: Diesel Engine (auxiliary)
Component: Governor
Cite:
Involves CG Approved Equipment: No
Security Violation: No
Deficiency: No

21May2019 19:03:00 EDT to 21May2019 19:03:00 EDT (Estimated): At some point either during or after overhaul, mechanical damage was sustained on the surfaces of Governor C's pilot valve bushing and shaft drive.
Timeline Type: Condition
Timeline Subtype: Vessel - Material/Equipment Condition
Location: Unknown

Subject(s) and Details

Name	Type	Status	Role
SLNC GOODWILL	Vessel	Undamaged	Involved in a Marine Casualty

System: Engineering
Subsystem: Diesel Engine (auxiliary)
Component: Governor
Cite:
Involves CG Approved Equipment: No
Security Violation: No
Deficiency: No

21Jul2019 19:00:00 EDT to 21Jul2019 19:00:00 EDT (Estimated): The governor installed on DG#2, Governor A (Part # 8521-0047DC, Serial # 14639129), was overhauled.
Timeline Type: Condition
Timeline Subtype: Vessel - Material/Equipment Condition
Location: Unknown

Subject(s) and Details

Name	Type	Status	Role
SLNC GOODWILL	Vessel	Undamaged	Involved in a Marine Casualty

System: Engineering
Subsystem: Diesel Engine (auxiliary)
Component: Governor
Cite:
Involves CG Approved Equipment: No
Security Violation: No
Deficiency: No

03Oct2019 23:00:00 EDT to 03Oct2019 23:00:00 EDT (Estimated): The Third Assistant Engineer (3AE), Trenton Lloyd-Rees, started employment with SLNC and was serving aboard the SLNC GOODWILL.
Timeline Type: Condition
Timeline Subtype: Person - Person Condition
Location: Unknown

Subject(s) and Details

Name	Type	Status	Role
TRENTON LLOYD-REES	Person	Dead	Subject of Investigation

System: Personnel

Subsystem: Work Experience

Component: Total Time in Industry (Years and Months)

Cite:

Involves CG Approved Equipment: No

Security Violation: No

Deficiency: No

25Dec2019 18:00:00 EST to 25Dec2019 18:00:00 EST (Estimated): An annual test was conducted on the DG#1 governor under normal operating conditions; at the time of the test, the engine had 42617 run hours and the rebuilt governor had 1500 run hours. Oil levels, linkages, fuel rack, and speed sensor were all checked and a new micro-switch was installed on the overspeed device.
Timeline Type: Condition
Timeline Subtype: Vessel - Material/Equipment Condition
Location: Unknown

Subject(s) and Details

Name	Type	Status	Role
SLNC GOODWILL	Vessel	Undamaged	Involved in a Marine Casualty

System: Engineering

Subsystem: Diesel Engine (auxiliary)

Component: Governor

Cite:

Involves CG Approved Equipment: No

Security Violation: No

Deficiency: No

26Dec2019 06:00:00 EST to 26Dec2019 06:00:00 EST (Estimated): The next annual maintenance on the DG#1 governor was scheduled for 24Dec20.
Timeline Type: Condition
Timeline Subtype: Vessel - Material/Equipment Condition
Location: Unknown

Subject(s) and Details

Name	Type	Status	Role
SLNC GOODWILL	Vessel	Undamaged	Involved in a Marine Casualty

System: Engineering

Subsystem: Diesel Engine (auxiliary)

Component: Governor

Cite:

Involves CG Approved Equipment: No

Security Violation: No

Deficiency: No

03Jun2020 18:00:00 EDT to 03Jun2020 18:00:00 EDT (Estimated): The 2/M joined the vessel; it was his first assignment to the SLNC GOODWILL.

Timeline Type: Action
Timeline Subtype: Bridge Operations - Changing Watch
Location: Unknown

Subject(s) and Details

Name	Type	Status	Role
(b) (6), (b) (7)(C) (b) (6), (b) (7)(C)	Person	Not at Risk	Witness

04Jun2020 18:00:00 EDT to 04Jun2020 18:00:00 EDT (Estimated): The CE joined the vessel; it was his third assignment to the SLNC GOODWILL.
Timeline Type: Action
Timeline Subtype: Engineering Operations - Changing Watch
Location: Unknown

Subject(s) and Details

Name	Type	Status	Role
(b) (6), (b) (7)(C) (b) (6), (b) (7)(C)	Person	At Risk, Not Injured	Witness

12Jul2020 19:00:00 EDT to 12Jul2020 19:00:00 EDT (Estimated): A quarterly safety check was conducted on the DG#1 which included alarm, pressure, and temperature testing. It did not included a test of the overspeed trip.
Timeline Type: Action
Timeline Subtype: Engineering Operations - Routine, Scheduled, and Preventive Maintenance
Location: Unknown

Subject(s) and Details

Name	Type	Status	Role
TRENTON LLOYD-REES	Person	Dead	Subject of Investigation

12Jul2020 19:00:00 EDT to 22Jul2020 19:00:00 EDT (Estimated): The 2000 hr scheduled, preventative maintenance was conducted on the DG#1. Included in the maintenance weas a test of the overspeed alarm, shut-downs, and changing the oil in the governor.
Timeline Type: Action
Timeline Subtype: Engineering Operations - Routine, Scheduled, and Preventive Maintenance
Location: Unknown

Subject(s) and Details

Name	Type	Status	Role
TRENTON LLOYD-REES	Person	Dead	Subject of Investigation

12Jul2020 19:01:00 EDT to 12Jul2020 19:01:00 EDT (Estimated): The design specification requirement for the DG#1 flywheel was for grey cast iron of Grade C4 with an ultimate tensile strength of between 300 -400 megapascals (MPa) and a Brinell hardness of between 200-250 HB.
Timeline Type: Condition
Timeline Subtype: Vessel - Material/Equipment Condition
Location: Unknown

Subject(s) and Details

Name	Type	Status	Role
SLNC GOODWILL	Vessel	Undamaged	Involved in a Marine Casualty

System: Electrical
Subsystem: Electric Generation Source (service)
Component: Generator
Cite:
Involves CG Approved Equipment: No
Security Violation: No
Deficiency: No

12Jul2020 19:02:00 EDT to 12Jul2020 19:02:00 EDT (Estimated): The flywheel installed on DG#1 did not meet the design requirements of the engine licensor (MAN Engergy Soluction SE). After eight tests, the flywheel measured between 56%-64% of the required minimum strength and the hardness was, on average, 83% of the required minimum hardness.
Timeline Type: Condition
Timeline Subtype: Vessel - Material/Equipment Condition
Location: Unknown

Subject(s) and Details

Name	Type	Status	Role
SLNC GOODWILL	Vessel	Undamaged	Involved in a Marine Casualty

System: Electrical
Subsystem: Electric Generation Source (service)
Component: Generator
Cite:
Involves CG Approved Equipment: No
Security Violation: No
Deficiency: No

12Jul2020 19:03:00 EDT to 12Jul2020 19:03:00 EDT (Estimated): Micro-shrinkage voids were present in the area around the flywheel coupling bolt holes.
Timeline Type: Condition
Timeline Subtype: Vessel - Material/Equipment Condition
Location: Unknown

Subject(s) and Details

Name	Type	Status	Role
SLNC GOODWILL	Vessel	Undamaged	Involved in a Marine Casualty

System: Electrical
Subsystem: Electric Generation Source (service)
Component: Generator
Cite:
Involves CG Approved Equipment: No
Security Violation: No
Deficiency: No

13Jul2020 07:00:00 EDT to 13Jul2020 07:00:00 EDT (Estimated): The next quarterly safety check was scheduled for 12Oct20.

Timeline Type: Condition
Timeline Subtype: Vessel - Material/Equipment Condition
Location: Unknown

Subject(s) and Details

Name	Type	Status	Role
SLNC GOODWILL	Vessel	Undamaged	Involved in a Marine Casualty

System: Electrical
Subsystem: Electric Generation Source (service)
Component: Generator
Cite:
Involves CG Approved Equipment: No
Security Violation: No
Deficiency: No

25Jul2020 18:00:00 EDT to 25Jul2020 18:00:00 EDT (Estimated): The Master and 4/M joined the vessel.

Timeline Type: Action
Timeline Subtype: Bridge Operations - Changing Watch
Location: Unknown

Subject(s) and Details

Name	Type	Status	Role
(b) (6), (b) (7)(C) [redacted]	Person	Not at Risk	Witness

Name	Type	Status	Role
(b) (6), (b) (7)(C)	Person	Not at Risk	Witness

02Aug2020 22:59:01 EDT to 02Aug2020 22:59:01 EDT (Estimated): No oil was in Governor C while it was stored onboard the vessel and it was found on it's side. The 1/AE stated that, in his experience, oil was kept in governors being stored onboard vessels and they were kept in a vertical position.
Timeline Type: Condition
Timeline Subtype: Vessel - Material/Equipment Condition
Location: Unknown

Subject(s) and Details

Name	Type	Status	Role
SLNC GOODWILL	Vessel	Undamaged	Involved in a Marine Casualty

System: Engineering
Subsystem: Diesel Engine (auxiliary)
Component: Governor
Cite:
Involves CG Approved Equipment: No
Security Violation: No
Deficiency: No

02Aug2020 22:59:02 EDT to 02Aug2020 22:59:02 EDT (Estimated): The manufacturer of Governor C recommends their governors be transported and stored in an upright position to prevent the ballhead assembly from sliding out of its support bracket as well as preventing oil from leaking out of "breather holes"; those holes are necessary to allow interal air pressure to adjust to ambient air pressure.
Timeline Type: Condition
Timeline Subtype: Organization - Organization Condition
Location: Unknown

Subject(s) and Details

Name	Type	Status	Role
Woodward Inc.	Organization		Witness

02Aug2020 23:00:00 EDT to 02Aug2020 23:00:00 EDT (Estimated): When started during cargo operations, DG#1 would "hunt". This meant that the rotational speed (rpms) of the engine was fluctuating and wouldn't remain consistent. When placed in "idle", DG#1 would stop.
Timeline Type: Condition
Timeline Subtype: Vessel - Material/Equipment Condition
Location: Unknown

Subject(s) and Details

Name	Type	Status	Role
SLNC GOODWILL	Vessel	Undamaged	Involved in a Marine Casualty

System: Electrical
Subsystem: Electric Generation Source (service)
Component: Generator
Cite:
Involves CG Approved Equipment: No
Security Violation: No
Deficiency: No

03Aug2020 00:00:00 EDT to 03Aug2020 00:00:00 EDT (Estimated): The CE made the decision to change out Governor B with Governor C on DG#1 in an attempt to resolve DG #1 "hunting".
Timeline Type: Action
Timeline Subtype: Engineering Operations - Unscheduled, Corrective Repair
Location: Unknown

Subject(s) and Details

Name	Type	Status	Role
TRENTON LLOYD-REES	Person	Dead	Subject of Investigation

Name	Type	Status	Role
(b) (6), (b) (7)(C) (b) (6), (b) (7)(C)	Person	At Risk, Not Injured	Witness

Name	Type	Status	Role
(b) (6), (b) (7)(C)	Person	At Risk, Not Injured	Witness

03Aug2020 19:00:00 EDT to 03Aug2020 19:00:00 EDT (Known): The 1/AE was involved with work on the vessel's oily-water seperator.

Timeline Type: Condition
Timeline Subtype: Person - Person Condition
Location: Unknown

Subject(s) and Details

Name	Type	Status	Role
(b) (6), (b) (7)(C)	Person	At Risk, Not Injured	Witness

System: Personnel
Subsystem: Psychological Condition
Component: Workload
Cite:
Involves CG Approved Equipment: No
Security Violation: No
Deficiency: No

03Aug2020 22:59:00 EDT to 03Aug2020 22:59:00 EDT (Estimated): Prior to installing Governor C, the CE, 1/AE, and 3/AE visually inspected it to look for obvious signs of damage, water staining, or debris; nothing was noted and installation commenced.
Timeline Type: Condition
Timeline Subtype: Vessel - Material/Equipment Condition
Location: Unknown

Subject(s) and Details

Name	Type	Status	Role
SLNC GOODWILL	Vessel	Undamaged	Involved in a Marine Casualty

System: Engineering
Subsystem: Diesel Engine (auxiliary)
Component: Governor
Cite:
Involves CG Approved Equipment: No
Security Violation: No
Deficiency: No

04Aug2020 00:00:00 EDT to 05Aug2020 07:00:00 EDT (Estimated): Installation of Governor C on DG#1 was started by the CE, 1/AE, and 3/AE in the afternoon. It was not completed that day and work was halted around 2000; DG#1 remained offline.
Timeline Type: Action
Timeline Subtype: Engineering Operations - Unscheduled, Corrective Repair
Location: Unknown

Subject(s) and Details

Name	Type	Status	Role
TRENTON LLOYD-REES	Person	Dead	Subject of Investigation

Name	Type	Status	Role
(b) (6), (b) (7)(C) (b) (6), (b) (7)(C)	Person	At Risk, Not Injured	Witness

Name	Type	Status	Role
(b) (6), (b) (7)(C)	Person	At Risk, Not Injured	Witness

04Aug2020 00:01:00 EDT to 04Aug2020 00:01:00 EDT (Estimated): The 1/AE hadn't changed a governor onboard the SLNC GOODWILL, but had several times on other vessels. The 3/AE hadn't changed a governor before and was there for training.
Timeline Type: Condition
Timeline Subtype: Person - Person Condition
Location: Unknown

Subject(s) and Details

Name	Type	Status	Role
TRENTON LLOYD-REES	Person	Dead	Subject of Investigation

System: Personnel
Subsystem: Work Experience
Component: Other Experience - Shipboard
Cite:
Involves CG Approved Equipment: No
Security Violation: No
Deficiency: No

Name	Type	Status	Role
(b) (6), (b) (7)(C)	Person	At Risk, Not Injured	Witness

System: Personnel
Subsystem: Work Experience
Component: Other Experience - Shipboard
Cite:
Involves CG Approved Equipment: No
Security Violation: No
Deficiency: No

04Aug2020 17:00:00 EDT to 04Aug2020 17:00:00 EDT (Estimated): During the four days prior to the casualty, the C/E had worked 9.5 hours each day. Leading up to the day of the casualty, he stopped work at 1830 the day before and resumed work at 0600 the day of.
Timeline Type: Condition
Timeline Subtype: Person - Person Condition
Location: Unknown

Subject(s) and Details

Name	Type	Status	Role
(b) (6), (b) (7)(C) (b) (6), (b) (7)(C)	Person	At Risk, Not Injured	Witness

System: Personnel
Subsystem: Physical Condition
Component: Other physical capability
Cite:
Involves CG Approved Equipment: No
Security Violation: No
Deficiency: No

04Aug2020 18:00:00 EDT to 04Aug2020 23:00:00 EDT (Estimated): The 1/AE was involved with unscheduled work in the inert gas system due to a blocked sprayer in the combustion chamber.
Timeline Type: Action
Timeline Subtype: Engineering Operations - Routine, Scheduled, and Preventive Maintenance
Location: Unknown

Subject(s) and Details

Name	Type	Status	Role
(b) (6), (b) (7)(C) (b) (6), (b) (7)(C)	Person	At Risk, Not Injured	Witness

Name	Type	Status	Role
(b) (6), (b) (7)(C)	Person	At Risk, Not Injured	Witness

04Aug2020 18:00:00 EDT to 04Aug2020 18:00:00 EDT (Estimated): During the four days prior to the casualty, the 1/AE had worked 10 (01Aug), 10.5 (02Aug), 8.5 (03Aug), and 11 (04Aug) hours respectively. Leading up to the day of the casualty, he stopped work at 1830 the day before and started again at 0700 the day of.
Timeline Type: Condition
Timeline Subtype: Person - Person Condition
Location: Unknown

Subject(s) and Details

Name	Type	Status	Role
(b) (6), (b) (7)(C)	Person	At Risk, Not Injured	Witness

System: Personnel
Subsystem: Physical Condition
Component: Other physical capability
Cite:
Involves CG Approved Equipment: No
Security Violation: No
Deficiency: No

04Aug2020 23:00:00 EDT to 04Aug2020 23:00:00 EDT (Estimated): During the four days prior to the casualty, the 3/AE had worked 10.5 hours each day. Leading up to the day of the casualty, he had stopped work at midnight and started work at 1200.

Timeline Type: Condition
Timeline Subtype: Person - Person Condition
Location: Unknown

Subject(s) and Details

Name	Type	Status	Role
TRENTON LLOYD-REES	Person	Dead	Subject of Investigation

System: Personnel
Subsystem: Physical Condition
Component: Other physical capability
Cite:
Involves CG Approved Equipment: No
Security Violation: No
Deficiency: No

04Aug2020 23:30:00 EDT to 04Aug2020 23:30:00 EDT (Estimated): The 1/AE and 3/AE resumed the installation of Governor C on DG#1. The CE arrived later to oversee the installation and testing.
Timeline Type: Action
Timeline Subtype: Engineering Operations - Unscheduled, Corrective Repair
Location: Unknown

Subject(s) and Details

Name	Type	Status	Role
TRENTON LLOYD-REES	Person	Dead	Subject of Investigation

Name	Type	Status	Role
(b) (6), (b) (7)(C) (b) (6), (b) (7)(C)	Person	At Risk, Not Injured	Witness

Name	Type	Status	Role
(b) (6), (b) (7)(C)	Person	At Risk, Not Injured	Witness

04Aug2020 23:31:00 EDT to 04Aug2020 23:31:00 EDT (Estimated): Two pages of the Woodward product manual were determined to be relevant to the governor change-out; they were printed out and taken to DG #1. The manual being used as a reference by the 1/AE and 3/AE was for a different governor than what was being installed. The 1/AE used Governor A on DG#2 as a reference.
Timeline Type: Condition
Timeline Subtype: Organization - Organization Condition
Location: Unknown

Subject(s) and Details

Name	Type	Status	Role
SCHUYLER LINE NAVIGATION CORP	Organization		Other

04Aug2020 23:35:00 EDT to 04Aug2020 23:35:00 EDT (Estimated): The 1/AE visually checked that the linkage setting for Governor C on DG#1 matched the linkage setting of Governor A on DG #2 and showed the 3/AE for training.

Timeline Type: Condition
Timeline Subtype: Vessel - Material/Equipment Condition
Location: Unknown

Subject(s) and Details

Name	Type	Status	Role
SLNC GOODWILL	Vessel	Undamaged	Involved in a Marine Casualty

System: Engineering
Subsystem: Diesel Engine (auxiliary)
Component: Governor
Cite:
Involves CG Approved Equipment: No
Security Violation: No
Deficiency: No

04Aug2020 23:45:00 EDT to 04Aug2020 23:45:00 EDT (Estimated): The CE installed the synchronizing motor on Governor C. It was the same synchronizing motor used on Governor B.
Timeline Type: Action
Timeline Subtype: Engineering Operations - Unscheduled, Corrective Repair
Location: Known

Primary Location: Yes
Description: Sea of Japan, approx.74 NM southwest of the port of Sasebo, Japan

Latitude: 32°29.0 N Longitude: 128°29.0 E

Subject(s) and Details

Name	Type	Status	Role
(b) (6), (b) (7)(C) (b) (6), (b) (7)(C)	Person	At Risk, Not Injured	Witness

05Aug2020 00:00:00 EDT to 05Aug2020 00:00:00 EDT (Estimated): Governor C's overspeed protection device and pneumatic shut off were tested by the CE, 1/AE, and 3/AE prior to starting DG#1; both were functioning as designed.
Timeline Type: Condition
Timeline Subtype: Vessel - Material/Equipment Condition
Location: Known

Primary Location: Yes
Description: Sea of Japan, approx.74 NM southwest of the port of Sasebo, Japan

Latitude: 32°29.0 N Longitude: 128°29.0 E

Subject(s) and Details

Name	Type	Status	Role
SLNC GOODWILL	Vessel	Undamaged	Involved in a Marine Casualty

System: Engineering
Subsystem: Diesel Engine (auxiliary)
Component: Governor
Cite:
Involves CG Approved Equipment: No
Security Violation: No
Deficiency: No

05Aug2020 00:01:00 EDT to 05Aug2020 00:01:00 EDT (Estimated): The engine had an electronic and mechanical overspeed protection device that were set to activate and shut down DG#1 if the engine's rpms exceeded approx. 1,020. The normal, designed operating speed for DG#1 was 900 rpms.
Timeline Type: Condition
Timeline Subtype: Vessel - Material/Equipment Condition
Location: Known

Primary Location: Yes
Description: Sea of Japan, approx.74 NM southwest of the port of Sasebo, Japan

Latitude: 32°29.0 N Longitude: 128°29.0 E

Subject(s) and Details

Name	Type	Status	Role
SLNC GOODWILL	Vessel	Undamaged	Involved in a Marine Casualty

System: Engineering
Subsystem: Diesel Engine (auxiliary)
Component: Governor
Cite:
Involves CG Approved Equipment: No
Security Violation: No
Deficiency: No

05Aug2020 00:35:00 EDT to 05Aug2020 00:35:00 EDT (Estimated): The 1/AE started up DG#1 for the first time since installing Governor C. The 3/AE and CE were nearby to observe and assist.
Timeline Type: Action
Timeline Subtype: Engineering Operations - Engineering Systems Operations
Location: Known

Primary Location: Yes
Description: Sea of Japan, approx.74 NM southwest of the port of Sasebo, Japan

Latitude: 32°29.0 N Longitude: 128°29.0 E

Subject(s) and Details

Name	Type	Status	Role
TRENTON LLOYD-REES	Person	Dead	Subject of Investigation

Name	Type	Status	Role
(b) (6), (b) (7)(C) (b) (6), (b) (7)(C)	Person	At Risk, Not Injured	Witness

Name	Type	Status	Role
(b) (6), (b) (7)(C)	Person	At Risk, Not Injured	Witness

05Aug2020 00:36:00 EDT to 05Aug2020 00:36:00 EDT (Estimated): DG#1 rpms were unstable and steadily increased.
Timeline Type: Condition
Timeline Subtype: Vessel - Material/Equipment Condition
Location: Known

Primary Location: Yes
Description: Sea of Japan, approx.74 NM southwest of the port of Sasebo, Japan

Latitude: 32°29.0 N Longitude: 128°29.0 E

Subject(s) and Details

Name	Type	Status	Role
SLNC GOODWILL	Vessel	Undamaged	Involved in a Marine Casualty

System: Electrical
Subsystem: Electric Generation Source (service)
Component: Generator
Cite:
Involves CG Approved Equipment: No
Security Violation: No
Deficiency: No

05Aug2020 00:37:00 EDT to 05Aug2020 00:37:00 EDT (Estimated): The overspeed protection device activated when DG#1 rpms exceeded approx. 1,020 and successfully shut down DG#1.
Timeline Type: Condition
Timeline Subtype: Vessel - Material/Equipment Condition
Location: Known

Primary Location: Yes
Description: Sea of Japan, approx.74 NM southwest of the port of Sasebo, Japan

Latitude: 32°29.0 N Longitude: 128°29.0 E

Subject(s) and Details

Name	Type	Status	Role
SLNC GOODWILL	Vessel	Undamaged	Involved in a Marine Casualty

System: Engineering
Subsystem: Diesel Engine (auxiliary)
Component: Overspeed Device
Cite:
Involves CG Approved Equipment: No
Security Violation: No
Deficiency: No

05Aug2020 00:38:00 EDT to 05Aug2020 00:38:00 EDT (Estimated): The 1/AE, CE, and 3/AE inspected the governor installation to ensure fittings were secure and if there were any obvious signs of a problem. None were found and the overspeed protection device was reset.
Timeline Type: Action
Timeline Subtype: Engineering Operations - Engineering Systems Inspection and Testing
Location: Known

Primary Location: Yes
Description: Sea of Japan, approx.74 NM southwest of the port of Sasebo, Japan

Latitude: 32°29.0 N Longitude: 128°29.0 E

Subject(s) and Details

Name	Type	Status	Role
TRENTON LLOYD-REES	Person	Dead	Subject of Investigation

Name	Type	Status	Role
(b) (6), (b) (7)(C) (b) (6), (b) (7)(C)	Person	At Risk, Not Injured	Witness

Name	Type	Status	Role
(b) (6), (b) (7)(C)	Person	At Risk, Not Injured	Witness

05Aug2020 00:39:00 EDT to 05Aug2020 00:39:00 EDT (Estimated): The 1/AE attempted to restart DG#1 a second time.
Timeline Type: Action
Timeline Subtype: Engineering Operations - Engineering Systems Inspection and Testing
Location: Known

Primary Location: Yes
Description: Sea of Japan, approx.74 NM southwest of the port of Sasebo, Japan

Latitude: 32°29.0 N Longitude: 128°29.0 E

Subject(s) and Details

Name	Type	Status	Role
(b) (6), (b) (7)(C)	Person	At Risk, Not Injured	Witness

05Aug2020 00:39:01 EDT to 05Aug2020 00:39:01 EDT (Estimated): A material failure occured within the casing of Governor C that prevented the regulation of fuel to DG #1.
Timeline Type: Event
Timeline Subtype: Material Failure/Malfunction
Location: Known

Primary Location: Yes
Description: Sea of Japan, approx.74 NM southwest of the port of Sasebo, Japan

Latitude: 32°29.0 N Longitude: 128°29.0 E

Subject(s) and Details

Name	Type	Status	Role
SLNC GOODWILL	Vessel	Undamaged	Involved in a Marine Casualty

System: Engineering
Subsystem: Diesel Engine (auxiliary)
Component: Governor
Cite:
Involves CG Approved Equipment: No
Security Violation: No
Deficiency: No
Failure/Malfunction Type: Catastrophic Failure/Malfunction

05Aug2020 00:40:02 EDT to 05Aug2020 00:40:02 EDT (Estimated): The CE was standing at the aft end of DG#1, the 3/AE was standing with the 1/AE between DG#1 and DG#2.
Timeline Type: Condition
Timeline Subtype: Person - Person Condition
Location: Known

Primary Location: Yes
Description: Sea of Japan, approx.74 NM southwest of the port of Sasebo, Japan

Latitude: 32°29.0 N Longitude: 128°29.0 E

Subject(s) and Details

Name	Type	Status	Role
TRENTON LLOYD-REES	Person	Dead	Subject of Investigation

System: Personnel
Subsystem: Physical Condition
Component: Other physical capability
Cite:
Involves CG Approved Equipment: No
Security Violation: No
Deficiency: No

Name	Type	Status	Role
(b) (6), (b) (7)(C) (b) (6), (b) (7)(C)	Person	At Risk, Not Injured	Witness

System: Personnel
Subsystem: Physical Condition
Component: Other physical capability
Cite:
Involves CG Approved Equipment: No
Security Violation: No
Deficiency: No

Name	Type	Status	Role
(b) (6), (b) (7)(C)	Person	At Risk, Not Injured	Witness

System: Personnel
Subsystem: Physical Condition
Component: Other physical capability
Cite:
Involves CG Approved Equipment: No
Security Violation: No
Deficiency: No

05Aug2020 00:41:30 EDT to 05Aug2020 00:41:30 EDT (Estimated): DG#1 rpms steadily increased, accompanied by an unfamiliar noise and vibration; Governor C's overspeed trip device didn't activate.
Timeline Type: Condition
Timeline Subtype: Vessel - Material/Equipment Condition
Location: Known

Primary Location: Yes
Description: Sea of Japan, approx.74 NM southwest of the port of Sasebo, Japan

Latitude: 32°29.0 N Longitude: 128°29.0 E

Subject(s) and Details

Name	Type	Status	Role
SLNC GOODWILL	Vessel	Undamaged	Involved in a Marine Casualty

System: Electrical
Subsystem: Electric Generation Source (service)
Component: Generator
Cite:
Involves CG Approved Equipment: No
Security Violation: No
Deficiency: No

05Aug2020 00:41:35 EDT to 05Aug2020 00:41:35 EDT (Known): The overspeed protection device failed to trip.
Timeline Type: Event
Timeline Subtype: Material Failure/Malfunction
Location: Known

Primary Location: Yes
Description: Sea of Japan, approx.74 NM southwest of the port of Sasebo, Japan

Latitude: 32°29.0 N Longitude: 128°29.0 E

Subject(s) and Details

Name	Type	Status	Role
SLNC GOODWILL	Vessel	Undamaged	Involved in a Marine Casualty

System: Engineering
Subsystem: Diesel Engine (auxiliary)
Component: Overspeed Device
Cite:
Involves CG Approved Equipment: No
Security Violation: No
Deficiency: No
Failure/Malfunction Type: Catastrophic Failure/Malfunction

05Aug2020 00:41:45 EDT to 05Aug2020 00:41:45 EDT (Estimated): The 1/AE attempted to stop the generator at both the governor and start box via the electronic and mechanical overspeed device; nothing happened when he pushed the button for a manual stop.
Timeline Type: Action
Timeline Subtype: Engineering Operations - Engineering Systems Operations
Location: Known

Primary Location: Yes
Description: Sea of Japan, approx.74 NM southwest of the port of Sasebo, Japan

Latitude: 32°29.0 N Longitude: 128°29.0 E

Subject(s) and Details

Name	Type	Status	Role
(b) (6), (b) (7)(C)	Person	At Risk, Not Injured	Witness

05Aug2020 00:41:46 EDT to 05Aug2020 00:41:46 EDT (Estimated): Smoke began to be visible from the engine and rpms continued to increase. Despite having passed the upper limit for DG#1 rpms, the overspeed trip device in Governor C failed to activate.
Timeline Type: Condition
Timeline Subtype: Vessel - Material/Equipment Condition
Location: Known

Primary Location: Yes
Description: Sea of Japan, approx.74 NM southwest of the port of Sasebo, Japan

Latitude: 32°29.0 N Longitude: 128°29.0 E

Subject(s) and Details

Name	Type	Status	Role
SLNC GOODWILL	Vessel	Undamaged	Involved in a Marine Casualty

System: Engineering
Subsystem: Diesel Engine (auxiliary)
Component: Emergency shutdown
Cite:
Involves CG Approved Equipment: No
Security Violation: No
Deficiency: No

05Aug2020 00:41:50 EDT to 05Aug2020 00:41:50 EDT (Estimated): The 1/AE ran to the aft end of DG#1 to secure the fuel oil delivery to the engine while the 3/AE remained in the vicinity of Governor C, between DG #1 and DG #2. The CE yelled for everyone to get back.
Timeline Type: Action
Timeline Subtype: Engineering Operations - Engineering Systems Operations
Location: Known

Primary Location: Yes
Description: Sea of Japan, approx.74 NM southwest of the port of Sasebo, Japan

Latitude: 32°29.0 N Longitude: 128°29.0 E

Subject(s) and Details

Name	Type	Status	Role
(b) (6), (b) (7)(C) (b) (6), (b) (7)(C)	Person	At Risk, Not Injured	Witness

Name	Type	Status	Role
(b) (6), (b) (7)(C)	Person	At Risk, Not Injured	Witness

05Aug2020 00:42:00 EDT to 05Aug2020 00:42:00 EDT (Estimated): The DG#1 flywheel broke apart into several sections.
Timeline Type: Event
Timeline Subtype: Material Failure/Malfunction
Location: Known

Primary Location: Yes
Description: Sea of Japan, approx.74 NM southwest of the port of Sasebo, Japan

Latitude: 32°29.0 N Longitude: 128°29.0 E

Subject(s) and Details

Name	Type	Status	Role
SLNC GOODWILL	Vessel	Undamaged	Involved in a Marine Casualty

System: Electrical
Subsystem: Electric Generation Source (service)
Component: Generator
Cite:
Involves CG Approved Equipment: No
Security Violation: No
Deficiency: No
Failure/Malfunction Type: Catastrophic Failure/Malfunction

05Aug2020 00:42:01 EDT to 05Aug2020 00:42:01 EDT (Estimated): The sections of the flywheel were hurled through the engine room at a high rate of speed. One large section struck the 3/AE who was still standing between DG#1 and DG#2.
Timeline Type: Condition
Timeline Subtype: Vessel - Material/Equipment Condition
Location: Known

Primary Location: Yes
Description: Sea of Japan, approx.74 NM southwest of the port of Sasebo, Japan

Latitude: 32°29.0 N Longitude: 128°29.0 E

Subject(s) and Details

Name	Type	Status	Role
SLNC GOODWILL	Vessel	Undamaged	Involved in a Marine Casualty

System: Electrical
Subsystem: Electric Generation Source (service)
Component: Generator
Cite:
Involves CG Approved Equipment: No
Security Violation: No
Deficiency: No

05Aug2020 00:42:02 EDT to 05Aug2020 00:42:02 EDT (Estimated): The 3/AE was struck in the upper torso and neck by a piece of the flywheel after it had broken apart, causing significant blunt-force trauma and bleeding. He was given medical treatment onboard the vessel, but never recovered from his injuries. His death was recorded as having occurred at 1823, cause of death was listed as hemorrhagic shock.
Timeline Type: Event
Timeline Subtype: Personnel Casualty - Death
Location: Known

Primary Location: Yes
Description: Sea of Japan, approx.74 NM southwest of the port of Sasebo, Japan

Latitude: 32°29.0 N Longitude: 128°29.0 E

Subject(s) and Details

Name	Type	Status	Role
TRENTON LLOYD-REES	Person	Dead	Subject of Investigation

Nature Of Event Causing Death: Contact Injury- Struck by Moving Object

Cause Of Death: struck by section of cast iron flywheel after it broke free from DG#1

Casualty Involved Diving: No

05Aug2020 00:42:03 EDT to 05Aug2020 00:42:03 EDT (Estimated): The pieces of DG#1 flywheel struck and ruptured air piping and water piping running through the generator space.
Timeline Type: Condition
Timeline Subtype: Vessel - Material/Equipment Condition
Location: Known

Primary Location: Yes
Description: Sea of Japan, approx.74 NM southwest of the port of Sasebo, Japan

Latitude: 32°29.0 N Longitude: 128°29.0 E

Subject(s) and Details

Name	Type	Status	Role
SLNC GOODWILL	Vessel	Undamaged	Involved in a Marine Casualty

System: Electrical

Subsystem: Electric Generation Source (service)

Component: Generator

Cite:

Involves CG Approved Equipment: No

Security Violation: No

Deficiency: No

05Aug2020 00:42:04 EDT to 05Aug2020 00:42:04 EDT (Estimated): The vessel lost electrical power.

Timeline Type: Event
Timeline Subtype: Loss of Electrical Power
Location: Known

Primary Location: Yes
Description: Sea of Japan, approx.74 NM southwest of the port of Sasebo, Japan

Latitude: 32°29.0 N Longitude: 128°29.0 E

Subject(s) and Details

Name	Type	Status	Role
SLNC GOODWILL	Vessel	Undamaged	Involved in a Marine Casualty

05Aug2020 00:42:05 EDT to 05Aug2020 00:42:05 EDT (Estimated): The vessel's main diesel engine shut down and the vessel was drifting approx. 12 NM off the coast of Japan.
Timeline Type: Event
Timeline Subtype: Loss/Reduction of Vessel Propulsion/Steering
Location: Known

Primary Location: Yes
Description: Sea of Japan, approx.74 NM southwest of the port of Sasebo, Japan

Latitude: 32°29.0 N Longitude: 128°29.0 E

Subject(s) and Details

Name	Type	Status	Role
SLNC GOODWILL	Vessel	Undamaged	Involved in a Marine Casualty

05Aug2020 00:50:00 EDT to 05Aug2020 04:25:00 EDT (Estimated): The 3/AE was transported to the vessel's hospital space and given onboard medical treatment beyond first aid to include: dressings for bleeding, morphine injection (one), epinephrin injection (two), needle thoracostomy (needle inserted into lung to relieve fluid/pressure), nasopharyngeal airway, CPR, and automated external defibrillator (AED; never advised to shock).
Timeline Type: Action
Timeline Subtype: Safety and Emergency Operations - General Safety
Location: Known

Primary Location: Yes
Description: Sea of Japan, approx.74 NM southwest of the port of Sasebo, Japan

Latitude: 32°29.0 N Longitude: 128°29.0 E

Subject(s) and Details

Name	Type	Status	Role
TRENTON LLOYD-REES	Person	Dead	Subject of Investigation

Name	Type	Status	Role
(b) (6), (b) (7)(C) (b) (6), (b) (7)(C)	Person	Not at Risk	Witness

Name	Type	Status	Role
(b) (6), (b) (7)(C)	Person	Not at Risk	Witness

Name	Type	Status	Role
(b) (6), (b) (7)(C)	Person	Not at Risk	Witness

Name	Type	Status	Role
(b) (6), (b) (7)(C)	Person	Not at Risk	Witness

05Aug2020 00:51:00 EDT to 05Aug2020 00:51:00 EDT (Estimated): The vessel was not equipped with the ability to conduct video teleconferencing in the medical space.
Timeline Type: Condition
Timeline Subtype: Vessel - Material/Equipment Condition
Location: Known

Primary Location: Yes
Description: Sea of Japan, approx.74 NM southwest of the port of Sasebo, Japan

Latitude: 32°29.0 N Longitude: 128°29.0 E

Subject(s) and Details

Name	Type	Status	Role
SLNC GOODWILL	Vessel	Undamaged	Involved in a Marine Casualty

System: Accommodation/Occupational Safety
Subsystem: Medical/First Aid
Component: Hospital Space
Cite:
Involves CG Approved Equipment: No
Security Violation: No
Deficiency: No

05Aug2020 01:02:00 EDT to 05Aug2020 01:02:00 EDT (Estimated): The Master requested a helicopter medivac for the 3/AE. The Moji Coast Guard confirmed they were responding and gave an ETA of 1730.
Timeline Type: Action
Timeline Subtype: Communications
Location: Known

Primary Location: Yes
Description: Sea of Japan, approx.74 NM southwest of the port of Sasebo, Japan

Latitude: 32°29.0 N Longitude: 128°29.0 E

Subject(s) and Details

Name	Type	Status	Role
(b) (6), (b) (7)(C) [redacted]	Person	Not at Risk	Witness

05Aug2020 01:15:00 EDT to 05Aug2020 01:15:00 EDT (Estimated): The vessel's 2/M and Master administered medical treatment to the 3/AE while receiving consultation from shoreside Medical Alert Services (MAS). The crew described injuries verbally and received instruction from MAS personnel.
Timeline Type: Condition
Timeline Subtype: Person - Communications Condition
Location: Known

Primary Location: Yes
Description: Sea of Japan, approx.74 NM southwest of the port of Sasebo, Japan

Latitude: 32°29.0 N Longitude: 128°29.0 E

Subject(s) and Details

Name	Type	Status	Role
(b) (6), (b) (7)(C) (b) (6), (b) (7)(C)	Person	Not at Risk	Witness

Communications Type: Ship to Shore

Communication Direction: Both

Means Of Communication: Verbal

Frequency/Channel:

Frequency Or Channel Used:

Power Setting:

Communications Acknowledged: Yes

Communication Effectiveness: Communication Effective

Effectiveness Description:

Interference Encountered: No Known Interference

Interference Description:

Name	Type	Status	Role
(b) (6), (b) (7)(C)	Person	Not at Risk	Witness

Communications Type: Ship to Shore

Communication Direction: Both

Means Of Communication: Verbal

Frequency/Channel:

Frequency Or Channel Used:

Power Setting:

Communications Acknowledged: Yes

Communication Effectiveness: Communication Effective

Effectiveness Description:

Interference Encountered: No Known Interference

Interference Description:

05Aug2020 02:40:00 EDT to 05Aug2020 02:40:00 EDT (Estimated): The CE and 3/AE were able to start DG #3 in emergency mode and restore some power to the vessel.

Timeline Type: Action
Timeline Subtype: Engineering Operations - Unscheduled, Corrective Repair
Location: Known

Primary Location: Yes
Description: Sea of Japan, approx.74 NM southwest of the port of Sasebo, Japan

Latitude: 32°29.0 N Longitude: 128°29.0 E

Subject(s) and Details

Name	Type	Status	Role
(b) (6), (b) (7)(C) (b) (6), (b) (7)(C)	Person	At Risk, Not Injured	Witness

Name	Type	Status	Role
(b) (6), (b) (7)(C)	Person	At Risk, Not Injured	Witness

05Aug2020 04:00:00 EDT to 05Aug2020 04:31:00 EDT (Estimated): The Moji Coast Guard helicopter arrived on station and lowered crew to the vessel. The 3/AE was transported out on deck and raised to the helicopter, then the remaining crew were recovered and the helicopter returned to shore to continue medical treatment of 3/AE.
Timeline Type: Condition
Timeline Subtype: Vessel - Material/Equipment Condition
Location: Known

Primary Location: Yes
Description: Sea of Japan, approx.74 NM southwest of the port of Sasebo, Japan

Latitude: 32°29.0 N Longitude: 128°29.0 E

Subject(s) and Details

Name	Type	Status	Role
SLNC GOODWILL	Vessel	Undamaged	Involved in a Marine Casualty

System: Operations/Management
Subsystem: Casualty Reporting/Post-Casualty Actions
Component: Rendering Necessary Assistance
Cite:
Involves CG Approved Equipment: No
Security Violation: No
Deficiency: No

05Aug2020 05:00:00 EDT to 05Aug2020 05:00:00 EDT (Estimated): The vessel's power and propulsion systems were restored. The vessel got back underway and anchored in Sasebo, Japan without further incident.
Timeline Type: Condition
Timeline Subtype: Vessel - Material/Equipment Condition
Location: Known

Primary Location: Yes
Description: Sea of Japan, approx.74 NM southwest of the port of Sasebo, Japan

Latitude: 32°29.0 N Longitude: 128°29.0 E

Subject(s) and Details

Name	Type	Status	Role
SLNC GOODWILL	Vessel	Undamaged	Involved in a Marine Casualty

System: Electrical
Subsystem: Electric Generation Source (service)
Component: Generator
Cite:
Involves CG Approved Equipment: No
Security Violation: No
Deficiency: No

05Aug2020 05:05:00 EDT to 05Aug2020 05:05:00 EDT (Estimated): No alcohol testing was conducted due to the extended medical response and engineering repairs being conducted by the crew; no evidence suggests that any persons directly involved were under the influence of alcohol during the casualty.
Timeline Type: Condition
Timeline Subtype: Person - Person Condition
Location: Known

Primary Location: Yes
Description: Sea of Japan, approx.74 NM southwest of the port of Sasebo, Japan

Latitude: 32°29.0 N Longitude: 128°29.0 E

Subject(s) and Details

Name	Type	Status	Role
(b) (6), (b) (7)(C) (b) (6), (b) (7)(C)	Person	At Risk, Not Injured	Witness

System: Personnel
Subsystem: Physiological Condition
Component: Alcohol/Drugs - Alcohol
Cite:
Involves CG Approved Equipment: No
Security Violation: No
Deficiency: No

Name	Type	Status	Role
(b) (6), (b) (7)(C)	Person	At Risk, Not Injured	Witness

System: Personnel
Subsystem: Physiological Condition
Component: Alcohol/Drugs - Alcohol
Cite:
Involves CG Approved Equipment: No
Security Violation: No
Deficiency: No

05Aug2020 20:30:00 EDT to 05Aug2020 20:30:00 EDT (Estimated): The vessel's crew, with the exception of the 3/AE, were subject to Post-Casualty DOT drug testing IAW 46 CFR 4.06; all results were (b) (7)(C), (b) (6)

Timeline Type: Action
Timeline Subtype: Drug/Alcohol Testing - DOT Drug Testing
Location: Unknown

Subject(s) and Details

Name	Type	Status	Role
(b) (6), (b) (7)(C) (b) (6), (b) (7)(C)	Person	At Risk, Not Injured	Witness

Reason Directed To Provide Sample(s): Post-casualty

Direction To Provide Sample(s)

Date/Time Directed: 06Aug2020 01:39 EDT

Means Of Direction: verbal

Organization Directing Chemical Test Sample: Marine Employer

Description: post-casualty

Mariner Directed To Get A DOT Drug Test: Yes

Chemical Test Sample Provided: Yes

Sample

Drug Test Sample Taken Using DOT Protocols: Yes

Sample Type: Urine

Date/Time Sample Was Taken: 05Aug2020 20:34 EDT

Sampling Location: SLNC GOODWILL

Collection Agent: (b) (6), (b) (7)(C) (b) (6), (b) (7)(C)

Collection Agent's Organization: SLNC GOODWILL

Donor Certify Sample: Yes

Irregularities Noted: (b) (6),

Drug Analysis

Analyzing Laboratory: Quest Diagnostics (LabOne, Inc. d/b/a Quest Diagnostics), Lenexa, KS, 66219

Specimen Analyzed Using DOT Protocols: Yes

Specimen Transferred And Chain Of Custody Complete: Yes

Primary Specimen Test Result

Result: (b) (6), (b) (7)(C)

(b) (6), (b) (7)(C)

Specimen Dilute: (b) (6),

Reason(s) Rejected For Testing:

Remarks:

Review Conducted By

Medical Review Officer: (b) (6), (b) (7)(C)

Coroner:

Determination/Verification: (b) (6), (b) (7)(C)

Specimen Dilute (MRO): (b) (6),

Split Specimen Analyzed: No

Name	Type	Status	Role
(b) (6), (b) (7)(C)	Person	At Risk, Not Injured	Witness

Reason Directed To Provide Sample(s): Post-casualty

Direction To Provide Sample(s)

Date/Time Directed: 06Aug2020 03:43 EDT

Means Of Direction: verbal

Organization Directing Chemical Test Sample: Marine Employer

Description: post-casualty

Mariner Directed To Get A DOT Drug Test: Yes

Chemical Test Sample Provided: Yes

Sample

Drug Test Sample Taken Using DOT Protocols: Yes

Sample Type: Urine

Date/Time Sample Was Taken: 05Aug2020 20:49 EDT

Sampling Location: SLNC GOODWILL

Collection Agent: (b) (6), (b) (7)(C) (b) (6), (b) (7)(C)

Collection Agent's Organization: SLNC GOODWILL

Donor Certify Sample: Yes

Irregularities Noted: (b) (6),

Drug Analysis

Analyzing Laboratory: Quest Diagnostics (LabOne, Inc. d/b/a Quest Diagnostics), Lenexa, KS, 66219

Specimen Analyzed Using DOT Protocols: Yes

Specimen Transferred And Chain Of Custody Complete: Yes

Primary Specimen Test Result

Result: [redacted]

[redacted]

Specimen Dilute: [redacted]

Reason(s) Rejected For Testing:

Remarks:

Review Conducted By

Medical Review Officer: [redacted]

Coroner:

Determination/Verification: [redacted]

Specimen Dilute (MRO): [redacted]

Split Specimen Analyzed: No

08Aug2020 23:00:00 EDT to 08Aug2020 23:00:00 EDT (Estimated): The Master submitted a completed CG_2692.
Timeline Type: Action
Timeline Subtype: Incident/Casualty Reporting/Notification - CG-2692
Location: Unknown

Subject(s) and Details

Name	Type	Status	Role
[redacted]	Person	Not at Risk	Witness

09Aug2020 01:00:00 EDT to 09Aug2020 01:00:00 EDT (Estimated): The electrical governor installed on DG #1 was damaged beyond repair following the flywheel failure and unable to be tested. The mechanical governor was not not subject to post-casualty testing; the last operational test was conducted two (02) weeks prior during a USCG inspection.
Timeline Type: Condition
Timeline Subtype: Vessel - Material/Equipment Condition
Location: Unknown

Subject(s) and Details

Name	Type	Status	Role
SLNC GOODWILL	Vessel	Undamaged	Involved in a Marine Casualty

System: Engineering
Subsystem: Diesel Engine (auxiliary)
Component: Overspeed Device
Cite:
Involves CG Approved Equipment: No
Security Violation: No
Deficiency: No

VIII. CORRESPONDENCE

OCMI endorsement, signed
Source: USCG
Date: 3/17/2022 2:48:59 AM
Attachments:

OCMI MISLE Endorsement, signed; Other;
(b) (6), (b) (7)(C) 17Mar2022 01:22:42 EDT; No

ROI - Command Endorsement, Executive Summary, & Investigating Officer's Report
Source: USCG
Date: 3/17/2022 2:49:10 AM
Attachments:

ROI, SLNC GOODWILL.docx; Investigative Officer Report;
(b) (6), (b) (7)(C) 12May2022 20:43:44 EDT; No

D14 review, complete
Source: USCG
Date: 5/13/2022 12:45:04 AM
Attachments:

RE_ ROI - SLNC GOODWILL _ Loss of Life, 05Aug20; Other;
(b) (6), (b) (7)(C) 12May2022 20:45:43 EDT; No

Redacted ROI
Source: USCG
Date: 5/16/2022 1:41:13 PM
Attachments:

ROI, SLNC GOODWILL.docx_Redacted; Investigative Officer Report;
(b) (6), (b) (7)(C) 16May2022 09:42:09 EDT; No

IX. CONCLUSIONS – PART 1. CAUSE

Initiating Event:
Material Failure/Malfunction (05Aug2020 00:39:01 EDT)

Precondition

Vessel/Facility/Equipment (Hardware)– Condition - Mechanical damage to internal components of Governor C

Post-casualty analysis of the governor installed on DG #1 at the time of the casualty (Governor C) identified visible evidence of mechanical damage to the surfaces of the governor pilot valve bushing and shaft drive. The damage was inconsistent with that caused by the break-up of the flywheel, which indicates that is was present prior to the casualty. Because both those internal components are involved with regulating the oil pressure in the governor, which in turn directly affects the amount of fuel supplied to DG #1, damage to either of them could have prevented an indication or response to an overspeed of DG #1. Had both of those components been operating as designed, the oil pressure and fuel supply would have remained within designed parameters and prevented DG #1 from overspeeding.

Condition/Vessel - Material/Equipment Condition (20Nov2008 22:02:00 EST); Location Unknown; Each generator was equipped with a governor. The purpose of the governor was to regulate the flow of fuel to the engine in order to maintain a relatively constant speed (rpm) independent of the electrical load placed on the generator.; SLNC GOODWILL

Condition/Vessel - Material/Equipment Condition (21May2019 19:01:00 EDT); Location Unknown; A third governor, Governor C, arrived onboard the vessel for use as a spare; it was a rebuilt governor, not brand new, and had not been installed on any generator onboard the vessel prior to DG #1 on 04Aug21.; SLNC GOODWILL

Condition/Vessel - Material/Equipment Condition (21May2019 19:03:00 EDT); Location Unknown; At some point either during or after overhaul, mechanical damage was sustained on the surfaces of Governor C's pilot valve bushing and shaft drive.; SLNC GOODWILL

Vessel/Facility/Equipment (Hardware)– Condition - Improper storage of Governor C

Governor C had been kept in storage onboard the vessel since May 2019. Either since that time or at some point after, the governor was drained of oil and not refilled. Additionally, despite being installed in a vertical position, it was stored horizontally. Neither of these conditions of storage accurately reflect the conditions of use experienced when the governor is installed and operational, and could well result in some of the internal components not operating as designed. Additionally, the manufacturer had storage instructions that specify the internal surfaces should be coated with oil that meets US MIL-H-17672 specification. Had Governor C been stored in a vertical position with the appropriate amount of oil it would have been in compliance with manufacturer's storage procedures, more accurately reflected the component's actual working conditions, and made them less likely to fail once the governor was installed.

Condition/Vessel - Material/Equipment Condition (02Aug2020 22:59:01 EDT); Location Unknown; No oil was in Governor C while it was stored onboard the vessel and it was found on it's side. The 1/AE stated that, in his experience, oil was kept in governors being stored onboard vessels and they were kept in a vertical position.; SLNC GOODWILL

Condition/Vessel - Material/Equipment Condition (21May2019 19:01:00 EDT); Location Unknown; A third governor, Governor C, arrived onboard the vessel for use as a spare; it was a rebuilt governor, not brand new, and had not been installed on any generator onboard the vessel prior to DG #1 on 04Aug21.; SLNC GOODWILL

Organization

Oversight - Improper recordkeeping for Governor C

Following the casualty, it was found that Governor B and Governor C, both installed on DG #1, had the same serial # and part # stamped on their data plates. Because the work completion report uses these numbers to identify which governor was overhauled, this error made it very difficult to determine whether or not both governors were actually overhauled and, if it was only one that was overhauled, which one it was. Had either someone on the 3rd party repair team or a crewmember/manager of the

vessel noticed the mistaken numbers stamped on the data plate, they could have clarified the work done and condition of each governor and have a clear record for each.

Condition/Vessel - Material/Equipment Condition (21May2019 19:00:00 EDT); Location Unknown; The governor installed on DG #1 prior to the casualty, Governor B (Part # 8520-0041, Serial # 15592175), was serviced in place by third party contractors licensed by the governor's manufacturing company.; SLNC GOODWILL

Condition/Vessel - Material/Equipment Condition (21May2019 19:01:00 EDT); Location Unknown; A third governor, Governor C, arrived onboard the vessel for use as a spare; it was a rebuilt governor, not brand new, and had not been installed on any generator onboard the vessel prior to DG #1 on 04Aug21.; SLNC GOODWILL

Condition/Vessel - Material/Equipment Condition (21May2019 19:02:00 EDT); Location Unknown; The data plate installed on Governor C included the same serial # and part # as Governor B. Although the numbers were the same at the time of the casualty, the operating company believes the original serial # for Governor C was 16178255.; SLNC GOODWILL

Production

Planning Error - Knowledge-based Mistake (Bias) - Failure to verify internal condition of Governor C

After being kept in storage for over a year, being found in a horizontal position, and then realizing no oil was present in Governor C, there were no additional steps taken by the vessel's engineering crew to verify if it's internal components were still fully operational. Even if a year wouldn't be considered an excessively long time for a governor to sit in storage, either the fact that it was stored on it's side or that there was no oil in it could have prompted someone to either open the governor and visually inspect the internal components or wait for the vessel to make port in Korea and have a third party technician confirm proper operation of the governor. Because the first option would require specific certifications, the second option would seem more plausible especially since the vessel had already sailed from Guam using Governor B. Had someone waited to verify the internal condition of Governor C, the material defects may have been found prior to it being used.

Action/Engineering Operations - Unscheduled, Corrective Repair (04Aug2020 00:00:00 EDT); Location Unknown; Installation of Governor C on DG#1 was started by the CE, 1/AE, and 3/AE in the afternoon. It was not completed that day and work was halted around 2000; DG#1 remained offline.; (b) (6), (b) (7)(C) TRENTON LLOYD-REES, (b) (6), (b) (7)(C) (b) (6), (b) (7)(C)

Action/Engineering Operations - Unscheduled, Corrective Repair (04Aug2020 23:30:00 EDT); Location Unknown; The 1/AE and 3/AE resumed the installation of Governor C on DG#1. The CE arrived later to oversee the installation and testing.; TRENTON LLOYD-REES, (b) (6), (b) (7)(C) (b) (6), (b) (7)(C) (b) (6), (b) (7)(C)

Action/Engineering Operations - Engineering Systems Operations (05Aug2020 00:35:00 EDT); Sea of Japan, approx.74 NM southwest of the port of Sasebo, Japan; The 1/AE started up DG#1 for the first time since installing Governor C. The 3/AE and CE were nearby to observe and assist.; TRENTON LLOYD-REES, (b) (6), (b) (7)(C) (b) (6), (b) (7)(C) (b) (6), (b) (7)(C)

Defense

Disabled - Inadequate storage procedures for Governor C

The governor manufacturer (Woodward) published Manual 25075 (Revision B, Mar2015) which detailed the storage procedures for mechanical-hydraulic controls. They also recommend their governors be kept in an upright position to keep the internal components in their proper positions and to prevent oil from leaking out of "breather holes" in the top of the assembly. It is unknown if Governor C was initially stored on it's side, or if it fell over at some point later on. Also, it's unclear whether Governor C had oil originally but it leaked out due to it being on it's side, or if it never had oil after being overhauled. Either way, the result was the same: on the day it was retrieved for installation, Governor C was on it's side and empty of oil. Had the storage procedures been followed fully and maintained during storage, that may have prevented damage to the internal components of Governor C and allowed it to function as designed.

Condition/Vessel - Material/Equipment Condition (02Aug2020 22:59:01 EDT); Location Unknown; No oil was in Governor C while it was stored onboard the vessel and it was found on it's side. The 1/AE stated that, in his experience, oil was kept in governors being stored onboard vessels and they were kept in a vertical position.; SLNC GOODWILL

Condition/Organization - Organization Condition (28Feb2015 22:00:00 EST); Location Unknown; The manufacturer of Governor C, Woodward Inc., released instructions for the storage of mechanical-hydraulic controls (governors). These instructions included that oil meeting the US MIL-H-17672 standard should be used to coat the internal surfaces of the device.; Woodward Inc.

Condition/Organization - Organization Condition (02Aug2020 22:59:02 EDT); Location Unknown; The manufacturer of Governor C recommends their governors be transported and stored in an upright position to prevent the ballhead assembly from sliding out of its support bracket as well as preventing oil from leaking out of "breather holes"; those holes are necessary to allow interal air pressure to adjust to ambient air pressure.; Woodward Inc.

Disabled - Inability to confirm maintenance history for Governor C

All three governors referenced in this incident were subject to preventative maintenance which included them being sent ashore to qualified technicians for overhaul, inspection, and repair. However, because the same part # and serial # were used for both Governor B and Governor C, this made it difficult to determine which one was being inspected. Had the data plates for Governor B and Governor C been maintained with the correct part # and serial #, it would have been obvious which one was being maintained and which one needed maintenance performed on it. Currently, there is no way to clearly identify whether it was Governor B or Governor C that was overhauled in May 2019, so it is possible that Governor C was well past its inspection interval and should not have been placed in service. Had the data plates been correct, it would have been clear to trace which governor was currently on maintenance schedule and should have been installed for use.

Condition/Vessel - Material/Equipment Condition (21May2019 19:01:00 EDT); Location Unknown; A third governor, Governor C, arrived onboard the vessel for use as a spare; it was a rebuilt governor, not brand new, and had not been installed on any generator onboard the vessel prior to DG #1 on 04Aug21.; SLNC GOODWILL

Condition/Vessel - Material/Equipment Condition (21May2019 19:02:00 EDT); Location Unknown; The data plate installed on Governor C included the same serial # and part # as Governor B. Although the numbers were the same at the time of the casualty, the operating company believes the original serial # for Governor C was 16178255.; SLNC GOODWILL

Failures of Defense Against Subsequent Events in the Incident

Subsequent Event # 1:

Material Failure/Malfunction (05Aug2020 00:42:00 EDT)

Defense Factors

Disabled - Inadequate mechanical properties of DG #1 flywheel

The engine licensor, MAN Energy Solutions SE, established design requirements for the flywheel that include an ultimate tensile strength of between 300MPa and 400MPa. Eight post-casualty tensile tests of flywheel fragments showed a range of results between 168 MPa and 194MPa; this is 56% to 64% of the required minimum strength. Additionally, microscopic inspection of the flywheel's bolt holes revealed areas of "microshrinkage", which are voids within the casting that can develop during the pour. These would have also reduced the flywheel's tensile strength because they induce planes of weakness and propagate cracking. Had the flywheel's tensile strength met at least the minimum requirements specified by the engine licensor, it is possible that the flywheel could have remained intact until either the 1/AE could have secured the fuel to DG #1 or, failing to secure DG #1, the crew could have had time to evacuate the space before it broke apart.

Condition/Vessel - Material/Equipment Condition(12Jul2020 23:01:00Z); Location Unknown; The design specification requirement for the DG#1 flywheel was for grey cast iron of Grade C4 with an ultimate tensile strength of between 300-400 megapascals (MPa) and a Brinell hardness of between 200-250 HB.; SLNC GOODWILL

Condition/Vessel - Material/Equipment Condition(12Jul2020 23:02:00Z); Location Unknown; The flywheel installed on DG#1 did not meet the design requirements of the engine licensor (MAN Engergy Soluction SE). After eight tests, the flywheel measured between 56%-64% of the required minimum strength and the hardness was, on average, 83% of the required minimum hardness.; SLNC GOODWILL

Condition/Vessel - Material/Equipment Condition(12Jul2020 23:03:00Z); Location Unknown; Micro-shrinkage voids were present in the area around the flywheel coupling bolt holes.; SLNC GOODWILL

Disabled - Inadequate chemical composition of DG#1 flywheel

The engine licensor, MAN Energy Solutions SE, established design requirements for the flywheel that include a Brinell hardness of between 200HB and 250HB. Eight post-casualty tests of flywheel fragments found the hardness to be 167HB on average; this is 83% of the required minimum hardness. Had the flywheel's hardness met at least the minimum requirements specified by the engine licensor, it is possible that the flywheel could have remained intact until either the 1/AE could have secured the fuel to DG #1 or, failing to secure DG #1, the crew could have had time to evacuate the space before it broke apart.

Condition/Vessel - Material/Equipment Condition(12Jul2020 23:01:00Z); Location Unknown; The design specification requirement for the DG#1 flywheel was for grey cast iron of Grade C4 with an ultimate tensile strength of between 300-400 megapascals (MPa) and a Brinell hardness of between 200-250 HB.; SLNC GOODWILL

Condition/Vessel - Material/Equipment Condition(12Jul2020 23:02:00Z); Location Unknown; The flywheel installed on DG#1 did not meet the design requirements of the engine licensor (MAN Engergy Soluction SE). After eight tests, the flywheel measured between 56%-64% of the required minimum strength and the hardness was, on average, 83% of the required minimum hardness.; SLNC GOODWILL

Subsequent Event # 2:

Personnel Casualty - Death (05Aug2020 00:42:02 EDT)

Defense Factors

Does Not Exist - No reasonable protective measures exist to prevent loss of life

The 3/AE was standing in a position that should have been reasonably safe under routine operating conditions and was wearing all the applicable personal protective equipment (PPE) for working in the vessel's engine room. Once the flywheel broke apart, there was no time to react nor any PPE normally worn in that environment that could have reasonably prevented the 3/AE from sustaining the injury that ultimately led to his death.

Condition/Vessel - Material/Equipment Condition(05Aug2020 04:42:01Z); Sea of Japan, approx.74 NM southwest of the port of Sasebo, Japan; The sections of the flywheel were hurled through the engine room at a high rate of speed. One large section struck the 3/AE who was still standing between DG#1 and DG#2.; SLNC GOODWILL

Condition/Vessel - Material/Equipment Condition(05Aug2020 04:42:03Z); Sea of Japan, approx.74 NM southwest of the port of Sasebo, Japan; The pieces of DG#1 flywheel struck and ruptured air piping and water piping running through the generator space.; SLNC GOODWILL

Inadequate - Inability to conduct visual teleconferencing during medical treatment

During interview, the 2/M stated that he had served on at least one other vessel that had the ability to conduct video teleconferencing in it's medical space. However, the SLNC GOODWILL was not equipped with that capability. As a result, a crewmember was required to describe the injury, sometimes while actively applying medical treatment, to a shoreside medical support service who was then required to visualize the description and attempt to offer the appropriate treatment option. If the vessel was able to dial up the same medical personnel and have them watching the treatment and see the extent of the injuries, it may have led to more timely recommendations/advice and active feedback during more technical medical treatment that was performed during this casualty such as use of a nasopharyngeal airway, intravenous injection, and needle thoracostomy.

Condition/Vessel - Material/Equipment Condition(05Aug2020 04:51:00Z); Sea of Japan, approx.74 NM southwest of the port of Sasebo, Japan; The vessel was not equipped with the ability to conduct video teleconferencing in the medical space.; SLNC GOODWILL

Condition/Person - Communications Condition(05Aug2020 05:15:00Z); Sea of Japan, approx.74 NM southwest of the port of Sasebo, Japan; The vessel's 2/M and Master administered medical treatment to the 3/AE while receiving consultation from shoreside Medical Alert Services (MAS). The crew described injuries verbally and received instruction from MAS personnel.; (b) (6), (b) (7)(C) (b) (6), (b) (7)(C) (b) (6), (b) (7)(C)

Subsequent Event # 3:

Loss of Electrical Power (05Aug2020 00:42:04 EDT)

Defense Factors

Does Not Exist - Significant damage to vessel's electrical generation/distribution

When the flywheel on DG #1 broke apart violently, the fragments caused significant damage to multiple systems within the vessel's engine room to include control, water supply, air supply, and electrical distribution. There was no reasonable defense that could have been used to prevent the fragments from causing this damage which subsequently resulted in a loss of power until repairs could be made.

Condition/Vessel - Material/Equipment Condition(05Aug2020 04:42:01Z); Sea of Japan, approx.74 NM southwest of the port of Sasebo, Japan; The sections of the flywheel were hurled through the engine room at a high rate of speed. One large section struck the 3/AE who was still standing between DG#1 and DG#2.; SLNC GOODWILL

Condition/Vessel - Material/Equipment Condition(05Aug2020 04:42:03Z); Sea of Japan, approx.74 NM southwest of the port of Sasebo, Japan; The pieces of DG#1 flywheel struck and ruptured air piping and water piping running through the generator space.; SLNC GOODWILL

Subsequent Event # 4:

Loss/Reduction of Vessel Propulsion/Steering (05Aug2020 00:42:05 EDT)

Defense Factors

Does Not Exist - Significant damage to propulsion control systems

When the flywheel on DG #1 broke apart violently, the fragments caused significant damage to multiple systems within the vessel's generator room to include control, water supply, air supply, and electrical distribution. All of these systems are necessary in order to maintain operation of the main diesel engine. There was no reasonable defense that could have been used to prevent the fragments from causing this damage which directly resulted in a loss of propulsion until repairs could be made.

Condition/Vessel - Material/Equipment Condition(05Aug2020 04:42:01Z); Sea of Japan, approx.74 NM southwest of the port of Sasebo, Japan; The sections of the flywheel were hurled through the engine room at a high rate of speed. One large section struck the 3/AE who was still standing between DG#1 and DG#2.; SLNC GOODWILL

Condition/Vessel - Material/Equipment Condition(05Aug2020 04:42:03Z); Sea of Japan, approx.74 NM southwest of the port of Sasebo, Japan; The pieces of DG#1 flywheel struck and ruptured air piping and water piping running through the generator space.; SLNC GOODWILL

Subsequent Event # 5:

Material Failure/Malfunction (05Aug2020 00:41:35 EDT)

Defense Factors

Disabled - Failure of the overspeed protection device

DG #1 was equipped with an electrical and mechanical overspeed protection device, or "overspeed trip", which are a secondary safety measure designed to prevent an uncontrolled increase in engine rpms should the governor fail to operate as designed. In this specific instance, DG #1 normally operates at 900 rpms and the overspeed device is set to trip at 1,020 rpms. All evidence clearly indicates that the rpms on DG #1 exceeded 1,020 rpms, but the overspeed device failed to trip. Additionally, the overspeed device had operated as designed just prior to this casualty: the first attempt to start DG #1 resulted in increased rpms and the activation of the overspeed protection device. Whether it was reset incorrectly or experienced a mechanical failure that prevented it from activating is unknown and cannot be supported either way using the evidence provided. Either way, had the overspeed trip device worked as designed it would have prevented the uncontrolled increase in rpms.

Condition/Vessel - Material/Equipment Condition(05Aug2020 04:36:00Z); Sea of Japan, approx.74 NM southwest of the port of Sasebo, Japan; DG#1 rpms were unstable and steadily increased.; SLNC GOODWILL

Condition/Vessel - Material/Equipment Condition(05Aug2020 04:37:00Z); Sea of Japan, approx.74 NM southwest of the port of Sasebo, Japan; The overspeed protection device activated when DG#1 rpms exceeded approx. 1,020 and successfully shut down DG#1.; SLNC GOODWILL

Condition/Vessel - Material/Equipment Condition(05Aug2020 04:41:30Z); Sea of Japan, approx.74 NM southwest of the port of Sasebo, Japan; DG#1 rpms steadily increased, accompanied by an unfamiliar noise and vibration; Governor C's overspeed trip device didn't activate.; SLNC GOODWILL

Condition/Vessel - Material/Equipment Condition(05Aug2020 04:41:46Z); Sea of Japan, approx.74 NM southwest of the port of Sasebo, Japan; Smoke began to be visible from the engine and rpms continued to increase. Despite having passed the upper limit for DG#1 rpms, the overspeed trip device in Governor C failed to activate.; SLNC GOODWILL

X. CONCLUSIONS – PART 2. ENFORCEMENT REFERRALS

None

XI. SAFETY RECOMMENDATIONS

Safety Alerts:

U.S. Department of State

REPORT OF DEATH OF A U.S. CITIZEN OR U.S. NON-CITIZEN NATIONAL ABROAD

Fukuoka, Japan — Post

08-13-2020 — Date of Issue *(mm-dd-yyyy)*

SSA No. (b) (7)(C), (b) (6)

Name in full Trenton David LLOYD-REES — Age 23

Date *(mm-dd-yyyy)* and Place of Birth (b) (7)(C), (b) (6) (b) (6), (b) (7)(C)

Evidence of U.S. Citizenship Regular passport # (b) (7)(C), (b) (6) issued on July 28, 2015

Address in U.S.A. (b) (6), (b) (7)(C)

Permanent or Temporary Address Abroad

Date of death August (Month) 05 (Day) 06: (Hour) 23 p.m. (Minute) 2020 (Year)

Place of death Nagasaki Airport (Number and street, or Hospital/ hotel), Omura-shi (City), Nagasaki-ken, Japan (Country)

Cause of death Hemorrhagic shock according to Dr. Hiroyuki Hiu of Nagasaki Medical Center,
Including authority for statement - if physician, include full name and official title, if any

Omura-shi, Nagasaki-ken, Japan.

Disposition of the remains Embalmed and shipped for burial in the USA.

Local law governing disinterment of remains provides that

Disposition of the effects In custody of Master SLNC Goodwill (b) (6), (b) (7)(C)

Person or official responsible for custody of effects and accounting therefore
Master SLNC Goodwill (b) (6), (b) (7)(C)

Traveling/residing abroad with relatives or friends as follows:

NAME	ADDRESS

Informed by telegram or telephone

NAME	ADDRESS	DATE *(mm-dd-yyyy)* NOTIFIED
Ms (b) (6), (b) (7)(C)	(b) (6), (b) (7)(C)	08-05-2020

Copy of this report sent to:

NAME	ADDRESS	DATE *(mm-dd-yyyy)* SENT
(b) (6), (b) (7)(C)	(b) (6), (b) (7)(C)	08-13-2020
Nishi Kyushu Warehouse	3-7 Inari-cho, Sasebo-shi, Nagasaki-ken, Japan	08-13-2020

Notification or copy sent to Federal Agencies: SSA X VA _____ OPM _____ Other ME (State Agency)

The original copy of this document and information concerning the effects are being placed in the permanent files of the U.S. Department of State, Passport Vital Records Section, CA/PPT/S/TO/RS/DO/MR, 1150 Passport Services PL, 6th Floor, Dulles, VA 20189-1150.

Remarks:

Passpor (b) (6), (b) (7)(C) canceled and returned to Mr. and Mrs (b) (6), (b) (7)(C)

(b) (6), (b) (7)(C) b) (6), (b) (7)(C) n reverse if necessary.)

[SEAL]

Signature on all copies

(b) (6), (b) (7)(C) Consul of the United States of America.

For Additional Certified Copies, see http://travel.state.gov/passport/faq/faq_5057.html

DS-2060 *(Formerly OF-180)*
05-2017

LLOYD-REES (Last name)
TRENTON (First name)
DAVID (Middle name)
08-05-2020 (Date *(mm-dd-yyyy)* of death)

(b) (6), (b) (7)(C)

Evidence Control Number (ECN) 7025155-[redacted]013 corresponds with an audio recording of an interview with [redacted] 1AE of the SLNC GOODWILL at the time of the casualty. The interview was conducted by [redacted] onboard the SLNC GOODWILL. A digital copy of the interview will be maintained at USCG Activities Far East.

Evidence Control Number (ECN) 7025155-[redacted]012 corresponds with an audio recording of an interview with [redacted], 4M of the SLNC GOODWILL at the time of the casualty. The interview was conducted by [redacted] onboard the SLNC GOODWILL on 08 August 2020. A digital copy of the interview will be maintained at USCG Activities Far East.

[redacted]

Evidence Control Number (ECN) 7025155-[redacted]007 corresponds with an audio recording of an interview with (b) (6), (b) (7)(C), Chief Engineer of the SLNC GOODWILL at the time of the casualty. The interview was conducted by [redacted](b) (6), (b) (7)(C) and witnessed by [redacted] (b) (6), (b) (7)(C) onboard the SLNC GOODWILL on 07 August 2020. A digital copy of the interview will be maintained at USCG Activities Far East.

[redacted]

Evidence Control Number (ECN) 7025155-[redacted]009 corresponds with an audio recording of an interview with [redacted], [redacted] of the SLNC GOODWILL at the time of the casualty. The interview was conducted by [redacted] onboard the SLNC GOODWILL on 08 August 2020. A digital copy of the interview will be maintained at USCG Activities Far East.

[redacted]

Evidence Control Number (ECN) 7025155-[redacted]014 corresponds with an audio recording of an interview with (b) (6), (b) (7)(C) Captain of the SLNC GOODWILL at the time of the casualty. The interview was conducted by [redacted] (b) (6), (b) (7)(C) onboard the SLNC GOODWILL on 07 August 2020. A digital copy of the interview will be maintained at USCG Activities Far East.

[redacted]

Generated By Commandant (CG-INV-3) 17JUL2023 14:40:07Z

For Official Use Only: Public Availability to be Determined under 5 U.S.C. 552.

Case History Report

Commandant (CG-INV-3)
17JUL2023 14:40Z

---Administrative Data---

MISLE Case Id: 1229748 Open Date: 05AUG2020 22:24Z
Status: Open - In Progress
Title: Case Created from Misle Notification
Owning Unit: Activities Far East Originating Unit: Activities Far East

Other Activities (Non IMA or Non Sortie) in Case:

MISLE Activity Id: 7025153	Enf Activity Id:	Type: Preliminary Investigation
MISLE Activity Id: 7025155	Enf Activity Id:	Type: Incident Investigation
MISLE Activity Id: 7028636	Enf Activity Id:	Type: Vessel Inspection

---Incident Data---

---Involved Subjects---

Vessel Name: SLNC GOODWILL
Primary VIN: 1266919
Role: Involved in a Marine Casualty
Flag: UNITED STATES
Service: Tank Ship
Damage Status: Undamaged

Call Sign: WDI5693
Gross Tonnage:
Approx. Length: 580.4 Feet
Year Completed:
Propulsion Type: Diesel Direct

Person Name: (b) (6), (b) (7)(C) (b) (6), (b) (7)(C)
Role: Witness
Status: At Risk, Not Injured
Birth Date: (b) (7)(C), (b) (6)

Identification(s)
SSN: (b) (7)(C), (b) (6)

Person Name: (b) (6), (b) (7)(C)
Role: Witness
Status: At Risk, Not Injured
Birth Date: (b) (6), (b) (7)(C)

Identification(s)

SSN: (b) (7)(C), (b) (6)

Person Name: LLOYD-REES, TRENTON — Status: Dead

Role: Subject of Investigation — Birth Date: (b) (7)(C), (b) (6)

Identification(s)

SSN: (b) (7)(C), (b) (6)

Person Name: LLOYD-REES, TRENTON — Status: Dead

Role: Subject of Investigation — Birth Date: (b) (7)(C), (b) (6)

Identification(s)

SSN: (b) (7)(C), (b) (6)

Person Name: (b) (6), (b) (7)(C) — Status: Not at Risk

Role: Medical Review Officer — Birth Date:

Identification(s)

Miscellaneous ID: MEDICAL REVIEW OFFICER

Miscellaneous ID: MRO

Person Name: (b) (6), (b) (7)(C) — Status: Not at Risk

Role: Other — Birth Date:

Identification(s)

Drivers License: (b) (6), (b) (7)(C)

Person Name (b) (6), (b) (7)(C) — Status: Not at Risk

Role: Other — Birth Date:

Identification(s)

Drivers License: (b) (7)(C), (b) (6)

Person Name: (b) (6), (b) (7)(C) — Status: Not at Risk

Role: Witness — Birth Date: (b) (6), (b) (7)(C)

Identification(s)

SSN: (b) (6), (b) (7)(C)

Person Name: (b) (6), (b) (7)(C) — Status: Not at Risk

Role: Witness — Birth Date: (b) (6), (b) (7)(C)

Identification(s)

SSN: (b) (6), (b) (7)(C)

US Merchant Mariner Credential: (b) (6), (b) (7)(C)

Person Name: (b) (6), (b) (7)(C) (b) (6), (b) (7)(C) — Status: Not at Risk

Role: Witness — Birth Date: (b) (6), (b) (7)(C)

Identification(s)

SSN: (b) (6), (b) (7)(C)

Generated By Commandant (CG-INV-3) 17JUL2023 14:40:07Z

For Official Use Only: Public Availability to be Determined under 5 U.S.C. 552.

US Merchant Mariner Credential: (b) (6), (b) (7)(C)

Person Name: (b) (6), (b) (7)(C) Status: Not at Risk

Role: Witness Birth Date: (b) (6), (b) (7)(C)

Identification(s)

SSN: (b) (6), (b) (7)(C)

Person Name: (b) (6), (b) (7)(C) Status: Not at Risk

Role: Witness Birth Date:

Identification(s)

Organization Name: NORD GOODWILL LLC

Role: Other

Identification(s)

Tax ID: (b) (6), (b) (7)(C)

Organization Name: SCHUYLER LINE NAVIGATION CORP

Role: Other

Identification(s)

Tax ID: (b) (6), (b) (7)(C)

IMO Company Number: 5779287

Organization Name: Woodward Inc.

Role: Witness

Identification(s)

Waterway: Sea of Japan, approx.74 NM southwest of the port of Sasebo, Japan

Role: Location

DEPARTMENT OF HOMELAND SECURITY
U.S. Coast Guard

OMB No: 1625-0001
Exp. Date: 07/31/2022

REPORT OF MANDATORY CHEMICAL TESTING FOLLOWING A SERIOUS MARINE INCIDENT INVOLVING VESSELS IN COMMERCIAL SERVICE

Note: This form shall be used to report data on persons directly involved in a serious marine incident involving a vessel in commercial service and the mandatory chemical drug and alcohol testing.

Section I - Reporting Vessel Information - Casualty Date/Time

1. Vessel Name	2. Vessel Official Number or IMO Number	3. Date/Time *(local)* of Occurrence
SLNC GOODWILL	9448334	2020AUG05 1342

Section II - Reason for Submitting this Report *(Check all that apply)*

4. The above vessel is in commercial service and was involved in a Serious Marine Incident that resulted in *(46 CFR 4.03-2)*:

- [X] One or more deaths
- [ ] An injury to a crewmember, passenger, or other person that requires professional medical treatment beyond first aid, and, in the case of a person employed on board a vessel in commercial service, which renders the individual unfit to perform routine vessel duties
- [X] Damage to property in excess of $200,000
- [ ] Actual or constructive total loss of any vessel subject to inspection under 46 USC 3301
- [ ] Actual or constructive total loss of any self-propelled vessel, not subject to inspection under 46 USC 3301, of 100 gross tons or more
- [ ] A discharge of oil of 10,000 gallons or more into the navigable waters of the United States, as defined in 33 USC 1321
- [ ] A discharge of a reportable quantity of a hazardous substance into the navigable waters of the United States
- [ ] A release of a reportable quantity of a hazardous substance into the environment United States

Section III - Personnel and Testing Information

5. Individuals Directly Involved in Serious Marine Incident	6. Drug and Alcohol Testing			
5a. Name *(Last, First, Middle)*	5b. USCG Credentialed?	6a. Drug Test Urine Sample Provided Within 32 Hours?	6b. Alcohol Test Specimen Provided within 2 Hours?	6c. Type of Alcohol Test Specimen Provided	6d. Alcohol Test Results
(b) (6), (b) (7)(C)	(b) (6), (b) (7)(C)				(b) (6), (b) (7)(C)

7. Explanation of why test samples were not collected within required timeframes or not at all and/or why testing was not conducted *(Required for each "No" checked in columns 6a or 6b)*

Due to an ongoing medical response to a crewmember casualty, and then efforts to restore power to the vessel the ship's crew was engaged in operations for the safety of the vessel past the two hour to eight hour Alcohol test time frame.

8. SAMHSA Accredited Laboratory Conducting Chemical Drug Tests	9. Laboratory or Individual Conducting Alcohol Tests
Name: Quest Diagnostics - Toxicology	Name:
Address: 10101 Renner Blvd Lenexa KS 66700	Address:
Telephone: 1-800-877-7484	Telephone:
Email:	Email:

Section IV - Person Making this Report

10. Name *(PRINT) (Last, First, Middle)*	11. Signature	12. Date
(b) (6), (b) (7)(C)	(b) (6), (b) (7)(C)	08/09/2020
13. Title	**14. Address**	
Master	(b) (6), (b) (7)(C) United States	
15. Telephone No.	**16. Email**	
(b) (6), (b) (7)(C)	(b) (6), (b) (7)(C)	

(b) (6), (b) (7)(C)

DEPARTMENT OF HOMELAND SECURITY
U.S. Coast Guard

OMB No: 1625-0001
Exp. Date: 07/31/2022

REPORT OF MANDATORY CHEMICAL TESTING FOLLOWING A SERIOUS MARINE INCIDENT INVOLVING VESSELS IN COMMERCIAL SERVICE

Note: This form shall be used to report data on persons directly involved in a serious marine incident involving a vessel in commercial service and the mandatory chemical drug and alcohol testing.

Section I - Reporting Vessel Information - Casualty Date/Time

1. Vessel Name	2. Vessel Official Number or IMO Number	3. Date/Time *(local)* of Occurrence
SLNC GOODWILL	9448334	2020AUG05 1342

Section II - Reason for Submitting this Report *(Check all that apply)*

4. The above vessel is in commercial service and was involved in a Serious Marine Incident that resulted in *(46 CFR 4.03-2)*:

- [X] One or more deaths
- [ ] An injury to a crewmember, passenger, or other person that requires professional medical treatment beyond first aid, and, in the case of a person employed on board a vessel in commercial service, which renders the individual unfit to perform routine vessel duties
- [X] Damage to property in excess of $200,000
- [ ] Actual or constructive total loss of any vessel subject to inspection under 46 USC 3301
- [ ] Actual or constructive total loss of any self-propelled vessel, not subject to inspection under 46 USC 3301, of 100 gross tons or more
- [ ] A discharge of oil of 10,000 gallons or more into the navigable waters of the United States, as defined in 33 USC 1321
- [ ] A discharge of a reportable quantity of a hazardous substance into the navigable waters of the United States
- [ ] A release of a reportable quantity of a hazardous substance into the environment United States

Section III - Personnel and Testing Information

5. Individuals Directly Involved in Serious Marine Incident	6. Drug and Alcohol Testing				
5a. Name *(Last, First, Middle)*	5b. USCG Credentialed?	6a. Drug Test Urine Sample Provided Within 32 Hours?	6b. Alcohol Test Specimen Provided within 2 Hours?	6c. Type of Alcohol Test Specimen Provided	6d. Alcohol Test Results
(b) (6), (b) (7)(C)					

(b) (6), (b) (7)(C)

7. Explanation of why test samples were not collected within required timeframes or not at all and/or why testing was not conducted *(Required for each "No" checked in columns 6a or 6b)*

Due to an ongoing medical response to a crewmember casualty, and then efforts to restore power to the vessel the ship's crew was engaged in operations for the safety of the vessel past the two hour to eight hour Alcohol test time frame.

8. SAMHSA Accredited Laboratory Conducting Chemical Drug Tests	9. Laboratory or Individual Conducting Alcohol Tests
Name: Quest Diagnostics - Toxicology	Name:
Address: 10101 Renner Blvd Lenexa KS 66700	Address:
Telephone: 1-800-877-7484	Telephone:
Email:	Email:

Section IV - Person Making this Report

10. Name *(PRINT) (Last, First, Middle)*	11. Signature	12. Date
(b) (6), (b) (7)(C)	(b) (6), (b) (7)(C)	08/09/2020
13. Title	14. Address	
Master	(b) (6), (b) (7)(C)	
15. Telephone No.	16. Email	
(b) (6), (b) (7)(C)	(b) (6), (b) (7)(C)	

(b) (6), (b) (7)(C)

INSTRUCTIONS FOR COMPLETION OF FORM CG-2692B

Report of Chemical Testing Following a Serious Marine Incident Involving a Commercial Vessel

WHEN TO USE THIS FORM

1. This form, when submitted in conjunction with a CG-2692 or submitted alone, satisfies the requirement found in the Code of Federal Regulations for written reports of chemical drug and alcohol testing of individuals engaged or employed on board a commercial vessel who are identified as being directly involved in serious marine incidents consisting of one or more of the occurrences lists in block 4. Alcohol tests are to be conducted not later than 2 hours (unless there are safety concerns directly related to the casualty that need to be addressed by the individual(s)) and drug test specimens collected not later than 32 hours after a serious marine incident.

INDIVIDUAL DIRECTLY INVOLVED IN A SERIOUS MARINE INCIDENT

2. The term "Individual Directly Involved in a Serious Marine Incident" means an individual whose order, action, or failure to act is determined to be, or cannot be ruled out as, a causative factor in the events leading to or causing a serious marine incident.

COMPLETION OF THIS FORM

3. In accordance with 46 CFR Subpart 4.06 this form shall be filled out as completely and accurately as possible. Please type or print clearly. Fill in all blanks that apply to the kind of accident that has occurred. If a block is not applicable, the abbreviation "NA" should be entered in that space. If the answer is unknown and cannot be obtained before the report has to be submitted (i.e. within 5 days of the accident), the abbreviation "UNK" should be entered in that block. If "NONE" is the correct response, enter it in the block.

4. If more than 10 individuals are directly involved in the Serious Marine Incident additional CG-2692Bs should be completed.

5. Once completed, deliver, email, or fax this form with a corresponding CG-2692 within 5 days of the casualty to the Coast Guard Sector, Marine Safety Unit, or Activity nearest the location of the casualty or, if at sea, nearest the arrival port. https://www.uscg.mil/Units/Organization

6. Upon receipt of a report of chemical test results. The marine employer shall submit a copy of the test results for each person listed in block 5a of this form to the Coast Guard Officer in Charge, Marine Inspection where the CG-2692B was submitted in accordance with 46 CFR §4.06-60(d).

7. Block 6d - Alcohol Test Result: When the alcohol test results are available, the alcohol concentration shall be expressed numerically in percent by weight (i.e. 0.04, 0.10, etc.); otherwise indicate positive for alcohol being present or negative for no alcohol present.

NOTICE: The information collected on this form is routinely available for public inspection. It is needed by the Coast Guard to carry out its responsibility to investigate marine casualties, to identify hazardous conditions or situations and to conduct statistical analysis. The information is used to determine whether new or revised safety initiatives are necessary for the protection of life or property in the marine environment.

(b) (6), (b) (7)(C)

I.M.T.

(b) (6), (b) (7)(C)
1451 Tallevast Rd
Sarasota, FL 34243
Voice: (b) (6), (b) (7)(C) Fax: 941.753.9975

MRO REPORT - FEDERAL
Controlled Substance Testing Results

Name of Donor: (b) (6), (b) (7)(C)

SSN / ID#: (b) (6), (b) (7)(C)

Name of Company: AMS/ SCHUYLER LINE NAVIGATION

Collection Date: 8/6/2020 10:17 AM

Specimen ID Number: (b) (6), (b) (7)(C)

Reason for Test: POST ACCIDENT

Analyzing Laboratory: QUEST DIAGNOSTICS
10101 RENNER BLVD.
LENEXA, KS 66219

MRO CCF Received: 8/12/2020 - 3:15 PM

Split Specimen: YES

Certified MRO: (b) (6), (b) (7)(C)

Urine Specimen Tested For:

(b) (7)(C), (b) (6)

Verified Test Result: (b) (6), (b) (7)(C)

I have received and reviewed the Laboratory result for the specimen represented by this form in accordance with the US Coast Guard Controlled Substance Testing requirements as contained in 49 CFR part 40 and 46 CFR part 16.

(b) (6), (b) (7)(C)

Certified Medical Review Officer - (b) (6), (b) (7)(C)

8/12/2020
Verified Date

This information is required by Section 49 CFR part 40 to be retained in the employee's qualification file

(b) (6), (b) (7)(C)

I.M.T.

(b) (6), (b) (7)(C)
1451 Tallevast Rd
Sarasota, FL 34243
Voice (b) (6), (b) (7)(C) Fax: 941.753.9975

MRO REPORT - FEDERAL
Controlled Substance Testing Results

Name of Donor: (b) (6), (b) (7)(C)

SSN / ID#: (b) (6), (b) (7)(C)

Name of Company: AMS/ SCHUYLER LINE NAVIGATION

Collection Date: 8/6/2020 10:30 AM

Specimen ID Number: (b) (6), (b) (7)(C)

Reason for Test: POST ACCIDENT

Analyzing Laboratory: QUEST DIAGNOSTICS
10101 RENNER BLVD.
LENEXA, KS 66219

MRO CCF Received: 8/12/2020 - 3:15 PM

Split Specimen: YES

Certified MRO: (b) (6), (b) (7)(C)

Urine Specimen Tested For:

(b) (7)(C), (b) (6)

Verified Test Result: (b) (6), (b) (7)(C)

I have received and reviewed the Laboratory result for the specimen represented by this form in accordance with the US Coast Guard Controlled Substance Testing requirements as contained in 49 CFR part 40 and 46 CFR part 16.

(b) (6), (b) (7)(C)

Certified Medical Review Officer (b) (6), (b) (7)(C)

8/12/2020
Verified Date

This information is required by Section 49 CFR part 40 to be retained in the employee's qualification file

(b) (6), (b) (7)(C)

I.M.T.

(b) (6), (b) (7)(C)
1451 Tallevast Rd
Sarasota, FL 34243
Voice (b) (6), (b) (7)(C) Fax: 941.753.9975

MRO REPORT - FEDERAL
Controlled Substance Testing Results

Name of Donor: (b) (6), (b) (7)(C)

SSN / ID#: (b) (6), (b) (7)(C)

Name of Company: AMS/ SCHUYLER LINE NAVIGATION

Collection Date: 8/6/2020 9:34 AM

Specimen ID Number: (b) (6), (b) (7)(C)

Reason for Test: POST ACCIDENT

Analyzing Laboratory: QUEST DIAGNOSTICS
10101 RENNER BLVD.
LENEXA, KS 66219

MRO CCF Received: 8/12/2020 - 3:15 PM

Split Specimen: YES

Certified MRO: (b) (6), (b) (7)(C)

Urine Specimen Tested For:

(b) (7)(C), (b) (6)

Verified Test Result: (b) (6), (b) (7)(C)

I have received and reviewed the Laboratory result for the specimen represented by this form in accordance with the US Coast Guard Controlled Substance Testing requirements as contained in 49 CFR part 40 and 46 CFR part 16.

(b) (6), (b) (7)(C)

Certified Medical Review Officer (b) (6), (b) (7)(C)

8/12/2020
Verified Date

This information is required by Section 49 CFR part 40 to be retained in the employee's qualification file

(b) (6), (b) (7)(C)

I.M.T.

(b) (6), (b) (7)(C)
1451 Tallevast Rd
Sarasota, FL 34243
Voice: (b) (6), (b) (7)(C) Fax: 941.753.9975

MRO REPORT - FEDERAL
Controlled Substance Testing Results

Name of Donor: (b) (6), (b) (7)(C)

SSN / ID#: (b) (6), (b) (7)(C)

Name of Company: AMS/ SCHUYLER LINE NAVIGATION

Collection Date: 8/6/2020 10:51 AM

Specimen ID Number: (b) (6), (b) (7)(C)

Reason for Test: POST ACCIDENT

Analyzing Laboratory: QUEST DIAGNOSTICS
10101 RENNER BLVD.
LENEXA, KS 66219

MRO CCF Received: 8/12/2020 - 3:15 PM

Split Specimen: YES

Certified MRO: (b) (6), (b) (7)(C)

Urine Specimen Tested For:

(b) (7)(C), (b) (6)

Verified Test Result: (b) (6), (b) (7)(C)

I have received and reviewed the Laboratory result for the specimen represented by this form in accordance with the US Coast Guard Controlled Substance Testing requirements as contained in 49 CFR part 40 and 46 CFR part 16.

(b) (6), (b) (7)(C)

Certified Medical Review Officer (b) (6), (b) (7)(C)

8/12/2020
Verified Date

This information is required by Section 49 CFR part 40 to be retained in the employee's qualification file

(b) (6), (b) (7)(C)

I.M.T.

(b) (6), (b) (7)(C)
1451 Tallevast Rd
Sarasota, FL 34243
Voice: (b) (6), (b) (7)(C) Fax: 941.753.9975

MRO REPORT - FEDERAL
Controlled Substance Testing Results

Name of Donor: (b) (6), (b) (7)(C)

SSN / ID#: (b) (6), (b) (7)(C)

Name of Company: AMS/ SCHUYLER LINE NAVIGATION

Collection Date: 8/6/2020 10:22 AM

Specimen ID Number: (b) (6), (b) (7)(C)

Reason for Test: POST ACCIDENT

Analyzing Laboratory: QUEST DIAGNOSTICS
10101 RENNER BLVD.
LENEXA, KS 66219

MRO CCF Received: 8/12/2020 - 3:15 PM

Split Specimen: YES

Certified MRO: (b) (6), (b) (7)(C)

Urine Specimen Tested For:

(b) (7)(C), (b) (6)

Verified Test Result: (b) (6), (b) (7)(C)

Comments:
CORRECTABLE FLAW AMENDED BY COLLECTION SITE.

I have received and reviewed the Laboratory result for the specimen represented by this form in accordance with the US Coast Guard Controlled Substance Testing requirements as contained in 49 CFR part 40 and 46 CFR part 16.

(b) (6), (b) (7)(C)

Certified Medical Review Officer (b) (6), (b) (7)(C)

8/19/2020
Verified Date

This information is required by Section 49 CFR part 40 to be retained in the employee's qualification file

(b) (6), (b) (7)(C)

I.M.T.

(b) (6), (b) (7)(C)
1451 Tallevast Rd
Sarasota, FL 34243
Voice (b) (6), (b) (7)(C) Fax: 941.753.9975

MRO REPORT - FEDERAL
Controlled Substance Testing Results

Name of Donor: (b) (6), (b) (7)(C)

SSN / ID#: (b) (6), (b) (7)(C)

Name of Company: AMS/ SCHUYLER LINE NAVIGATION

Collection Date: 8/6/2020 10:44 AM

Specimen ID Number: (b) (6), (b) (7)(C)

Reason for Test: POST ACCIDENT

Analyzing Laboratory: QUEST DIAGNOSTICS
10101 RENNER BLVD.
LENEXA, KS 66219

MRO CCF Received: 8/12/2020 - 3:15 PM

Split Specimen: YES

Certified MRO: (b) (6), (b) (7)(C)

Urine Specimen Tested For:

(b) (7)(C), (b) (6)

Verified Test Result: (b) (6), (b) (7)(C)

Comments:
CORRECTABLE FLAW AMENDED BY COLLECTION SITE.

I have received and reviewed the Laboratory result for the specimen represented by this form in accordance with the US Coast Guard Controlled Substance Testing requirements as contained in 49 CFR part 40 and 46 CFR part 16.

(b) (6), (b) (7)(C)

(b) (6), (b) (7)(C)

Certified Medical Review Officer (b) (6), (b) (7)(C)

8/19/2020
Verified Date

This information is required by Section 49 CFR part 40 to be retained in the employee's qualification file

(b) (6), (b) (7)(C)

I.M.T.

(b) (6), (b) (7)(C)
1451 Tallevast Rd
Sarasota, FL 34243
Voice: (b) (6), (b) (7)(C) Fax: 941.753.9975

MRO REPORT - FEDERAL
Controlled Substance Testing Results

Name of Donor: (b) (6), (b) (7)(C)

SSN / ID#: (b) (6), (b) (7)(C)

Name of Company: AMS/ SCHUYLER LINE NAVIGATION

Collection Date: 8/6/2020 10:37 AM

Specimen ID Number: (b) (6), (b) (7)(C)

Reason for Test: POST ACCIDENT

Analyzing Laboratory: QUEST DIAGNOSTICS
10101 RENNER BLVD.
LENEXA, KS 66219

MRO CCF Received: 8/12/2020 - 3:15 PM

Split Specimen: YES

Certified MRO: (b) (6), (b) (7)(C)

Urine Specimen Tested For:

(b) (7)(C), (b) (6)

Dilute Values:

CREATININE (b) (6), (b) (7)(C)

SPECIFIC GRAVITY (b) (6), (b) (7)(C)

Verified Test Result: (b) (6), (b) (7)(C)

Comments:
You may retest the individual, but not under direct observation.

I have received and reviewed the Laboratory result for the specimen represented by this form in accordance with the US Coast Guard Controlled Substance Testing requirements as contained in 49 CFR part 40 and 46 CFR part 16.

(b) (6), (b) (7)(C)

Certified Medical Review Officer (b) (6), (b) (7)(C)

8/12/2020
Verified Date

This information is required by Section 49 CFR part 40 to be retained in the employee's qualification file

(b) (6), (b) (7)(C)

I.M.T.

(b) (6), (b) (7)(C)
1451 Tallevast Rd
Sarasota, FL 34243
Voice (b) (6), (b) (7)(C) Fax: 941.753.9975

MRO REPORT - FEDERAL
Controlled Substance Testing Results

Name of Donor: (b) (6), (b) (7)(C)

SSN / ID#:

Name of Company: AMS/ SCHUYLER LINE NAVIGATION

Collection Date: 8/11/2020

Specimen ID Number: (b) (6), (b) (7)(C)

Reason for Test: POST ACCIDENT

Collected By: (b) (7)(C), (b) (6)

Analyzing Laboratory: QUEST DIAGNOSTICS
10101 RENNER BLVD.
LENEXA, KS 66219

MRO CCF Received: 8/12/2020 - 3:15 PM

Split Specimen: YES

Certified MRO: (b) (6), (b) (7)(C)

Urine Specimen Tested For:
(b) (7)(C), (b) (6)

Verified Test Result: (b) (6), (b) (7)(C)

I have received and reviewed the Laboratory result for the specimen represented by this form in accordance with the US Coast Guard Controlled Substance Testing requirements as contained in 49 CFR part 40 and 46 CFR part 16.

(b) (6), (b) (7)(C)

Certified Medical Review Officer • (b) (6), (b) (7)(C)

8/12/2020
Verified Date

This information is required by Section 49 CFR part 40 to be retained in the employee's qualification file

(b) (6), (b) (7)(C)

I.M.T.

(b) (6), (b) (7)(C)
1451 Tallevast Rd
Sarasota, FL 34243
Voice: (b) (6), (b) (7)(C) Fax: 941.753.9975

MRO REPORT - FEDERAL
Controlled Substance Testing Results

Name of Donor: (b) (6), (b) (7)(C)

SSN / ID#:

Name of Company: AMS/ SCHUYLER LINE NAVIGATION

Collection Date: 8/6/2020 10:09 AM

Specimen ID Number: (b) (6), (b) (7)(C)

Reason for Test: POST ACCIDENT

Analyzing Laboratory: QUEST DIAGNOSTICS
10101 RENNER BLVD.
LENEXA, KS 66219

MRO CCF Received: 8/12/2020 - 3:15 PM

Split Specimen: YES

Certified MRO: (b) (6), (b) (7)(C)

Urine Specimen Tested For:
(b) (7)(C), (b) (6)

Verified Test Result: (b) (6), (b) (7)(C)

I have received and reviewed the Laboratory result for the specimen represented by this form in accordance with the US Coast Guard Controlled Substance Testing requirements as contained in 49 CFR part 40 and 46 CFR part 16.

(b) (6), (b) (7)(C)

Certified Medical Review Officer - (b) (6), (b) (7)(C)

8/12/2020
Verified Date

This information is required by Section 49 CFR part 40 to be retained in the employee's qualification file

(b) (6), (b) (7)(C)

I.M.T.

(b) (6), (b) (7)(C)
1451 Tallevast Rd
Sarasota, FL 34243
Voice: (b) (6), (b) (7)(C) Fax: 941.753.9975

MRO REPORT - FEDERAL
Controlled Substance Testing Results

Name of Donor: (b) (6), (b) (7)(C)

SSN / ID#:

Name of Company: AMS/ SCHUYLER LINE NAVIGATION

Collection Date: 8/6/2020 10:02 AM

Specimen ID Number: (b) (6), (b) (7)(C)

Reason for Test: POST ACCIDENT

Analyzing Laboratory: QUEST DIAGNOSTICS
10101 RENNER BLVD.
LENEXA, KS 66219

MRO CCF Received: 8/12/2020 - 3:15 PM

Split Specimen: YES

Certified MRO: (b) (6), (b) (7)(C)

Urine Specimen Tested For:

(b) (7)(C), (b) (6)

Verified Test Result: (b) (6), (b) (7)(C)

I have received and reviewed the Laboratory result for the specimen represented by this form in accordance with the US Coast Guard Controlled Substance Testing requirements as contained in 49 CFR part 40 and 46 CFR part 16.

(b) (6), (b) (7)(C)

(b) (6), (b) (7)(C)

Certified Medical Review Officer

8/12/2020
Verified Date

This information is required by Section 49 CFR part 40 to be retained in the employee's qualification file

(b) (6), (b) (7)(C)

I.M.T.

(b) (6), (b) (7)(C)
1451 Tallevast Rd
Sarasota, FL 34243
Voice: (b) (6), (b) (7)(C) Fax: 941.753.9975

MRO REPORT - FEDERAL
Controlled Substance Testing Results

Name of Donor: (b) (6), (b) (7)(C)

SSN / ID#:

Name of Company: AMS/ SCHUYLER LINE NAVIGATION

Collection Date: 8/6/2020 9:55 AM

Specimen ID Number: (b) (6), (b) (7)(C)

Reason for Test: POST ACCIDENT

Analyzing Laboratory: QUEST DIAGNOSTICS
10101 RENNER BLVD.
LENEXA, KS 66219

MRO CCF Received: 8/12/2020 - 3:15 PM

Split Specimen: YES

Certified MRO: (b) (6), (b) (7)(C)

Urine Specimen Tested For:

(b) (7)(C), (b) (6)

Verified Test Result: (b) (6), (b) (7)(C)

I have received and reviewed the Laboratory result for the specimen represented by this form in accordance with the US Coast Guard Controlled Substance Testing requirements as contained in 49 CFR part 40 and 46 CFR part 16.

(b) (6), (b) (7)(C)

Certified Medical Review Officer (b) (6), (b) (7)(C)

8/12/2020
Verified Date

This information is required by Section 49 CFR part 40 to be retained in the employee's qualification file

(b) (6), (b) (7)(C)

I.M.T.

(b) (6), (b) (7)(C)
1451 Tallevast Rd
Sarasota, FL 34243
Voice: (b) (6), (b) (7)(C) Fax: 941.753.9975

MRO REPORT - FEDERAL
Controlled Substance Testing Results

Name of Donor: (b) (6), (b) (7)(C)

SSN / ID#:

Name of Company: AMS/ SCHUYLER LINE NAVIGATION

Collection Date: 8/6/2020 9:49 AM

Specimen ID Number: (b) (6), (b) (7)(C)

Reason for Test: POST ACCIDENT

Analyzing Laboratory: QUEST DIAGNOSTICS
10101 RENNER BLVD.
LENEXA, KS 66219

MRO CCF Received: 8/12/2020 - 3:15 PM

Split Specimen: YES

Certified MRO: (b) (6), (b) (7)(C)

Urine Specimen Tested For:

(b) (7)(C), (b) (6)

Verified Test Result: (b) (6), (b) (7)(C)

I have received and reviewed the Laboratory result for the specimen represented by this form in accordance with the US Coast Guard Controlled Substance Testing requirements as contained in 49 CFR part 40 and 46 CFR part 16.

(b) (6), (b) (7)(C)

Certified Medical Review Officer • (b) (6), (b) (7)(C)

8/12/2020
Verified Date

This information is required by Section 49 CFR part 40 to be retained in the employee's qualification file

(b) (6), (b) (7)(C)

I.M.T.

(b) (6), (b) (7)(C)
1451 Tallevast Rd
Sarasota, FL 34243
Voic(b) (6), (b) (7)(C) Fax: 941.753.9975

MRO REPORT - FEDERAL
Controlled Substance Testing Results

Name of Donor: (b) (6), (b) (7)(C)

SSN / ID#:

Name of Company: AMS/ SCHUYLER LINE NAVIGATION

Collection Date: 8/6/2020 9:14 AM

Specimen ID Number: (b) (6), (b) (7)(C)

Reason for Test: POST ACCIDENT

Analyzing Laboratory: QUEST DIAGNOSTICS
10101 RENNER BLVD.
LENEXA, KS 66219

MRO CCF Received: 8/12/2020 - 3:15 PM

Split Specimen: YES

Certified MRO: (b) (6), (b) (7)(C)

Urine Specimen Tested For:
(b) (7)(C), (b) (6)

Verified Test Result: (b) (6), (b) (7)(C)

I have received and reviewed the Laboratory result for the specimen represented by this form in accordance with the US Coast Guard Controlled Substance Testing requirements as contained in 49 CFR part 40 and 46 CFR part 16.

(b) (6), (b) (7)(C)

Certified Medical Review Officer (b) (6), (b) (7)(C)

8/12/2020
Verified Date

This information is required by Section 49 CFR part 40 to be retained in the employee's qualification file

(b) (6), (b) (7)(C)

I.M.T.

(b) (6), (b) (7)(C) FP, CMRO
Voice (b) (6), (b) (7)(C)

MRO REPORT - FEDERAL
Controlled Substance Testing Results

Name of Donor: (b) (6), (b) (7)(C)

SSN / ID#:

Name of Company: AMS/ SCHUYLER LINE NAVIGATION

Collection Date: 8/6/2020 9:55 AM

Specimen ID Number: (b) (6), (b) (7)(C)

Reason for Test: POST ACCIDENT

Analyzing Laboratory: QUEST DIAGNOSTICS
10101 RENNER BLVD.
LENEXA, KS 66219

MRO CCF Received: 8/12/2020 - 3:15 PM

Split Specimen: YES

Certified MRO: (b) (6), (b) (7)(C)

Urine Specimen Tested For:
(b) (7)(C), (b) (6)

Verified Test Result: (b) (6), (b) (7)(C)

I have received and reviewed the Laboratory result for the specimen represented by this form in accordance with the US Coast Guard Controlled Substance Testing requirements as contained in 49 CFR part 40 and 46 CFR part 16.

(b) (6), (b) (7)(C)

Certified Medical Review Officer • AAMRO/951015207

8/12/2020
Verified Date

This information is required by Section 49 CFR part 40 to be retained in the employee's qualification file

(b) (6), (b) (7)(C)

I.M.T.

(b) (6), (b) (7)(C) ABFP, CMRO
(b) (6), (b) (7)(C)
Voic

MRO REPORT - FEDERAL
Controlled Substance Testing Results

Name of Donor: (b) (6), (b) (7)(C)

SSN / ID#:

Name of Company: AMS/ SCHUYLER LINE NAVIGATION

Collection Date: 8/6/2020

Specimen ID Number: (b) (6), (b) (7)(C)

Reason for Test: POST ACCIDENT

Analyzing Laboratory: QUEST DIAGNOSTICS
10101 RENNER BLVD.
LENEXA, KS 66219

MRO CCF Received: 8/12/2020 - 3:15 PM

Split Specimen: YES

Certified MRO: (b) (6), (b) (7)(C)

Urine Specimen Tested For:
(b) (7)(C), (b) (6)

Verified Test Result: (b) (6), (b) (7)(C)

I have received and reviewed the Laboratory result for the specimen represented by this form in accordance with the US Coast Guard Controlled Substance Testing requirements as contained in 49 CFR part 40 and 46 CFR part 16.

(b) (6), (b) (7)(C)

Certified Medical Review Officer • AAMRO/931015207

8/12/2020
Verified Date

This information is required by Section 49 CFR part 40 to be retained in the employee's qualification file

(b) (6), (b) (7)(C)

I.M.T.

(b) (6), (b) (7)(C)
1451 Tallevast Rd
Sarasota, FL 34243
Voice (b) (6), (b) (7)(C) Fax: 941.753.9975

MRO REPORT - FEDERAL
Controlled Substance Testing Results

Name of Donor: (b) (6), (b) (7)(C)

SSN / ID#:

Name of Company: AMS/ SCHUYLER LINE NAVIGATION

Collection Date: 8/6/2020 9:42 AM

Specimen ID Number: (b) (6), (b) (7)(C)

Reason for Test: POST ACCIDENT

Analyzing Laboratory: QUEST DIAGNOSTICS
10101 RENNER BLVD.
LENEXA, KS 66219

MRO CCF Received: 8/12/2020 - 3:15 PM

Split Specimen: YES

Certified MRO: (b) (6), (b) (7)(C)

Urine Specimen Tested For:

(b) (7)(C), (b) (6)

Verified Test Result: (b) (6), (b) (7)(C)

I have received and reviewed the Laboratory result for the specimen represented by this form in accordance with the US Coast Guard Controlled Substance Testing requirements as contained in 49 CFR part 40 and 46 CFR part 16.

(b) (6), (b) (7)(C)

Certified Medical Review Officer • (b) (6), (b) (7)(C)

8/12/2020
Verified Date

This information is required by Section 49 CFR part 40 to be retained in the employee's qualification file

(b) (6), (b) (7)(C)

I.M.T.

(b) (6), (b) (7)(C)
1451 Tallevast Rd
Sarasota, FL 34243
Voice: (b) (6), (b) (7)(C) Fax: 941.753.9975

MRO REPORT - FEDERAL
Controlled Substance Testing Results

Name of Donor: (b) (6), (b) (7)(C)

SSN / ID#:

Name of Company: AMS/ SCHUYLER LINE NAVIGATION

Collection Date: 8/6/2020 4:54 PM

Specimen ID Number: (b) (6), (b) (7)(C)

Reason for Test: POST ACCIDENT

Analyzing Laboratory: QUEST DIAGNOSTICS
10101 RENNER BLVD.
LENEXA, KS 66219

MRO CCF Received: 8/12/2020 - 3:15 PM

Split Specimen: YES

Certified MRO: (b) (6), (b) (7)(C)

Urine Specimen Tested For:
(b) (7)(C), (b) (6)

Verified Test Result: (b) (6), (b) (7)(C)

I have received and reviewed the Laboratory result for the specimen represented by this form in accordance with the US Coast Guard Controlled Substance Testing requirements as contained in 49 CFR part 40 and 46 CFR part 16.

(b) (6), (b) (7)(C)

(b) (6), (b) (7)(C)

Certified Medical Review Officer

8/12/2020
Verified Date

This information is required by Section 49 CFR part 40 to be retained in the employee's qualification file

(b) (6), (b) (7)(C)

I.M.T.

(b) (6), (b) (7)(C), ABFP, CMRO
1451 Tallevast Rd
Sarasota, FL 34243
Voice: 941.753.9199 Fax: 941.753.9975

MRO REPORT - FEDERAL
Controlled Substance Testing Results

Name of Donor: (b) (6), (b) (7)(C)

SSN / ID#:

Name of Company: AMS/ SCHUYLER LINE NAVIGATION

Collection Date: 8/6/2020 10:57 AM

Specimen ID Number: (b) (6), (b) (7)(C)

Reason for Test: POST ACCIDENT

Analyzing Laboratory: QUEST DIAGNOSTICS
10101 RENNER BLVD.
LENEXA, KS 66219

MRO CCF Received: 8/12/2020 - 3:15 PM

Split Specimen: YES

Certified MRO: (b) (6), (b) (7)(C)

Urine Specimen Tested For:

(b) (7)(C), (b) (6)

Verified Test Result: (b) (6), (b) (7)(C)

I have received and reviewed the Laboratory result for the specimen represented by this form in accordance with the US Coast Guard Controlled Substance Testing requirements as contained in 49 CFR part 40 and 46 CFR part 16.

(b) (6), (b) (7)(C)

Certified Medical Review Offic(b) (6), (b) (7)(C)

8/12/2020
Verified Date

This information is required by Section 49 CFR part 40 to be retained in the employee's qualification file

(b) (6), (b) (7)(C)

FEDERAL DRUG TESTING CUSTODY AND CONTROL FORM

Quest Diagnostics
800-877-7484
www.questdiagnostics.com/mydrugtest

(b) (6), (b) (7)(C)

SPECIMEN ID NO.

STEP 1: COMPLETED BY COLLECTOR OR EMPLOYER REPRESENTATIVE

LAB ACCESSION NO.

(b) (6), (b) (7)(C)

(b) (6), (b) (7)(C)

OMB No. 0930-0158

C. Donor SSN or Employee I.D. No. (b) (6), (b) (7)(C)

D. Specify Testing Authority: ☐ HHS ☐ NRC Specify DOT Agency: ☐ FMCSA ☐ FAA ☐ FRA ☐ FTA ☐ PHMSA ☒ USCG

E. Reason for Test: ☐ Pre-employment ☐ Random ☐ Reasonable Suspicion/Cause ☐ Post Accident ☐ Return to Duty ☐ Follow-up ☐ Other (specify)

F. Drug Tests to be Performed: ☐ THC, COC, PCP, OPI, AMP ☐ THC & COC Only ☐ Other (specify)

65804N DOT DRUG PANEL 8/15

G. Collection Site Name: SLNC GODWIN Collection Site Code:

Address: 120 SEVEN AVE SUITE 201

City, State and Zip: ANNA MARIA MD 21403

Collector Phone No.: (b) (6), (b) (7)(C)

Collector Fax No.:

STEP 2: COMPLETED BY COLLECTOR (make remarks when appropriate) Collector reads specimen temperature within 4 minutes.

Temperature between 90° and 100° F? ☒ Yes ☐ No, Enter Remark Collection: ☒ Split ☐ Single ☐ None Provided, Enter Remark ☐ Observed, (Enter Remark)

REMARKS

STEP 3: Collector affixes bottle seal(s) to bottle(s). Collector dates seal(s). Donor initials seal(s). Donor completes STEP 5 on Copy 2 (MRO Copy)

STEP 4: CHAIN OF CUSTODY - INITIATED BY COLLECTOR AND COMPLETED BY TEST FACILITY

I certify that the specimen given to me by the donor identified in the certification section on Copy 2 of this form was collected, labeled, sealed, and released to the Delivery Service noted in accordance with applicable Federal requirements.

X (b) (6), (b) (7)(C)

Signature of Collector

(b) (6), (b) (7)(C)

(Print) Collector's Name (First, MI, Last) | 08/06/2020 Date (Mo./Day/Yr.) | 09:34 AM PM Time of Collection

SPECIMEN BOTTLE(S) RELEASED TO:

☐ Quest Diagnostics Courier
☒ FedEx
☐ Other

Name of Delivery Service

STEP 5: COMPLETED BY DONOR

I certify that I provided my urine specimen to the collector; that I have not adulterated it in any manner; each specimen bottle used was sealed with a tamper-evident seal in my presence; and that the information provided on this form and on the label affixed to each specimen bottle is correct.

X (b) (6), (b) (7)(C)

(b) (6), (b) (7)(C)

08/06/2020 Date (Mo./Day/Yr.)

Daytime Phone (b) (6), (b) (7)(C)

Evening Phone (b) (6), (b) (7)(C)

Date of Birth (b) (6), (b) (7)(C) Mo. Day Yr.

After the Medical Review Officer receives the test results for the specimen identified by this form, he/she may contact you to ask about prescriptions and over-the-counter medications you may have taken. Therefore,you may want to make a list of those medications for your own records. THIS LIST IS NOT NECESSARY. If you choose to make a list, do so either on a separate piece of paper or on the back of your copy (Copy 5). – DO NOT PROVIDE THIS INFORMATION ON THE BACK OF ANY OTHER COPY OF THE FORM. TAKE COPY 5 WITH YOU.

STEP 6: COMPLETED BY MEDICAL REVIEW OFFICER – PRIMARY SPECIMEN

In accordance with applicable Federal requirements, my verification is:

(b) (6), (b) (7)(C)

REMARKS:

X

Signature of Medical Review Officer | (PRINT) Medical Review Officer's Name (First, MI, Last) | Date (Mo./Day/Yr.)

STEP 7: COMPLETED BY MEDICAL REVIEW OFFICER – SPLIT SPECIMEN

In accordance with applicable Federal requirements, my verification for split specimen (if tested) is:

☐ **RECONFIRMED** for:

☐ **FAILED TO RECONFIRM** for:

☐ **TEST CANCELLED**

REMARKS:

X

Signature of Medical Review Officer | (PRINT) Medical Review Officer's Name (First, MI, Last) | (b) (6), (b) (7)(C) Date (Mo./Day/Yr.)

COPY 4 - EMPLOYER COPY

FEDERAL DRUG TESTING CUSTODY AND CONTROL FORM

(b) (6), (b) (7)(C)

Quest Diagnostics

800-877-7484

www.questdiagnostics.com/mydrugtest

LAB ACCESSION NO.

OMB No. 0930-0158

A. Employer Name, Address, I.D. No.

SCHUYLER LINE NAVIGATION
NICHOLAS BARKER
130 SEVERN AVE
ANNAPOLIS, MD 21403
PH: 443-321-4554 FAX

B. MRO Name, Address, Phone No. and Fax No.

(b) (6), (b) (7)(C)

INDUSTRIAL DRUG TESTING
1491 TOLLEVAST RD
SARASOTA, FL 34243
PH: 888-800-4676 FAX: 941-753-9975

C. Donor SSN or Employee I.D. No. (b) (6), (b) (7)(C)

D. Specify Testing Authority: ☐ HHS ☐ [illegible] ☐ FMCSA ☐ FAA ☐ FRA ☐ FTA ☐ PHMSA ☒ USCG

E. Reason for Test: ☐ Pre-employment ☐ Random ☐ Reasonable Suspicion/Cause ☒ Post Accident ☐ Return to Duty ☐ Follow-up ☐ Other (specify) _____

F. Drug Tests to be Performed: ☒ THC, COC, PCP, OPI, AMP ☐ THC & COC Only ☐ Other (specify) _____

☒ 6S04N DOT DRUG PANEL KITS

G. Collection Site Name: SLNC GOODWILL

Address: 130 SEVERN AVE SUITE 201

City, State and Zip: ANNAPOLIS, MD 21403 USA

Collection Site Code:

Collector Phone No.: _____

Collector Fax No.: _____

STEP 2: COMPLETED BY COLLECTOR (make remarks when appropriate) Collector reads specimen temperature within 4 minutes.

Temperature between 90° and 100° F? ☒ Yes ☐ No, Enter Remark Collection: ☒ Split ☐ Single ☐ None Provided, Enter Remark ☐ Observed, (Enter Remark)

REMARKS

STEP 3: Collector affixes bottle seal(s) to bottle(s). Collector dates seal(s). Donor initials seal(s). Donor completes STEP 5 on Copy 2 (MRO Copy)

STEP 4: CHAIN OF CUSTODY - INITIATED BY COLLECTOR AND COMPLETED BY TEST FACILITY

I certify that the specimen given to me by the donor identified in the certification section on Copy 2 of this form was collected, labeled, sealed, and released to the Delivery Service noted in accordance with applicable Federal requirements.

X (b) (6), (b) (7)(C) [illegible]ollector

(Print) Collector's Name (First, MI, Last)

08 / 06 / 20 [illegible] AM PM

Date (Mo./Day/Yr.) Time of Collection

SPECIMEN BOTTLE(S) RELEASED TO:

☐ Quest Diagnostics Courier
☒ FedEx
☐ Other

Name of Delivery Service

STEP 5: COMPLETED BY DONOR

I certify that I provided my urine specimen to the collector; that I have not adulterated it in any manner; each specimen bottle used was sealed with a tamper-evident seal in my presence; and that the information provided on this form and on the label affixed to each specimen bottle is correct.

X (b) (6), (b) (7)(C)

(PRINT) Donor's Name (First, MI, Last)

08 / 06 / 20

Date (Mo./Day/Yr.)

Daytime Phone No. (b) (6), (b) (7)(C)

Evening Phone No. ( )

Date of Birth (b) (6), (b) (7)(C)

After the Medical Review Officer receives the test results for the specimen identified by this form, he/she may contact you to ask about prescriptions and over-the-counter medications you may have taken. Therefore,you may want to make a list of those medications for your own records. THIS LIST IS NOT NECESSARY. If you choose to make a list, do so either on a separate piece of paper or on the back of your copy (Copy 5). – DO NOT PROVIDE THIS INFORMATION ON THE BACK OF ANY OTHER COPY OF THE FORM. TAKE COPY 5 WITH YOU.

STEP 6: COMPLETED BY MEDICAL REVIEW OFFICER – PRIMARY SPECIMEN

In accordance with applicable Federal requirements, my verification is:

☐ **NEGATIVE** ☐ **POSITIVE** for: _____

☐ DILUTE

☐ **REFUSAL TO TEST** because – check reason(s) below:

☐ **TEST CANCELLED**

☐ ADULTERATED (adulterant/reason): _____

☐ SUBSTITUTED

☐ OTHER _____

REMARKS: _____

X _____ _____ / / _____

Signature of Medical Review Officer (PRINT) Medical Review Officer's Name (First, MI, Last) Date (Mo./Day/Yr.)

STEP 7: COMPLETED BY MEDICAL REVIEW OFFICER – SPLIT SPECIMEN

In accordance with applicable Federal requirements, my verification for split specimen (if tested) is:

(b) (6), (b) (7)(C)

☐ **RECONFIRMED** for: _____

☐ **FAILED TO RECONFIRM** for: _____

CELLED

REMARKS: _____

X _____ _____ / / _____

Signature of Medical Review Officer (PRINT) Medical Review Officer's Name (First, MI, Last) (b) (6), (b) (7)(C) e (Mo./Day/Yr.)

COPY 4 - EMPLOYER COPY

FEDERAL DRUG TESTING CUSTODY AND CONTROL FORM

(b) (6), (b) (7)(C)

Quest Diagnostics

800-877-7484
www.questdiagnostics.com/mydrugtest

OMB No. 0930-0158

STEP 1: COMPLETED BY COLLECTOR OR EMPLOYER REPRESENTATIVE LAB ACCESSION NO.

A. Employer Name, Address, I.D. No.

B. MRO Name, Address, Phone No. and Fax No.

C. Donor SSN or Employee I.D. No. (b) (6), (b) (7)(C)

D. Specify Testing Authority: ☐ HHS ☐ NRC Specify DOT Agency: ☐ FMCSA ☐ FAA ☐ FRA ☐ FTA ☐ PHMSA ☒ USCG

E. Reason for Test: ☐ Pre-employment ☐ Random ☐ Reasonable Suspicion/Cause ☒ Post Accident ☐ Return to Duty ☐ Follow-up ☐ Other (specify) _____

F. Drug Tests to be Performed: ☒ THC, COC, PCP, OPI, AMP ☐ THC & COC Only ☐ Other (specify) _____

G. Collection Site Name: _____ Collection Site Code:

Address: _____ Collector Phone No.: _____

City, State and Zip: _____ Collector Fax No.: _____

STEP 2: COMPLETED BY COLLECTOR (make remarks when appropriate) Collector reads specimen temperature within 4 minutes.

Temperature between 90° and 100° F? ☒ Yes ☐ No, Enter Remark Collection: ☒ Split ☐ Single ☐ None Provided, Enter Remark ☐ Observed, (Enter Remark)

REMARKS

STEP 3: Collector affixes bottle seal(s) to bottle(s). Collector dates seal(s). Donor initials seal(s). Donor completes STEP 5 on Copy 2 (MRO Copy)

STEP 4: CHAIN OF CUSTODY - INITIATED BY COLLECTOR AND COMPLETED BY TEST FACILITY

I certify that the specimen given to me by the donor identified in the certification section on Copy 2 of this form was collected, labeled, sealed, and released to the Delivery Service noted in accordance with applicable Federal requirements.

X (b) (6), (b) (7)(C)

Date (Mo./Day/Yr.) Time of Collection AM PM

SPECIMEN BOTTLE(S) RELEASED TO:

☐ Quest Diagnostics Courier
☒ FedEx
☐ Other

Name of Delivery Service

STEP 5: COMPLETED BY DONOR

I certify that I provided my urine specimen to the collector; that I have not adulterated it in any manner; each specimen bottle used was sealed with a tamper-evident seal in my presence; and that the information provided on this form and on the label affixed to each specimen bottle is correct.

X (b) (6), (b) (7)(C) (b) (6), (b) (7)(C) 08/06/20

Date (Mo./Day/Yr.)

Daytime Phone (b) (6), (b) (7)(C) Evening Phone No. ( ) Date of Birth (b) (6), (b) (7)(C)

After the Medical Review Officer receives the test results for the specimen identified by this form, he/she may contact you to ask about prescriptions and over-the-counter medications you may have taken. Therefore,you may want to make a list of those medications for your own records. THIS LIST IS NOT NECESSARY. If you choose to make a list, do so either on a separate piece of paper or on the back of your copy (Copy 5). – DO NOT PROVIDE THIS INFORMATION ON THE BACK OF ANY OTHER COPY OF THE FORM. TAKE COPY 5 WITH YOU.

STEP 6: COMPLETED BY MEDICAL REVIEW OFFICER – PRIMARY SPECIMEN

In accordance with applicable Federal requirements, my verification is:

☐ **NEGATIVE** ☐ **POSITIVE** for: _____

☐ DILUTE

☐ **REFUSAL TO TEST** because – check reason(s) below:

☐ **TEST CANCELLED**

☐ ADULTERATED (adulterant/reason): _____

☐ SUBSTITUTED

☐ OTHER _____

REMARKS: _____

X _____ _____ / / _____

Signature of Medical Review Officer (PRINT) Medical Review Officer's Name (First, MI, Last) Date (Mo./Day/Yr.)

STEP 7: COMPLETED BY MEDICAL REVIEW OFFICER – SPLIT SPECIMEN

(b) (6), (b) (7)(C)

In accordance with applicable Federal requirements, my verification for split specimen (if tested) is:

☐ **RECONFIRMED** for: _____ **ANCELLED**

☐ **FAILED TO RECONFIRM** for: _____

REMARKS: _____

X _____ _____ / / _____

Signature of Medical Review Officer (PRINT) Medical Review Officer's Name (First, MI, Last) (b) (6), (b) (7)(C) Date (Mo./Day/Yr.)

COPY 4 - EMPLOYER COPY

RECORD OF HOURS OF REST

Aug 2020

IMO STCW 2010(+Manila)

Vessel: SLNC Goodwill

IMO No: 9448334

Flag: United States

Seafarer (Full Name): 06 [redacted]

Position (Rank): (b) (6), (b) (7)(C)

Watchkeeper: NO

Date	Periods of work are shaded (00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24)	Hours of work in 24h period	Hours of rest in 24h period	Comments	NOT TO BE COMPLETED BY THE SEAFARER: Hours of rest in any 24h period	NOT TO BE COMPLETED BY THE SEAFARER: Hours of rest in any 7 day period
8/1/2020		9.5	14.5		13.0	101.5
8/2/2020		9.5	14.5		13.0	101.5
8/3/2020		9.5	14.5		13.0	101.5
8/4/2020		9.5	14.5		13.0	101.5
8/5/2020		16.0	8.0		7.5	95.0
8/6/2020		15.0	9.0		5.0	89.5
8/7/2020		7.5	16.5		10.5	91.5
8/8/2020		9.5	14.5		13.0	91.5
8/9/2020		9.5	14.5		13.0	91.5
8/10/2020		9.5	14.5		13.0	91.5
8/11/2020		9.5	14.5		13.0	91.5
8/12/2020		9.5	14.5		13.0	98.0
8/13/2020		9.5	14.5		13.0	103.5
8/14/2020		9.5	14.5		13.0	101.5
8/15/2020		9.5	14.5		13.0	101.5
8/16/2020		9.5	14.5		13.0	101.5
8/17/2020		9.5	14.5		13.0	101.5
8/18/2020		9.5	14.5		13.0	101.5
8/19/2020		9.5	14.5		13.0	101.5
8/20/2020		9.5	14.5		13.0	101.5
8/21/2020		9.5	14.5		13.0	101.5
8/22/2020		9.5	14.5		13.0	101.5
8/23/2020		9.5	14.5		13.0	101.5
8/24/2020		9.5	14.5		13.0	101.5
8/25/2020		9.5	14.5		13.0	101.5
8/26/2020		9.5	14.5		13.0	101.5
8/27/2020		9.5	14.5		13.0	101.5
8/28/2020		9.5	14.5		13.0	101.5
8/29/2020		9.5	14.5		13.0	101.5
8/30/2020		9.5	14.5		13.0	101.5
8/31/2020		9.5	14.5		13.0	101.5
	00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24	304.5	439.5			

The following national laws, regulations and/or collective agreements governing limitations on working hours or minimum rest periods apply to this ship:

USCG, IMO STCW 2010, OPA 90, MM&P, SIU

I AGREE THAT THIS RECORD IS AN ACCURATE REFLECTION OF THE HOURS OF WORK OR REST OF THE SEAFARER CONCERNED.

Name of master or person authorized by master to sign this record: (b) (6), (b) (7)(C), Chief Officer

Signature of master or authorized person: _____

Signature of seafarer: _____

A copy of this record is to be given to the seafarer. This form is subject to examination and endorsement under procedures established by: United States

(name of competent authority)

M3-1

(b) (7)(C), (b) (6)

ZHENJIANG MARINE DIESEL WORKS

ZJMD — MAN B&W

Instruction Book

L23/30H

Shipyard :

Ship name :

Hull No. :

Rule :

Add: 250,Guangtangqiao Zhenjiang

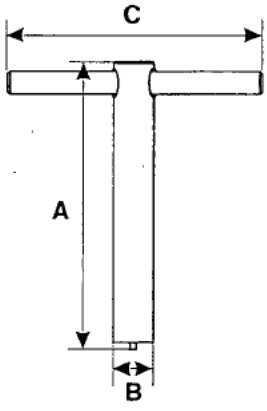
Jiangsu Province P.R.China

Tel: (b) (6), (b) (7)(C)

Fax: +86 511 451 0033

Plate Page 1 (1)	Tools for Control and Safety Systems Automatics and Instruments	52009-02H

L23/30H

Illustration of Tools	Designation	Dimensions A	Dimensions B	Dimensions C	S/E	Item No.
	Spanner for adjusting of overspeed stop.	125	ø20	100	S	016

S = Standard E = Extra

JWE 제원엔지니어링
#472-30 Gupyoung-dong Saha-gu Busan Korea
Tel.(051)264-1375~7 Fax.(051)264-1374
Home page : http://www.jewoneng.co.kr
E-mail: (b) (6), (b) (7)(C)

Registered ISO 9001:2008

WOODWARD Business Partner

WORK COMPLETION REPORT

JEWON ENGINEERING
Technical Repairing Team

- CUSTOMER/END USER : SCHUYLER LINE
- Ref. No. : GW-19-603a
- Location : PUSAN / KOREA
- Site / Ship(Hull)'s Name : M/V SLNC GOODWILL
- DATE : 20TH ~ 22ND.MAY.2019
- Reason : No.1 D/G governor overhaul
- Charged Person : (b) (6), (b) (7)(C)
- GOVERNOR INFORMATION
  1. Governor Manufacturer : WOODWARD
  2. Governor Vendor/Type : UG-8D
  3. Governor P/N & S/N :

	PART NO	SERIAL NO	REMARKS
UG-8D	8520-0041	15592175	D/G NO.1

- TIME TABLE for TRAVEL/WORK SERVICE

DATE	TIME for WORK				TIME for TRAVEL		REMARKS
	Start Time	End Time	Reg. Times	Over Times	Reg. Times	Over Times	
20TH MAY.2019					4.0		BUSAN – ULSAN – BUSAN (Try to onboard but failed because of weather)
20TH MAY.2019							WORK
21ST MAY.2019							WORK
22ND MAY.2019							BUSAN – ULSAN – BUSAN (Install and test)

JEWON ENGINEERING CO. JWE 제원엔지니어링

I certify and confirm that the works contained in this report has been completed to my satisfaction and list of re(b) (6), (b) (7)(C) correct.

CUSTOMER (b) (6)

SERVICE ENGINEER Signature
(b) (6), (b) (7)(C)

JWE 제원엔지니어링

#472-30 Gupyoung-dong Saha-gu Busan Korea
Tel.(051)264-1375~7 Fax.(051)264-1374

Home page : http://www.jewoneng.co.kr
E-mail (b) (6), (b) (7)(C)

Registered ISO 9001:2008

WOODWARD Business Partner

USING SPARE PARTS

	Part. Name.	Reference No.	Part. No.	Number	Unit	Remark
1	OVERHAUL KIT			1	SET	
2	PILOT VALVE BUSHING		31188	1	EA	
3	PILOT VALVE PLUNGER		30084	1	EA	
4	LAMINATED DRIVE SPRING		30317	12	EA	
5	SIGHT GLASS		1832-109	1	EA	
6	FLYWEIGHT		196089	2	EA	
7	FLYWEIGHT BEARING		180013	4	EA	
8	PIPE PLUG		187034	2	EA	
9	BEVEL GEAR BEARING		16008	1	EA	
10	ELASTIC STOP NUT		1137-821	1	EA	
11	FLEXLOC STOP NUT		1137-425	1	EA	
12	MOTOR OVERHAUL			1	SET	
13	MOTOR BEARING		1782-013	1	EA	
14	MOTOR BEARING		1782-014	1	EA	
15	BRUSH CAP		37928	2	EA	
16	-BLANK-					
17						
18						
19						
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21						
22						
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24						
25						
26						
27						

JEWON ENGINEERING CO., JWE 제원엔지니어링

I certify and confirm that the works contained in this report has been completed to my satisfaction and list of replacement is correct.

CHIEF ENGINEER
DATE:

CUSTOMER Sign (b) (6), (b) (7)(C)

SERVICE ENGINEER Signature (b) (6), (b) (7)(C)

JWE 제원엔지니어링
#472-30 Gupyoung-dong Saha-gu Busan Korea
Tel.(051)264-1375~7 Fax.(051)264-1374
Home page : http://www.jewoneng.co.kr
E-mail (b) (6), (b) (7)(C)

Registered ISO 9001:2008

WOODWARD Business Partner

WORK COMPLETION REPORT

JEWON ENGINEERING
Technical Repairing Team

- CUSTOMER/END USER : SCHUYLER LINE
- Ref. No. : GW-19-603a
- Location : PUSAN / KOREA
- Site / Ship(Hull)'s Name : M/V SLNC GOODWILL
- DATE : 20TH ~ 22ND.MAY.2019
- Reason : No.1 D/G governor overhaul
- Charged Person : (b) (6), (b) (7)(C) [redacted]
- GOVERNOR INFORMATION
  1. Governor Manufacturer : WOODWARD
  2. Governor Vendor/Type : UG-8D
  3. Governor P/N & S/N :

	PART NO	SERIAL NO	REMARKS
UG-8D	8520-0041	15592175	D/G NO.1

- TIME TABLE for TRAVEL/WORK SERVICE

DATE	TIME for WORK				TIME for TRAVEL		REMARKS
	Start Time	End Time	Reg. Times	Over Times	Reg. Times	Over Times	
20TH MAY.2019					4.0		BUSAN – ULSAN – BUSAN (Try to onboard but failed because of weather)
20TH MAY.2019							WORK
21ST MAY.2019							WORK
22ND MAY.2019					4.0		BUSAN – ULSAN – BUSAN (Install and test)

I certify and confirm that the works contained in this report has been completed to my satisfaction and list of replacement is correct.

CUSTOMER Signature **SERVICE ENGINEER Signature**

제원엔지니어링
#472-30 Gupyoung-dong Saha-gu Busan Korea
Tel.(051)264-1375~7 Fax.(051)264-1374
Home page : http://www.jewoneng.co.kr
E-mail (b) (6), (b) (7)(C)

Registered ISO 9001:2008

WOODWARD Business Partner

USING SPARE PARTS

	Part. Name.	Reference No.	Part. No.	Number	Unit	Remark
1	OVERHAUL KIT			1	SET	
2	PILOT VALVE BUSHING		31188	1	EA	
3	PILOT VALVE PLUNGER		30084	1	EA	
4	LAMINATED DRIVE SPRING		30317	12	EA	
5	SIGHT GLASS		1832-109	1	EA	
6	FLYWEIGHT		196089	2	EA	
7	FLYWEIGHT BEARING		180013	4	EA	
8	PIPE PLUG		187034	2	EA	
9	BEVEL GEAR BEARING		16008	1	EA	
10	ELASTIC STOP NUT		1137-821	1	EA	
11	FLEXLOC STOP NUT		1137-425	1	EA	
12	MOTOR OVERHAUL			1	SET	
13	MOTOR BEARING		1782-013	1	EA	
14	MOTOR BEARING		1782-014	1	EA	
15	BRUSH CAP		37928	2	EA	
16	-BLANK-					
17						
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25						
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27						

I certify and confirm that the works contained in this report has been completed to my satisfaction and list of replacement is correct.

CUSTOMER Signature

SERVICE ENGINEER Signature

JWE 제원엔지니어링
#472-30 Gupyoung-dong Saha-gu Busan Korea
Tel.(051)264-1375~7 Fax.(051)264-1374
Home page : http://www.jewoneng.co.kr
E-mail:(b) (6), (b) (7)(C)

Purpose of work

1. It is highly recommended that Hydraulic-Mechanical Governor/Actuator receives periodical maintenance in order to extend its service life, Hydraulic-Mechanical Governor/Actuator consist of mechanically moving parts and life limited parts in it that requires periodical maintenance or overhaul.
2. Periodical maintenance.

Work

1. 20TH.MAY.2019, receive governor from the agent of M/V SLNC GOODWILL at JEWON ENGINEERING
2. Carried out governor overhaul.

2-1. Disassembled governor : Contaminated by oil



2-2. Cleaning & Parts inspection




2-3. Renewed Part

a) P.V. PLUNGER & P.V. BUSHING : It was jiggling problem on test stand so replace P.V. PLUNGER & P.V. BUSHING (Control land wear)

b) FLYWEIGHT : Flyweight toe was wear down. (That part's reason for the hunting & jiggling)

c) SIGHT OIL GAUGE : Sight oil gauge wear and break. (Oil leakage)

2-4. Governor test : test the governor on the woodward test stand.

3. 22ND.MAY.2019 install the governor on the engine of M/V SLNC GOODWILL.

3-1. Install the governor to No.1 Diesel engine.

3-2. Carried out engine & governor running test.

JWE 제원엔지니어링
#472-30 Gupyoung-dong Saha-gu Busan Korea
Tel.(051)264-1375~7 Fax.(051)264-1374
Home page : http://www.jewoneng.co.kr
E-mail (b) (6), (b) (7)(C)

Remark

1. I recommend governor should be overhaul at least every 2 years.
2. Upper listed parts exchanged. Exchange that parts beside overhaul kits.
3. It was jiggling problem on test stand so replace P.V. PLUNGER & P.V. BUSHING, Flyweight.
4. Governor motor overhaul and both side of bearing was replaced.

---END---

General Test Record for Woodward UG 8D Governors

Customer M/V SLNC GOODWILL **Location** D/G NO.1

Part No. 8520-0041 **Serial No.** 15592175

Tested by: [redacted] **Assembled by:** [redacted] **Date:** 21th.MAY.2019

Check ✕'s proceeding Numbers Not Applicable.

Test at 71°C to 82°C using oil viscosity of approximately 20 mm^2/s

1. Compensation system leakage and needle valve seating checked. √
2. Compensating piston bypass in both directions checked. √
3. Governor oil pressure at 350 rpm (UG8, 758 / UG10, 910kPa.)check in both direction. 200 PSI.

✕ 4. With governor control at 400 rpm, apply 90.5 N-m for UG8, 11.7 N- for UG10 torque in fuel off direction
Speed is _____ rpm, r/min min-1, 395 min.

5. Jiggle is with tolerance. √
6. Steady-state regulation is acceptable +/-0.1% √
7. Off speed recovery is acceptable. √
8. Droop is set to give 1 rpm, r/min, min-1 rise above 1001 rpm, r/min, min-1 for .80 term.
shaft travel.
9. High speed stop is set at 1513 rpm, r/min, min-1 9.9 indicator.(within 0 to + 10 rpm)
10. Low speed set at 1023 rpm, r/min, min-1 0.0 indicator.(within 0 to -10 rpm)

Note:Tolerance for coarse metric speeder screw is +20 to 0 for H.S and +0 to -20 for L.S.

Stop pin set at____rpm, r/min, min-1.

✕ 11. Shutdown nuts adjusted._____

✕ 12. Pneumatic speed set_____rpm, r/min, min-1 at _____kPa. air.
_____rpm, r/min, min-1 at _____kPa. air.

✕ 13. Air, oil, water shutdown_____kPa and above_____ below_____.

✕ 14. Shutdown solenoid operates at 85 rated voltage. √ _____VDC____VAC
Energize to S.D. √ De-energize to S.D. _____ Latch _____ Potted ___

15. Governor is free of oil leaks. √
16. Needle valve set 1/2 turn open. (Final adjustment to be done in the field.)

Four UG-D only, continued on next sheet.

Serial No. 15592175

General Test Record for Woodward UG 18D Governors

17. Sync. knob positioned and pinned. √.
18. Load indicator positioned knob pinned. √.
19. Speed droop knob is pinned, "0" on dial matched pointer, √
20. Friction clutch is set. √ (0.51-0.62 N-m w/motor), (0.17-0.28 N-m w/o motor)
21. Sync. motor operates properly. √ VAC 24 VDC

✕ 22. Test & Record mag. P.U. voltage at 400 rpm. V
(0.25V min true rpm for Exp. proof P.U) (0.6V min true rpm for Std. mag P.U)

✕ 23. Max. speed limit switch operates at rpm, r/min, min-1 and above.

✕ 24. Min. speed limit switch operates at rpm, r/min, min-1 and below.

✕ 25. Signal limit switch operates at rpm, r/min, min-1.

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E-mail (b) (6), (b) (7)(C)

Registered: ISO 9001:2008

WOODWARD Business Partner

WORK COMPLETION REPORT

JEWON ENGINEERING
Technical Repairing Team

- CUSTOMER/END USER : SCHUYLER LINE
- Ref. No. : GW-19-603a
- Location : PUSAN / KOREA
- Site / Ship(Hull)'s Name : M/V SLNC GOODWILL
- DATE : 20TH ~ 22ND.MAY.2019
- Reason : No.1 D/G governor overhaul
- Charged Person : (b) (6), (b) (7)(C)
- GOVERNOR INFORMATION
  1. Governor Manufacturer : WOODWARD
  2. Governor Vendor/Type : UG-8D
  3. Governor P/N & S/N :

	PART NO	SERIAL NO	REMARKS
UG-8D	8520-0041	15592175	D/G NO.1

- TIME TABLE for TRAVEL/WORK SERVICE

DATE	TIME for WORK				TIME for TRAVEL		REMARKS
	Start Time	End Time	Reg. Times	Over Times	Reg. Times	Over Times	
20TH MAY.2019					4.0		BUSAN – ULSAN – BUSAN (Try to onboard but failed because of weather)
20TH MAY.2019							WORK
21ST MAY.2019							WORK
22ND MAY.2019							BUSAN – ULSAN – BUSAN (Install and test)

JEWON ENGINEERING CO. JWE 제원엔지니어링

I certify and confirm that the works contained in this report has been completed to my satisfaction and list of replacement is correct.

(b) (6), (b) (7)(C) CHIEF ENGINEER DATE:

Cus(b) (6), (

(b) (6), (b) (7)(C) gnature

(b) (6), (b) (7)(C)

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◆ USING SPARE PARTS

	Part. Name.	Reference No.	Part. No.	Number	Unit	Remark
1	OVERHAUL KIT			1	SET	
2	PILOT VALVE BUSHING		31188	1	EA	
3	PILOT VALVE PLUNGER		30084	1	EA	
4	LAMINATED DRIVE SPRING		30317	12	EA	
5	SIGHT GLASS		1832-109	1	EA	
6	FLYWEIGHT		196089	2	EA	
7	FLYWEIGHT BEARING		180013	4	EA	
8	PIPE PLUG		187034	2	EA	
9	BEVEL GEAR BEARING		16008	1	EA	
10	ELASTIC STOP NUT		1137-821	1	EA	
11	FLEXLOC STOP NUT		1137-425	1	EA	
12	MOTOR OVERHAUL			1	SET	
13	MOTOR BEARING		1782-013	1	EA	
14	MOTOR BEARING		1782-014	1	EA	
15	BRUSH CAP		37928	2	EA	
16	-BLANK-					
17						
18						
19						
20						
21						
22						
23						
24						
25						
26						
27						

JEWON ENGINEERING CO. JWE 제원엔지니어링

I certify and confirm that the works contained in this report has been completed to my satisfaction and list of replacement is correct.

CUST (b) (6), (b) (7)(C)

SERVICE ENGINEER Signature
(b) (6), (b) (7)(C)

(b) (6), (b) (7)(C)

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Registered ISO 9001:2008

WOODWARD Business Partner

WORK COMPLETION REPORT

JEWON ENGINEERING
Technical Repairing Team

- CUSTOMER/END USER : SCHUYLER LINE
- Ref. No. : GW-19-603a
- Location : PUSAN / KOREA
- Site / Ship(Hull)'s Name : M/V SLNC GOODWILL
- DATE : 20TH ~ 22ND.MAY.2019
- Reason : No.1 D/G governor overhaul
- Charged Person : (b) (6), (b) (7)(C)
- GOVERNOR INFORMATION
  1. Governor Manufacturer : WOODWARD
  2. Governor Vendor/Type : UG-8D
  3. Governor P/N & S/N :

	PART NO	SERIAL NO	REMARKS
UG-8D	8520-0041	15592175	D/G NO.1

- TIME TABLE for TRAVEL/WORK SERVICE

DATE	TIME for WORK				TIME for TRAVEL		REMARKS
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20TH MAY.2019							WORK
21ST MAY.2019							WORK
22ND MAY.2019					4.0		BUSAN – ULSAN – BUSAN (Install and test)

I certify and confirm that the works contained in this report has been completed to my satisfaction and list of replacement is correct.

CUSTOMER Signature **SERVICE ENGINEER Signature**

(b) (6), (b) (7)(C)

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◆ USING SPARE PARTS

	Part. Name.	Reference No.	Part. No.	Number	Unit	Remark
1	OVERHAUL KIT			1	SET	
2	PILOT VALVE BUSHING		31188	1	EA	
3	PILOT VALVE PLUNGER		30084	1	EA	
4	LAMINATED DRIVE SPRING		30317	12	EA	
5	SIGHT GLASS		1832-109	1	EA	
6	FLYWEIGHT		196089	2	EA	
7	FLYWEIGHT BEARING		180013	4	EA	
8	PIPE PLUG		187034	2	EA	
9	BEVEL GEAR BEARING		16006	1	EA	
10	ELASTIC STOP NUT		1137-821	1	EA	
11	FLEXLOC STOP NUT		1137-425	1	EA	
12	MOTOR OVERHAUL			1	SET	
13	MOTOR BEARING		1782-013	1	EA	
14	MOTOR BEARING		1782-014	1	EA	
15	BRUSH CAP		37928	2	EA	
16	-BLANK-					
17						
18						
19						
20						
21						
22						
23						
24						
25						
26						
27						

I certify and confirm that the works contained in this report has been completed to my satisfaction and list of replacement is correct.

CUSTOMER Signature

SERVICE ENGINEER Signature

(b) (6), (b) (7)(C)

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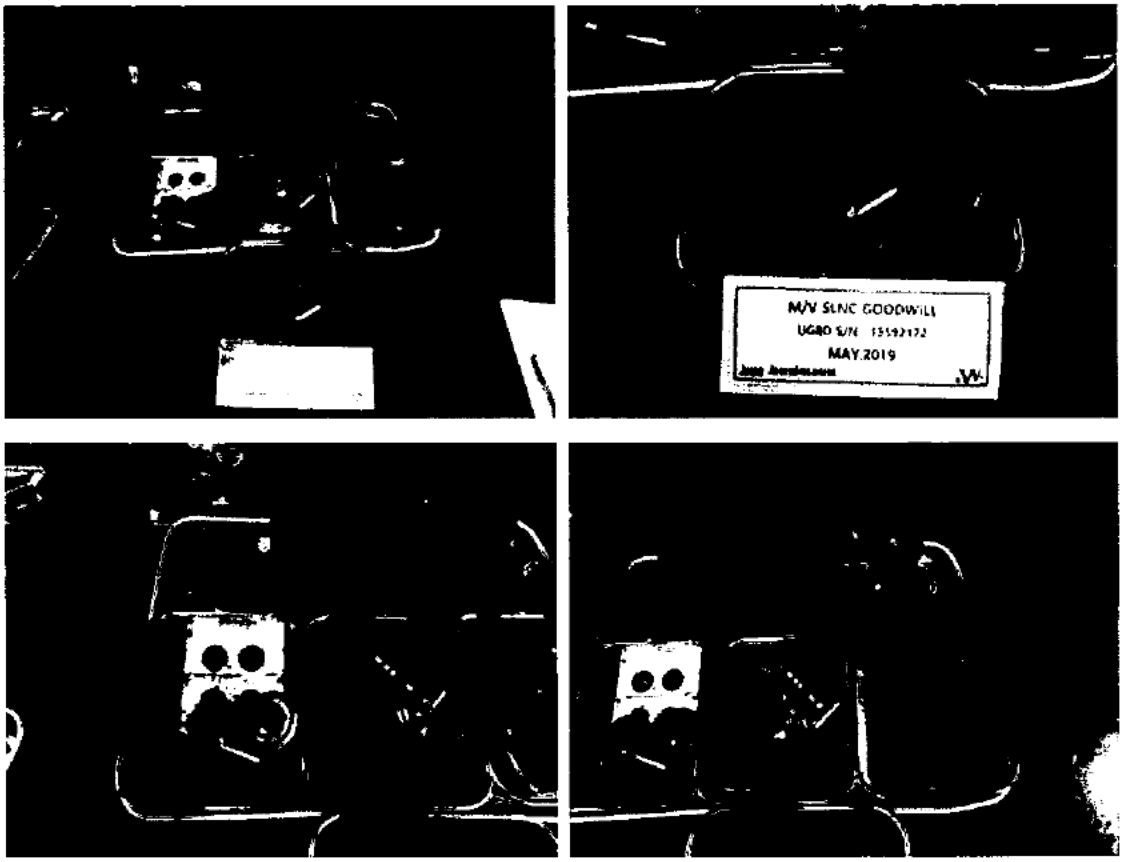
Purpose of work

1. It is highly recommended that Hydraulic-Mechanical Governor/Actuator receives periodical maintenance in order to extend its service life, Hydraulic-Mechanical Governor/Actuator consist of mechanically moving parts and life limited parts in it that requires periodical maintenance or overhaul.
2. Periodical maintenance.

Work

1. 20TH.MAY.2019, receive governor from the agent of M/V SLNC GOODWILL at JEWON ENGINEERING
2. Carried out governor overhaul.

2-1. Disassembled governor : Contaminated by oil



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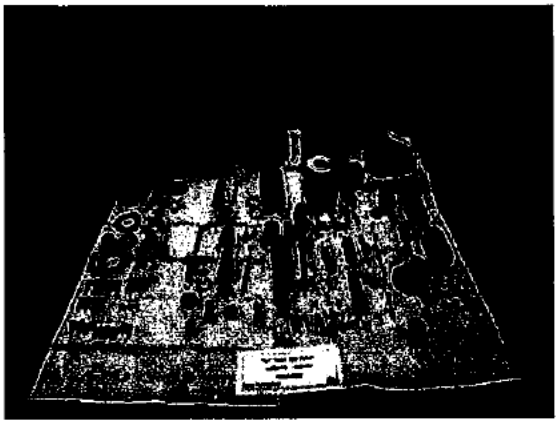
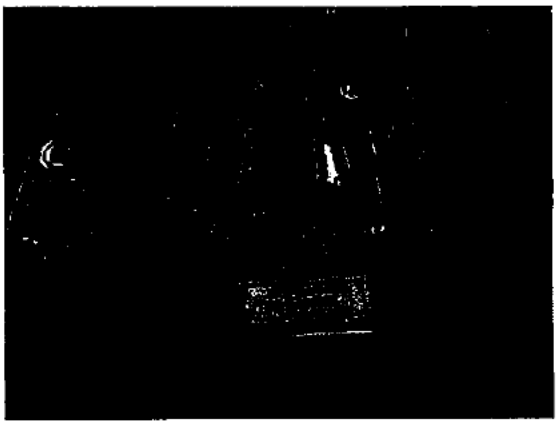
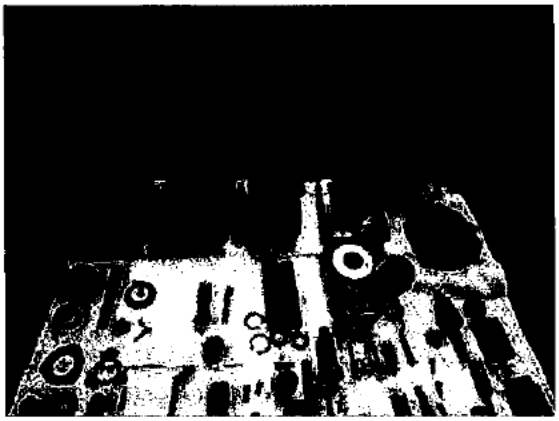
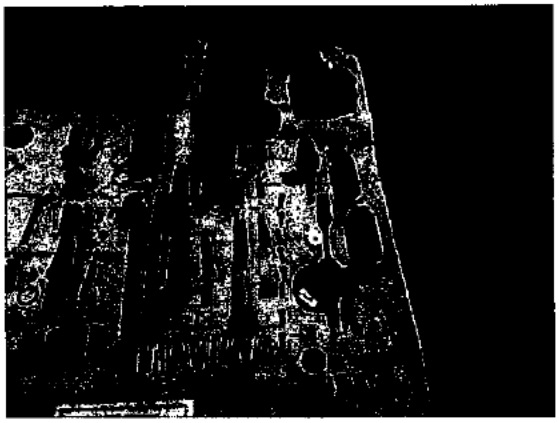
2-2. Cleaning & Parts inspection

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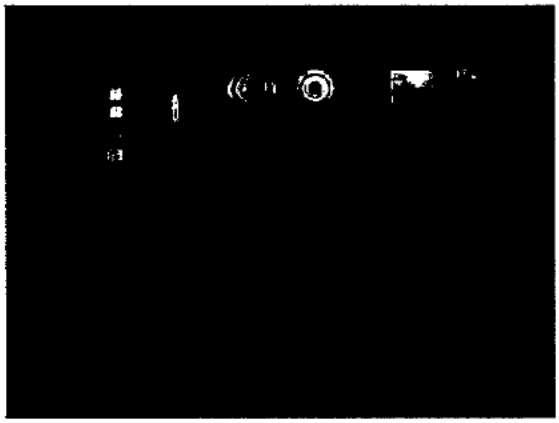
2-3. Renewed Part



a) P.V. PLUNGER & P.V. BUSHING : It was jiggling problem on test stand so replace P.V. PLUNGER & P.V. BUSHING (Control land wear)

b) FLYWEIGHT : Flyweight toe was wear down. (That part's reason for the hunting & jiggling)

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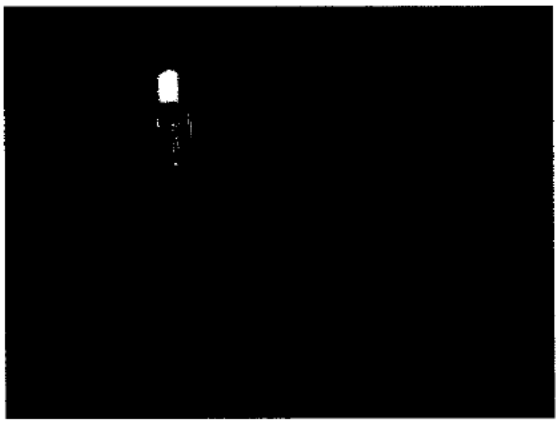
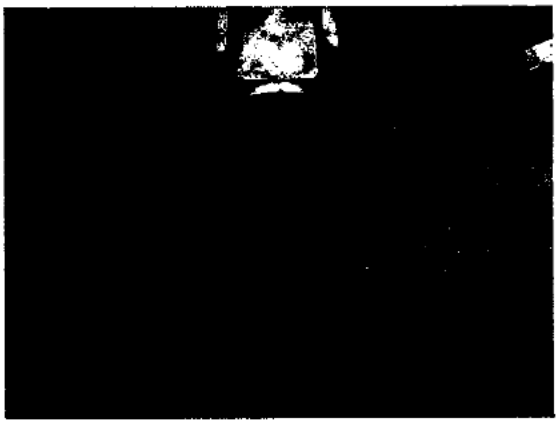
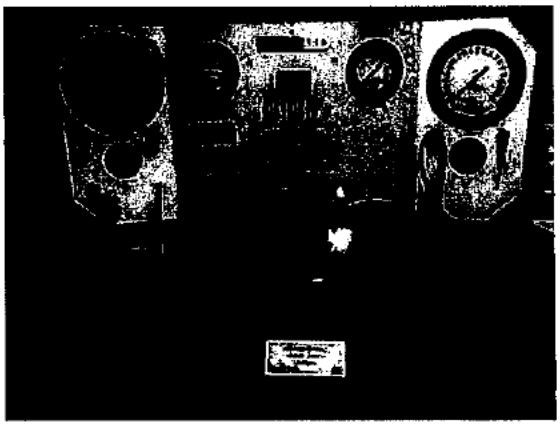
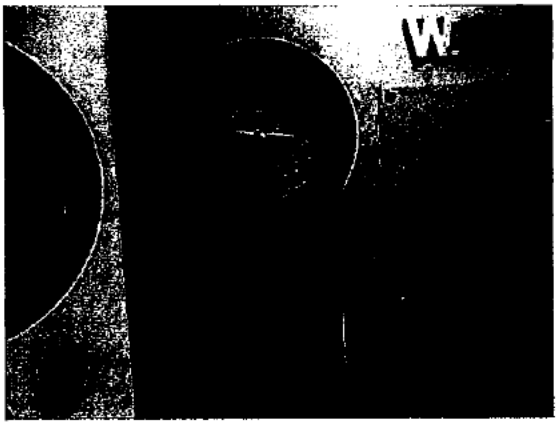
c) SIGHT OIL GAUGE : Sight oil gauge wear and break. (Oil leakage)





2-4. Governor test : test the governor on the woodward test stand.





3. 22ND.MAY.2019 install the governor on the engine of M/V SLNC GOODWILL.

3-1. Install the governor to No.1 Diesel engine.

3-2. Carried out engine & governor running test.

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Remark

1. I recommend governor should be overhaul at least every 2 years.
2. Upper listed parts exchanged. Exchange that parts beside overhaul kits.
3. It was jiggling problem on test stand so replace P.V. PLUNGER & P.V. BUSHING, Flyweight.
4. Governor motor overhaul and both side of bearing was replaced.

---END---

General Test Record for Woodward UG 8D Governors

Customer M/V SLNC GOODWILL **Location** D/G NO.1

Part No. 8520-0041 **Serial No.** 15592175

Tested by: (b) (6), (b) (7)(C) **Assembled by:** (b) (6), (b) (7)(C) **Date:** 21th.MAY.2019

Check ✕'s proceeding Numbers Not Applicable.

Test at 71°C to 82°C using oil viscosity of approximately 20 mm^2/s

1. Compensation system leakage and needle valve seating checked. √
2. Compensating piston bypass in both directions checked. √
3. Governor oil pressure at 350 rpm (UG8, 758 / UG10, 910kPa.)check in both direction. 200 PSI.

✕ 4. With governor control at 400 rpm, apply 90.5 N-m for UG8, 11.7 N- for UG10 torque in fuel off direction
Speed is _____ rpm, r/min min-1, 395 min.

5. Jiggle is with tolerance. √
6. Steady-state regulation is acceptable +/-0.1% √
7. Off speed recovery is acceptable. √
8. Droop is set to give 1 rpm, r/min, min-1 rise above 1001 rpm, r/min, min-1 for .80 term. shaft travel.
9. High speed stop is set at 1513 rpm, r/min, min-1 9.9 indicator.(within 0 to + 10 rpm)
10. Low speed set at 1023 rpm, r/min, min-1 0.0 indicator.(within 0 to -10 rpm)

Note:Tolerance for coarse metric speeder screw is +20 to 0 for H.S and +0 to -20 for L.S.

Stop pin set at____rpm, r/min, min-1.

✕ 11. Shutdown nuts adjusted._____.

✕ 12. Pneumatic speed set_____rpm, r/min, min-1 at _____kPa. air.
_____rpm, r/min, min-1 at _____kPa. air.

✕ 13. Air, oil, water shutdown_____kPa and above_____ below_____.

✕ 14. Shutdown solenoid operates at 85 rated voltage. √ _____VDC____VAC
Energize to S.D. √ De-energize to S.D. _____ Latch _____ Potted ___

15. Governor is free of oil leaks. √
16. Needle valve set 1/2 turn open. (Final adjustment to be done in the field.)

Four UG-D only, continued on next sheet.

(b) (6), (b) (7)(C)

Serial No. 15592175

General Test Record for Woodward UG 18D Governors

17. Sync. knob positioned and pinned. √.
18. Load indicator positioned knob pinned. √.
19. Speed droop knob is pinned, "0" on dial matched pointer, √
20. Friction clutch is set. √ (0.51-0.62 N-m w/motor), _____(0.17-0.28 N-m w/o motor)
21. Sync. motor operates properly. √ _____ VAC 24 VDC

✕ 22. Test & Record mag. P.U. voltage at 400 rpm._____ V
(0.25V min true rpm for Exp. proof P.U) (0.6V min true rpm for Std. mag P.U)

✕ 23. Max. speed limit switch operates at_____ rpm, r/min, min-1 and above.

✕ 24. Min. speed limit switch operates at_____ rpm, r/min, min-1 and below.

✕ 25. Signal limit switch operates at_____ rpm, r/min, min-1.

Lloyd's Register

Schuyler Line Navigation Company LLC

Attention: (b) (6), (b) (7)(C) : Schuyler Line Navigation Company
CC: (b) (6), (b) (7)(C)

Lloyd's Register EMEA
Global Technology Centre
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United Kingdom

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E (b) (6), (b) (7)(C)
www.lr.org

21 January 2021

STATEMENT OF PRELIMINARY FINDINGS

For settlement purposes only

At the request of Schuyler Line Navigation Company LLC (SLNC), The Client, Lloyd's Register EMEA's Technical Investigation Department (TID), on behalf of Lloyd's Register North America, Inc., is undertaking an investigation to establish the cause of failure of the number 1 diesel generator installed onboard the vessel SLNC Goodwill, IMO Number 9448334.

MT SLNC Goodwill, IMO number 9448334 is an oil products/chemical tanker built in 2009 at the Guangzhou Shipyard International Co., Ltd., China as their yard number 06131056.

SLNC Goodwill hotel and electric services are provided by three auxiliary generating sets each with an MAN B&W – ZJMD 6L23/30H type prime mover rated to deliver 960 KW at 900 rpm. The generating sets are located in two separate rooms. Set numbers 1 and 2 are in one room and set 3 is in an adjoining room to starboard.

Failure of the diesel generator number 1 occurred on 05 August 2020. According to reports received, Ship's Engineers had carried out maintenance on the engine on 04 August 2020, installing a replacement governor in an effort to rectify engine rotational speed problems. At the first start of the engine on 05 August with the replacement governor, it is reported that the engine speed was unstable and gradually increasing. Reports indicate that the manual overspeed trip was activated at approximately 1,020 rpm, which is in line with the design intent setting of 1,030 rpm.
After an inspection of the engine and generator, the overspeed trip was reset and the engine was started a second time. Reports indicate that it became immediately obvious that there was something wrong. Noise and vibrations were heard and felt. Actions to try and stop the engine were taken, unfortunately the severity of the problem was such that the flywheel burst, discharging the four segments of failed flywheel and other engine parts into the engine room resulting in fatal injury to the attending Third Assistant Engineer, and causing extensive damage to the engine, generator and surrounding support structures. It Is not known at what rotational speed the flywheel burst.

The investigation to date has undertaken visual inspections, metallurgical examinations and theoretical calculations. This statement presents the following preliminary conclusions into the cause of the engine failure.

1. The engine failed because the flywheel burst under overspeed conditions. The burst occurred because at the increased speed, the centrifugal force and corresponding stresses imposed in the flywheel at the bolted connection between engine, flywheel and generator were greater than the resisting strength of the flywheel material.

2. Investigation has identified that the mechanical properties and chemical composition of the flywheel material did not meet the design requirements of the engine licensor MAN.

3. In respect of the mechanical strength of the flywheel, the design specification is for a grey cast iron of Grade C4 with a tensile strength of between 300MPa and 400MPa and a Brinnell hardness of between 200HB and 250HB.

4. Two sets of tensile tests have been undertaken. Each of the sets of tensile tests looked at mechanical strength of test pieces taken from both radial and tangential directions. For the first series of tests, using material from the centre of the flywheel, four tests yielded an average strength of 174MPa with a range from 168MPa to 182MPa.

5. For the second series of tests, using material taken from in way of the bolt holes at the centre of one of the four segments, four tests yielded an average strength of 186.5 MPa with a range from 176MPa to 194MPa.

6. In respect of the material hardness, test results found the hardness to be 167HB.

7. In respect of the material chemical composition of the flywheel casting the following table presents the results of tests in relation to the design requirements.

Element	Design Specification (%)	Test Results (%)
Carbon	3.1 Nominal	2.2*
Silicon	1.7 Nominal	2.25
Manganese	0.8 Nominal	0.694
Phosphorous	0.2 Max	0.076
Sulphur	0.15 Max	0.081*

*Determined by Combustion analysis

8. In addition to the above, investigation has also found that the casting in way of the facture locations at the centre of the flywheel contained micro-shrinkage. Such a characteristic would also adversely affect the mechanical strength of the flywheel.

9. Calculations carried out show that, if the flywheel had possessed mechanical properties which met MAN's original design requirements, it should not have failed, even under overspeed conditions. Periodic tests of the engine overspeed devices, most recently in July 2020, had been carried out successfully.

Lloyd's Register

10. The calculations also show that, for the mechanical properties of the flywheel as identified by laboratory testing, failure would occur at speeds above the setting point of the overspeed trip devices installed on the engine.

11. The investigation has also identified that the engine went into an overspeed condition because the governor fitted to the engine developed a fault causing it to fail.

12. Failure of the governor resulted in an uncontrolled acceleration of the engine rotational speed to an overspeed condition.

13. The reason for the governor failure is still under investigation.

For and on behalf of Lloyd's Register,

(b) (6), (b) (7)(C)

(b) (6), (b) (7)(C)
Principal Specialist and Team Leader,
Technical and Failure Investigation Department
Advisory Services
Lloyd's Register EMEA, Lloyd's Register Global Technology Centre,
Southampton Boldrewood Innovation Campus, Burgess Road, Southampton, SO16 7QF, UK

(b) (7)(C), (b) (7)(C), (b) (6)

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Company No. 6257418 | VAT No. 901 5650 34

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ISO 45001

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MANAGEMENT
SYSTEMS
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ISO 45001

UKAS
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SYSTEMS
001

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Figure 1 – Flywheel Fractured Sections

Figure 2 – Flywheel Fractured Sections

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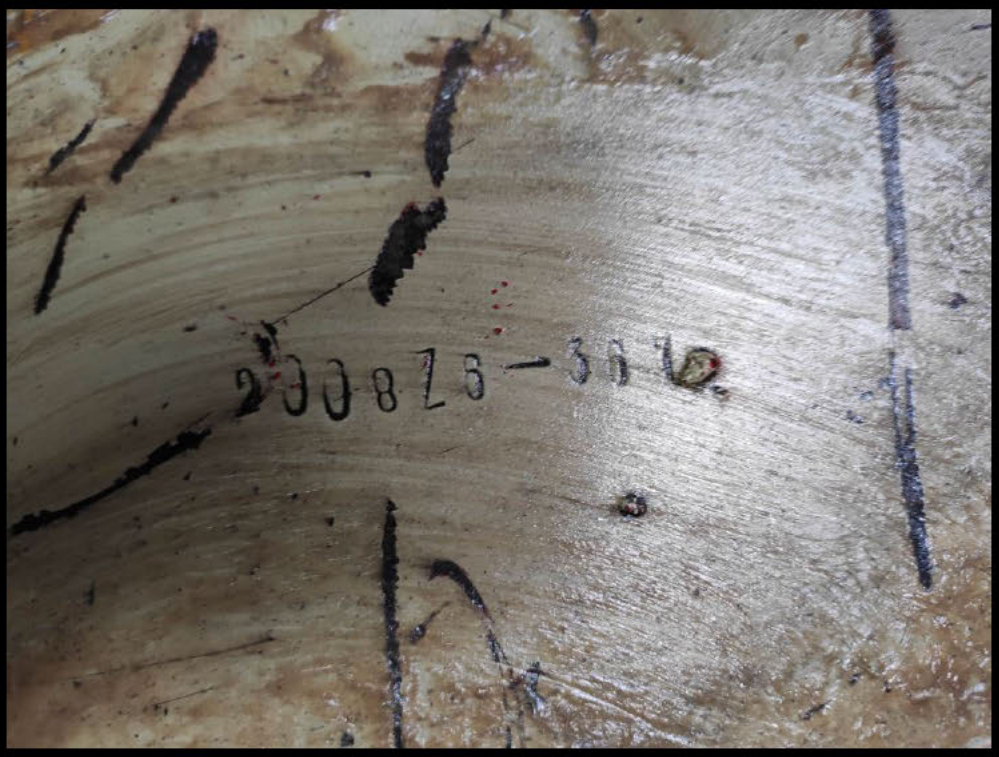

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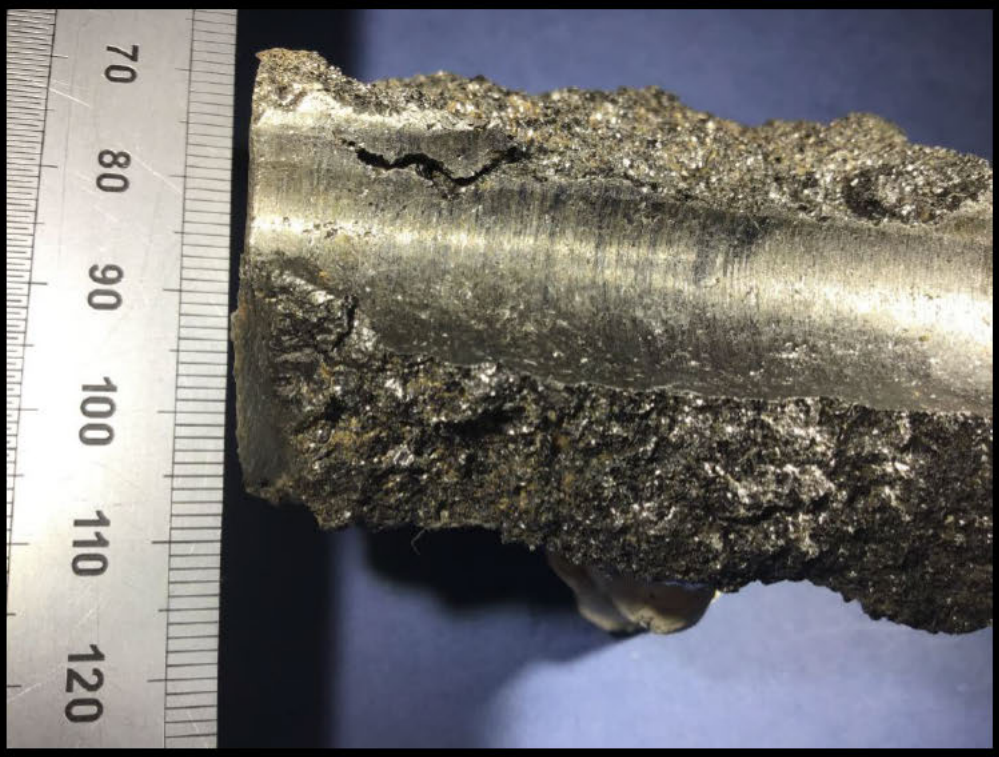

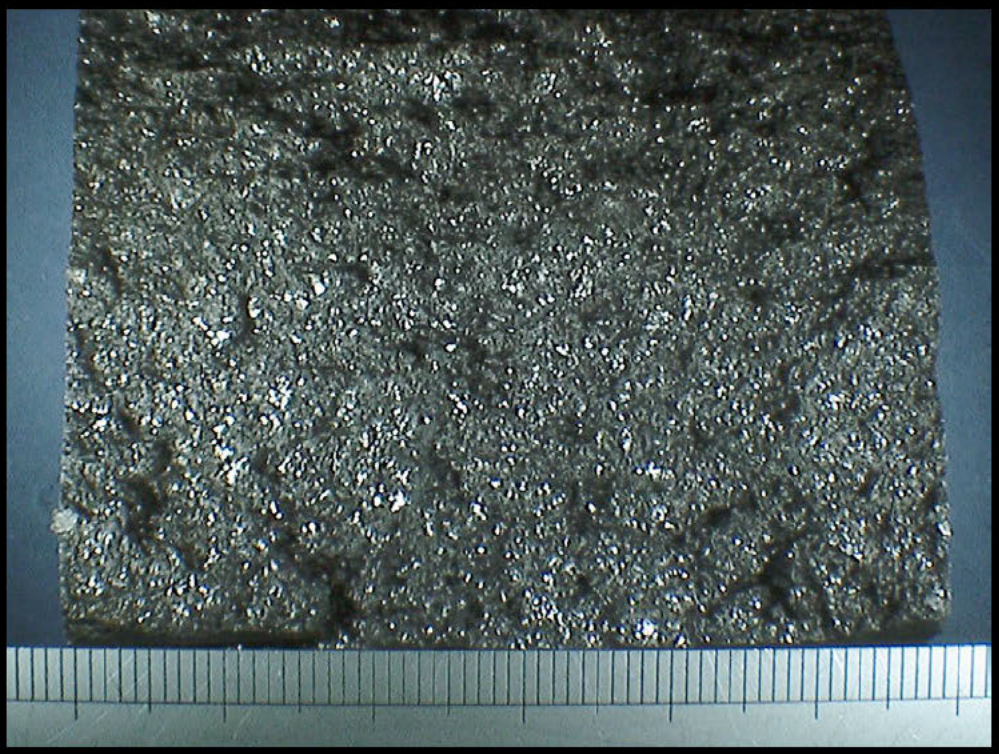

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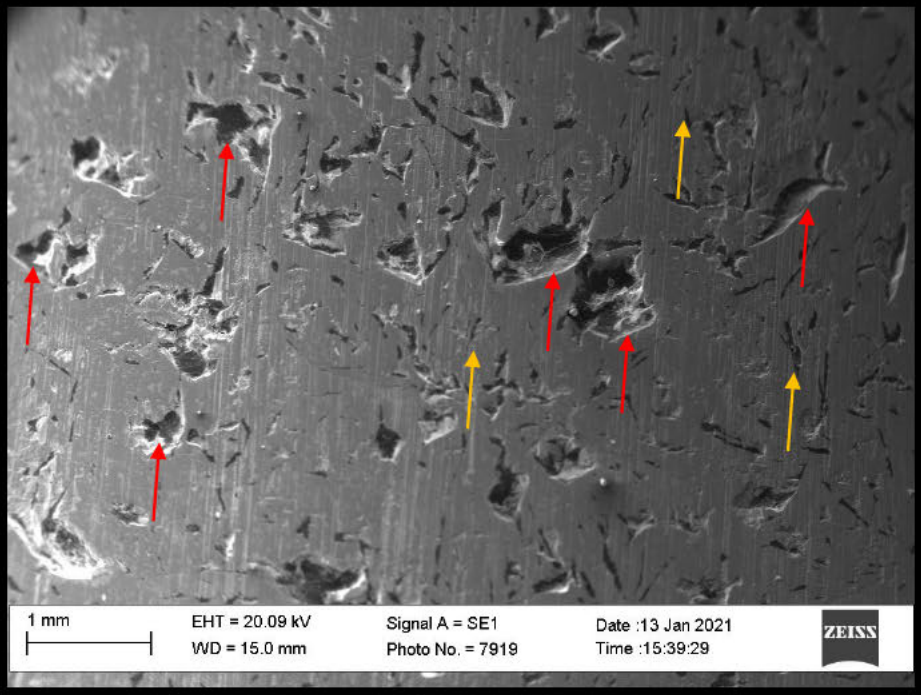

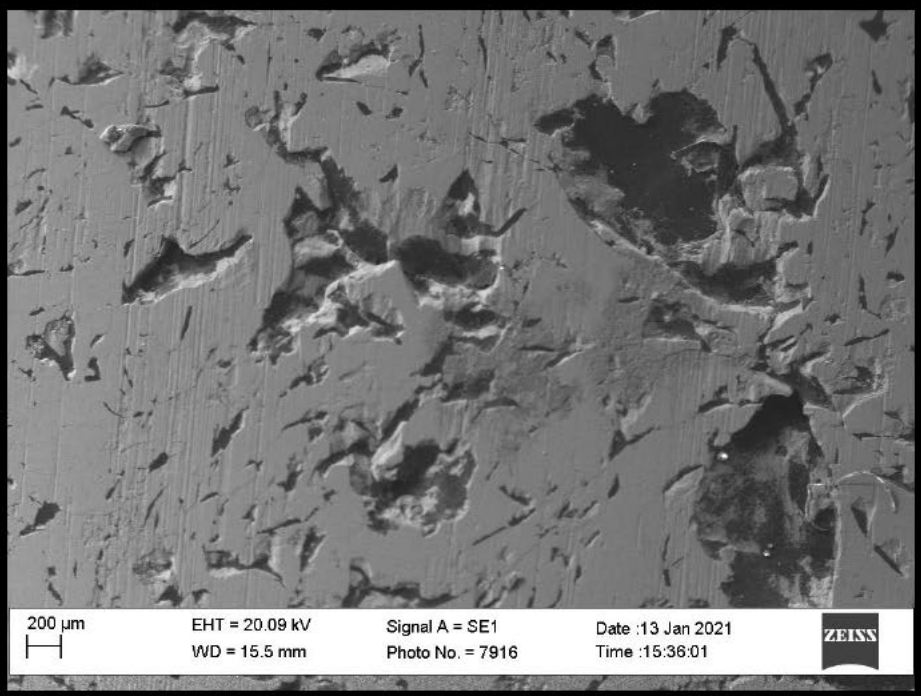

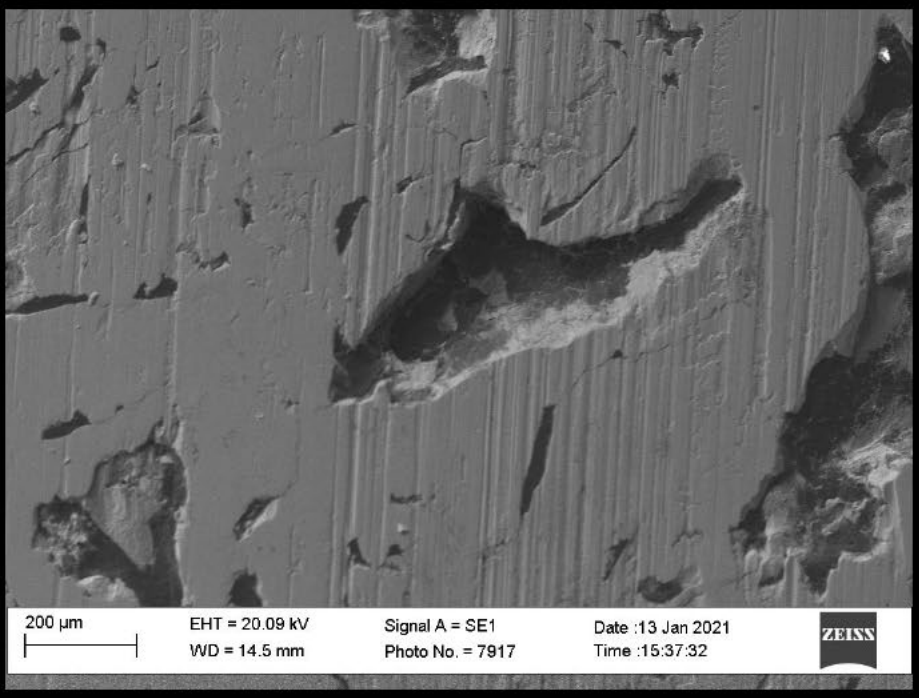

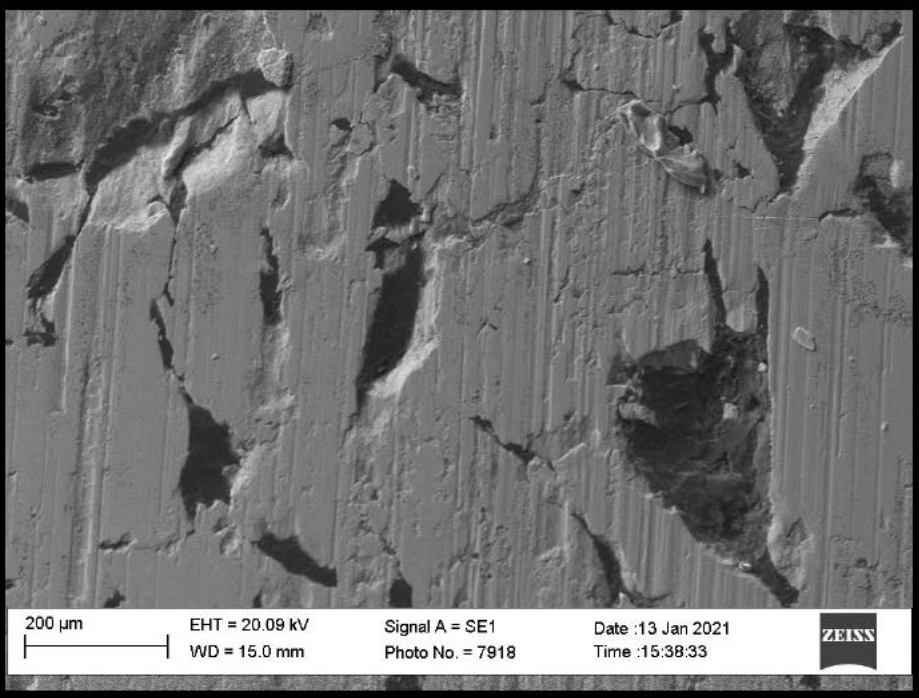

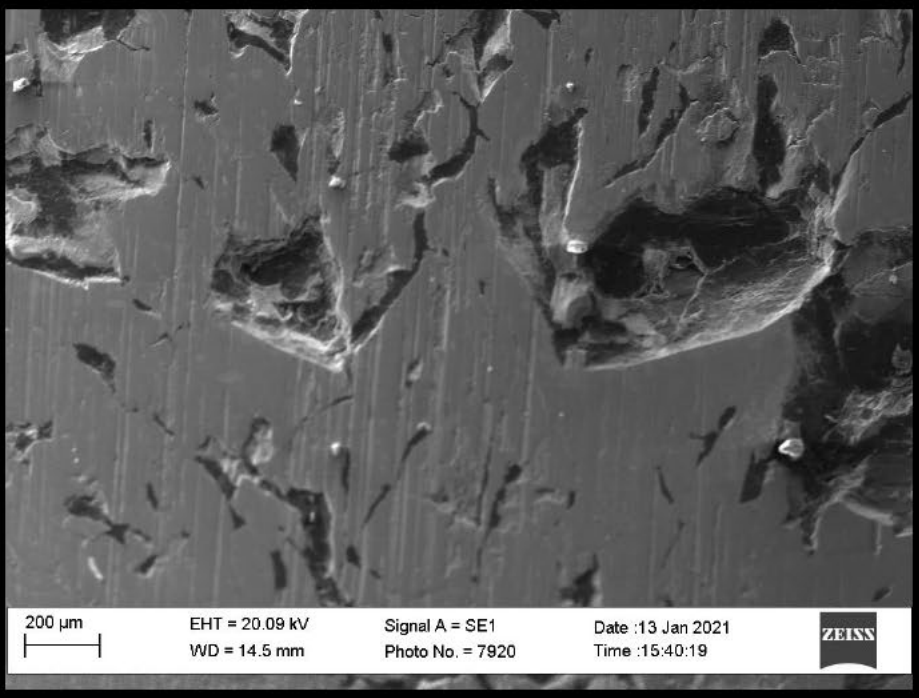

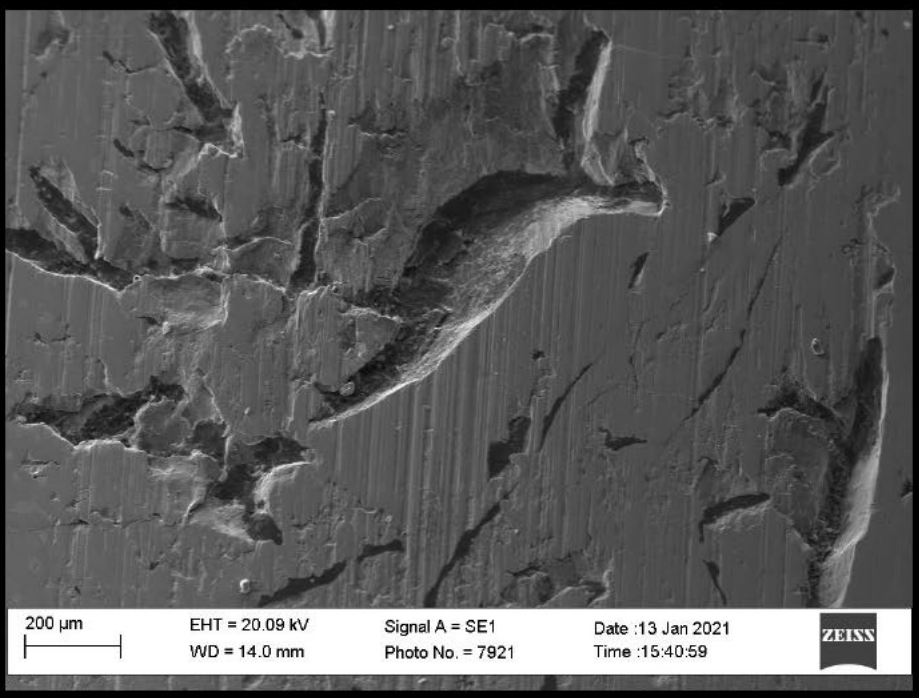

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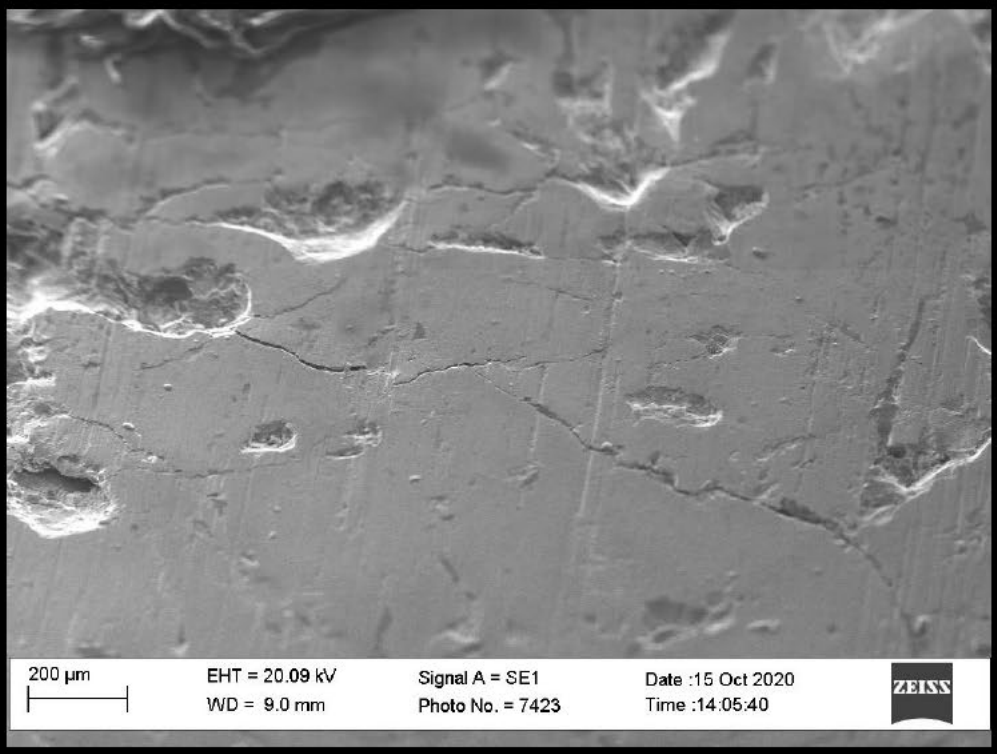

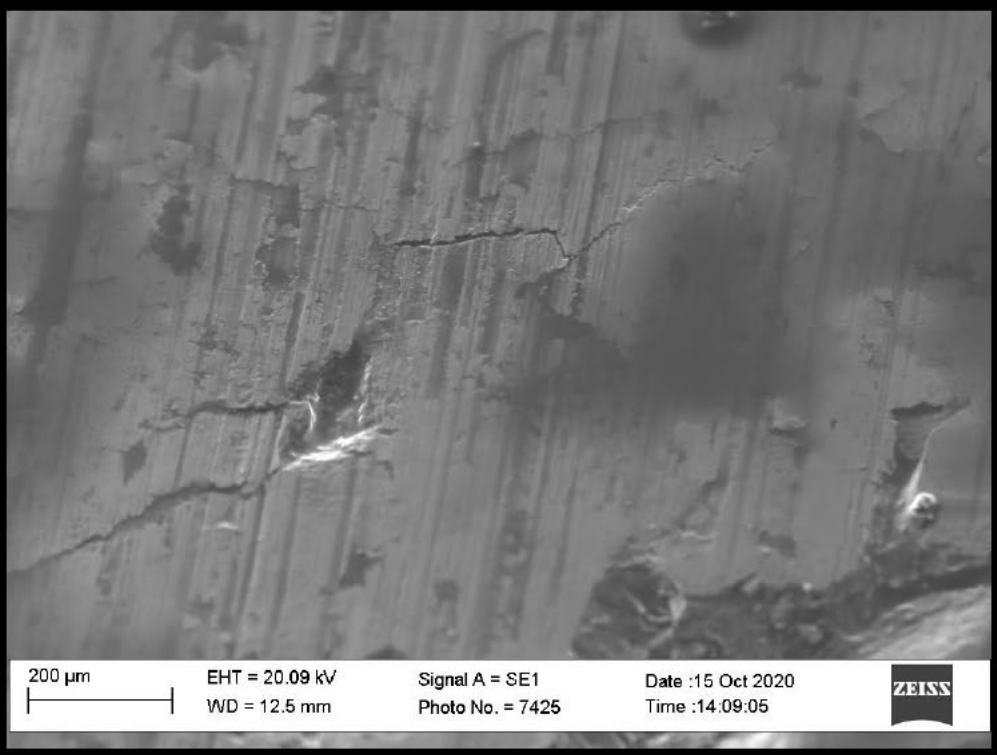

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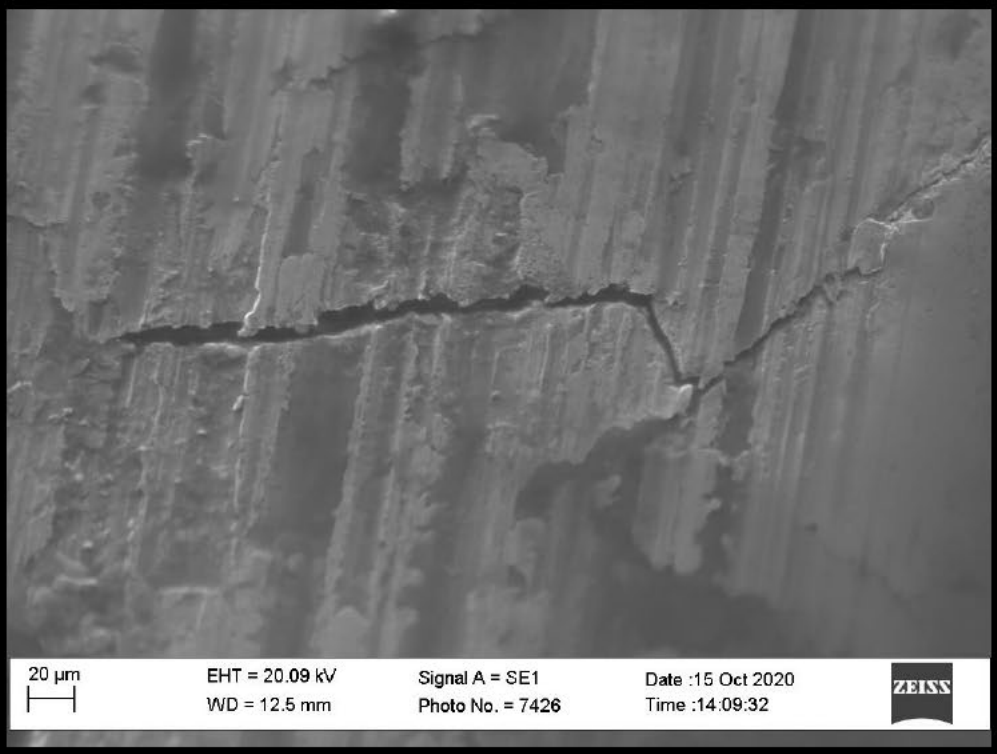

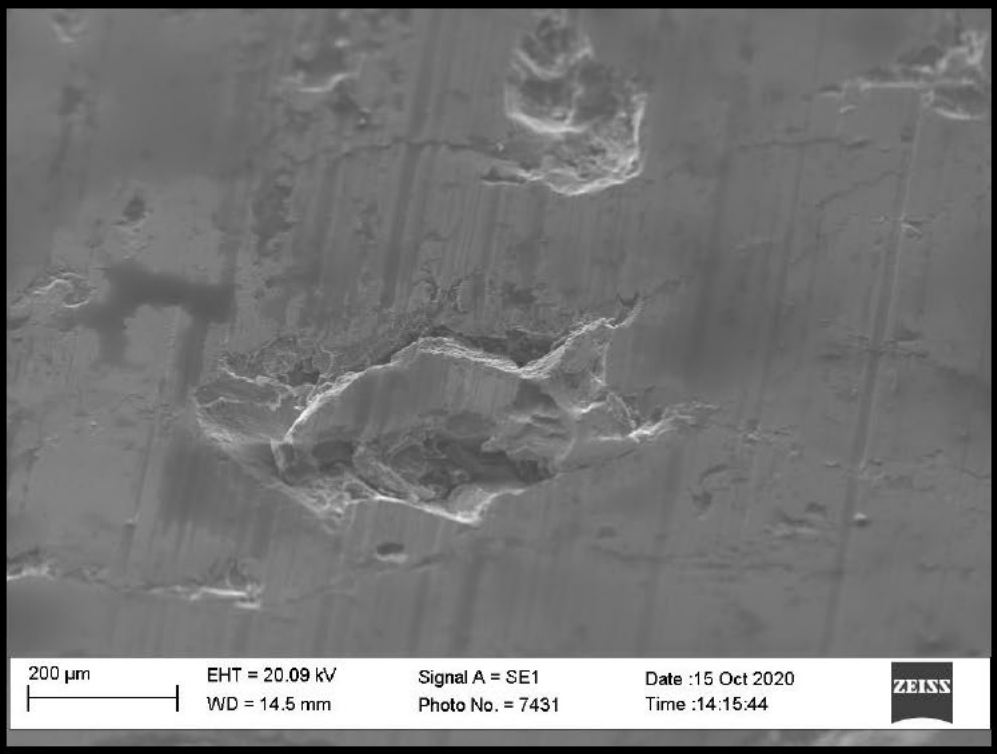

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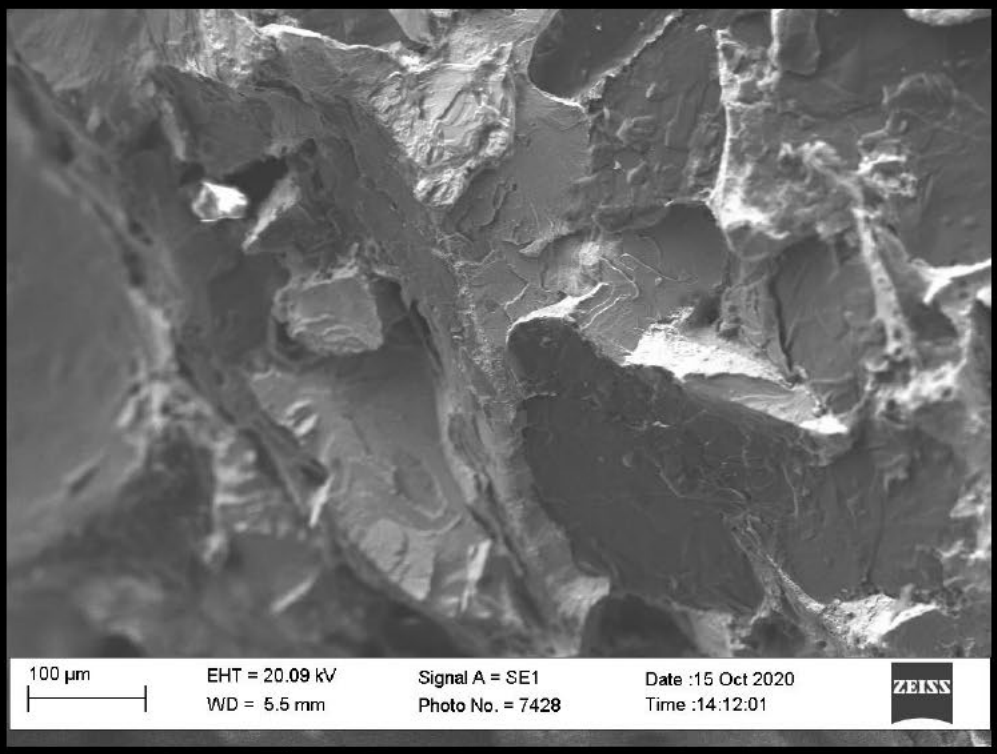

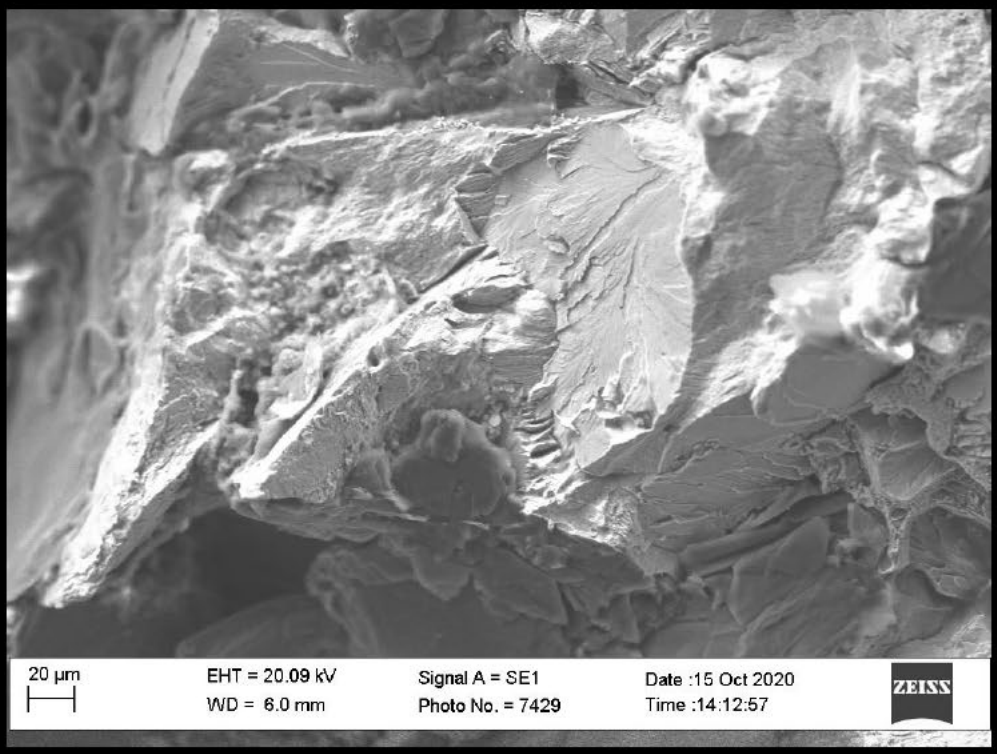

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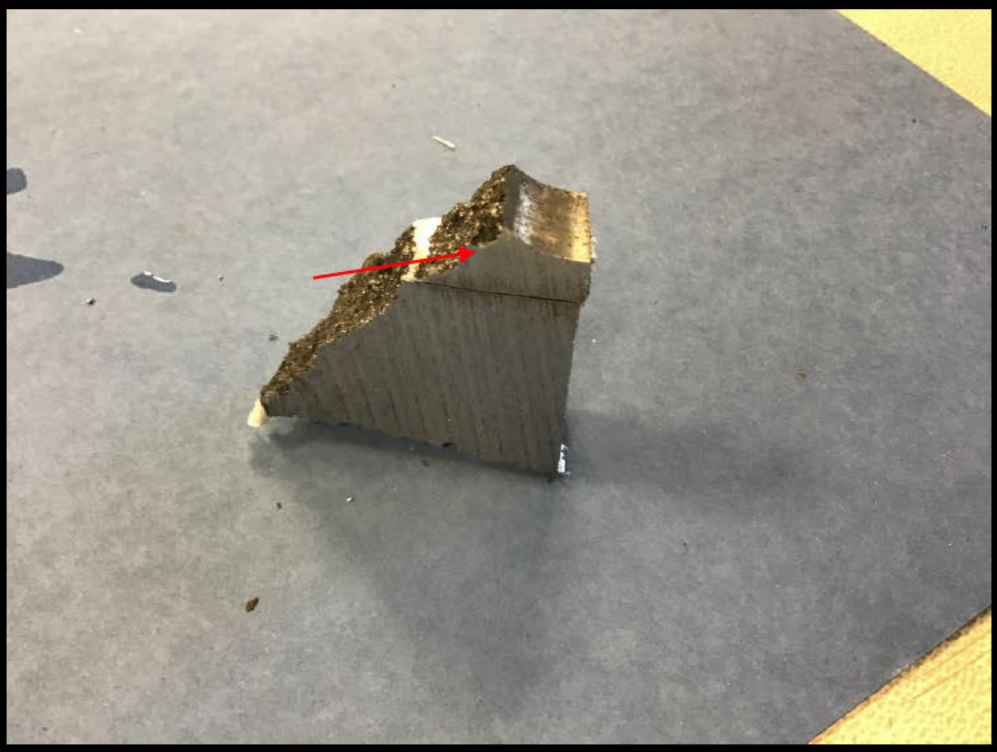

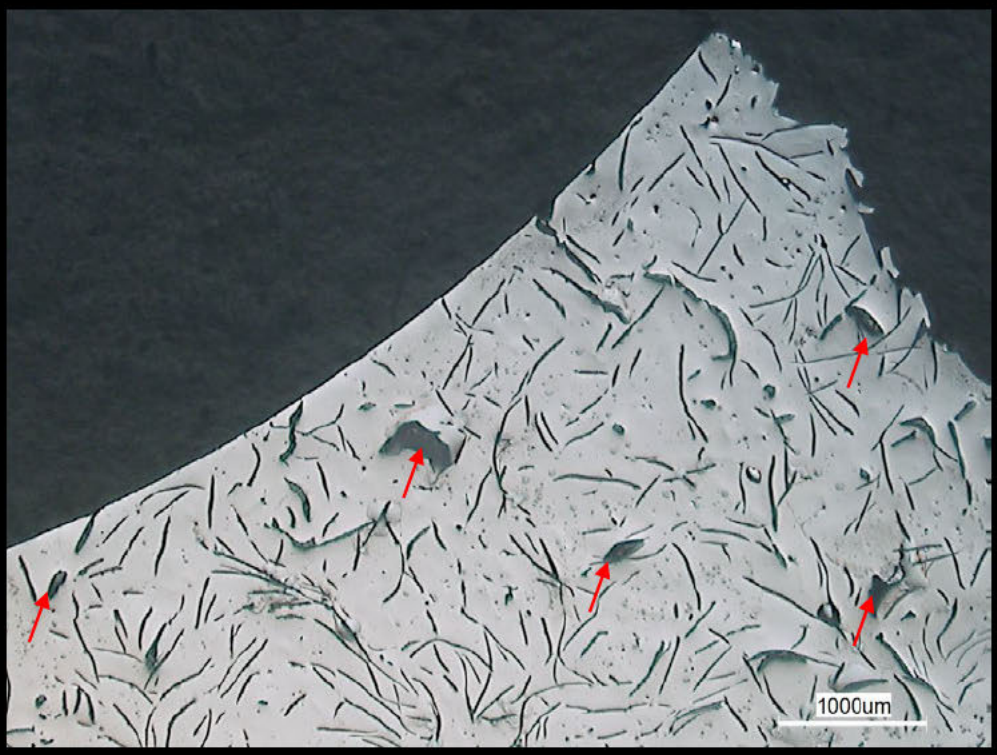

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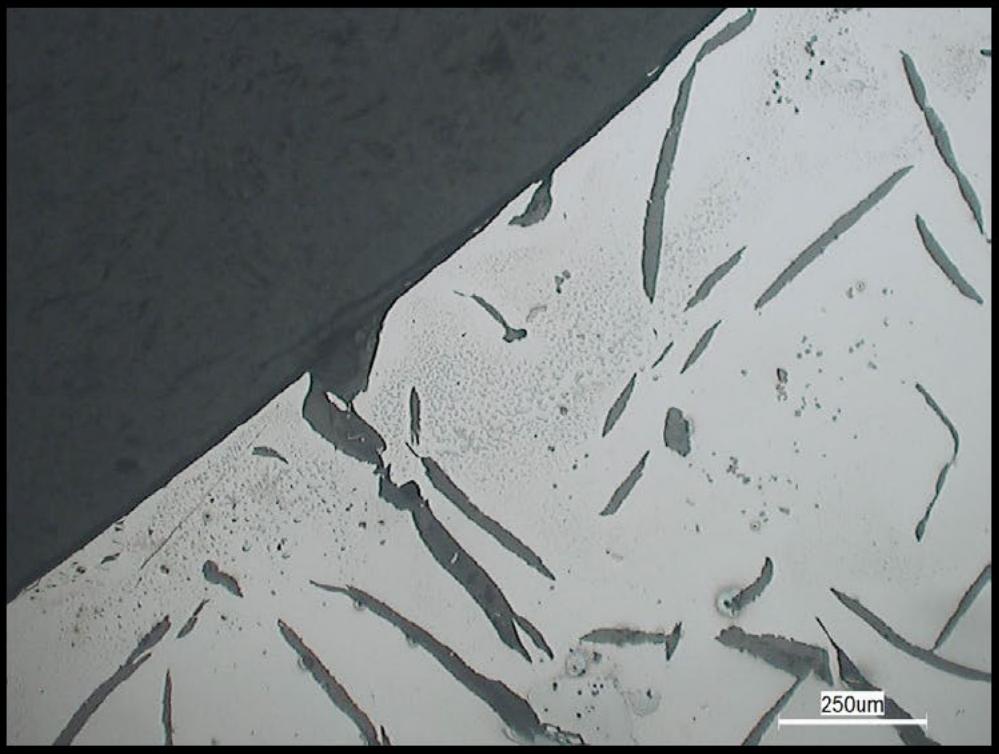

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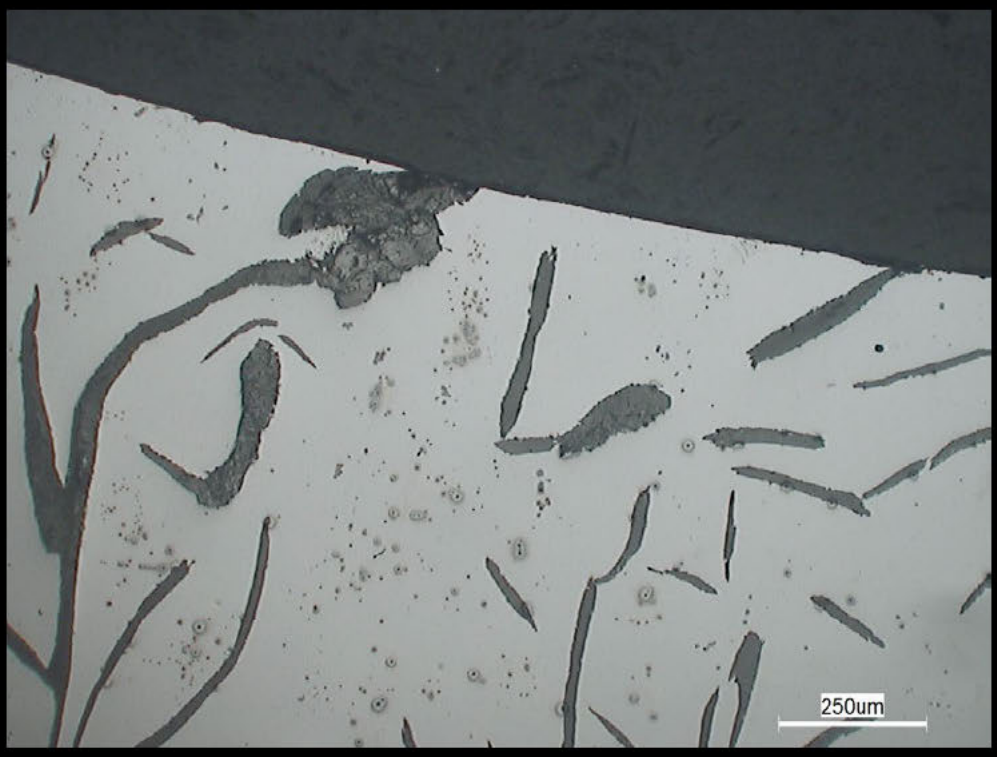

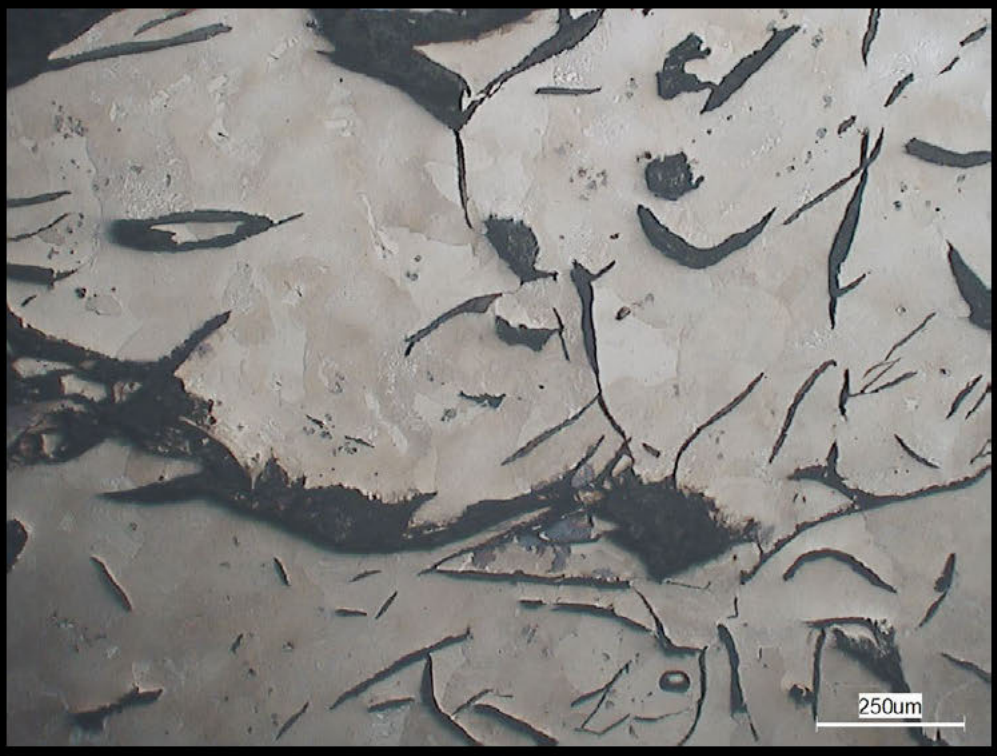

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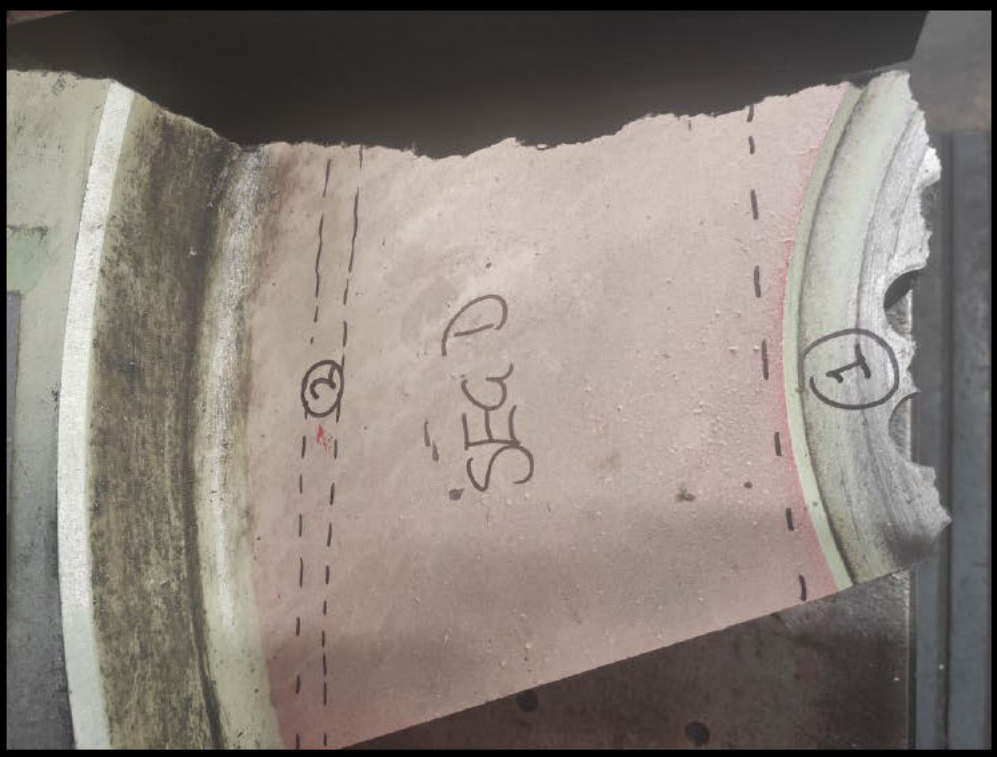

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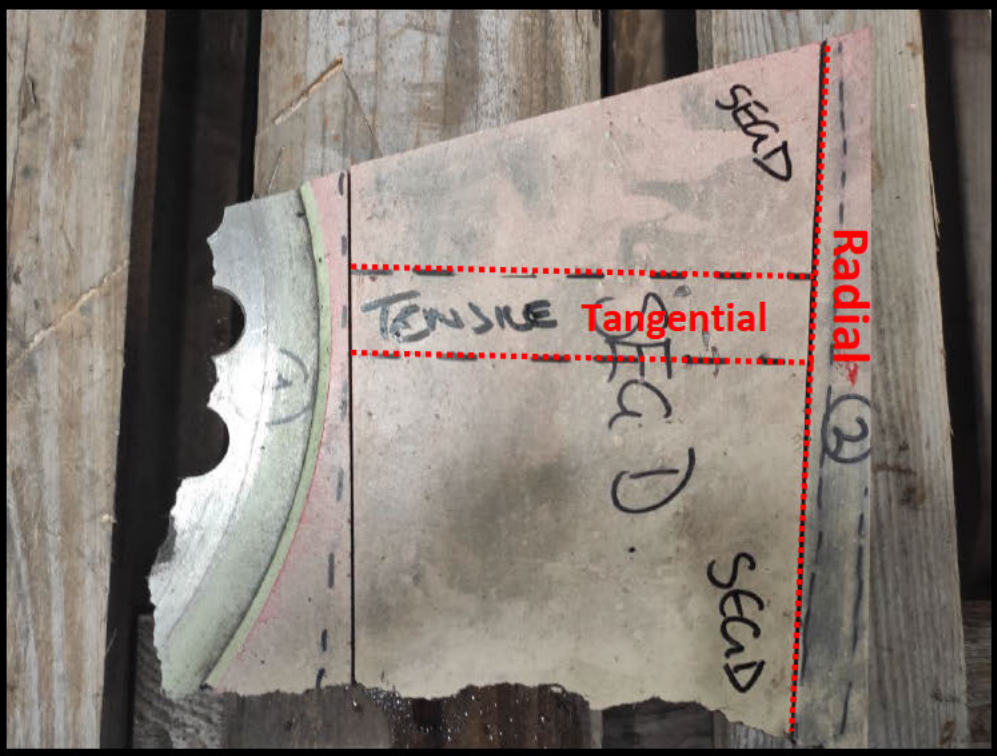
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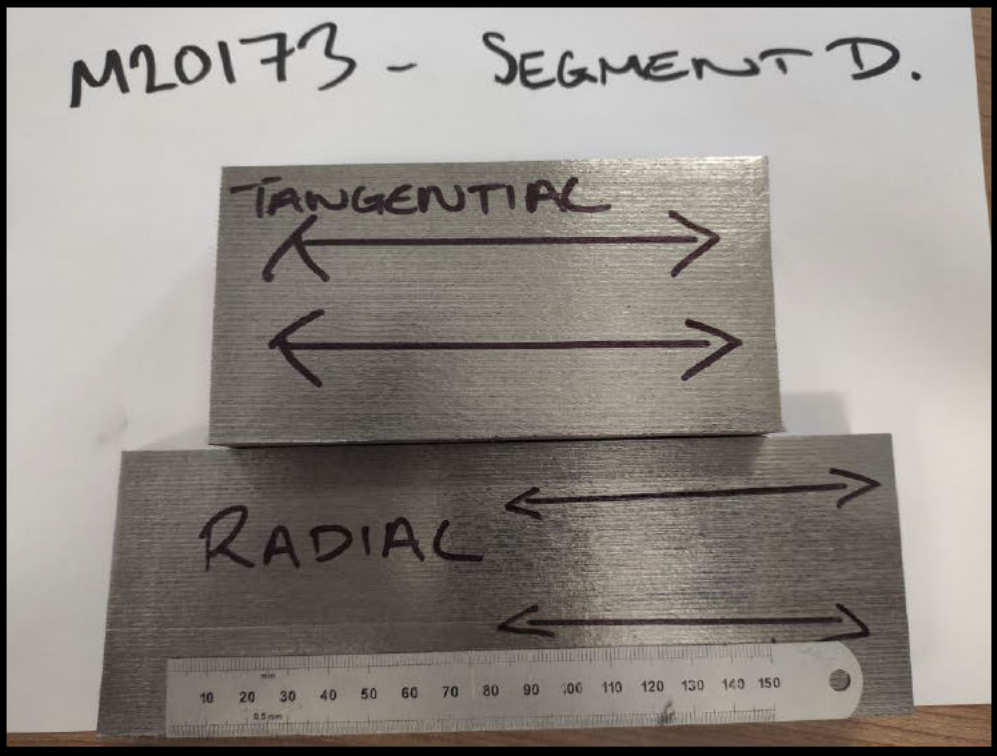
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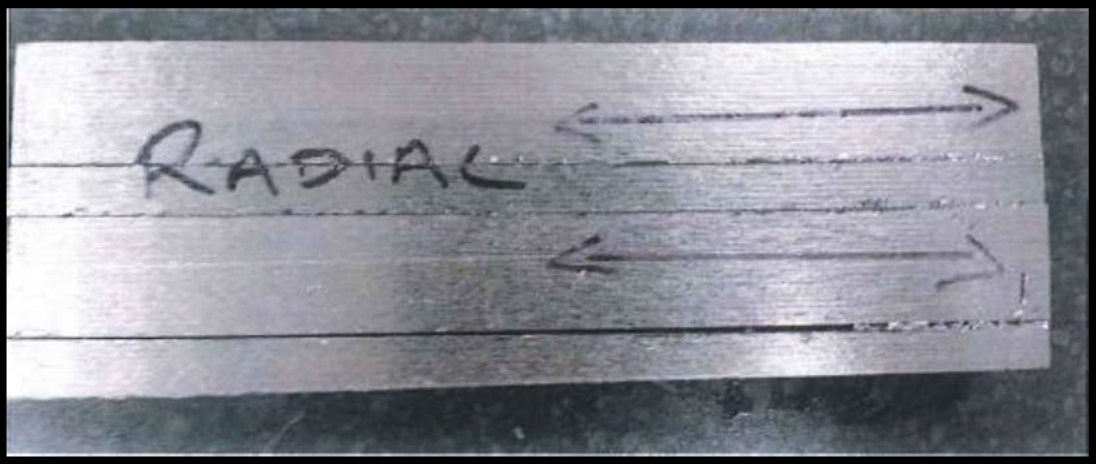

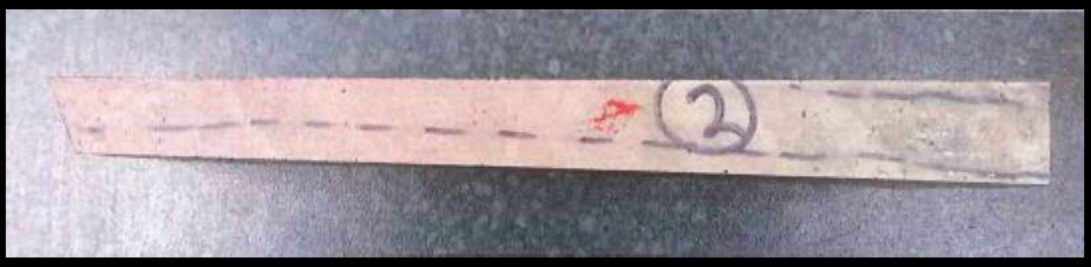

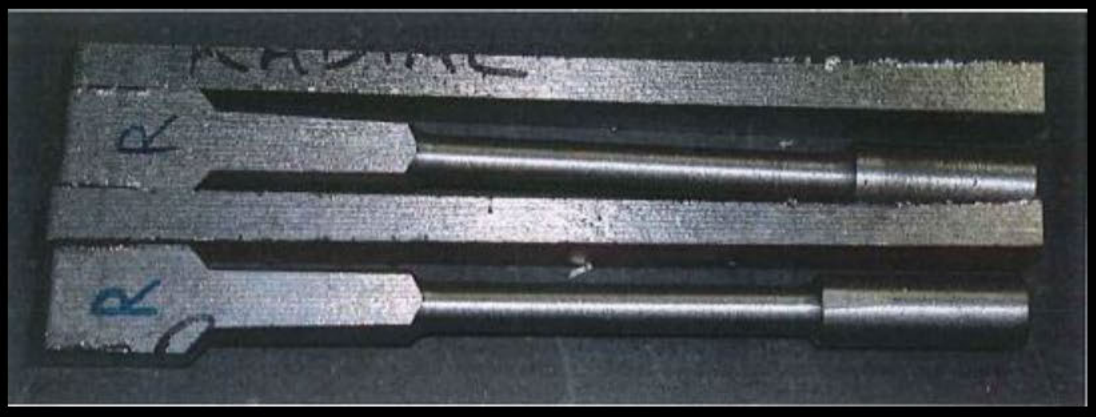

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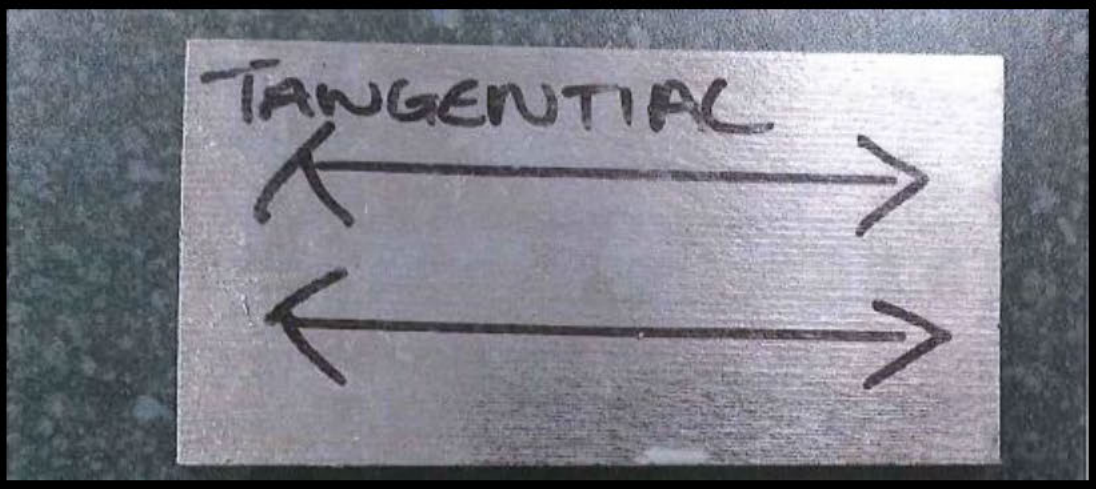

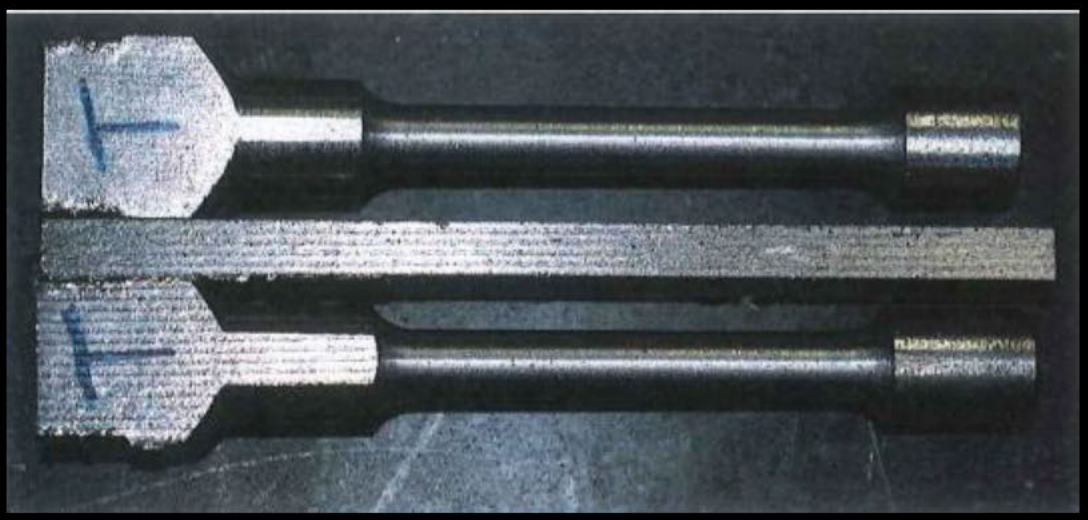

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Diesel Generator Failure Investigation

Report for: SLNC Goodwill, IMO 9448334

Name of company: Schuyler Line Navigation Company LLC

Report no: 2008-0018

31 March 2021

Lloyd's Register

(b) (6), (b) (7)(C)

Document Control Page

Written by:	Reviewed by:	Approved by:
(b) (6), (b) (7)(C)	(b) (6), (b) (7)(C)	(b) (6), (b) (7)(C)
Signature:	Signature:	Signature:
(b) (6), (b) (7)(C)		
Designation:	Designation:	Designation:
Principal Specialist Failure Investigation team Leader	Principal Specialist Analysis Team Leader	Marine Advisory Manager
Date of approval:		
31 March 2021		

Version history	Date	Reason for Revision:
5v1	31 March 2021	1st Issued

Report Summary

At the request of Schuyler Line Navigation Company LLC (SLNC), the undersigned Specialist has undertaken an investigation to understand the cause of failure of the number 1 diesel generator installed onboard the vessel SLNC Goodwill, which occurred on 05 August 2020.

The results of component inspections, reviews of documentary information, a materials investigation and torsional vibration and finite element calculations are presented which have established the following principal findings.

Root cause Investigation:

- The root cause of the damage to the number one diesel generator installed onboard the vessel SLNC Goodwill was the failure of the UG 8D governor which had been fitted on the 04 August 2020 to remediate engine speed regulation concerns.
- The failure of the governor caused the engine speed to accelerate in an uncontrolled manner to an overspeed condition higher than the normal set point of 1,030 rpm at which the engine mounted overspeed trip devices should stop the engine.
- The implications are that the engine mounted overspeed protection devices failed to stop the engine runaway. The reason remains unclear since the manual device was reset immediately before the failure.
- As a result of the overspeed condition, the flywheel burst causing fatal injuries to the attending Third Assistant Engineer and extensive damage to the engine and generator and surrounding structures.
- The following factors have been considered in relation to the root cause of failure and the consequent series of events:
    - Assembly of the governor to the engine.
    - The overhaul of the governor.
    - The mechanical properties of the flywheel.
    - Other contributory factors.
- While it cannot irrefutably be concluded that the governor was installed on the engine correctly, on the basis of evidence obtained from visual examinations, materials investigation, documentary evidence and supplementary analysis, it is considered that the governor was probably installed on the engine in accordance with Woodward procedures **[1]**.
- The possibility that the governor was installed incorrectly on the engine is considered to be less likely.
- On the basis of the evidence from visual examinations it is considered that factors associated with the overhaul of the governor identified in the report as '2019.8', carried out in July 2019 are most likely to be contributory to the cause of its failure.
- Visible evidence of mechanical damage to the surfaces of the governor pilot valve bushing and shaft drive surfaces exists, the nature and cause of which cannot be established as consistent with it occurring as a result of the governor failure.
- In addition, evidence associated with the 2021 overhaul of the governor identified in the report as '2019.5' overhauled in May 2019 suggest that shortcomings in care and attention to cleanliness may have existed at that time.
- Further evidence that a lack of care and attention existed is presented in the preparation of the two governor reports **[2]**, **[3]**, where details of test results were incorrectly transferred from test rig to record sheets.
- Once the connection between the governor shaft drive and the pilot valve bushing was broken, the ability to control the engine fuelling and speed was lost by the governor, and the engine accelerated to an uncontrolled overspeed condition. It is uncertain what speed the engine reached before the flywheel burst.
- The burst occurred because at the increased speed, the centrifugal forces and corresponding stresses induced in the flywheel at the bolted connection between engine, flywheel and generator were greater than the resisting strength of the flywheel material.

Materials Investigation:

- A materials investigation has identified that the mechanical properties and chemical composition of the flywheel material did not meet the design requirements of the engine licensor MAN Energy Solutions SE.
- In respect of the mechanical strength of the flywheel, the design specification requirement is for a grey cast iron of Grade C4 with an ultimate tensile strength of between 300MPa and 400MPa and a Brinell hardness of between 200HB and 250HB.
- Eight tensile tests were undertaken, yielding a range of results between 168MPa and 194MPa, i.e. between 56% and 64% of the required minimum strength. The hardness of the material was found on average to be 167HB, or 83% of the required minimum hardness.
- The chemical composition of the material was found to have reduced levels of carbon and manganese. Carbon being 2.2% relative to a specification nominal value of 3.1% and Manganese being 0.694% relative to a specification nominal value of 0.8%.
- The materials investigation also identified the presence of microshrinkage in the casting in way of the flywheel coupling bolt holes. Such a microstructural characteristic would additionally adversely affect the already reduced tensile strength of the material.

Finite element and torsional vibration analysis investigation:

- Finite element analysis results show good agreement with MAN Energy Solutions ES **[4]** in their assessment of principal stresses at the 12 coupling bolts locations.
- Dynamic torque effects due to torsional vibrations increased the induced stress due to centrifugal forces. Analyses were carried out, including the torsional vibration effects for cases of the engine fitted with a tuning wheel and a viscous damper, the latter at 100% damping, 50% damping and for a seized damper. In each case flywheel flange contact pressures of 0 MPa (representing a loose fitting of the flywheel flange) and at 24 MPa (representing a tight fitting of the flywheel flange) were considered.
- The induced principal stress, S1, in the flywheel reached the lower measured UTS (168 MPa) of the flywheel material at the following engine speeds, with:

    - The tuning wheel; at 1311 rpm (loose fit) and at 1325 rpm (tight fit).
    - The seized viscous damper; at 1228 rpm (loose fit) and at 1500 rpm (tight fit).
    - Viscous damper at 50% damping; at 1361 rpm (loose fit) and at 1500 rpm (tight fit).
    - Viscous damper at 100% damping; at 1385 rpm (loose fit) and at 1517 rpm (tight fit).

- The induced principal stress, S1, in the flywheel reached the lower specified requirement UTS (300 MPa) of the flywheel material at the following engine speeds, with:

    - The tuning wheel; at 1919 rpm (loose fit) and at 1979 rpm (tight fit).
    - The seized viscous damper; at 1912 rpm (loose fit) and at 1992 rpm (tight fit).
    - Viscous damper at 50% damping; at 1917 rpm (loose fit) and at 1986 rpm (tight fit).
    - Viscous damper at 100% damping; at 1929 rpm (loose fit) and at 1992 rpm (tight fit).

- The analysis also recognises that in all cases, the maximum principal stress on the flywheel was close to the two short retaining bolts on the alternator side of the flywheel. The presence of these bolts is for location of the flywheel during assembly of the engine and alternator on the base frame.
- From the above analysis, it is considered that If the flywheel had been of the correct strength material. The likelihood is that it would not have burst before damage to the cylinders and running gear would have stopped the engine.

The following recommendations are made:

- Noting that MPI checks have been carried out on the number 2 and number 3 generating sets, it is recommended that as soon as reasonably practical, the mechanical strength properties of the flywheels on the number 2 and number 3 generating sets are established. This is probably best achieved by carrying out hardness tests in regions as close to the flywheel hub as possible. Unfortunately, since the material is grey cast iron and non-homogeneous, only certain instruments are able to be used. It is also likely that to achieve best results, the flywheels will need to be removed from the generating sets.

- Closer inspection of the flywheel coupling bolt holes might also give an indication of casting quality. Investigation of the failed flywheel has identified that the bolt hole surfaces were very rough as a result of the microshrinkage. This inspection could be achieved by endoscope or borescope inspection and/or the casting of rubber replicas. TID can undertake such assessments.
- A general assessment of casting microstructure could be carried out using a method known as replication, where acetate strips are applied to the polished, etched casting surface. This method might not however, necessarily give an indication of casting strength.
- In relation to the above, submission of a three (3) gram sample of filings from each of the flywheels will allow full chemical analysis of the material, the results of which will permit an assessment of chemical composition for comparison against the required specification and as a comparison against the failed flywheel.
- TID is able to assist in setting up and managing the above suite of checks recommended to understand more closely the material properties of the flywheels of the number 2 and number 3 generating set engines.
- It is recommended that the condition of the damper on the number 1 generator crankshaft is inspected and the condition of the fluid established. The condition of the dampers on the number 2 and number 3 generator engines should also be verified.
- In relation to the above, it is also recommended that MAN Energy Solutions SE discuss with the engine builder the discrepancies identified in the torsional vibration calculations and additionally, the apparent discrepancy between what the engine builder thinks is fitted on the engine and what is actually fitted on the engine.
- Recommendations have previously been made **[7]** to subject the mechanical overspeed trip to testing, to understand why it failed to activate during the second overspeed event. Investigation should also be undertaken to test the functionality of the electronic overspeed trip device and associated components fitted to the damaged engine. It is also recommended that the functionality of the second and third generator set overspeed trip devices is confirmed.
- It was recommended early in the investigation **[7]** that the overspeed trip settings of the number 2 and number 3 generating sets should be lowered to below 1000 rpm. This recommendation is reiterated until such time that the material properties of the flywheels can be verified.
- It is recommended that the process of filling replacement governors is reviewed with a view to ensuring that the risks associated with introducing debris into the governors are understood and can be mitigated.

12. References

1. Woodward Governor product manual 03040, UG Dial Governor.

2. Jewon Engineering Technical Repairing Team report: Dated according to the governor test report as 26 July 2019.

3. Jewon Engineering Technical Repairing Team report: Dated according to the governor test report as 21 May 2019.

4. H.B Nielson, L23/30 Flywheel Calculation of Safety Against Bursting, four stroke GenSet Design. Presentation date 19 Sept 2014, MAB Diesel and Turbo

5. Chief Engineer Statement, dated 08 August 2020

6. Bud Hall, Fleet Technical Manager. Chief Engineer and First Engineer Interview report, dated 29 August 2020

7. TID report 2008-0018 No.1 Generator Engine Flywheel Failure Investigation 1v1, dated 15 September 2020.

8. TID report 2008-0018 No.1 Generator Engine Flywheel Failure Investigation 2v1, dated 24 February 2021.

9. Junma, Service report, 23 April 2019

10. Junma, Work done report, 01 April 2019

11. Junma, Inspection report, 25 April 2019

12. Junma, Turbo service report NR20R/172, 14 April 2019

13. JWE, Work completion report, 25 July 2019

14. JWE, Work completion report, 21 May 2019

15. Dieselman Singapore Pte Ltd. Job No J207351, Fuel pump inspection report Dated 29 October 2020

16. Dieselman Singapore Pte Ltd. Job No J207351, Fuel injector inspection report Dated 29 September 2020

17. ASM international: Gear materials, properties and manufacture, JR Davis ISBN 13: 978-0-87170-815-1

18. Turner ECS repair report RO00194U Governor UG 8 Dial. Dated according to the governor test report as 09 February 2021.

From: (b) (6), (b) (7)(C)
To: (b) (6), (b) (7)(C) USCG ACTIVITIES FAR EAS (USA)
Cc: Bud Hall
Subject: [Non-DoD Source] Re: [EXTERNAL]:FW: SLNC GOODWILL casualty investigation
Date: Wednesday, November 10, 2021 9:24:47 AM
Attachments: image001.png

Good morning (b) (6), (b) (7)(C) –

My apologies for having you wait on this, I've been somewhat out of pocket over the weekend.

We agree with your conclusion that there were two governors with the same serial number. We are fairly certain that JEWON, the Woodward licensed service company in Korea, made a mistake with the serial numbers during overhaul of these governors that resulted in this discrepancy. Please note we believe the Original serial number on the governor in use at the time of the incident was **16178255**.

We are still working with the previous managers to determine when the error with the serial numbers took place, and our intention is to eventually provide to JEWON and Woodward our findings for quality improvement purposes, both on governor overhaul performance and unit identification.

Hope this info helps explain where we are right now.

Regards
(b) (6), (b) (7)(C)
Port Captain / DPA
Schuyler Line Navigation Company LLC
(b) (6), (b) (7)(C)
O (b) (6), (b) (7)(C) | M 443-871-4475

From: "(b) (6), (b) (7)(C) USCG ACTIVITIES FAR EAS (USA)"
<(b) (6), (b) (7)(C) uscg.mil>
Date: Thursday, November 4, 2021 at 10:00 PM
To: (b) (6), (b) (7)(C) @schuylerline.com>
Cc: (b) (6), (b) (7)(C) @schuylerline.com>
Subject: RE: [EXTERNAL]:FW: SLNC GOODWILL casualty investigation

(b) (6), (b) (6), (b) (7)(C)

Thank you for clarifying the two different serial #s, I was under the impression they were both installed on the #1 Generator so that is very helpful.

Now that I review the evidence with this in mind it leads me to one other question: when the

Governor with serial #15592175 was changed out due to hunting on 04Aug, what was the serial # of the Governor that was installed in its place? From the photos that the CG collected on scene, it appears both the replaced and the newly installed Governor have the same part and serial # listed on their data plates.

v/r
(b) (6), (b) (7)(C)

From: (b) (6), (b) (7)(C) @schuylerline.com>
Sent: Friday, November 5, 2021 7:35 AM
To: (b) (6), (b) (7)(C) (b) (6), (b) (7)(USCG ACTIVITIES FAR EAS (USA) <(b) (6), (b) (7)(C) uscg.mil>
Cc (b) (6), (b) (7)(C) @schuylerline.com>
Subject: [Non-DoD Source] Re: [EXTERNAL]:FW: SLNC GOODWILL casualty investigation

Good morning (b) (6), (b) (7)((b) (6), (b) (7)(C) –

Hopefully I can answer your question. This is what I understand with reference to the governors.

The Governor with Serial #14639129 (report dated 22Jul19) was fitted on No. 2 Auxy Engine by Jewon 22 Jul19 and was NOT associated with No. 1 Auxiliary Engine.

The Governor with Serial #15592175 on No. 1 Auxiliary Engine was serviced IN PLACE by engineers from Woodward Licensed workshop Jewon on 17 May 2019. It was removed from No. 1 Auxiliary Engine the day prior to the incident as the engineers could not control the engine speed with it.

Hope this helps, if not let me know and I'll try to get further clarification.

Regards
(b) (6), (b) (7)(C)
Port Captain / DPA
Schuyler Line Navigation Company LLC
(b) (6), (b) (7)(C) @schuylerline.com
O (b) (6), (b) (7)(C) | M 443-871-4475

From: "(b) (6), (b) (7)(C) (b) (6), (b) (7)(C) USCG ACTIVITIES FAR EAS (USA)"
<(b) (6), (b) (7)(C) uscg.mil>
Date: Wednesday, November 3, 2021 at 9:07 PM
To: "(b) (6), (b) (7)(C) @schuylerline.com>
Cc: (b) (6), (b) (7)(C)
Subject: RE: [EXTERNAL]:FW: SLNC GOODWILL casualty investigation

(b) (6), (b) (7)(C)

One thing I remain unsure of is which governor was removed on 04Aug20 and which one was installed and being tested at the time of the casualty? In the photos collected on scene, both governors had identical part # and serial # on their data plates. However, I have two work completion reports from Jewon Engineering regarding Woodward UG-8D governors with two different part/serial #s:

Governor 1 – Part #8521-0047DC, Serial #14639129 (report dated 22Jul19)
Governor 2 – Part #8520-0041 Serial #15592175 (report dated 22May19)

At your earliest convenience, could you please clarify which governor was removed and which was installed? I was hoping the Class report would clarify, but I didn't see it in there.

Thank you.

v/r
(b) (6), (b) (7)(C)

From: (b) (6), (b) (7)(C) @schuylerline.com>
Sent: Thursday, November 4, 2021 6:40 AM
To: (b) (6), (b) (7)(C) (b) (6), (b) (7)(USCG ACTIVITIES FAR EAS (USA) <(b) (6), (b) (7)(C) uscg.mil>
Cc: (b) (6), (b) (7)(C) @schuylerline.com>
Subject: [Non-DoD Source] Re: [EXTERNAL]:FW: SLNC GOODWILL casualty investigation

(b) (6), (b) (7)((b) (6), (b) (7)(C) –

Please see attached for the Diesel Generator Failure Investigation as prepared by Lloyd's Register for us.
Will plan to provide more information if/when it becomes available.

Regards
(b) (6), (b) (7)(C)
Port Captain / DPA
Schuyler Line Navigation Company LLC
(b) (6), (b) (7)(C) @schuylerline.com
O (b) (6), (b) (7)(C) | M 443-871-4475

From: "(b) (6), (b) (7)(C) (b) (6), (b) (7)(C USCG ACTIVITIES FAR EAS (USA)"
<(b) (6), (b) (7)(C) uscg.mil>

Date: Wednesday, October 27, 2021 at 9:43 PM
To: "(b) (6), (b) (7)(C) @schuylerline.com>
Cc: (b) (6), (b) (7)(C) l@schuylerline.com>
Subject: RE: [EXTERNAL]:FW: SLNC GOODWILL casualty investigation

(b) (6), (b) (7)(C)

Roger sir. Greatly appreciate the assistance, this is exactly what I was looking for regarding testing results. Good copy on the possibility of a post-mortem exam and the settlement, standing by on those docs.

I mentioned it to (b) (6), (b) (7)(C), but I assure you I'm not trying to rush anything on your end. I'm still working my way through all the evidence and getting caught up, so I'll keep moving forward with what I have and we can stay in touch regarding the rest.

Again, thank you both for the assistance.

v/r
(b) (6), (b) (7)(C)

From: (b) (6), (b) (7)(C) @schuylerline.com>
Sent: Thursday, October 28, 2021 9:31 AM
To: (b) (6), (b) (7)(C) (b) (6), (b) (7)(USCG ACTIVITIES FAR EAS (USA) <(b) (6), (b) (7)(C) uscg.mil>
Cc: (b) (6), (b) (7)(C) @schuylerline.com>
Subject: [Non-DoD Source] Re: [EXTERNAL]:FW: SLNC GOODWILL casualty investigation

No worries (b) (6), (b) (7)(C).
I removed Sri from the email chain only because she has enough on her plate, and this all took place before her tenure.
I know that Bud Hall reached out to you, I may become the POC to assist you, but in the meantime you may hear from either of us.
Attached are results of post accident testing conducted on the crew, and I do not know if a post-mortem exam was administered on Mr Lloyd-Rees, but i am trying to find out.
We are also waiting to hear back from the "Settlement Agreement Parties" to find out what information can be shared. I personally do not know at what level that goes to, but ideally additional information is shared with (b) (6), (b) and me, that we can forward on to you.
Wish it was more, but for now this is all I've got.
Thanks for understanding and I hope to be able to help you close this out soonest.

Regards
(b) (6), (b) (7)(C)
Port Captain / DPA
Schuyler Line Navigation Company LLC

(b) (6), (b) (7)(C)

(b) (6), (b) (7)(C) @schuylerline.com
(b) (6), (b) (7)(C)

From: (b) (6), (b) (7)(C) (b) (6), (b) (7)(C) USCG ACTIVITIES FAR EAS (USA)"
<(b) (6), (b) (7)(C) uscg.mil>
Date: Tuesday, October 26, 2021 at 7:47 PM
To: "(b) (6), (b) (7)(C) @schuylerline.com>
Cc: (b) (6), (b) (7)(C) @schuylerline.com>
Subject: RE: [EXTERNAL]:FW: SLNC GOODWILL casualty investigation

(b) (6), (b) (6), (b) (7)(C)

Roger sir, thank you for the assistance. I am steadily working through everything that was already provided and greatly appreciate the cooperation we have received from your company in working through this investigation. By no means am I requesting to start over as my predecessor organized all the documentation collected thus far. For the sake of clarification, I am only inquiring about the following:

1. Was there any analysis of the flywheel or governor after 05Feb21? If so, respectfully request a copy.
2. Was there any investigative report regarding this casualty generated after 21Jan21? If so, respectfully request a copy.
3. Results of the post-casualty DOT drug testing (I am in receipt of the CG-2692B that identifies the 20 crewmembers were drug tested, just not the results).
4. Any results of post-mortem toxicology conducted on the 3AE related to the presence of drugs or alcohol.

I fully appreciate that some time has passed and I'm still familiarizing myself with the casualty and asking for documentation from several different sources, so if you'd like to schedule a phone call to discuss or clarify further please don't hesitate to let me know; I'm getting used to having phone conferences in the middle of the night here, so whenever is convenient for your I'm happy to accommodate.

Again, thank you for your time.

v/r

(b) (6), (b) (7)(C) (b) (6), (b) (7
Senior Investigating Officer
US Coast Guard Activities Far East
Yokota Air Base
Fussa-shi, Tokyo, Japan 197-0001

Desk: (b) (6), (b) (7)(C)
DSN: (b) (6), (b) (7)(C)
Mobile/Data: (b) (6), (b) (7)(C)
FEACT Marine Investigations (uscg.mil)

From: (b) (6), (b) (7)(C) @schuylerline.com>
Sent: Tuesday, October 26, 2021 9:36 PM
To: (b) (6), (b) (7)(C) USCG ACTIVITIES FAR EAS (USA) <(b) (6), (b) (7)(C) uscg.mil>; Sri Durga <(b) (6), (b) (7)(C) @schuylerline.com>
Subject: [Non-DoD Source] Re: [EXTERNAL]:FW: SLNC GOODWILL casualty investigation

Good evening (b) (6), (b) (7)(C) (b) (6), (b) (7)(C) –

My apologies sir, I do recall seeing your previous email but let it slip by.
Sounds like there have been personnel changes on both sides, and I would prefer a good working relationship with your office. Please allow me to circle back to our Technical Department and gather what they have and I will look to get this to you by the end of the week.
Thank you, sir.

(b) (6), (b) (7)(C)

Regards
(b) (6), (b) (7)(C)
Port Captain / DPA
Schuyler Line Navigation Company LLC
(b) (6), (b) (7)(C)

From: (b) (6), (b) (7)(C) USCG ACTIVITIES FAR EAS (USA)" <(b) (6), (b) (7)(C) uscg.mil>
Date: Tuesday, October 26, 2021 at 12:34 AM
To: (b) (6), (b) (7)(C) <(b) (6), (b) (7)(C) @schuylerline.com>, (b) (6), (b) (7)(C) <jmalone@schuylerline.com>
Subject: RE: [EXTERNAL]:FW: SLNC GOODWILL casualty investigation

Thank you very much, I greatly appreciate the assistance.

v/r
(b) (6), (b) (7)(C)

From: (b) (7)(C), (b) (6), (b) (7)(C) @schuylerline.com>

(b) (6), (b) (7)(C)

Sent: Tuesday, October 26, 2021 11:11 AM
To: (b) (6), (b) (7)(C) USCG ACTIVITIES FAR EAS (USA) <(b) (6), (b) (7)(C)uscg.mil>;
(b) (6), (b) (7)(C)@schuylerline.com>
Subject: [Non-DoD Source] RE: [EXTERNAL]:FW: SLNC GOODWILL casualty investigation

Good morning (b) (6), (b) (7)(C)

Thank you for your email. My colleague, (b) (6), (b) (7)(C), will be able to assist with your request on SLNC Goodwill.

Over to you, (b)(6)

(b) (6), (b) (7)(C)
Technical Coordinator
Company Mobile: +(b) (6), (b) (7)(C)
19 Kian Teck Drive
Singapore 628836
Email: (b) (7)(C), (b) (6)@schuylerline.com
Private Mobile (Urgent only): +

From: (b) (6), (b) (7)(C) USCG ACTIVITIES FAR EAS (USA) <(b) (6), (b) (7)(C)uscg.mil>
Sent: Tuesday, 26 October 2021 9:56 am
To: (b) (6), (b) (7)(C) (b) (6), (b) (7)(C)
Subject: [EXTERNAL]:FW: SLNC GOODWILL casualty investigation

Good morning,

Respectfully request your assistance with the subject investigation. I understand there have been some personnel changes and as I am new I am having trouble contacting the right personnel regarding this incident. Any assistance with the requested documentation, along with the Post-casualty DOT drug test results, would be greatly appreciated.

Thank you for your time and attention.

v/r

(b) (6), (b) (7)(C)
(b) (6), (b) (7)(C)
US Coast Guard Activities Far East

Yokota Air Base
Fussa-shi, Tokyo, Japan 197-0001
(b) (6), (b) (7)(C)
DSN: 225-7833
Mobile/Data: (b) (6), (b) (7)(C)
FEACT Marine Investigations (uscg.mil)

From: (b) (6), (b) (7)(C) USCG ACTIVITIES FAR EAS (USA)
Sent: Wednesday, October 20, 2021 9:06 AM
To: (b) (6), (b) (7)(C)@schuylerline.com' (b) (6), (b) (7)(C)@schuylerline.com>
Subject: SLNC GOODWILL casualty investigation

To Whom It May Concern:

Hello and I hope this email finds you doing well. I have recently assumed (b) (7)(C), (b) (b) (6), (b) (7)(C) duties as Senior Investigating Officer with the Coast Guard at Activities Far East and am slowly but surely getting caught up on the case involving the fatality onboard the SLNC GOODWILL last year and would like to complete the CG's investigation into the incident within the next month. I've been going through the evidence she'd already gathered, but found an email dated 06Apr21 where she had contacted a representative of SLNC regarding final analysis on why the governor failed as well as when the flywheel was replaced. At the time, a final report, so I wanted to touch base and see if that document and the information regarding the flywheel history were now available. I have a Statement of Preliminary Findings, dated 21Jan21, and an Examination of the Failed Flywheel, dated 05Feb21; my inquiry would be regarding any further analysis.

Thank you very much for your continued assistance with this investigation.

v/r

(b) (6), (b) (7)(C) (b) (7)(C), (b)
Senior Investigating Officer
US Coast Guard Activities Far East
Yokota Air Base
Fussa-shi, Tokyo, Japan 197-0001
(b) (6), (b) (7)(C)

DSN: 225-7833
Mobile/Data: (b) (6), (b) (7)(C)
FEACT Marine Investigations (uscg.mil)

Commercial Preservation Packaging for Storage of Mechanical-Hydraulic Controls

Manual 25075 (Revision B, 3/2015)

In order to protect a governor or actuator from damage caused by rust or corrosion, certain storage procedures must be followed. The procedures outlined here do not replace military specifications, although some military specifications are listed as references. These procedures are meant for commercial use only.

Storage Procedures

Use rust- and oxidation-inhibiting oil such as Texaco Regal R & O oil, or other oil that meets US MIL-H-17672 (hydraulic fluid, petroleum inhibited) specifications, to coat all internal surfaces of the device. If the governor or actuator is operated with oil other than rust- and oxidation-inhibiting oil, flush the unit with rust- and oxidation-inhibiting oil during operation before storage.

Plug all external openings to prevent contamination by solvents, cleaning agents, moisture, or other elements.

Coat the external surface of the governor or actuator with rust- and oxidation-inhibiting oil. Wrap the unit in a cushioning material to prevent projections, sharp corners, and sharp edges from damaging the barrier bag.

Enclose the governor or actuator in a barrier bag just large enough to enclose the control. Enclose the unit in a second heat-sealed barrier bag of the same material as the inner bag with the calculated amount of desiccant.

Calculate the amount of desiccant required by using the following formula:

U = AC + DX

where:

U = The number of units of desiccant required
A = Area (square inches) of barrier material to be used
C = 0.011
D = The number of pounds of packing material, other than metal, used within the barrier
X = 8 for cellulosic material, including wood, use as packing material. See US MIL-P-116 for other materials.

Use desiccants which meet the requirements of US MIL-D-3464 Type I or Type II. One producer of such desiccants is the Eagle Chemical Company, Inc.

Position the desiccant in bags of standard unit size and in appropriate locations in order to expose all voids in the governor to the dehydrating action of the desiccant.

Use a heat-sealable barrier bag that meets the requirements of Type I material per US MIL-B-22191 (latest revision).

Visually inspect the barrier material to see if the heat seal is complete and that no tears or damages are present. Pad the storage or shipping crate sufficiently to prevent tearing the barrier material.

Tag each packaged unit with the following:

- Unit Part Number (XXXX-XXXX)
- Unit Serial Number (XXXXXXXX)
- Date unit was packaged for storage

NOTICE

Damage to the barrier material in any way requires a complete repeat of the storage procedure.

References

These US Military Specifications were used as references:

MIL-P-116	Preservation-packaging, methods of
MIL-B-22191	Barrier materials, transparent, flexible, heat-sealable
QPL-22191	Qualified products list of MIL-B-22191
MIL-D-3464	Desiccants, activated, bagged, packaging use and static dehumidification
QPL-3464	Qualified products list of MIL-D-3464

We appreciate your comments about the content of our publications.

Send comments to: icinfo@woodward.com

Please reference publication **25075B**.

(b) (7)(C), (b) (6)

PO Box 1519, Fort Collins CO 80522-1519, USA
1000 East Drake Road, Fort Collins CO 80525, USA
Phone +1 (970) 482-5811 • Fax +1 (970) 498-3058

Email and Website—www.woodward.com

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as well as authorized distributors and other authorized service and sales facilities throughout the world.**

Complete address / phone / fax / email information for all locations is available on our website.

From: (b) (6), (b) (7)(C)
To: (b) (6), (b) (7)(C) USCG ACTIVITIES FAR EAS (USA)
Subject: [Non-DoD Source] RE: [EXTERNAL] Power Management Technical Inquiry
Date: Monday, November 29, 2021 11:50:46 PM

Dear

Glad to be of help. Woodward recommends to always store governors upright. This has to do with the ballhead assembly not sliding out of its support bracket. Storing a unit upright also prevents oil spillage, governor covers often have small breather holes to allow internal air pressure to adjust to ambient.
We advise (for the same reasons) to also always transport units standing up.

(b) (7)(C), (b) (6)
Woodward Nederland B.V.
Staff Application Engineer| LE APPLICATION ESP

Was this message helpful? Yes | It was OK | No

On Sun, 28th Nov 2021 at 7:19 pm, (b) (6), (b) (7)(C) (b) (6), (b) (7)(C) USCG ACTIVITIES FAR EAS (USA) <(b) (6), (b) (7)(C)uscg.mil> wrote:

(b) (6), (b) (7)(C)

> Thank you again for the storage guidelines. After reading through the document, I have one follow up question: does it matter if the governor was stored in a horizontal position instead of a vertical one? Could being kept laying on its side have any impact on the alignment or function of the internal components?
>
> Thank you again for your assistance.
>
> v/r
> (b) (6), (b) (7)(C)

On Sun, 28th Nov 2021 at 4:15 pm, (b) (6), (b) (7)(C) USCG ACTIVITIES FAR EAS (USA) <(b) (6), (b) (7)(C)uscg.mil> wrote:

(b) (6), (b) (7)(C)

> Thank you sir for your prompt response, the documentation provided is very helpful.
>
> I appreciate your time and assistance, and hope you have a great day.
>
> v/r
> (b) (6), (b) (7)(C)

(b) (6), (b) (7)(C)

***
The information in this email is confidential and intended solely for the individual or entity to whom it is addressed. If you have received this email in error please notify the sender by return e-mail, delete this email, and refrain from any disclosure or action based on the information.
***

On Wed, 24th Nov 2021 at 1:31 am, (b) (6), (b) (7)(C) wrote:

Dear (b) (6), (b) (7)(C)

Thanks for your email. Woodward does have storage guidelines for mechanical governors, please find attached a copy.

(b) (6), (b) (7)(C)
Woodward Nederland B.V.
Staff Application Engineer| LE APPLICATION ESP

On Tue, 23rd Nov 2021 at 5:50 pm, (b) (6), (b) (7)(C) USCG ACTIVITIES FAR EAS (USA) <(b) (6), (b) (7)(C) uscg.mil> wrote:

To Whom It may Concern:

I am trying to locate any guidance provided by Woodward on the storage of governors (UG-8 Speed Adjusting Device) onboard vessels, but don't see anything listed on the company website or any mention of it in Product Manual 03045. Are you aware if any such guidance exists, and if so could I please receive a copy?

Thank you for your time and assistance.

v/r

(b) (6), (b) (7)(C)
(b) (6), (b) (7)(C)
US Coast Guard Activities Far East
Yokota Air Base
Fussa-shi, Tokyo, Japan 197-0001
Desk: (b) (6), (b) (7)(C)
DSN: 225-7833
Mobile/Data: (b) (6), (b) (7)(C)
FEACT Marine Investigations (uscg.mil)

(b) (6), (b) (7)(C) USCG ACTIVITIES FAR EAS (USA)

Subject: FW: [EXTERNAL]:FW: SLNC GOODWILL casualty investigation
Attachments: BRN3C2AF460C0FA_004441.pdf

From: (b) (6), (b) (7)(C) @schuylerline.com>
Sent: Wednesday, December 8, 2021 2:30 AM
To: (b) (6), (b) (7)(C) USCG ACTIVITIES FAR EAS (USA) <(b) (6), (b) (7)(C) uscg.mil>
Subject: [Non-DoD Source] Re: [EXTERNAL]:FW: SLNC GOODWILL casualty investigation

I'm sorry for the delay (b) (7)(C), (b) (b) (6), (b) (7)(C)
One of those things that went out of sight out of mind for me.
Please see attached for (b) (7)(C), (b) (6) and (b) (6), (b) (7)(C) it looks like (b) (6), (b) (7)(C) was the specimen collector, not crew.
And confirm no post accident testing was conducted on the mechanical overspeed. The last testing was during the COI 2 weeks prior.

Regards
(b) (6), (b) (7)(C)
Port Captain / DPA
Schuyler Line Navigation Company LLC
(b) (6), (b) (7)(C) @schuylerline.com
(b) (6), (b) (7)(C)

From: (b) (6), (b) (7)(C) USCG ACTIVITIES FAR EAS (USA)" <(b) (6), (b) (7)(C) uscg.mil>
Date: Wednesday, December 1, 2021 at 6:39 PM
To: "(b) (6), (b) (7)(C) @schuylerline.com>
Cc: (b) (6), (b) (7)(C) @schuylerline.com>
Subject: RE: [EXTERNAL]:FW: SLNC GOODWILL casualty investigation

(b) (6), (b) b) (6), (b) (7)(C)

Thank you sir. In regards to the Custody Forms, if I could get the ones for (b) (6), (b) (7)(C) , and (b) (6), (b) (7)(C) that will be enough.

I understand the electronic overspeed was destroyed and you are confirming the status of whether or not testing was done on the mechanical; I appreciate the assistance and am standing by for whenever you can confirm.

Thank you for your continued assistance.

v/r
(b) (6), (b) (7)(C)

From: (b) (6), (b) (7)(C) @schuylerline.com>
Sent: Thursday, December 2, 2021 8:07 AM
To: (b) (6), (b) (7)(C) (b) (6), (b) (7) USCG ACTIVITIES FAR EAS (USA) <(b) (6), (b) (7)(C) uscg.mil>

(b) (6), (b) (7)(C)

Cc: [redacted]@schuylerline.com>
Subject: [Non-DoD Source] Re: [EXTERNAL]:FW: SLNC GOODWILL casualty investigation

It's no problem sir.
Attached is one of the completed custody forms for Capt [redacted]
I can share all of them if needed, wasn't sure if it was just one or all, and unfortunately the scan is not the best quality.

I do have answers on the other, and will address separately, but the short story is that the electronic overspeed was destroyed during the event, and the mechanical was not tested because it had just been successfully tested a couple weeks prior during the COI in Guam → I need to confirm with the vessel.

Regards
[redacted]
Port Captain / DPA
Schuyler Line Navigation Company LLC
[redacted]

[redacted]

SLNC GOODWILL

Automated Machinery Test Procedures

Revision 6 dated 22 June 2020

APPROVED
USCG 46 CFR Subpart 61.40
SEE LETTER Date: 2020-07-09

(b) (6), (b) (7)(C)

Record of Changes

Date	Procedure Number	Description
3/7/16	7	Deleted word "Duty" in Procedures number 4.
3/7/16	8	Corrected procedures for conducting test
3/7/16	28	Corrected slowdown setpoint
3/15/16	43	Changed procedure from "Main Engine FO Leak-off alarm" to "FO/LO leakage tank alarm"
1/15/16	46 & 47	Added "after cooling water temperature reaches [xxx] degrees F" to results/remarks section
1/15/16	129	Added "after air pressure reaches lag setpoint in switch [xxx]" to results/remarks section
1/16/16	Various	See USCG Letter Serial # E2-1600757 dated March 16, 2016
4/12/16	Various	Added procedures #142 and 239 through 248 in response to Email from MSC (b) (6), (b) (7)(C) and (b) (6), (b) (7)(C) dated 4/12/16
10/27/16	39	Corrected number of cylinders in description from 7 to 6
10/27/16	42	Added "Apply air pressure to collector on the side of fuel pump. Diaphragm shifts relay air valve which activates pressure switch which sends alarm signal." To procedure
10/27/16	52	Added "Enter 5 digit password" to procedure
10/27/16	60 & 61	Changed Setpoints and Results temps to 35°C
10/27/16	66	Changed FO Transfer to FO Supply
10/27/16	80	Changed "E-Stop" to "Stop Button"
10/27/16	Various	Changed Temperatures for Setpoint #183 from 80°C to 87°C and Setpoints #187 through 191 from 55°C to 65°C
10/27/16	206	Added Setpoint of -150 mm
10/27/16	208	Added " use manual bypass" to Procedure #2
10/27/16	213 & 214	Corrected Setpoint Temps for High FO inlet and Low FO inlet
10/27/16	228	Deleted Alarm Description "Uptake Temperature High"
10/27/16	237	Changed "Per Below" to "Page 60 - Machinery Space Fire Detect. SYS Detectors"
10/27/16	239 & 240	Added underline to "qualified third party" in Both Procedures
10/27/16	241-243	Added "Annual By outside contractors" to Results/Remarks
10/27/16	246	Added "Also in CCR as with 245"
10/27/16	249	Added numbering to item 249
10/27/16	MSFDSD Page 60	Corrected Level/Space naming and Added Zone/Smoke numbers
12/5/16	71, 72, 73, & 75	Amended with the following: 71 is not a SHD, 72 alarms at 95, 73 changed procedure for test, and 75 added setpoint.
1/5/2017	71	Amended to demonstrate shutdown
1/5/2017	113, 114, & 115, 137,138	Added setpoint to RP trip test procedures per Dwg E2-1 ECR MSB: Removed procedure 137 and 138. The vessel is not equipped with an automatic bilge pump.
22 June 2020	Various	Amended Procedures 1,3,5,30,34,36,40,42,52,61,62,72,73,78-81,92,94,102,104,112,114,136,137,147,155-157,208, and 211 Deleted old procedures: # 63,129,226,236 as equipment was no OB. Procedure 236 redundant with #132 Inserted new Procedure #63, and 68. All procedures after these re-numbered.

ABBREVIATIONS

ACP	AutoChief Control Panel
A/E	Auxiliary Engine or generator
BCU	Bridge Control Unit
CB	Circuit Breaker
ECC	Engine Control Room console
ECR	Engine Control Room
EDG	Emergency Diesel Generator
EOT	Engine Order Telegraph
ESB	Emergency Switchboard
ESU	Main Engine Safety Unit
F.O.	Fuel Oil
EOT	Engine Order Telegraph (See LTU)
E/S	Engine side or local control panel
FDP	Fire Detection and Fire Repeater Panels
FDP/A	Fire detection panel on Navigational Bridge
H	Audible signal for alarm condition at Engine Control Room console (unless otherwise noted)
H & L	See “H” and “L” herein
L	Visual light Alarm at ECC or text Alarm on HMI (unless otherwise noted)
L.O.	Lube Oil
LTU	Lever Telegraph Unit
LVL	Level control or float switch
MCB	Miniature Circuit Breaker
MCCB	Molded Case Circuit Breaker
MCU	Main Control Unit or (Main Computer Unit)
M.E.	Main Engine
MSB	Main Switchboard
PRS	Pressure switch or pressure control device
PSC	Pressure Sensor Calibrator or Portable Pressure Hand Pump
S/G	Steering Gear
SHD	Shutdown
SLD	M.E. Safety Slowdown
STBY	Standby
TMP	Temperature control device, switch or analog signal
VAC	Voltage Alternating Current
VDC	Voltage Direct Current
W/H	Wheel House control station
WBU	Watch Bridge Unit
WCS	Bridge Wing Console – STBD
WCP	Bridge Wing Console – PORT
WCU	Watch Cabin Unit

NOTE: Set point values are given for guidance and should be interpreted as approximate. A tolerance of ±10% should be expected on most actuation points For additional guidance concerning set point values, refer to the appropriate equipment instruction manual.

STANDARD TEST PROCEDURES

The following standard procedures outlined below will be used unless the U.S. Coast Guard Inspector authorizes alternate methods.

PRESSURE SWITCHES

Connect the test equipment to the test valve and raise or lower the test pressure above/below the switch setting and then slowly reduce/raise the pressure until the switch contacts function.

PRS-1 System where pressures can be adjusted to designated set point

1. Regulate system pressure to designated set point.
2. Observe sensor output signal and compare with instrument or gauge, if installed.
3. Observe resulting functional alarm response on MCC and conditional response on equipment i.e. shutdown, slowdown etc..).

PRS-2 Low pressure device fitted with 3-way test valves and calibrated pressure gauge

1. Connect drain line & bleed valve hose on installed 3-way valve at PRS and ensure drain line is closed.
2. Place system in normal operation.
3. Close flow to sensor with 3-way valve, which pressurizes drain line to bleed valve and closes flow from normal source.
4. Bleed pressure slowly using bleed valve on drain line.
5. Observe resulting functional alarm response on MCC and conditional response on equipment i.e. shutdown, slowdown etc..).
6. Restore system to normal operating arrangement.

PRS-3 Pressure device set beyond normal limits of the system

1. Connect portable PSC on installed 3-way valve test before PRS
2. Close flow to PRS with 3-way valve, which opens flow from PSC to sensor
3. Using PSC, pressurize sensor to operating parameters
4. Place system in normal operation
5. Using PSC raise pressure to above or below setpoint
6. Observe resulting functional alarm response on MCU and conditional response on equipment i.e. shutdown, slowdown etc..).
7. Restore the system to its normal operating arrangement.

PRS-4 For pump standby auto start if no block and bleed is available

1. Assure pumps are secured.
2. Disconnect pressure switch sensing line from system and connect PSC to switch input.
3. Confirm pressure switch activates at correct set point.
4. Close sensing line valve, bleed off pressure at PSC and confirm standby pump switches over.
5. Observe resulting functional alarm response on MCU and conditional response on equipment i.e. shutdown, slowdown etc..).
6. Restore system to normal operating arrangement.

TEMPERATURE SWITCHES

Remove sensor from protecting well and place sensor in wet-well or dry-well calibrator temperature raise or lower the temperature slowly until the temperature contact functions.

TMP-1 Temperature device in system where medium can be temperature controlled to designated set point

1. Provide an independent thermometer at sensor, if not installed.
2. Regulate the medium temperature to designated set point.
3. Observe the operation response.
4. Restore the system to its normal operating condition

TMP-2 Temperature device in system without temperature regulation

1. Observe current temperature value.
2. Remove sensor from wet[1] or dry well and place in wet or dry well temperature calibrator. Wiring should remain connected to system.
3. Adjust calibrator temperature to alarm set point
4. Observe resulting functional alarm response on MCC and conditional response on equipment i.e. shutdown, slowdown etc..).
5. Restore sensor to original condition.

TMP-3 Temperature device in Equipment without temperature regulation and sensing device is not removable (i.e., thermocouple, RTD, not in wet or dry well well etc..)

1. Place system in normal operation and verify a normal sensor output.
2. Disconnect the thermal detector at the console or some other accessible point.
3. Simulate sensor output (millivolt signal or resistance) with a signal generator and verify correlation between simulated signals and console display.
4. Increase simulated voltage or resistance to create an alarm condition. Verify proper set points.
5. Observe resulting functional alarm response on MCU and conditional response on equipment i.e. shutdown, slowdown etc..).
6. Remove the electrical simulators and reconnect the sensors.
7. Verify the proper polarity and that indicators are reading properly.

[1] If temperature switch is removed from a wet well then sensor hole must be plugged before starting test.

LEVEL SWITCHES

Remove sensor from protecting

LVL-1 Level sensors with system where the fluid level can be regulated

1. Place the machine or system in normal operation.
2. Adjust or regulate the flow to regulate fluid level to alarm set point.
3. Observe resulting functional alarm response on MCU and conditional response on equipment i.e. shutdown, slowdown etc..).
4. Verify the fluid level at time of alarm
5. Restore the system to its normal operating condition.

LVL-2 System containing pressure sensing level transmitters with 3-way test valve

1. Place system in normal operation.
2. Close flow to sensor with 3-way valve, which pressurizes drain line to bleed valve and closes flow from normal source.
3. Bleed pressure slowly from using bleed valve on drain line.
4. Observe resulting functional alarm response on MCU and conditional response on equipment i.e. shutdown, slowdown etc..).
5. Restore system to normal operating arrangement.

LVL-3 System or machine without fluid level control – level sensor internally mounted

1. Place system in normal operation.
2. Drain or pump tank level down or up to activate the level sensor to the designated level.
3. Observe resulting functional alarm response on MCU and conditional response on equipment i.e. shutdown, slowdown etc..).
4. For high level alarms and where tank levels cannot be raised to high level alarm points for safety reasons, remove high level indicator (float switch) and place in a liquid bath to activate switch and demonstrate float and sensor integrity. Test shall include ensuring float mechanism floats, float is not detached and float is not leaking.
5. Restore the system to its normal operating arrangement.

Fire Alarm Sensors

In lieu of completing these tests by the ships crew a service report from a qualified manufactures representative is considered as an acceptable alternative.

FIRE-1 Manually operated fire alarm detector

1. Assure that the manual station is not alarmed and fire detection system is active.
2. Remove glass cover for push button.
3. Activate push button.
4. Witness detector LED light and Fire Detection Panel on the Navigational Bridge annunciate the alarm for detector.
5. Restore the system to its normal operating condition.

FIRE-2 Smoke detector

1. Assure that the smoke detector is not alarmed and fire detection system is active.
2. Activate smoke detector by using the manufactures recommended test smoke sprayed into the detector head.
3. Witness detector LED light and Fire Detection Panel on the Navigational Bridge annunciate the alarm for detector.
4. Restore system to normal operating arrangement.

FIRE-3 Heat detector

1. Assure that the heat detector is not alarmed and fire detection system is active.
2. Activate heat detector by using heat gun[2] blowing into the detector head. Hand held thermometer may be used to verify temperature. DO NOT USE AN OPEN FLAME!
3. Witness detector LED light and Fire Detection Panel on the Navigational Bridge annunciate the alarm for detector.
4. Restore the system to its normal operating arrangement.

FIRE-4 Infrared flame detector

1. Assure that the flame detector is not alarmed and fire detection system is active.
2. Using a bright flashlight, flash the light across the flame detectors sensor to activate the flame detector head
3. Witness detector LED light and Fire Detection Panel on the Navigational Bridge annunciate the alarm for detector.
4. Restore the system to its normal operating arrangement.

[2] *UNDER NO CIRCUMSTANCES SHALL AN OPEN FLAME SUCH AS A LIGHTER OR MATCHES BE USED*

INTERNAL COMMUNICATIONS

WATCHSTANDERS ALARMS AND WATCH CALL SYSTEM

ITEM NO.	DESCRIPTION	PROCEDURE	SETPOINT	RESULTS/REMARKS	CHECK OFF S	CHECK OFF U
1.	KONGSBURG SAFETY SYSTEM (DEADMAN) ALARM *The KONGSBURG Engineers safety system (Dead man system) is a system for engineer fitness. When activated, the reset button must be pressed by the engineer within a pre-defined time period. If not, the system will indicate "Engineer fitness alarm"*	1) Ensure Kongsberg Alarm system is set to Bridge Watch and any duty engineer is selected 2) Activate KONGSBURG Safety System "Dead man" alarm by placing key in the "ON" 3) When pre-alarm sounds do not reset timer.	**27 Min: Pre-alarm** **3 Min from pre-alarm to deadman alarm**	a) Placing system on starts time and the need to reset the dead man alarm timer at specified interval. b) Failure to reset timer triggers "Engineer Fitness Alarm" in the wheel house and throughout all remote watch call stations.		
2.	ENGINEER NEEDS ASSISTANCE ALARM	1) On extension alarm panel in engine room assign duty engineer (place system in UMS) 2) Activate any alarm in engine room and do not acknowledge alarm in ECR	**5 minutes**	a) Accept duty from engineer's cabin b) Buzzer is activated on bridge and all common extension alarm panels and alarm LED flashes upon alarm activation. c) Failure to acknowledge at duty engineer's extension alarm panel after time period expires Alarm goes to "ALL CALL" or engineer needs assistance		
3.	ENGINEERS' WATCH CALLING SYSTEM (DUTY ENG) *Note: The engineering watch calling system is a supplemental communication method for contacting the duty engineer or all engineers manually*	1) Ensure Kongsberg Alarm system is set to Bridge Watch and any duty engineer is selected 2) Select "HOME" on C/R console 3) Select "WCALL ENGINE" 4) Select "CALL DUTY ENG"		An indicator beside the called engineer(s) title on the Watch Calling Units starts to sound and is lit. The called engineer(s) signs the call by pushing the ACK button.		
4.	ENGINEERS' WATCH CALLING SYSTEM (ALL CALL) *See note above.*	1) Normal operations UMS engine room 2) Select "HOME" on C/R console 3) Select "WCALL ENGINE" 4) Select "ALL CALL ENG"		An indicator beside on all engineer(s)] Watch Calling Units starts to sound and is lit.		

ITEM NO.	DESCRIPTION	PROCEDURE	SETPOINT	RESULTS/REMARKS		CHECK OFF S	CHECK OFF U
5.	EXTENDED ALARMS ON WATCH CABIN UNITS	1) Ensure Kongsberg Alarm system is set to Bridge Watch 2) Select desired duty engineer 3) Initiate alarm (any) on ECU and do not reset alarm at the ECU during test. This initiates timer alarm timer. 4) Silence the alarm at the selected duty engineers WCU and allow alarm to repeat without resetting on the ECU. 5) Allow alarm to repeat a third time without resetting at the ECU. 6) After "All Call" reset alarm at ECU. 7) Repeat for each Qualified Engineering Watch standers WCU alarm panel:		a) H&L Alarm is relayed on selected duty engineers WCU b) Alarm is relayed on all public space WCU's c) If alarm remains unacknowledged after set period of time H&L alarm repeats d) If alarm remains unacknowledged H&L alarm repeats a third time and then sounds on all WCU's for all qualified engineers	Chief Eng Rm		
					1st Assist		
					2nd Eng.		
					3rd Eng.		
					RM 502		
					RM 503		
					RM 504		
					D-Deck		
					Officers Smoke RM		
					Crews Day RM		
					Gym		
					Officers Mess		
					Crews Mess		
					Duty Mess		
					C/E Office		

PA AND SOUND POWERED PHONES

ITEM NO.	DESCRIPTION	PROCEDURE	SETPOINT	RESULTS/REMARKS	CHECK OFF S	CHECK OFF U
6.	Public Address & Sound Powered Phone Systems are used for emergency communications between the Bridge and the Engineering Staff					
	DIAL #200 ON THE VMP-430 TELEPHONE SYSTEM AND BROADCAST AN ANNOUNCEMENT FROM THE BRIDGE ON THE PA	Listen from ECR.		ECR can hear and understand.		
		Listen from C/E stateroom		Can hear and understand.		
		Listen from 1 A/E stateroom		Can hear and understand.		
		Listen from 2 A/E stateroom		Can hear and understand.		
		Listen from 3 A/E stateroom		Can hear and understand.		
		Listen from CCR		Can hear and understand.		
7.	SOUND POWER PHONE COMMUNICATION BETWEEN BRIDGE AND ECR	Ring the ECR from the bridge		Can hear and understand from both locations.		
		Ring the bridge from the ECR		Can hear and understand from both locations.		
8.	SOUND POWER PHONE COMMUNICATION BETWEEN BRIDGE AND STEERING GEAR ROOM	Ring the bridge from the steering gear Room		Can hear and understand from both locations.		
		Ring the steering gear room from the bridge		Can hear and understand from both locations.		
9.	VMP-430 SHIPS TELEPHONE SYSTEM	On ECR VMP-430 phone, dial any of the following: Chief, 1st., 2nd. or 3rd Engr.		Phone rings in respective room Can hear and understand from both locations.		
10.	8. VMP-430 SHIPS TELEPHONE SYSTEM	On Bridge VMP-430 phone, dial main engine local control station (ELCS)		Phone rings in at engine local control station load speaker functions at ELCS, Can hear and understand from both locations.		

MANEUVERING & STEERING CONTROLS

MAIN ENGINE REMOTE CONTROLS

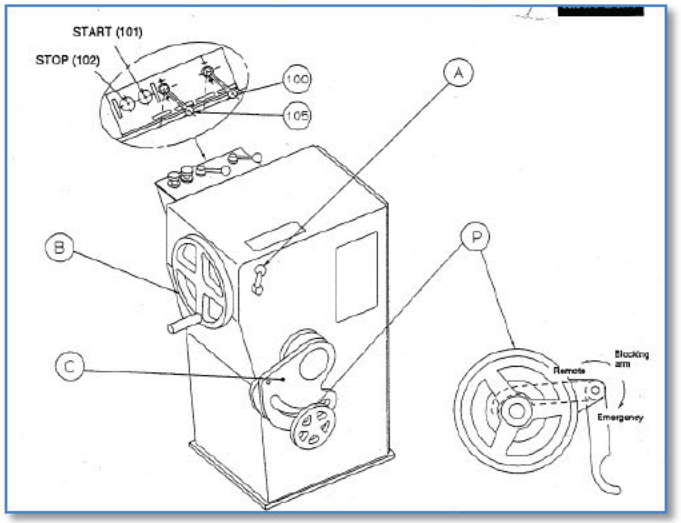
ITEM NO.	ALARM DESCRIPTION CONTROL POSITION	PROCEDURE CHANGE OVER TEST (M/E @ STOP)	SETPOINT	RESULTS/REMARKS	SAT	UNSAT
11.	LOCAL CONTROL TO ECR CONTROL TO BRIDGE CONTROL AND BACK TO ECR CONTROL	1) Engine stopped and in local control 2) Move fuel lever into Remote position		In ECR 1) ECR LED in LTU will start to flash and a buzzer is activated.		
		3) In ECR push "ECR" on "LTU"		LOCAL LED will become dark. ECR LED will become steady. Buzzer is silenced. ECR control is obtained.		
		In ECR: 4) Move switch from C/R Control to Bridge Control		In WH: BRIDGE LED will start flashing. Buzzer is activated.		
		In WH: 5) Press "Bridge" on "LTU"		ECR LED will become dark. BRIDGE LED will become steady. Buzzer is silenced. Bridge control is obtained.		
		In WH: 6). Press "ECR" on "LTU"		In ECR: ECR LED will start flashing. Buzzer is activated.		
		In ECR: 7) Move Switch from Bridge Control to C/R Control		BRIDGE LED will become dark. ECR LED will become steady. Buzzer is silenced. ECR control is obtained.		

Note: The engine control can be taken from the WH to the ECR at any time by pressing the "ECR" button on the "LTU" in the control room. The W/H then has to acknowledge the transfer by pressing the ECR button on the LTU on the Bridge. If the Bridge does not confirm transfer, ECR can force command transfer by pushing the "ECR" pushbutton on the LTU, until transfer is forced to occur (approx. 5 seconds). The engine control can be taken to the local control station at any time by moving the fuel lever out of the remote position.

MAIN ENGINE REMOTE CONTROLS Cont'd

ITEM NO.	DESCRIPTION	PROCEDURE	SETPOINT	RESULTS/REMARKS	CHECK OFF S	CHECK OFF U
12.	CHANGE CONTROL TO E/S (LOCAL) CONTROL	This test is to be completed U/W with the main engine secured		Transfer and control of engine accomplished locally		

1) Check that valve (105), which is the "telegraph handle" of the engine side control system, is in the required position. Note that reversing to a new direction is only possible when stop valve (102 is activated.
2) Turn Handle "A" counterclockwise to free the regulating hand wheel "B"
3) Place blocking arm in emergency position
4) Turn hand wheel "B" to move the innermost lever of the changeover mechanism "C" to a position where the impact hand wheel "P" is able to enter the tapered slots in both levers. Quickly, turn the impact wheel "P" counterclockwise; this causes disconnection of the governor and connection of the regulating hand wheel "B" to fuel pumps. *Note: When the governor is disengaged, the engine is still protected from overspeed by the electric overspeed*
5) Change position of valve "100" from Normal to Emergency. Now air supply is led to the valves of the
maneuvering system for emergency running.
6) Check that valve "105", which is the "telegraph handle" of the emergency control system, is in the required
position.
7) Start: Move regulating hand wheel to "Start" position and push down on start valve. When the starting level r/min has been reached, release the start valve. Engine runs.
8) Increase speed by turning regulating hand wheel
9) Reversing and Start in New Direction: Activate stop valve "102-B6" and move valve "105-C5", which reverses the rollers for the fuel pumps and the starting air distributor. The engine is now ready to start per item 6) above.



MAIN ENGINE REMOTE CONTROLS (continued)

ITEM NO.	ALARM DESCRIPTION CONTROL POSITION	PROCEDURE CHANGE OVER TEST (M/E @ STOP)	SETPOINT	RESULTS/REMARKS	SAT	UNSAT
13.	TURNING GEAR INTERLOCK	Main Engine in ECR control and ready to start.		C/R L on.		
		Without engaging turning gear, activate turning gear limit switch		Turning gear engaged lamp on @ C/R.		
		Move Engine controls slow ahead		Main engine remains stopped. M/E safety system abnormal alarm on ECC		
14.	EOT MISMATCH ALARM	1) M/E Start air secured 2) Move EOT on bridge to any desired command 3) On Engine room EOT move to any other position		H & L Miss match alarm		
15.	WRONG DIRECTION	Main engine in ECR control. Go to engine side controls and switch to local control. Have bridge give "Ahead" order. Start Engine in the "Astern" direction.		Bell & L at engine side. Bell @ W/H. Bell @ C/R.		
16.	ENGINE EMERGENCY STOPS	Activate emergency stop push button on appropriate engine control system. After test, Reset emergency Stop by pushing the E-stop button again. Then proceed to next test location	Binary	H & L Engine stops. If U/W convention stop is also activated and speed order to the rpm control system is set to zero.	Bridge P Wing S Wing ECR Local Control Box	
17.	SPEED AND THRUST INSTRUMENTATION	While at sea conducting pre-arrival tests verify speed and direction of propulsion instruments		Instrumentation shows revolutions of propeller shaft and direction of thrust is verified in each direction as called for on the EOT.		

Note: Item No. 9, 11, 12 & 14 shall be tested by crew for actual performance at sea and recorded in the ships log. These items can be demonstrated in port for general logic only.

STEERING ALARMS

ITEM NO.	ALARM DESCRIPTION	PROCEDURE	SETPOINT	RESULTS/REMARKS	SAT	UNSAT
18.	NO. 1 STEERING GEAR RUNNING	1) Ensure local control panels are in remote and power is in the on position 2) Start No. 1 steering gear motor from bridge		Steering gear starts		
19.	NO. 1 STEERING GEAR POWER & PHASE FAILURE	With No. 1 steering pump in remote 1) Open local controller in steering gear room 2) Open main power switch using hand tool.	Binary	No.2 steering gear starts automatically H & L Tag 1005 S/G Servo PP Loss Phase Tag 1001 S/G Control Power Failure on ECC, Bridge and W/H steering alarm panel flash with steering control Power and Phase No Volt indicators		
20.	NO. 2 STEERING GEAR RUNNING	1) Ensure local control panels are in remote and power is in the on position 2) Start No.2 steering gear motor from bridge		Steering gear starts		
21.	NO. 2 STEERING GEAR POWER & PHASE FAILURE	With No. 2 steering pump in remote 1) Open local controller in steering gear room 2) Open main power switch using hand tool.	Binary	No.1 steering gear starts automatically H & L Tag 1007 S/G Servo PP Loss Phase Tag 1002 S/G Control Power Failure on ECC, and Bridge and W/H steering alarm panel flash with steering control Power and Phase No Volt indicators		
22.	NO. 1 STEERING GEAR MOTOR OVERLOAD	Activate test button on motor overload module on (K4) contactor in motor controller	Binary	H & L in ECR and in W/H Tag 1003 S/G Servo PP Overload		
23.	NO. 2 STEERING GEAR MOTOR OVERLOAD	Activate test button on motor overload module on (K4) contactor in motor controller	Binary	H & L in ECR and in W/H Tag 1004 S/G Servo PP Overload		
24.	NO. 1 STEERING GEAR HYDRAULIC OIL LEVEL LOW	With S/G running remove the cover on the LL switch and lift the knob to activate the LL alarm. Do not to lift too high as damage to spring might occur.	Binary	No.2 steering gear starts automatically H & L Tag 1009 S/G Oil Tank Level Low Tag 1013 S/G STBY Unit Auto Cut In		
25.	NO. 2 STEERING GEAR HYDRAULIC OIL LEVEL LOW	With S/G running remove the cover on the LL switch and lift the knob to activate the LL alarm. Do not to lift too high as damage to spring might occur.	Binary	No.1 steering gear starts automatically H & L Tag 1011 S/G Oil Tank Level Low Tag 1012 S/G STBY Unit Auto Cut In		

RUDDER ALARMS

ITEM NO.	ALARM DESCRIPTION	PROCEDURE	SETPOINT	RESULTS/REMARKS	SAT	UNSAT
26.	RUDDER ANGLE REPEATER	With steering gear operating 1) Set rudder at mid-ships b) Move helm to 30° starboard c) Move helm to 30° port	0°	Confirm W/H rudder repeater is within ±1° of mid-ships		
			30° stbd	Confirm W/H rudder repeater is within ±1° of 30° port		
			30° port	Confirm W/H rudder repeater is within ±1° of 30° starboard		
27.	STEERING GEAR TEST	With steering gear operating Swing helm on bridge from 30° P to 35° S		Rudder responds 30° to 35° within 60 seconds		
28.	STEERING FAILURE	With the vessel at sea under normal propulsion, secure the steering pumps and steer a course greater than 5° off course.	binary	H & L at steering stand.		

Note: Item No. 25 to be performed at sea and logged in official log book. Assure that the vessel is in safe area before conducting test.

PROPULSION SYSTEMS

MAIN ENGINE ALARMS

ITEM NO.	DESCRIPTION	PROCEDURE	SETPOINT	RESULTS/REMARKS	SAT	UNSAT
29.	ENGINE SAFETY SYSTEM SLOWDOWN FUNCTIONAL TEST	U/W engine running <80% MCR in bridge control 1) Initial any SLD alarm on main engine 2) Depress "Cancel SLD" pushbutton on the bridge ACP unit 3) Repeat SLD alarm without depressing "Cancel SHD" pushbutton 4) Reset SHD after sensor is restored by setting maneuvering lever at the control stand in control stop position		1) H&L 2) Slowdown function is canceled 3) Engine slows down immediately		
30.	ENGINE SAFETY SYSTEM SHUTDOWN FUNCTIONAL TEST Note: *Slowdown function is available for 7 seconds During this time the Master can initiate a SLD for the safety of the ship.*	U/W engine running <80% MCR in bridge control 1) Initial any **SLD** alarm on ME 2) Depress "Cancel SLD" pushbutton on the bridge ACP unit 3) Repeat SLD alarm without depressing "Cancel SLD" pushbutton 4) Reset SLD after sensor is restored by setting maneuvering lever at the control stand in control stop position		1) H&L 2) Slowdown function is canceled 3) Engine Slowdown is initiated i		
31.	M.E. L.O. INLET PRESSURE[3]	PRS-2	Alarm 0.2 MPa SLD: 0.14 MPa SHD: 0.12 MPa	H & L ME Slow down or shutdown Tag 3052 M.E. LO Inlet Pressure lo		
32.	M.E. T/C LO OUTLET HIGH TEMPERATURE	TMP-2 at dock with engine secured	95°C	H & L Tag 3039 M.E. T/C Outlet Temp		
33.	M.E. T/C LO INLET PRESSURE	PRS-2 at dock with engine secured	0.12Mpa	H & L Tag 3038 M.E. T/C LO Inlet Pressure		
34.	THRUST PAD HIGH TEMPERATURE	1. Using an infrared handheld thermometer, verify that the temperature reading on the Kongsburg reads at or near the temperature on the sensor bearing housing 2. Lower the setpoint to just below the temperature observed on the handheld thermometer.	75° C HI 80° C Slowdown 90° C Shutdown	H & L ME 2/Second time delay Tag 3079 Thrust bearing Hi		

[3] *Item 28 and 29 Shall be tested U/W and Logged for DNV/USCG to show slowdown and shutdown system functions other testes to be performed at dock with engine secured)*

MAIN ENGINE ALARMS Cont'd

ITEM NO.	DESCRIPTION	PROCEDURE	SETPOINT	RESULTS/REMARKS		SAT	UNSAT
35.	M.E JACKET WATER COOLING LOW PRESSURE	PRS-2 at dock with engine secured	0.2 MPa LO 0.15 MPa SLD	H & L ME Slow Down W/2 second delay Tag 3014 M.E. JWC Lo Press			
36.	M.E. C.F.W DIFFERENTIAL PRESSURE ACROSS ENGINE	With cooling water pump running and engine secured PRS-2 on Sensor PS307	0.15 MPa	H & L Tag 3024 M.E. CFW Dift Press Across Eng.			
37.	M.E. L.O. HIGH INLET TEMPERATURE	TMP-2 at dock with engine secured	55° C HI 60° C Slowdown	H & L ME Slow down W/2 second delay Tag 3033 M.E. Hi Inlet Temp			
38.	M. E. PISTON COOLING OIL OUTLET TEMP CYLINDERS 1 THROUGH 6	TMP-2 at dock with engine secured	70° C HI 75° C Slowdown	H & L ME Slow Down W/2 second time delay Tags 3041 through 3046	1		
					2		
					3		
					4		
					5		
					6		
39.	M.E. EXHAUST VALVE AIR INLET TO AIR CYLINDER PRESSURE	PRS-2 at dock with engine secured	0.55 MPa LO	H & L ME Slow Down W/2 second TD			
40.	CYLINDER EXHAUST GAS HIGH CYLINDERS 1 THROUGH 6	TMP -2 at dock with engine secured	430° C HI 450° Slowdown	Activate alarm. Tags 3053 through 3058	1		
					2		
					3		
					4		
					5		
					6		
41.	EXHAUST GAS AFTER T/C TEMPERATURE HIGH	TMP-2	350° C HI	H&L Tag 3052 M.E. Gas after T/C Hi			
42.	EXHAUST GAS AFTER CYLINDER DEVIATION TEMP Cylinders 1 through 6	With engine in ½ ahead or with AutoChief simulating engine RPMs: `TMP -2	± 50° C HI ± 60° Slowdown	H & L ME Slow Down W/2 second delay Tags 3059 through 3064	1		
					2		
					3		
					4		
					5		
					6		

MAIN ENGINE ALARMS Cont'd

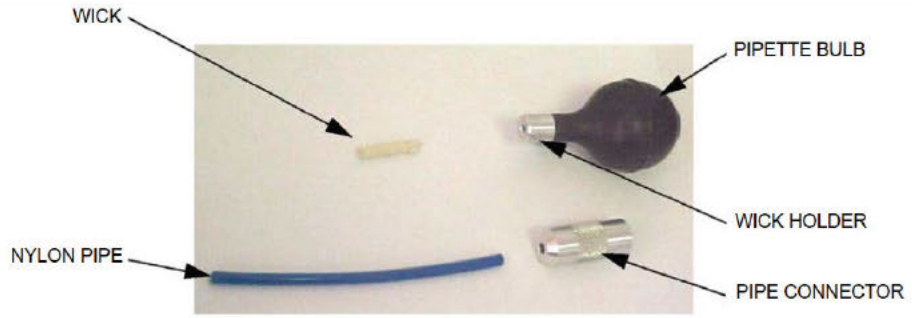
ITEM NO.	DESCRIPTION	PROCEDURE	SETPOINT	RESULTS/REMARKS		SAT	UNSAT
43.	M/E HIGH PRESSURE F.O. PIPE LEAK Cylinders 1 through 6	LVL-3 Apply air pressure to collector on the side of fuel pump. Diaphragm shifts relay air valve which activates pressure switch which sends alarm signal.	Binary	H & L ME Slow Down W/2 second delay Tags 3026 through 3031	1		
					2		
					3		
					4		
					5		
					6		
44.	M/E PISTON CYLINDER COOLING OIL OUTLET NO FLOW	Disconnect oil pipe which leads to the no-flow sensor	Binary	H & L ME Slow Down Tags 3046 through 3051	1		
					2		
					3		
					4		
					5		
					6		
45.	M/E F.O. INLET PRESSURE	PRS-2	0.65MPa	H&L Tag: 3025 M/E F.O. Inlet Pressure			
46.	MAIN LO AUTO FILTER DIFF PRESSURE HIGH	PRS-2	0.09MPa	H&L Tag: 4112 Main LO Auto Filter Diff Pressure High			
47.	FW EXPANSION TANK LOW LEVEL	LVL-3	400MM	H&L w/15 second delay Tag: 4243 F.W. Expansion Tank Low Level			
48.	M/E LO SUMP TANK LOW LEVEL	LVL-3	200MM	H&L w/15 second delay Tag: 4215 M/E LO Sump Tank Low Level			

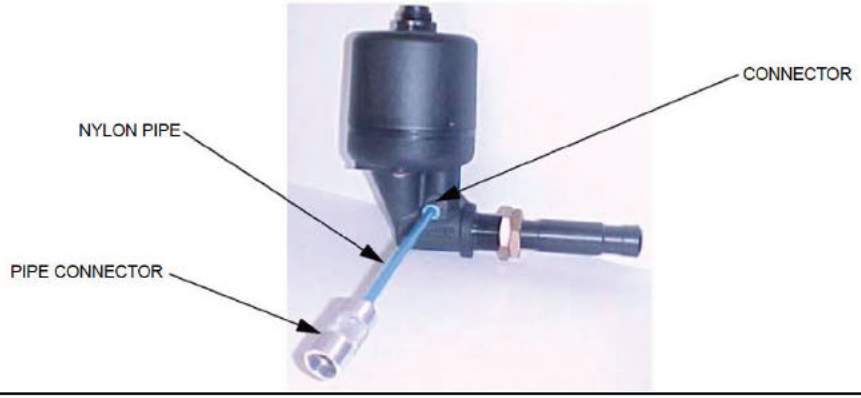
MAIN ENGINE ALARMS Cont'd

ITEM NO.	DESCRIPTION	PROCEDURE	SETPOINT	RESULTS/REMARKS	SAT	UNSAT
49.	ALPHA LUBRICATION SYSTEM CHACK	1) With engine secured 2) Depress PRE_LUBRICATION button on the HMI panel and inspect LED's on intermediate box	binary	All LED's for feedback indication on the intermediate boxes should flash indicating that the lubricators are functioning correctly		
50.	CRANK CASE OIL MIST (Bearing High Temp) M1-5		.05mg/L	H & L ME Slow down w/2 second delay Tag 3009 Crank case oil mist Hi		

PROCEDURE

1) With engine secured & Graviner Mk6 on
2) Cut a length of wick approximately 30 mm long. Assemble the smoke tester by pushing the wick into the wick holder fitted with the pipette bulb. Press the nylon pipe into the Pipe connector
3) Push the nylon pipe of the smoke tester into the connector on the side of the detector base body
4) Dip the wick into the bottle of smoke oil and reseal the bottle firmly
5) Ignite the wick of the smoke tester and blow out the flame. Squeeze the pipette bulb to keep the wick smoking
6) While the wick is still smouldering, insert it into the pipe connector and squeeze the pipette bulb.
7) Observe the wick is still smouldering, insert nylon pipe into the pipe connector of the detector and squeeze the pipette bulb. Note results here.
8) After tests are completed the Maximum Actual Average readings should be erased. This can be done in the Engineer Main Menu then configuration and then CLR. Maximum Average
9) To release the pipe from the connector, press in the blue plastic collar on the end of the connector at the same time as pulling the pipe out.
10) Remove the nylon pipe from the pipe connector for stowage purposes.
11) The wick is reusable and can be left in the wick holder. Fully extinguish the wick after use at all times.
12) Refer to the Material Safety Data Sheet in the event of health or safety issues.





MAIN ENGINE ALARMS Cont'd

ITEM NO.	ALARM DESCRIPTION	PROCEDURE	SETPOINT	RESULTS/REMARKS			SAT	UNSAT
51.	OIL MIST DETECTOR FAIL	1) With engine secured and Graviner Mk6 functioning remove the connector pin on any detector for 10 seconds 2) Re-install connector and reset Graviner by holding in reset button for 5 seconds	Binary	H & L on Graviner Panel and ECC 2/Second delay				
52.	LINE SHAFT BEARINGS HIGH TEMP BEARINGS 1 THROUGH 3	1. Using an infrared handheld thermometer, verify that the temperature reading on the Kongsburg reads at or near the temperature on the sensor bearing housing 2. Lower the setpoint to just below the temperature observed on the handheld thermometer.	Stern Tube AFT See remarks	H & L 2/Second delay Tag 3080 Aft Bearing Hi	60° C HI 65° C SLD	1		
			Stern Tube Fwd See Remarks	H & L 2/Second delay Tag 3081 Stern Tube Fwd bearing Hi	60° C HI 65° C SLD	2		
			Intermediate See Remarks	H & L 2/Second delay Tag 3081 Intermediate Bearing Hi	65° C HI 70° C SLD	3		

MAIN ENGINE ALARMS Cont'd

ITEM NO.	ALARM DESCRIPTION	PROCEDURE	SETPOINT	RESULTS/REMARKS		SAT	UNSAT
53.	MAIN ENGINE OVER SPEED (Test and Log for DNV/USCG)	1) Activate the Over Speed Test Level and set to 25 rpm. (ACP, Page Safety System/RPM Detector) 2.) Start engine. After test Deactivate the Over Speed Test Level. Enter 5 digit password		H & L Tag 3003 ME Overspeed Engine starts normally. After reaching the RPM limit, Shut-Down outputs are directly activated through the ESU. The engine stops.			
54.	M. E. JACKET WATER COOLING HIGH OUTLET CYLINDER TEMPERATURE CYLINDERS 1 THROUGH 6	TMP-2	85° C HI 90° C SLD	H & L Tag 3018 through 3023 ME Slow Down W/2 second time delay	1 2 3 4 5 6		
55.	SCAVENGING AIR HIGH TEMPERATURE	TMP-2; Each of 6 Cylinders.	80 ^{0}C HI 120 ^{0}C SLD	H & L; ME Slow Down Tag 3065 through 3070	1 2 3 4 5 6		
56.	SCAVENGE AIR WATER LEVEL	Engine secured On lower level of engine room starboard side under scavenge air box, remove float sensor from housing and activate float by lifting float mechanism	Binary	H & L 15 second time delay Tag 3072 M/E Scavenge Air Receiver W. Lev/H		SAT	UNSAT
57.	SCAVENGE AIR RECEIVER PRESSURE	PRS-2	0.039MPa	H&L Tag: 3071 M/E Scav. Air Receiver Pressure			
58.	FO/LO LEAKAGE TANK HIGH LEVEL ALARM	LVL-3	Binary	H & L 2 Second time delay			

MAIN ENGINE AND VITAL AUXILARIES – STANDBY PUMP OPERATION

ITEM NO.	DESCRIPTION	PROCEDURE	SETPOINT	RESULTS/REMARKS	SAT	UNSAT
59.	M.E L.O PUMP #1 STANDBY START	Select # 2 ON; #1 STBY Trip Breaker for #2	0.16MPa	#1 Pump Starts H & L Tag 4001 M.E. LO Pump standby start		
60.	M.E L.O PUMP #2 STANDBY START	Select # 1 ON; #2 STBY Trip Breaker for #1	0.16Mpa	#2 Pump Starts H & L Tag 4001 M.E. LO Pump standby start		
61.	M.E SW. PUMP #1 STANDBY START	Set to Control System #1. Control System selects lead pump. TMP-2. Temp. Sensor in L.T. Outlet.	35°C	#1 Pump Starts after cooling water temperature reaches 35 degrees F		
62.	M.E SW. PUMP #2 STANDBY START	Set to Control System #1. Control System selects lead pump. TMP-2. Temp. Sensor in L.T. Outlet.	35°C	#2 Pump Starts after cooling water temperature reaches 35 degrees F		
63.	M.E SW. PUMP #3 STANDBY START	Set to Control System #1. Control System selects lead pump. TMP-2. Temp. Sensor in L.T. Outlet.	35°C	#2 Pump Starts after cooling water temperature reaches 35 degrees F		
64.	M.E H.T.F.W PUMP #1 STANDBY START	Select #2 ON; #1 STBY Trip breaker for #2	0.25Mpa	#1 Pump Starts H & L		
65.	M.E H.T.F.W PUMP #2 STANDBY START	Select #1 ON; #2 STBY Trip Breaker for #2	0.25Mpa	#2 Pump Starts H & L Tag: 4004 M/E LTFW ST/BY PP start		
66.	M.E L.T.F.W PUMP #2 STANDBY START	Select #2 ON; #1 STBY Trip breaker for #2	0.2Mpa	#1 Pump Starts H & L Tag: 4004 M/E LTFW ST/BY PP start		
67.	M.E L.T.F.W PUMP #2 STANDBY START	Select #1 ON; #2 STBY Trip breaker for #1	0.2Mpa	#2 Pump Starts H & L		
68.	M.E L.T.F.W PUMP #3 STANDBY START	Select #1 ON; #3 STBY Trip breaker for #1	0.2Mpa	#3 Pump Starts H & L		
69.	FO SUPPLY STANDBY PUMP START	Select #1 ON; #2 STBY PRS- 2	0.3MPa	Standby pump starts H&L Tag: 4110 FO Transf. ST/BY Pump Start		
70.	FO CIRC STANDBY PUMP START	Select #1 ON; #2 STBY PRS- 2	0.6MPa	Standby pump starts H&L Tag: 4111 FO Circ. ST/BY Pump Start		

POWER GENERATION

EMERGENCY DIESEL GENERATOR AUTOSTART AND SAFETY DEVICES

ITEM NO.	ALARM DESCRIPTION	PROCEDURE	SETPOINT	RESULTS/REMARKS	SAT	UNSAT
71.	EDG AUTOMATIC STARTUP	1) Begin with all loads on ESB being fed from main generator side. 2) Open emergency bus tie on MSB.	N/A	1) The circuit breaker on main bust tie on the ESB opens automatically. 2) The EDG starts and comes up to speed automatically. 3) The EDG breaker to the ESB closes automatically. 4) All loads on the ESB are being fed from the EDG side. 5) Confirm EDG comes online in less than 45 seconds.		
72.	OVER SPEED	Engine running without load. 1) On the engine control panel, displaying the main screen, press the Page button 2 times. 2) Press the down arrow 3 times to Engine Protect, Press Enter. 3) Press the down arrow 8 times to Overspeed, Press the Enter button 1 time. 4) Press the down arrow to change the set-point from 115% to 95% to initiate overspeed. 5) Reset the fault and reset the over speed set-point to 115%	2050 RPM	**H & L; Engine Stops**		
73.	L.O. INLET LOW PRESSURE	PRS-2	2.5 Bar	H & L;		
74.	CFW HIGH TEMPERATURE	TMP-2	95^{0}C	Alarm only		
75.	FAILURE TO START	1) Hold governor stop solenoid in stopped position 2) Start the engine locally	Binary	After third attempt to start; H & L "Start Failure" alarm is given, and engine does not start.		
76.	FUEL LEAKAGE	LVL-3		Alarm only		
77.	CFW LOW PRESSURE	PRS-2	0.5 Bar	Alarm only		

GENERATOR ENGINE REMOTE STARTS

ITEM NO.	ALARM DESCRIPTION / CONTROL POSITION	PROCEDURE / ONE GENERATOR ON LINE	SETPOINT	RESULTS/REMARKS		SAT	UNSAT
78.	ECR GENERATOR START FUNCTION	1) Generator #1 on line 2) On "Syncro" panel on MSB select #2 generator as standby 3) On #2 generator panel on MSB depress the "start" button 4) Depress Auto Sync button 5) Single up on #2 and secure #1		Generator starts Generator parallels w/ bus			
79.	ECR GENERATOR START FUNCTION	1) Generator #2 on line 2) On "Syncro" panel on MSB select #3 generator as standby 3) On #3 generator panel on MSB depress the "start" button 4) Depress Auto Sync button 5) Single up on #3 and secure #2		Generator starts Generator parallels w/ bus			
80.	ECR GENERATOR START FUNCTION	1) Generator #3 on line 2) On "Syncro" panel on MSB select #1 generator as standby 3) On #1 generator panel on MSB depress the "start" button 4) Depress Auto Sync button 5) Single up on #1 and secure #3		Generator starts Generator parallels w/ bus			
81.	GENERATOR FAIL TO START	1) With generator off line close start air valve and activate start sequence MSB		H & L	A/E NO.1		
					A/E NO.2		
					A/E NO.3		
82.	GENERATOR LOCAL START	1) Start each generator locally at the generator local control panel.		H & L	A/E NO.1		
					A/E NO.2		
					A/E NO.3		
83.	GENERATOR "E-STOP"	With A/E running and off line depress appropriate "Stop button" switch on panel #3 of ECC.		H & L	A/E NO.1		
					A/E NO.2		
					A/E NO.3		

#1 SERVICE GENERATOR ENGINE SAFETY DEVICES

ITEM NO.	ALARM DESCRIPTION	PROCEDURE	SETPOINT	RESULTS/REMARKS		SAT	UNSAT
84.	OVERSPEED SHUTDOWN	1. Engine running at operating temperature and not online 2) Using a mechanical tool manually override governor actuator arm and slowly rise engine RPMS to set point.	1015 RPM	H&L Engine Stops Tag: 2011 No.1 A/E OVERSPEED SHD			
85.	LUBE OIL INLET PRESSURE LOW	1. Engine running at operating temperature and not online 2. PRS-2	0.4 Mpa LO 0.25 SHD	H & L Tag: 2006 No.1 D/G L.O. Inlet pressure Engine shuts down on LO-LO			
86.	FUEL OIL INLET PRESSURE LOW	PRS-2	0.4 Mpa LO	H & L Tag: 2030 No.1 D/G F.O. Inlet pressure			
87.	LUBE OIL INLET TEMPERATURE	TMP-2	75°C HI	H & L Tag: 2008 No.1 D/G L.O. Inlet Temp			
88.	C.F.W. INLET PRESSURE	PRS-2	0.08 MPa	H & L			
89.	CFW OUTLET TEMPERATURE	1) Engine running at operating temperature and not online 2) TMP-2	90°C HI 95°C SHD	H & L; Engine Stops Tag: 2009 No.1 D/G CFW Outlet Temp			
90.	F.O. FILTER HIGH DIEF PRESSURE		0.02~0.25 Mpa	H&L Tag 2038 No.1 A/E F.O. FILTER HI PRES.			
91.	DG EXHAUST GAS OUTLET TEMPERATURE	TMP-2	420°C	Tag: 2023 H & L (No.X Exh Gas Tag: 2027 Temp Out) Tag: 2029 Tag: 2032 Tag: 2034 Tag: 2036	CYL 1 CYL 2 CYL 3 CYL 4 CYL 5 CYL 6		
92.	DG EXHAUST GAS HT DEVIATION FROM AVERAGE Note: Deviation temperatures are inhibited when the generator is not on the bus	1) Engine running at operating temperature and connected to the buss 2) TMP-2	±50°C	Tag: 2026 H&L (No.1 A/E EXH Tag: 2028 GAS HT DEIV FM Tag: 2031 AVERAGE) Tag: 2033 Tag: 2035 Tag: 2037	CYL 1 CYL 2 CYL 3 CYL 4 CYL 5 CYL 6		
93.	DG EXHAUST GAS T/C INLET TEMPERATURE HIGH	TMP-2	550°C	H&L Tag: 2066 No.2 D/G EXH GAS INLET T/C TEMP			
94.	TURNING GEAR INTERLOCK	Engage turning bar, Close start air valve and activate start sequence at local control panel.	Binary	Starter air solenoid does not engage and Engine does not attempt to start; Light on Generator Section of MSB illuminates: Turning Gear Interlock.			

#2 SERVICE GENERATOR ENGINE SAFETY DEVICES

ITEM NO.	ALARM DESCRIPTION	PROCEDURE	SETPOINT	RESULTS/REMARKS		SAT	UNSAT
95.	OVERSPEED SHUTDOWN	1. Engine running up to operating temperature. 2) Using a mechanical tool manually override governor actuator arm and slowly rise engine RPMS to set point.	1015 RPM	H&L Engine Stops Tag: 2061 No.2 A/E OVERSPEED SHD			
96.	LUBE OIL INLET PRESSURE LOW	PRS-2	0.4 Mpa LO 0.25 SHD	H & L Tag: 2056 No.2 D/G L.O. Inlet pressure Engine shuts down on LO-LO			
97.	FUEL OIL INLET PRESSURE LOW	PRS-2	0.4 Mpa LO	H & L Tag: 2080 No.2 D/G F.O. Inlet pressure L0			
98.	LUBE OIL INLET TEMPERATURE	TMP-2	75°C HI	H & L Tag: 2058 No.2 A/E D/G L.O. Inlet Temp			
99.	C.F.W. INLET PRESSURE	PRS-2	0.08 MPa	H & L Tag: 2057 No.2 A/E CFW Inlet Pressure			
100.	CFW OUTLET TEMPERATURE	TMP-2	90°C HI 95°C SHD	H & L; Engine Stops			
	F.O. FILTER HIGH DIEF PRESSURE		0.02~0.25 Mpa	H&L Tag 2088 No.2 A/E F.O. FILTER HI PRES.			
101.	DG EXHAUST GAS OUTLET TEMPERATURE	TMP-2	420°C	Tag: 2075 H&L (No.2 A/E EXH Tag: 2077 GAS HT DEIV FM Tag: 2079 AVERAGE) Tag: 2082 Tag: 2084 Tag: 2086	CYL 1 CYL 2 CYL 3 CYL 4 CYL 5 CYL 6		
102.	DG EXHAUST GAS HT DEVIATION FROM AVERAGE Note: Deviation temperatures are inhibited when the generator is not on the bus	1) Engine running at operating temperature and connected to the buss 2) TMP-2	±50°C	Tag: 2076 H&L (No.2 A/E EXH Tag: 2078 GAS HT DEIV FM Tag: 2081 AVERAGE) Tag: 2083 Tag: 2085 Tag: 2087	CYL 1 CYL 2 CYL 3 CYL 4 CYL 5 CYL 6		
103.	DG EXHAUST GAS T/C INLET TEMPERATURE HIGH	TMP-2	550°C	H&L Tag: 2066 No.2 D/G EXH GAS INLET T/C TEMP			
104.	TURNING GEAR INTERLOCK	Engage turning bar, Close start air valve and activate start sequence at local control panel.	Binary	Starter air solenoid does not engage and Engine does not attempt to start; Light on Generator Section of MSB illuminates: Turning Gear Interlock.			

#3 SERVICE GENERATOR ENGINE SAFETY DEVICES

ITEM NO.	ALARM DESCRIPTION	PROCEDURE	SETPOINT	RESULTS/REMARKS		SAT	UNSAT
105.	OVERSPEED SHUTDOWN	1. Engine running up to operating temperature. 2) Using a mechanical tool manually override governor actuator arm and slowly rise engine RPMS to set point.	1015 RPM	H&L Engine Stops Tag: 2111 No.3 A/E OVERSPEED SHD			
106.	LUBE OIL INLET PRESSURE LOW	PRS-2	0.4 Mpa LO 0.25 SHD	H & L Tag: 2106 No.3 D/G L.O. Inlet pressure Engine shuts down on LO-LO			
107.	FUEL OIL INLET PRESSURE LOW	PRS-2	0.4 Mpa LO	H & L Tag: 2130 No.3 D/G F.O. Inlet pressure L0			
108.	LUBE OIL INLET TEMPERATURE	TMP-2	75°C HI	H & L Tag: 2108 No.3 A/E D/G L.O. Inlet Temp			
109.	C.F.W. INLET PRESSURE	PRS-2	0.08 MPa	H & L Tag: 2107 No.3 A/E CFW Inlet Pressure			
110.	CFW OUTLET TEMPERATURE	TMP-2	90°C HI 95°C SHD	H & L; Engine Stops Tag: 2109 No.3 A/E CFW Outlet Temp			
	F.O. FILTER HIGH DIEF PRESSURE		0.02~0.25 Mpa	H&L Tag 2138 No.3 A/E F.O. FILTER HI PRES.			
111.	DG EXHAUST GAS OUTLET TEMPERATURE	TMP-2	420°C	Tag: 2125 H&L (No.3 A/E EXH Tag: 2127 GAS HT DEIV FM Tag: 2129 AVERAGE) Tag: 2132 Tag: 2134 Tag: 2136	CYL 1 CYL 2 CYL 3 CYL 4 CYL 5 CYL 6		
112.	DG EXHAUST GAS HT DEVIATION FROM AVERAGE Note: Deviation temperatures are inhibited when the generator is not on the bus	1) Engine running at operating temperature and connected to the buss 2) TMP-2	±50°C	Tag: 2126 H&L (No.3 A/E EXH Tag: 2128 GAS HT DEIV FM Tag: 2131 AVERAGE) Tag: 2133 Tag: 2135 Tag: 2137	CYL 1 CYL 2 CYL 3 CYL 4 CYL 5 CYL 6		
113.	DG EXHAUST GAS T/C INLET TEMPERATURE HIGH	TMP-2	550°C	H&L; Tag: 2116 No.3 D/G EXH GAS INLET T/C TEMP			
114.	TURNING GEAR INTERLOCK	Engage turning bar, Close start air valve and activate start sequence at local control panel.	Binary	Starter air solenoid does not engage and Engine does not attempt to start; Light on Generator Section of MSB illuminates: Turning Gear Interlock.			

GENERATOR SWITCHBOARD SAFETY DEVICES

ITEM NO.	ALARM DESCRIPTION	PROCEDURE	SETPOINT	RESULTS/REMARKS	SAT	UNSAT
115.	#1 G/E REVERSE POWER	1) #1 and #2 in parallel. 2) Place genset selector switches in manual 3) Reduce engine speed at governor control on MSB on #1 while raising speed on #2.	(10%/-91kW)	H & L 4 sec. delay; breaker opens; Preferential Trips activated		
116.	#2 G/E REVERSE POWER	1) #2 and #3 2) Place genset selector switches in manual. 3) Reduce engine speed at governor control on MSB on #2 while raising speed on #3	(10%/-91kW)	H & L 4 sec. delay; breaker opens; Preferential Trips activated		
117.	#3 G/E REVERSE POWER	1) #3 and #1 in parallel. 2) Place genset selector switches in manual. 3) Reduce engine speed at governor control on MSB on #3 while raising speed on #1.	(10%/-91kW)	H & L 4 sec. delay; breaker opens; Preferential Trips activated		
118.	MSB BUSS ABNORMAL (UNDER VOLTAGE)	1) With on line generator open generator panel on MSB 2) On the DIEF RMV-112D UV relay adjust the 80% - 100% dashpot to 100%	95% or 418VAC 5 seconds	H & L		
119.	MSB BUSS ABNORMAL (HIGH VOLTAGE)	1) With on line generator open generator panel on MSB 2) On the DIEF RMV-112D UV relay adjust the 106% - 120% dashpot to 100%	105% or 462VAC 5 seconds	H & L		
120.	MSB BUSS ABNORMAL (HIGH FREQUENCY)	1) With on line generator open generator panel on MSB 2) On the DIEF RMV-112D Over Frequency relay adjust the 100% - 110% dashpot to 100%	105% or 63Hz 5 seconds	H & L Tag: 5002 MSB Frequency High		
121.	MSB BUSS ABNORMAL (LOW FREQUENCY)	1) With on line generator open generator panel on MSB 2) On the DIEF RMV-112D under frequency relay adjust the 80% - 100% dashpot to 100%	95% or 57Hz 5 seconds	H & L		

GENERATOR SWITCHBOARD SAFETY DEVICES (Cont'd)

ITEM NO.	ALARM DESCRIPTION	PROCEDURE	SETPOINT	RESULTS/REMARKS	SAT	UNSAT
122.	Automatic Startup Black out start	1) This test can be completed with any one SSDG feeding the MSB and an alternate in standby 2) Advise crew of a impending power interruption 3) Open MCB for online generator		H&L 1) The standby generator starts and it's CB closes, restoring power 2) EDG starts 3) No loss of propulsion safety trip control system		
123.	Number 2 Generator auto-start	a) With #1 G/E online; #2 G/E in stand-by, increase the load. b) With both generators now online, decrease load.	95% or 864kW for 5 seconds 80% or 728kW for 10 minutes	#2 G/E starts automatically and parallels #2 G/E automatically goes off-line and secures after cool down period.		
124.	Number 3 Generator auto start	a) With #2 G/E online; #3 G/E in stand-by increase the load. b) With both generators now online, decrease load	95% or 864kW for 5 seconds 80% or 728kW for 10 minutes	#3 G/E starts automatically and parallels #3 G/E automatically goes off-line and secures after cool down period.		
125.	Number 1 Generator auto start	a) With #3 G/E online; #1 G/E in stand-by increase the load. b) With all both generators now online, decrease load.	95% or 864kW for 5 seconds 80% or 728kW for 10 minutes	#1 G/E starts automatically and parallels. #1 G/E automatically goes off-line and secures after cool down period.		
126.	PREFERENCE TRIP #1*	1) With two generators on line in parallel 2) Trip ACB to one breaker		H & L Preferential trips occur		

**Note: Preferential Trips will also occur when completing reverse power relay tests*

SYSTEM POWER SUPPLIES

ITEM NO.	ALARM DESCRIPTION	PROCEDURE	SETPOINT	RESULTS/REMARKS	SAT	UNSAT
127.	MCU AC POWER FAIL TO UPS U4 *Failure of Normal Power*	Open MCCB "EL21" located on ESB	Binary	H & L Power is supplied by redundant AC power supply U2 from MSB and 24 VDC "G1" battery backup		
128.	MCU AC POWER FAIL to UPS U2 *Failure of Backup Power*	Open MCCB "4P24" located on MSB	Binary	H & L Power is supplied by redundant AC power supply U4 from ESB and 24 VDC "G1" battery backup		
129.	DC 24V BATTERY "G1" FAILURE	Secure 24VDC power at FB switch	Binary	H & L		
130.	ECC BATTERY LOW VOLTAGE	Secure AC power from MSB "4P24" and ESB "EL21"	Binary	H & L 24 VDC Batteries assume load for a minimum of 30 minutes		
131.	ENGINE TELEGRAPH POWER FAILURE	Secure power to the C/R Maneuvering Unit & EOT by removing X10 DC power input on underside of the telegraph.		H & L No loss of control when in Bridge Control		
132.	BRIDGE TELEGRAPH POWER FAILURE	Secure power to the Bridge Maneuvering Unit & EOT by removing X10 DC power input on underside of the telegraph.		H & L Must operate on P/S bridge wing, ECR Control or in Local Control		
133.	FIRE ALARM AC POWER FAILURE	On MSB open MCCB "4P2"		H&L in ECR and W/H; Tag 13003 Fire Alarm AC Power		
134.	MSB POWER FAILURE TO BATTERY CHARGING AND DICHARGING PANEL	Open CB "M1" from MSB 1 on main NP control panel in Electric Equipment Room		H & L Tag: 5012 Battery Charger Panel Fail		
135.	ESB POWER FAILURE TO BATTERY CHARGING AND DICHARGING PANEL	Open CB "M2" from ESB on main NP control panel in Electric Equipment Room		H & L Tag: 5012 Battery Charger Panel Fail		
136.	220V POWER FAILURE TO A7-1 UPS *UPS FEEDS KONGSBURG ROS 1 COMPUTER A3 AND LCD DISPLAY*	Open CB 1F06 on 220 VAC panel board in section 3 of the ECC		H &L 220VAC UPS Fail PC A3, LCD remain operational on UPS		
137.	220V POWER FAILURE TO A7-2 UPS *UPS FEEDS KONGSBURG ROS 2 COMPUTER A3 AND LCD DISPLAY*	Open CB 1F07 on 220 VAC panel board in section 3 of the ECC		H &L 220VAC UPS Fail PC A6, LCD remain operational on UPS		

FLOODING SAFETY

ENGINE ROOM AUTO BILGE SYSTEM

ITEM NO.	DESCRIPTION	PROCEDURE	SETPOINT	RESULT/REMARKS		SAT	UNSAT
138.	BILGE WELL HIGH LEVEL ALARMS	Fill ER bilge well with water or LVL-1		H & L	ER Forward PS Bilge Well		
					ER Forward SB Bilge Well		
					ER Below ME		
					ER Aft bilge well		
					S/G Room		
					Bow Thruster		
					Bosun Store		
					E FP Room		
139.	OILY WATER HIGH OIL CONTENT ALARM	Simulate high oil content shutdown	15 ppm	H & L 2 Second delay			
140.	DIRTY BILGE WATER TANK HIGH 90%	LVL-1 or LVL -3	300MM	H & L 2 Second delay			
141.	CLEAN BILGE WATER TANK HIGH 90%	LVL-1 or LVL -3	300MM	H & L 2 Second delay			
142.	EMERGENCY BILGE SUCTION VALVE OPERATIONAL TEST	Ensure system is secured and Cycle Emergency Bilge Suction Valve Open and Closed. *It is not necessary to pump water to accomplish this test*		Associated valve should open and close freely			

COMPRESSED AIR SYSTEMS & FUEL DELIVERY

COMPRESSED AIR SYSTEMS

ITEM NO.	ALARM DESCRIPTION	PROCEDURE	SETPOINT	RESULTS/REMARKS	SAT	UNSAT
143.	STARTING AIR COMPRESSORS	1) Place both start air compressors in Auto 2) Lower air pressure		Both compressors will run		
144.	NO. 1 MAIN AIR RECEIVER LOW	PRS-3	1.6 MPa	H & L Tag: 4120 Main Air Reservoir Pressure Engine remains capable of further starts per SOLAS Reg 31.2.9		
145.	NO. 2 MAIN AIR RECEIVER LOW	PRS-3	1.6 MPa	H & L Tag: 4121 Main Air Reservoir Pressure Engine remains capable of further starts per SOLAS Reg 31.2.9		
146.	AUXILIARY AIR RECEIVER LOW	PRS-3	1.6 MPa	H & L		
147.	CONTROL AIR INLET PRESSURE	PRS-3	0.55 MPa	H & L		
148.	M/E STARTING AIR INLET PRESSURE	PRS-3	1.5 MPa	H & L Tag: 3073 M/E Starting Air Pressure Low		
149.	#1 MAIN AIR COMPRESSOR ABNORMAL	Open CB 1P19 on MSB or PRS-3 or PRS-4	Binary	H & L Tag: 4116 No.1 Main Air Compressor abn Standby Compressor start automatically		
150.	#2 MAIN AIR COMPRESSOR ABNORMAL	PRS-3 or PRS-4	Binary Lag setpoint:	H & L Tag: 4117 No.2 Main Air Compressor abn Standby Compressor start automatically after air pressure reaches lag setpoint in switch [xxx]		
151.	QUICK CLOSING VALVE AIR PRESSURE LOW	PRS-3 or PRS-4	0.55 MPa	H & L		
152.	NO. 1 A/E STARTING AIR INLET PRESSURE	PRS-3 or PRS-4	0.7 MPa	H & L Tag: 2002 No.1 D/G Start. Air Inlet Press		
153.	NO. 2 A/E STARTING AIR INLET PRESSURE	PRS-3 or PRS-4	0.7 MPa	H & L Tag: 2052 No.1 D/G Start. Air Inlet Press		
154.	NO. 3 A/E STARTING AIR INLET PRESSURE	PRS-3 or PRS-4	0.7 MPa	H & L Tag: 2102 No.1 D/G Start. Air Inlet Press		

ITEM NO.	ALARM DESCRIPTION	PROCEDURE	SETPOINT	RESULTS/REMARKS	SAT	UNSAT
155.	NO. 1 A/E START FAIL	1) A/E #2 or #3 on line 2) Close air start valve on No.1 A/E 3) On "Syncro" panel on MSB select #1 generator as standby and in manual control 4) On #1 generator panel on MSB depress the "start" button	Binary 2 Second Delay	A/E #1 Fails to start H&L Tag:2001 No.1 A/E Start Fail		
156.	NO. 2 A/E START FAIL	1) A/E #1 or #3 on line 2) Close air start valve on No.2 A/E 3) On "Syncro" panel on MSB select #2 generator as standby and in manual control 4) On #2 generator panel on MSB depress the "start" button	Binary 2 Second Delay	A/E #2 Fails to start H&L Tag:2051 No.2 A/E Start Fail		
157.	NO. 3 A/E START FAIL	1) A/E #1 or #2 on line 2) Close air start valve on No.3 A/E 3) On "Syncro" panel on MSB select #3 generator as standby and in manual control 4) On #3 generator panel on MSB depress the "start" button	Binary 2 Second Delay	A/E #3 Fails to start H&L Tag:2101 No.1 A/E Start Fail		

FO AND LO TANK TEMPERATURE AND LEVEL ALARMS

ITEM NO.	ALARM DESCRIPTION Level Alarms	PROCEDURE	SETPOINT	RESULTS/REMARKS	SAT	UNSAT
158.	NO. 1 DO TANK HIGH	LVL-1 or LVL-3	350MM	H & L after 15s delay Tag: 4214 No.1 DO Tank High Level 95%		
159.	DO SERVICE TANK LOW	LVL-1 or LVL-3	900MM	H & L after 15s delay Tag: 4221 DO Service Tank Low Level		
160.	HFO SERVICE TANK LOW	LVL-1 or LVL-3	1500MM	H & L after 15s delay Tag: 4222 HFO Service Tank Low Level		
161.	HFO SETTLING TANK HIGH	LVL-1 or LVL-3	900MM	H & L after 15s delay Tag: 4223 HFO Settling Tank High Level		
162.	HFO SETTLING TANK LOW	LVL-1 or LVL-3	600MM	H & L after 15s delay Tag: 4224 HFO Settling Tank Low Level		
163.	L.S. FO SETTLING TANK HIGH	LVL-1 or LVL-3	900MM	H & L after 15s delay Tag: 4225 LSFO Settling Tank High Level		
164.	L.S. FO SETTLING TANK LOW	LVL-1 or LVL-3	600MM	H & L after 15s delay Tag: 4226 LSFO Settling Tank Low Level		
165.	HFO SLUDGE TANK HIGH	LVL-1 or LVL-3	200MM	H & L after 15s delay Tag: 4227 HFO Sludge Tank High Level		
166.	LO SLUDGE TANK HIGH	LVL-1 or LVL-3	200MM	H & L after 15s delay Tag: 4228 LO Sludge Tank High Level		
167.	HFO OVERFLOW TANK HIGH (90%)	LVL-1 or LVL-3	300MM	H & L after 15s delay Tag: 4229 HFO Overflow Tank High Level		
168.	OIL DRAIN TANK FOR LO AND FO HIGH LEVEL	LVL-1 or LVL-3	300MM	H & L after 15s delay Tag: 4230 Oil Drain TK for FO & LO High Level (90%)		
169.	NO. 1 PS HFO TANK HIGH 95%	LVL-1 or LVL-3	660MM	H & L after 15s delay Tag: 4246 No.1 PS HFO Tank High Level (95%)		
170.	NO. 1 SB HFO TANK HIGH 95%	LVL-1 or LVL-3	660MM	H & L after 15s delay Tag: 4247 No.1 SB HFO Tank High Level (95%)		
171.	NO. 2 PS HFO TANK HIGH 95%	LVL-1 or LVL-3	660MM	H & L after 15s delay Tag: 4248 No.2 PS HFO Tank High Level (95%)		
172.	LFSO STORAGE TANK HIGH 95%	LVL-1 or LVL-3	660MM	H & L after 15s delay Tag: 4249 LSFO Tank High Level (95%)		
173.	NO. 3 SB HFO TANK HIGH 95%	LVL-1 or LVL-3	660MM	H & L after 15s delay Tag: 4250 No.3 SB HFO Tank High Level (95%)		

FO AND LO TANK TEMPERATURE AND LEVEL ALARMS Cont'd

ITEM NO.	ALARM DESCRIPTION Level Alarms	PROCEDURE	SETPOINT	RESULTS/REMARKS	SAT	UNSAT
174.	LFSO SERVICE TANK LOW LEVEL	LVL-1 or LVL-3	1500MM	H & L after 15s delay Tag: 4265 LSFO Serv. Tank Low Level		
175.	D.O. TANK FOR IGG LOW	LVL-1 or LVL-3	400MM	H & L after 15s delay Tag: 4267 DO Tk. For IGG Low Level		
176.	EMERGENCY GENERATOR D.O. TANK LOW-LOW	LVL-1 or LVL-3	Binary	H & L after 2s delay		
177.	CYL OIL SERVICE TANK HIGH LEVEL	LVL-1 or LVL-3	200MM	H & L after 15s delay Tag: 4268 Cyl Oil Service Tank high Level		
178.	D.O. TANK FOR INCINERATOR LOW LEVEL	LVL-1 or LVL-3	LL	H & L after 15s delay Tag: 4269 DO TK For Incinerator Low Level		
179.	WASTE OIL SETTLING TANK HIGH LEVEL	LVL-1 or LVL-3	HL	H & L after 15s delay Tag: 4270 Waste Oil Settling Tank High Level		
180.	WASTE OIL SETTLING TANK LOW LEVEL	LVL-1 or LVL-3	LL	H & L after 15s delay Tag: 4270 Waste Oil Settling Tank Low Level		
181.	CYL OIL SERVICE TANK LOW LEVEL	LVL-1 or LVL-3	300MM	H & L after 15s delay Tag: 4245 Cyl Oil Service Tank Low Level		

FO AND LO TANK TEMPERATURE AND LEVEL ALARMS Cont'd

ITEM NO.	ALARM DESCRIPTION Temperature Alarms	PROCEDURE	SETPOINT	RESULTS/REMARKS	SAT	UNSAT
182.	FO SETTLING TANK HIGH TEMPERATURE		87°C	H & L after 2s delay Tag: 4201 FO Sett TK Temp High		
183.	FO SERVICE TANK HIGH TEMPERATURE		98°C	H & L after 2s delay Tag: 4202 FO SERV. TK Temp High		
184.	LSFO SETTLING TANK HIGH TEMPERATURE		80°C	H & L after 2s delay Tag: 4203 LSFO Sett TK Temp High		
185.	LSFO SERVICE TANK HIGH TEMPERATURE		98°C	H & L after 2s delay Tag: 4204 LSFO Serv. TK Temp High		
186.	NO.1 PS HFO TANK HIGH TEMPERATURE		65°C	H & L after 2s delay Tag: 4205 No.1 PS HFO TK Temp High		
187.	NO.1 SB HFO TANK HIGH TEMPERATURE		65°C	H & L after 2s delay Tag: 4206 No.1 SB HFO TK Temp High		
188.	NO.2 PS HFO TANK HIGH TEMPERATURE		65°C	H & L after 2s delay Tag: 4207 No.2 PS HFO TK Temp High		
189.	LSFO TANK HIGH TEMPERATURE		65°C	H & L after 2s delay Tag: 4208 LFSO TK Temp High		
190.	NO.3 SB HFO TANK HIGH TEMPERATURE		65°C	H & L after 2s delay Tag: 4209 No.3 SB HFO TK Temp High		

QUICK CLOSING FUEL & L/O VALVES

ITEM NO	DESCRIPTION	PROCEDURE	RESULT	REMARKS		SAT	UNSAT
				VALVE IDENTIFICATION	SERVING VALVES		
191.	QUICK CLOSING VALVES	1. In Cargo Control Room open cabinet and check to see that the QCV air reservoir has a working pressure of 0.7 MPa. 2. Open cabinet door and activate valves one at a time: 3. Locally inspect valve to ensure the valves fully close then reset each valve prior to moving to next test.	VALVE CLOSES	QCV FOR I.G.G. D.O. TK	I.G.G. Diesel Oil Tank to I.G.G F.O. Unit		
				QCV FOR INCINERATOR	Incinerator Waste Oil Service Tank to Incinerator		
				QCV FOR UPPER FLAT	A/E L.O. Storage Tank to A/E & L.O. Transfer Pumps		
					M/E L.O. Settling Tank to L.O. Purifier feed pumps		
					M/E L.O. Storage Tank to M/E L.O. Sump Tank		
					Cylinder Oil Tank to M/E		
					M/E Cyl. Oil Storage Tank No.1 to Cyl. O. Transfer pump		
					M/E CYL. Oil Storage Tank No.2 Cyl. O. Transfer pump		
				QCV FOR LOWER FLAT	M/E		
					F.O. Sett Tank to Boiler		
					F.O. Sett Tank to F.O. Purifier, feed pumps & transfer pump		
					F.O. Service TK to F.O. transfer pump		
					F.O. Service TK to F.O. supply unit		
					D.O Service TK to F.O. Supply unit		
					D.O Service TK to Boiler		
					D.O Service TK to D.O. Supply pump		
					D.O Service TK to D.O. Purifier Feed Pump & D.O. Transfer pump		
					L.F.S.O Tank to F.O. Transfer pump		
					L.F.S.O Tank to F.O Supply Unit		
					L.F.S.O Sett Tank to Boiler		
					L.F.S.O Sett Tank to Boiler F.O. Purifier Feed Pump & F.O. Transfer pump		

QUICK CLOSING VALVES Cont'd

ITEM NO	DESCRIPTION	PROCEDURE	RESULT	REMARKS		SAT	UNSAT
				VALVE IDENTIFICATION	SERVING VALVES		
	QUICK CLOSING VALVES		VALVE CLOSES	QCV FOR F.O. TK	No. 1 H.F.O. Tank Port		
					No. 2 H.F.O. Tank Port		
					No. 1 D.O. Tank Port		
					No. 3 H.F.O. Tank Starboard		
					No. 1 H.F.O. Tank Starboard		
					L.S.H. F.O. Tank		

PURIFIERS & FO BOOSTER UNIT

ITEM NO.	ALARM DESCRIPTION	PROCEDURE	SETPOINT	RESULTS/REMARKS	SAT	UNSAT
192.	NO. 1 FO PURIFIER ABNORMAL	Purifier online and running 1) Secure Power to purifier	Binary	H & L Tag 4101 No.1 FO Purifier Abnormal		
193.	NO. 2 FO PURIFIER ABNORMAL	Purifier online and running 1) Secure Power to purifier	Binary	H & L Tag 4102 No.1 FO Purifier Abnormal		
194.	DO PURIFIER ABNORMAL	Purifier online and running 1) Secure Power to purifier	Binary	H & L Tag 4103 DO Purifier Abnormal		
195.	No.1 M/E PURIFIER ABNORMAL	Purifier online and running 1) Secure Power to purifier	Binary	H & L Tag 4104 No.1 M/E Purifier Abnormal		
196.	No.2 M/E PURIFIER ABNORMAL	Purifier online and running 1) Secure Power to purifier	Binary	H & L Tag 4105 No.2 M/E Purifier Abnormal		
197.	A/E PURIFIER ABNORMAL	Purifier online and running 1) Secure Power to purifier	Binary	H & L Tag 4106 A/E Purifier Abnormal		
198.	FO AUTO FILTER HIGH DIFF PRESSURE	PRS-3	0.09MPa	H&L Tag: 4108 FO Auto Filter Diff Pressure High		
199.	FO VISCOSITY HIGHT/LOW		10/7Cst	H&L Tag: 4109 FO Viscosity High/Low		

AUXILIARY BOILER

AUXILIARY BOILER TEST PROCEDURE

ITEM NO.	ALARM DESCRIPTION	PROCEDURE	SETPOINT	RESULTS/REMARKS		SAT	UNSAT
200.	START SEQUENCE TEST & NORMAL AUTOMATIC OPERATION	Manually Start boiler and build pressure		Normal sequence will commence 1) pre-purge 2) ignition 3) Fuel 4) Flame			
201.	FLAME FAILURE	With boiler on line 1) Remove LAE10 flame scanner No.1 from holder and cover sensor 2) Reset all shut downs and repeat with flame scanner No.2	Binary	H & L Boiler trips Tag: 1101 Aux. Boiler Shut Down	FS No.1 FS No.2		
202.	GLOWING FURNACE	Boiler off line 1) LAE10 flame scanner removed 2) Point flash light directly into flame scanner and set burner to start.		H & L Boiler fails to start			
203.	HIGH WATER LEVEL	Set for Automatic Feed Regulation. Raise Drum water	150mm	H & L			
204.	LOW WATER LEVEL	With the boiler operating at pressure 1) Secure feed water to boiler and lower water level while observing sight glass	-120mm	H & L			
205.	LOW-LOW WATER LEVEL	Option A: With the boiler operating at pressure 1) Depress "Channel #1" test for more than 5 seconds Option B: With the boiler operating at pressure 1) Lower water level	-150mm	H & L Boiler secures 5 send time delay Tag: 1101 Aux. Boiler Shut Down			
206.	LOW OIL PRESSURE ALARM & STANDBY PUMP START	With the boiler operating at pressure 1) One pump running with one in standby 2) Slowly decrease pressure on pressure regulating valve until set point is reached		H & L Standby pump starts			
207.	LOW OIL PRESSURE SHUT DOWN AND TRIP FUNCTION	With the boiler operating at pressure 1) One pump running with one in standby 2) Slowly use manual bypass decrease pressure on pressure regulating valve until set point is reached		H & L Standby pump starts secures Boiler trips Tag: 1101 Aux. Boiler Shut Down			

		3) Continue to reduce pressure.				

AUXILIARY BOILER TESTS Cont'd

ITEM NO.	ALARM DESCRIPTION	PROCEDURE	SETPOINT	RESULTS/REMARKS		SAT	UNSAT
208.	LOW COMBUSTION AIR PRESSURE	With the boiler operating at pressure 1) Open the installed vent valves on differential pressure transmitter.	5% of Airflow	H & L Boiler trips Tag: 1101 Aux. Boiler Shut Down			
209.	EMERGENCY STOP	With the boiler firing 1) Depress the "E-Stop". 2) Reset and then test alternate location		H&L Boiler trips Tag: 1101 Aux. Boiler Shut Down	ECR Local At PP		
210.	HIGH STEAM PRESSURE	With the burner in operation 1) Raise the steam pressure until set point is reached	7.5 Bar HI 8.5 Bar HI-HI	H & L Boiler trips Tag: 1101 Aux. Boiler Shut Down			
211.	AUX BOILER UPTAKE TEMPERATURE HIGH	TMP2	450°C	H & L Boiler trips			
212.	HIGH FUEL OIL INLET TEMPERATURE	TMP2	145°C	H & L			
213.	LOW FUEL OIL INLET TEMPERATURE	TMP2	110°C	H & L			
214.	BOILER POWER FAILURE	With the boiler operating at pressure 1) Secure main power to boiler controls	Binary	H&L Boiler Trips			
215.	STANDBY WATER PUMP START	Select # 1 ON; #2 STBY Trip Breaker for #1	0.9MPa	#2 Pump Starts H & L			

COMPOSITE AUXILIARY BOILER TEST PROCEDURE

Vertical Smoke Water Tube Boiler (Waste Heat)

ITEM NO.	ALARM DESCRIPTION	PROCEDURE	SETPOINT	RESULTS/REMARKS		SAT	UNSAT
216.	START SEQUENCE TEST & NORMAL AUTOMATIC OPERATION	Manually Start boiler and build pressure		Normal sequence will commence 1) pre-purge 2) ignition 3) Fuel 4) Flame			
217.	FLAME FAILURE	With boiler on line 1) Remove flame scanner No.1 from holder and cover sensor 2) Reset all shut downs and repeat with flame scanner No.2		H & L Boiler trips Tag: 1103 Composite Boiler Shut Down	FS No.1 FS No.2		
218.	GLOWING FURNACE	Boiler off line 1) Flame scanner removed 2) Point flashlight directly into flame scanner and set burner to start.		H & L Boiler fails to start			
219.	HIGH WATER LEVEL	Manually raise water level	150mm	H & L W/15 Sec Time Delay			
220.	LOW WATER LEVEL	With the boiler operating at pressure 1) Secure feed water to boiler and lower water level while observing sight glass	-135mm	H & L W/15 Sec Time Delay			
221.	LOW-LOW WATER LEVEL	Option A: With the boiler operating at pressure 1) Depress "Channel #1" test for more than 5 seconds Option B: With the boiler operating at pressure 1) Lower water level	-120mm	H & L W/15 Sec Time Delay Boiler secures 5 send time delay Tag: 1103 Composite Boiler Shut Down			
222.	STEAM PRESSURE HIGH	With the burner in operation 1) Raise the steam pressure until set point is reached	.75Mpa	H & L Boiler trips			
223.	WATER STANDBY PUMP START	Select # 1 ON; #2 STBY Trip Breaker for #1		H & L Standby pump starts			
224.	HIGH FUEL OIL TEMP	TMP2	160°C	H & L			
225.	LOW FUEL OIL TEMP	TMP2	80°C	H & L			

COMPOSITE AUXILIARY BOILER TESTS Cont'd

ITEM NO.	ALARM DESCRIPTION	PROCEDURE	SETPOINT	RESULTS/REMARKS		SAT	UNSAT
226.	EMERGENCY STOP	With the boiler firing 1) Depress the "E-Stop". 2) Reset and then test alternate location		H&L Boiler trips Tag: 1103 Aux. Boiler Shut Down	ECR Local At PP		

(b) (6), (b) (7)(C)

FIRE DETECTION AND EXTINGUISHING

FIREMAIN PUMP CONTROLS

ITEM NO.	ALARM DESCRIPTION CONTROL POSITION	PROCEDURE	SETPOINT	RESULTS/REMARKS	SAT	UNSAT
227.	BRIDGE #1 FIRE PUMP CONTROLS	1. Depress #1 Fire pump start button 2. Secure pump		#1 Fire pump starts and local pressure gage shows pressure.		
228.	BRIDGE #2 FIRE PUMP CONTROLS	1. Depress No.2 Fire pump start button 2. Secure pump		#2 Fire pump starts and pressure gage shows pressure.		
229.	CARGO CONTROL ROOM #1 FIRE PUMP CONTROLS	1. Depress No.1 Fire pump start button 2. Secure pump		#1 Fire pump starts and pressure gage shows pressure.		
230.	CARGO CONTROL ROOM #2 FIRE PUMP CONTROLS	1. Depress No.2 Fire pump start button 2. Secure pump		#2 Fire pump starts and pressure gage shows pressure.		
231.	ECR #1 FIRE PUMP CONTROLS	1. Depress No.1 Fire pump start button 2. Secure pump		#1 Fire pump starts and pressure gage shows pressure.		
232.	ECR #2 FIRE PUMP CONTROLS	1. Depress No.2 Fire pump start button 2. Secure pump		#2 Fire pump starts and pressure gage shows pressure.		
233.	FOAM ROOM #1 FIRE PUMP CONTROLS	1. Depress No.1 Fire pump start button 2. Secure pump		#1 Fire pump starts and pressure gage shows pressure.		
234.	FOAM ROOM #2 FIRE PUMP CONTROLS	1. Depress No.2 Fire pump start button 2. Secure pump		Fire pump starts and pressure gage shows pressure.		

FIRE DETECTION SYSTEM

ITEM NO.	ALARM DESCRIPTION	PROCEDURE	SETPOINT	RESULTS/REMARKS	SAT	UNSAT
235.	FIRE DETECTION SYSTEM	FIRE 1,2,3 or 4 Test E/R fire detectors (page 60 - Machinery Space Fire Detect. SYS Detectors) This can be accomplished by a third party vendor on an annual basis	Binary	H & L in bridge, E/R and Accommodation space		

FIXED FIRE EXTINGUISHING SYSTEMS

ITEM NO.	ALARM DESCRIPTION	PROCEDURE	SETPOINT	RESULTS/REMARKS	SAT	UNSAT
236.	ENGINE ROOM FIXED HIGH PRESSURE C02 FIRE EXTINGUISHING SYSTEM PEFORMANCE TEST	This test is completed on an annual basis by a qualified third party. ***Due to Safety reasons Procedures 240 through 243 shall not be completed by the crew***		H & L in bridge, E/R and Accommodation space		
237.	C02 BOTTLE WEIGHT	This test is completed on an annual basis by a qualified third party. Loosen the mounting clamps at the cylinder and weigh the cylinder.		The correct charge should be not less than **10%** below the required weight.		
238.	DEMONSTRATE CO_2 ACTUATION RELEASE TEST FOR THE E/R	At the CO_2 storage bottles remove actuators from all CO_2 cylinders and install spectacle flange at main CO_2 discharge line.		Annual by outside contractor		
		At the activation control station in the ballast Control Room, remove the pilot line from the nitrogen charge bottles and connect a 15-lb test CO_2 cylinder.				
		Ensure all E/R ventilation is running and that all personnel have been removed from E/R during test				
		Activate the test cylinder to simulate pressurize from one of the activation control cylinders to distribution valves				
		Open Door to E/r release box & Pull Handle Marked No.1		E/R Ventilation shuts down upon opening door. Alarm sounds and distribution valve opens after pulling handle No.1		
		Pull Handle Marked No.2		CO_2 passes valve to timer. After 30 to 40 seconds the discharge pins in each actuator are activated.		

FIXED FIRE EXTINGUISHING SYSTEMS Cont'd

ITEM NO.	ALARM DESCRIPTION	PROCEDURE	SETPOINT	RESULTS/REMARKS	SAT	UNSAT
239.	DEMONSTRATE CO_2 ACTUATION RELEASE TEST FOR THE ECC	At the CO_2 storage bottles remove actuators from all CO_2 cylinders and install spectacle flange at main CO_2 discharge line.		Annual by outside contractor		
		At the activation control station in the ballast Control Room, remove the pilot line from the nitrogen charge bottles and connect a 15-lb test CO_2 cylinder.				
		Activate the test cylinder to simulate pressurize from one of the activation control cylinders to distribution valves				
		Open Door to ECC release box & Pull Handle Marked No.1		Alarm sounds and distribution valve opens after pulling handle No.1		
		Pull Handle Marked No.2		CO_2 passes valve to timer. After 30 to 40 seconds the discharge pins in each actuator are activated.		
240.	DEMONSTRATE CO_2 ACTUATION RELEASE TEST FOR THE IGG ROOM	At the CO_2 storage bottles remove actuators from all CO_2 cylinders and install spectacle flange at main CO_2 discharge line.		Annual by outside contractor		
		At the activation control station in the ballast Control Room, remove the pilot line from the nitrogen charge bottles and connect a 15-lb test CO_2 cylinder.				
		Activate the test cylinder to simulate pressurize from one of the activation control cylinders to distribution valves				
		Open Door to IGG Room release box & Pull Handle Marked No.1		Alarm sounds and distribution valve opens after pulling handle No.1		
		Pull Handle Marked No.2		CO_2 passes valve to timer. After 30 to 40 seconds the discharge pins in each actuator are activated.		
		Restore system to ready for use status.				

[redacted]

FIXED FIRE EXTINGUISHING SYSTEMS Cont'd

ITEM NO.	ALARM DESCRIPTION	PROCEDURE	SETPOINT	RESULTS/REMARKS	SAT	UNSAT
241.	DEMONSTRATE WATER MIST ACTUATION RELEASE TEST	Close all outlet valves and open test valves				
		Release one section manually by activating the "F1 or F2" button on the FCP, select a zone for release and press "OK"		Pump starts, correct valve opens for zone selected and water is discharged through drain valve, and display on the FCP indicates: Water Mist System Released" Alarm is actuated on the FCP		
		Reset the alarm on the FCP		Valve closes and pump stops		
		Close test valve and repeat procedures for all zones.				
				Protection Zones:		
				IGG		
				Aux Boiler		
				Main Engine		
				Incinerator		
				Composite Boiler		
				Aux Engine #1		
				Aux Engine #2		
				Aux Engine #3		
				FO/MDO Purifier		

EMERGENCY STOP SYSTEM FOR VENTILATION AND MISC VITAL SYSTEMS

ITEM NO.	ALARM DESCRIPTION	PROCEDURE	SETPOINT	RESULTS/REMARKS	SAT	UNSAT
242.	DEMONSTRATE VENTILATION EMERGENCY STOP SYSTEM ON SHIPS CONTROL CENTER AND ON WHEELHOUSE "ESS-1"	1. In-port test only 2. Ensure all of the items listed in results/remarks are energized or are operationally tested just prior to test. 3. Open glass protective test on bridge console and depress "ESS-1" emergency stop button 4. RESET and ready to repeat test 5. Ensure all of the items listed in results/remarks are energized or are operationally tested just prior to second test. 6. Open glass protective test on FCR console and depress "ES-1" emergency stop button		Verify the following items are secured or no longer have power: No. 1 E/R Supply Fan No. 3 E/R Supply Fan No. 4 E/R Supply Fan No. 2 E/R Fan No. 1 ME Aux Blower No. 2 ME Aux Blower Packed Air Conditioning Unit for ER 45D Power Dist Board		
243.	DEMONSTRATE EMERGENCY ACOMM VENT AND GALLEY EQUIP STOP SYSTEM ON SHIPS CONTROL CENTER "ESS-2"	1. In-port test only 2. Ensure all of the items listed in results/remarks are energized or are operationally tested just prior to test. 3. Open glass protective test on bridge console and depress "ESS-2" emergency stop button 4. RESET (Also in CCR as with 245.)		Verify the following items are secured or no longer have power: 22D Power Dist Board 23D Power Dist Board 47D Power Dist Board 4AD Power Dist Board C02 Room Fan Air Cond. Fan		

FIXED FIRE EXTINGUISHING SYSTEMS Cont'd

ITEM NO.	ALARM DESCRIPTION	PROCEDURE	SETPOINT	RESULTS/REMARKS	SAT	UNSAT
244.	DEMONSTRATE MACHINERY EMERGENCY STOP SYSTEM ON SHIPS CONTROL CENTER "ESS-3" *ESS-3 is for the ships purifiers, aux boiler, ME and AE oil pumps & incinerator*	1. In-port test only 2. Ensure all of the items listed in results/remarks are energized or are operationally tested just prior to test. 3. Open glass protective test on bridge console and depress "ESS-3" emergency stop button 4. RESET		Verify the following items are secured or no longer have power: 43D Power Dist Board 44D Power Dist Board Aux Boiler Control Panel F.O. Feed Unit No.1 & No. 2 M.E L.O. Pumps D.O. Transfer Pump L.O. Transfer Pump H.F.O. Transfer Pump D/G D.O Supply Pump No.1 through No.3 Prime Pump Incinerator		
245.	DEMONSTRATE EMERGENCY A/E STOP SYSTEM ON SHIPS CONTROL CENTER "ESS-4"	1. In-port test only 2. A/E Engines running and ships power being supplied via EDG 3. Open glass protective test on Ships Control console and depress "ESS-4" emergency stop button 4. RESET		All A/E Engines stop		
249.	DEMONSTRATE EMERGENCY IGG STOP SYSTEM ON SHIPS CONTROL CENTER "ESS-5"	1. In-port test only 2. IGG System running 3. Open glass protective test on Ships Control console and depress "ESS-5" emergency stop button 4. RESET		Verify the following items are secured or no longer have power: No.1 and No.2 IGS Fan I.G.S. F.O. Pump		

MACHINERY SPACE FIRE DETECTION SYSTEM DETECTORS

LEVEL	SPACE			TYPE & Number	PROCEDURE	SAT	UNSAT
B-DECK	Engine Casing	Zone 2	Smoke 50	AFSW 51			
A-Deck	Engine Casing	Zone 2	Smoke 48	AFSW 49			
A-Deck	IGG Space	Zone 2	Smoke 46	AFSW 48			
A-Deck	EDG Space	Zone 1	Smoke65	AFSW 50			
Upper Deck	Engine Casing	(No Smoke Detectors)		AFT26			
Upper Deck	Engine Casing			AFT25			
Upper Level	ECR	Zone 2	Smoke 2	AFS121			
Upper Level	Store Room	Zone 2	Smoke 5	AFSW22			
Upper Level	Electricians Workshop	Zone 2	Smoke 7	AFSW23			
Upper Level	Workshop	Zone 2	Smoke 3	AFSW21			
Upper Level	E/R Aft of A/C	Zone 2	Smoke 16	AFSW28			
Upper Level	E/R Near Reefer	Zone 2	Smoke 17	AFSW39			
Upper Level	E/R Fwd M/E	Zone 2	Smoke 19	AF F			
Upper Level	E/R Aft M/E	Zone	Smoke 21	AFSW31			
Upper Level	E/R Above M/E	(Not a Smoke Detector)		AFSW32			
Upper Level	Incinerator	Zone 2	Smoke 14	AFSW30			
Lower Platform	Generator #3	Zone 2	Smoke 27				
Lower Platform	Generator Room	Zone 2	Smoke 26	AFSW36			
Lower Platform	Air Compressor Room	Zone 2	Smoke 29	AFSW37			
Lower Platform	Air Compressor Room MSD	Zone 2	Smoke 28	AFSW38			
Lower Platform	E/R Aft	Zone 2	Smoke 31	AFSW39			
Lower Platform	E/R Fwd	Zone 2	Smoke 32	AFSW40			
Lower Platform	E/R Port	Zone 2	Smoke 33	AFSW41			
Lower Level	E/R Port	Zone 2	Smoke 39	AFSW42			
Lower Level	E/R Stbd	Zone 2	Smoke 37	AFSW43			
Lower Level	E/R Aft	Zone 2	Smoke 38	AFSW44			
Steering Gear	Steering Gear Room Port	Zone 2	Smoke 9	AFSW24			
Steering Gear	Steering Gear Room Stbd	Zone 2	Smoke 11	AFSW25			
Steering Gear	Steering Gear Room (P) Store	Zone 2	Smoke 8	AFSW26			
Steering Gear	Steering Gear Room (S) Store	Zone 2	Smoke 12	AFSW27			

DEPARTMENT OF HOMELAND SECURITY
U.S. Coast Guard

OMB No: 1625-0001
Exp. Date: 03/31/2019

REPORT of MARINE CASUALTY, COMMERCIAL DIVING CASUALTY, or OCS-RELATED CASUALTY

Section I - Reporting Vessel/Facility Information

1. Vessel or Facility Name	2. Vessel Official Number or IMO Number	3. Vessel Flag
SLNC Goodwill	9448334	US
4. Vessel Length ☐ Feet ☒ Meters: 183.2	**5. Vessel Gross Tons**: 30241	**6. Vessel Propulsion Type**: MOTOR
7. Vessel or Facility Type: TANKSHIP	**8. Vessel or Facility Service or Occupation**: MSC FAR EAST CHARTER	

9. FOR TOWING ONLY

- 9a. Arrangement: ☐ Pushing Ahead ☐ Towing Astern ☐ Towing Alongside
- 9b. Number of Vessels Towed: Empty ____ Loaded ____ Total ____
- 9c. Maximum Size of Tow/Tow-Boat(s): Length ____ feet Width ____ feet
- 9d. Did one or more of the barges in the tow cause or sustain damage in the marine casualty? ☐ Yes ☐ No *(If Yes complete and attach one or more CG-2692A forms to this report)*

Section II - Reason for Submitting this Report *(Check all that apply)*

10. The above vessel was involved in a Marine Casualty consisting in (*46 CFR 4.05-1 and 4.05-10*):
- ☐ 1. Unintended grounding or an unintended strike of (allision with) a bridge
- ☐ 2. Intended grounding or intended strike of a bridge that created a hazard to navigation, the environment or the safety of the vessel, or that meets any of the criteria in 3 through 8 below
- ☐ 3. Loss of main propulsion, primary steering, or any associated component or control system that reduces the maneuverability of the vessel
- ☒ 4. Occurrence materially and adversely affected the vessel's seaworthiness or fitness for service or route
- ☒ 5. Loss of life
- ☐ 6. Injury that requires professional medical treatment (treatment beyond first aid) and, if the person is engaged or employed on board a vessel in commercial service, that renders the individual unfit to perform his or her routine duties
- ☒ 7. Occurrence causing property damage in excess of $75,000
- ☐ 8. Occurrence involving significant harm to the environment

11. The above facility or vessel was involved in a Commercial Diving Casualty involving (*46 CFR 197.484*):
- ☐ 1. Loss of life
- ☐ 2. Diving-related injury to any person causing incapacitation for more than 72 hours
- ☐ 3. Diving-related injury to any person requiring hospitalization for more than 24 hours

12. The above facility or vessel was involved in an OCS Facility Casualty Resulting in (*33 CFR 146.30 and 146.35*):
- ☐ 1. Death
- ☐ 2. Injury to 5 or more persons in a single incident
- ☐ 3. Injury causing any person to be incapacitated for more than 72 hours
- ☐ 4. OCS Facility only - Damage affecting the usefulness of primary lifesaving or firefighting equipment
- ☐ 5. OCS Facility only - Damage to the facility exceeding $25,000 resulting from a collision by a vessel with the facility
- ☐ 6. OCS Facility only - Damage to a floating OCS facility exceeding $25,000

Section III - Associated Parties Information *(Fill all fields that apply)*

13. Name of Owner	Telephone	14. Name of Operator or Manager	Telephone
NORD GOODWILL LLC		Schuyler Line Navigation Co	14102166020
Address: 2711 CENTERVILL RD STE 400 WILMINGTON, DE 19808 United States	**Email address**	**Address**: (b) (7)(C), (b) (6)	**Email address**: (b) (6), (b) (7)(C)
15. Name of Master or Person in Charge *(Last, First, Middle)*: (b) (6), (b) (7)(C)	Telephone: (b) (6), (b) (7)(C)	**16. Name of Agent** *(Last, First, Middle)*	Telephone
Address: Same as block 14	Email address: (b) (6), (b) (7)(C)	Address	Email address
17. Name of Dive Supervisor *(Last, First, Middle)*		**18. Name of Pilot** *(Last, First, Middle)*	Telephone
Address	Email address	Address	Email address

Section IV - Casualty Information

19. Date/Time *(local)* of Occurrence	20. Location-Name of Body of Water or Waterway: Latitude: 32-29N Longitude: 128-29E	River Mile Marker: OR
2020 August 5 1342	Sea of Japan	

21. Property Damage Estimated Damage Cost(s) to:
Vessel: $500000 Cargo: $ ____
Facility: $ ____ Other: $ ____

Describe the Extent of Property Damage
#1 SSDG loss, damage to ships systems and bulk heads above and below the #1 SSDG.

22. Status of Involved Persons (*If there are 1 or more injured, dead or missing persons complete and attach one or more CG-2692C forms to this Report*)
Total Number of Persons: On Board the Vessel: 20 Injured: 0 Dead: 1 Missing: ____

(b) (6), (b) (7)(C)

Section IV - Casualty Information *(continued)*

23. Was This Casualty a Serious Marine Incident (SMI) as Defined in 46 CFR 4.03-2?

☒ Yes ☐ No ☐ Not at this Time, But is Likely to Become an SMI *(If Yes or Is Likely to Become an SMI complete/attach one or more CG-2692B forms to this report)*

24a. Is there any evidence of alcohol or drug use by or intoxication of individuals directly involved in the casualty?

☐ Yes ☒ No *(If Yes, identify those individuals for whom evidence has been obtained and specify the method to obtain such evidence in block 24c)*

24b. Did any individual directly involved in a casualty refuse to submit to, or cooperate in, the administration of a timely chemical test, when directed by a law enforcement officer or by the marine employer?

☐ Yes ☒ No *(If Yes, note the individual(s) who refused in block 24c)*

24c. Individuals with evidence of drug or alcohol use, evidence of intoxication, or who refused to submit/cooperate in a timely chemical test *(if more space is needed, continue in block 25c)*

NA

24d. Is there evidence that alcohol use contributed to this casualty?

☐ Yes ☒ No *(If Yes, discuss in block 25b)*

25. Nature and Circumstance of the Casualty:

25a. Activity or Operation Being Conducted at the Time of the Casualty:

#1 SSDG was being returned to service by Chief Engineer, 1AE, and 3AE. The governor was being replaced with a shore reconditioned spare. During start up and testing, #1 SSDG started to over speed and runaway causing the flywheel to disintegrate. The electronic and mechanical over speed devices failed to stop the #1 SSDG. The debris from this caused fatal blunt force trauma to the 3AE, and a loss of ship's power, and damage to the surrounding spaces.

25b. Description of the Casualty (casualty events and the conditions and actions that were believed to be causal factors as well as any hazards created as a result of the casualty. Attach additional sheets if necessary.):

The #1 SSDG flywheel caused damage to the bulkheads and spaces above below and beside the 1/2 Generator room. 1342 LT (JST)the ship lost main power and propulsion. The ship's Emergency Diesel Generator went on-line. The ship's Fire and Emergency signal was sounded and crew mustered for response.
No fire was found in the E/R spaces. But structural damage to the bulkheads and a severely injured crewmember the 3AE. The 3AE was evacuated to the ship's hospital, Medical Alert Services activated, and medical treatment begun. Immediately the Master called Japan Coast Guard to report an casualty and emergency and request medical evacuation. Injured 3AE was medevac'd by Japanese Coast Guard Helicopter at 1725(JST).
The damage to the SSDG's and control systems left the vessel without power and adrift. The ship's crew worked to restore power to the #3 SSDG and then restore propulsion.
Attached timeline of events for the vessel:
Attached timeline of events from Medical Advisory Service:
Attached witness statement's already provided to USCG inspectors.

25c. Any other comments, including with respect to use of or need for emergency response equipment:

While vessel was adrift working to restore power the set of the vessel was bringing it towards land approximately 10nm away. Japanese Coast Guard dispatched a patrol cutter to our location. To provide emergency tow if necessary if the vessel was in imminent danger. A tug boat was dispatched at the master's request to aid the vessel and provide emergency towing if necessary. A favorable shift in currents provided the vessel's crew time to restore power and propulsion and proceed to a safe harbor. Once propulsion was restored the vessel proceeded to rendez-vous with the the dispatched tug boat, and proceed under escort to the nearest safe port

Section V - Person Making this Report

24. Name *(PRINT) (Last, First, Middle)*	25. Signature:	26. Date
(b) (6), (b) (7)(C)	(b) (6), (b) (7)(C)	8/09/2020
27. Title	**28. Address**	
Master	(b) (6), (b) (7)(C) nited States	
29. Telephone No.	**30. Email**	
(b) (6), (b) (7)(C)	(b) (6), (b) (7)(C)	

(b) (6), (b) (7)(C)

INSTRUCTIONS FOR COMPLETION OF FORM CG-2692
REPORT OF MARINE CASUALTY, COMMERCIAL DIVING CASUALTY, OR OCS-RELATED CASUALTY

An agency may not conduct or sponsor, and a person is not required to respond to a collection of information unless it displays a valid OMB control number. The Coast Guard estimates that the average burden for this report is 1 hour. You may submit any comments concerning the accuracy of this burden estimate or any suggestions for reducing the burden to: Commandant (CG-INV), U.S. Coast Guard Stop 7501, 2703 Martin Luther King Jr Ave SE, Washington, DC 20593-7501 or Office of Management and Budget, Paperwork Reduction Project (1625-0001), Washington, DC 20503.

WHEN TO USE THIS FORM

1. This form satisfies the requirement for written reports of casualties and accidents found in the Code of Federal Regulations for vessels, commercial diving operations, and Outer Continental Shelf (OCS) facilities. Depending on the circumstances surrounding an incident, a written report may be required if it meets one or more of the conditions described in instructions 2 - 4.

2. VESSELS. If you are the owner, agent, master, operator, or person in charge of a vessel, other than a public vessel or an uninspected recreational or state-numbered vessel, you must submit a report if your vessel:

A. is involved in a marine casualty or accident that occurs upon the navigable waters of the United States, its territories or possessions and meets any of the criteria in block 10, or

B. is a United States vessel involved in a marine casualty or accident, wherever such casualty or accident occurs, that meets any of the criteria in block 10, or

C. is a foreign vessel engaged in OCS activities as defined in 33 CFR 140.10 and is involved in a marine casualty or accident that meets any of the criteria in block 10, or

D. is a foreign tank vessel operating in waters subject to the jurisdiction of the United States, including the Exclusive Economic Zone (EEZ), which involves significant harm to the environment or material damage affecting the seaworthiness or efficiency of the vessel.

3. DIVING.

A. Commercial Diving. If you are the master or person in charge of a vessel or facility from which a commercial diving operation is conducted: (1) at any deepwater port or the safety zone thereof as defined in 33 CFR Part 150; (2) from any artificial island, installation, or other device on the Outer Continental Shelf (OCS) and the waters adjacent thereto as defined in 33 CFR Part 147 or otherwise related to activities on the OCS; (3) from any vessel required to have a certificate of inspection issued by the Coast Guard, including mobile offshore drilling units, regardless of their geographic location; or (4) from any vessel connected with a deepwater port or within the deepwater port safety zone or from any vessel engaged in activities related to the OCS, you must submit a report if there is a diving casualty meeting the criteria in block 11, except if the diving operation is:

1. performed solely for marine scientific research and development purposes by educational institutions,
2. performed solely for research and development for the advancement of diving equipment and technology, or
3. performed solely for search and rescue or related public safety purposes by or under the control of a governmental agency.

B: All Other Diving. Any occurrence of injury or loss of life to any person while diving from a vessel subject to instruction 2 and using underwater breathing apparatus must be reported under instruction 2.

4. OUTER CONTINENTAL SHELF (OCS) FACILITIES. If you are the owner, operator, or person in charge of an OCS facility engaged in OCS activities as defined in 33 CFR 140.10, you must submit a report if your facility is involved in a casualty or accident that meets any of the criteria in block 12.

COMPLETION OF THIS FORM

5. In accordance with 46 CFR §4.05-10, 46 CFR §197.486, and 33 CFR §146.35, this form shall be filled out as completely and accurately as possible. Please type or print clearly. Fill in all blanks that apply to the kind of accident that has occurred. If a block is not applicable, the abbreviation "NA" should be entered in that space. If the answer is unknown and cannot be obtained before the report has to be submitted (i.e. within 5 days of the accident), the abbreviation "UNK" should be entered in that block. If "NONE" is the correct response, enter it in the block.

6. Once completed, deliver, email, or fax this form within 5 days of the casualty to the Coast Guard Sector, Marine Safety Unit, or Activity nearest the location of the casualty or, if at sea, nearest the arrival port. http://www.uscg.mil/top/units/

7. Tugs or towboats with tows under their control shall complete blocks 9a through 9d and, if one or more barges in their tow causes or sustains damage or meets any other reporting criteria, use the "Barge Addendum," CG-2692A to report information on the barge(s) involved.

8. If an incident involves multiple barges suffering or causing damage while moored or anchored (such as in a fleeting area), or breaking away from their moorage and causing or sustaining damage, enter the location of the moorage in Block 1 of the CG-2692 and complete the form except for blocks 2-8. Details for the barges will be entered on the CG-2692A. If a single barge is involved in a marine casualty while moored or anchored, it shall be documented as any other vessel using the CG-2692.

9. If the casualty meets the criteria for a serious marine incident as defined in 46 CFR §4.03, use the "Chemical Drug and Alcohol Testing Addendum," CG-2692B to report information on required drug and alcohol testing following a serious marine incident.

10. If one or more persons on the vessel or facility were injured, killed, or missing as a result of the casualty, use the "Personnel Casualty" Addendum," CG-2692C to report information on the extent of all personnel casualties.

11. For facilities and vessels engaged in OCS activities who are reporting a casualty in accordance with 33 CFR §146.35 or 33 CFR §146.303, use the "Involved Persons and Witnesses Addendum," CG-2692D to provide a list of all involved persons and witnesses to the casualty being reported. The CG-2692D may also be used to provide data on persons involved or witnessing a marine casualty or commercial diving casualty.

12. Block 20 - "Location": Always identify the body of water or waterway. Latitude and longitude to the nearest tenth of a minute should always be entered except in those rivers and waterways where a mile marker system is commonly used. In those cases, the mile number to the nearest tenth of a mile should be entered. If the latitude and longitude, or mile number, are unknown, reference to a known landmark or object (buoy, light, etc.) with distance and bearing to the object is permissible.

Privacy Act Notice

(CG-2692, CG-2692A, CG-2692B, CG-2692C and CG-2692D)

Authority: Title 46, United States Code (U.S.C.) §6301, Title 46, Code of Federal Regulations (CFR), Parts 4 and 197, and Title 33, CFR Part 146 authorizes the collection of this information. Specifically, 46 CFR §4.05-10 mandates that vessel owners, agents, masters, operators, or persons in charge file a written report of any marine casualty required to be reported under 46 CFR §4.05-1. 46 CFR §197.486 mandates that persons in charge of vessels or facilities file a report of any diving casualty required to be reported under 33 CFR §197.484, and 46 CFR §146.35 mandates that owners, operators, or persons in charge of an OCS facility or vessel engaged in OCS activities file a report of any OCS-related casualty required to be reported under 33 CFR §146.30. For marine casualties, diving casualties when the diving installation is on a vessel, and The written report must be provided on Form CG-2692 (Report of Marine Casualty, Commercial Diving Casualty, or OCS-Related Casualty) supplemented as necessary by appended Forms CG-2692A (Barge Addendum), CG-2692B (Chemical Drug and Alcohol Testing Addendum), CG-2692C (Personnel Casualty Addendum), and CG-2692D (Involved Persons and Witnesses Addendum). The forms may be used for diving casualties when the diving installation is on a facility or for OCS-related casualties that are not also marine casualties under 46 CFR Part 4.

Purpose: The Coast Guard uses this information in gathering facts to determine causes surrounding reportable marine casualties. This information assists in promoting the safety of life, property, and the protection of the marine environment through preventing the reoccurrence of accidents.

Routine Uses: Reportable marine casualty information is needed for Coast Guard investigations of vessel casualties involving injury, death, property damage, environmental damage and dangerous conditions and for preparation and submission of data reports mandated by Congress (see 46 U.S.C. 6301). Information gathered is also used to determine whether new or revised safety laws, regulations, and policies are necessary. Additionally, chemical testing information is needed to improve Coast Guard detection and reduction of drug use by mariners. The information contained on forms CG-2692, CG-2692A, CG-2692B, CG-2692C, and CG-2692D may be disclosed under the Freedom of Information Act (FOIA) in response to a written FOIA request.

Disclosure: Furnishing this information is mandatory per 46 CFR §4.05-10. Failure to furnish the requested information for occurrences that are reportable marine casualties, diving casualties, or OCS-related casualties may result in civil penalty sanctions as outlined in 33 CFR Part 1. Coast Guard credentialed mariners may be subject to administrative adjudication per 46 CFR Part 5 for reporting failures. Some of the casualty information collected on this form may be made available for public inspection; however, information collected is protected from use in civil litigation per 46 U.S.C. §6308. Personal privacy information will not be disclosed routinely. Social Security numbers are not mandated on this form.

(b) (6), (b) (7)(C)

DEPARTMENT OF HOMELAND SECURITY
U.S. Coast Guard

OMB No: 1625-0001
Exp. Date: 07/31/2022

PERSONNEL CASUALTY ADDENDUM

Note: This form shall be used to report data on persons who were injured, killed, or are missing as a result of the marine casualty described on form CG-2692.
This form may only be used in addition to form CG-2692, never alone.

Section I - Reporting Vessel/Facility Information - Casualty Date/Time

1. Vessel or Facility Name	2. Date/Time *(local)* of Occurrence
SLNC GOODWILL	2020AUG05 1342 LT

Section II - Injured, Dead, and Missing Person Details

3a. Name *(Last, First, Middle)*	3b. Relationship to Vessel or Facility	3c. Status
Lloyd-Rees, Trenton David	[X] Crew - Position: 3rd Assistant Engineer [ ] Passenger [ ] Other - Describe:	[ ] Injured [X] Dead [ ] Missing
3d. Address: (b) (6), (b) (7)(C)		

3e. Telephone	3f. Email Address	3g. For Crew - On Duty at Time?	3h. Date of Birth	3i. Date of Death
1-(b) (7)(C), (b) (6)		[X] Yes [ ] No	(b) (7)(C), (b) (6)	08/05/2020

3j. Activity of Person at Time of Casualty: Conducting Generator Repairs to #1 SSDG

3k. Location on Vessel or Facility Where Casualty Occurred: 1/2 AE Generator Room

3l. Extent of Injuries to Person *(Parts of Body and Type of Injuries)*: Blunt force trauma to head and neck

4a. Name *(Last, First, Middle)*	4b. Relationship to Vessel or Facility	4c. Status
	[ ] Crew - Position: [ ] Passenger [ ] Other - Describe:	[ ] Injured [ ] Dead [ ] Missing
4d. Address		

4e. Telephone	4f. Email Address	4g. For Crew - On Duty at Time?	4h. Date of Birth	4i. Date of Death
		[ ] Yes [ ] No		

4j. Activity of Person at Time of Casualty:

4k. Location on Vessel or Facility Where Casualty Occurred:

4l. Extent of Injuries to Person *(Parts of Body and Type of Injuries)*:

5a. Name *(Last, First, Middle)*	5b. Relationship to Vessel or Facility	5c. Status
	[ ] Crew - Position: [ ] Passenger [ ] Other - Describe:	[ ] Injured [ ] Dead [ ] Missing
5d. Address		

5e. Telephone	5f. Email Address	5g. For Crew - On Duty at Time?	5h. Date of Birth	5i. Date of Death
		[ ] Yes [ ] No		

5j. Activity of Person at Time of Casualty:

5k. Location on Vessel or Facility Where Casualty Occurred:

5l. Extent of Injuries to Person *(Parts of Body and Type of Injuries)*:

6a. Name *(Last, First, Middle)*	6b. Relationship to Vessel or Facility	6c. Status
	[ ] Crew - Position: [ ] Passenger [ ] Other - Describe:	[ ] Injured [ ] Dead [ ] Missing
6d. Address		

6e. Telephone	6f. Email Address	6g. For Crew - On Duty at Time?	6h. Date of Birth	6i. Date of Death
		[ ] Yes [ ] No		

6j. Activity of Person at Time of Casualty:

6k. Location on Vessel or Facility Where Casualty Occurred:

6l. Extent of Injuries to Person *(Parts of Body and Type of Injuries)*:

7a. Name *(Last, First, Middle)*	7b. Relationship to Vessel or Facility	7c. Status
	[ ] Crew - Position: [ ] Passenger [ ] Other - Describe:	[ ] Injured [ ] Dead [ ] Missing
7d. Address		

7e. Telephone	7f. Email Address	7g. For Crew - On Duty at Time?	7h. Date of Birth	7i. Date of Death
		[ ] Yes [ ] No		

7j. Activity of Person at Time of Casualty:

7k. Location on Vessel or Facility Where Casualty Occurred:

7l. Extent of Injuries to Person *(Parts of Body and Type of Injuries)*:

INSTRUCTIONS FOR COMPLETION OF FORM CG-2692C
PERSONNEL CASUALTY ADDENDUM

Note: This form shall be used to report data on persons who were injured, killed, or missing as a result of the marine casualty described on form CG-2692. This form may only be used in addition to form CG-2692, never alone.

WHEN TO USE THIS FORM

1. This form, when submitted in conjunction with a CG-2692, satisfies the requirement for written reports of casualties found in the Code of Federal Regulations for vessels. Specifically, it provides information on one or more persons who were injured, dead or missing as a result of their involvement in a reportable marine casualty, commercial diving casualty, or an OCS-related casualty. This form may only be used in addition to form CG-2692, never alone.

DEFINITIONS

2. Loss of Life - a life is considered lost when the person is known to be deceased (e.g. the body has been recovered), the person as been categorized as "presumed lost/dead" by agencies leading search and rescue efforts, or the circumstances of the occurrence make recovery of the person alive unlikely.

3. Injury - defined as damage or harm caused to the structure or function of the body as a result of an outside physical agent. Damage or harm caused exclusively by animal/insect bites/scratches is excluded. Pursuant to the Occupational Safety and Health Administration's (OSHA) definition of "injury or illness" in 29 CFR 1904.46, the Coast Guard considers injuries and illnesses as separate types of occurrences. As such, damage or harm caused by illness, including but not limited to: communicable illness (i.e. colds, flu, etc.), food poisoning, heart attack, stroke, or other pre-existing medical condition is not considered an injury and does not fall under this criterion.

COMPLETION OF THIS FORM

4. In accordance with 46 CFR §4.05-10, 46 CFR §197.486, and 33 CFR §146.35 this form shall be filled out as completely and accurately as possible. Please type or print clearly. Fill in all blanks that apply to the kind of casualty that has occurred. If a block is not applicable, the abbreviation "NA" should be entered in that space. If the answer is unknown and cannot be obtained before the report has to be submitted (i.e. within 5 days of the accident), the abbreviation "UNK" should be entered in that block. If "NONE" is the correct response, enter it in the block.

5. If more than 5 individuals were injured, dead, or missing as a result of the marine casualty additional CG2692Cs should be completed.

6. Once completed, deliver, email, or fax this form with a corresponding CG-2692 within 5 days of the casualty to the Coast Guard Sector, Marine Safety Unit, or Activity nearest the location of the casualty or, if at sea, nearest the arrival port. https://www.uscg.mil/Units/Organization

NOTICE: The information collected on this form is routinely available for public inspection. It is needed by the Coast Guard to carry out its responsibility to investigate marine casualties, to identify hazardous conditions or situations and to conduct statistical analysis. The information is used to determine whether new or revised safety initiatives are necessary for the protection of life or property in the marine environment.

Enclosure: CG-03 page 2 of 2
Case# 1229748
ECN 7025155-(b)(6), (b)(7)(C) 003

MV SLNC GODWIN VOY NO. ____ MARSEC LVL: 1 FROM DELTA PIER, GUAM TOWARDS ____ DATE 31 JULY 2020 ZD -10

HR	COURSE BASE CSE	COURSE GYRO	COURSE STEER	ERROR GYRO	WIND DIR	WIND FORCE	SEA DIR	SEA FEET	SWELL DIR	SWELL FEET	TEMPERATURES DRY	TEMPERATURES WET	BAR	SKY/WX
0100														
0200														
0300														
0400	P/S	TO DELTA			ENE	2	CALM		-	-	28	26	1007	P CLDY
0500														
0600														
0700														
0800	P/S	TO DELTA			E	3	CALM		-	-	31	28	1007.5	P CLDY
0900														
1000														
1100														
1200	P/S	TO DELTA			E	4	E	3	-	-	32	31	1010	P CLDY
1300														
1400														
1500														
1600	P/S	TO DELTA			E	4	E	2	-	-	32	31	1010	P CLDY
1700														
1800	56.5	241	319		ENE	4	ENE	2	110	3	30	28	1007	P CLDY
1900														
2000	318.5	325	323		ENE	4	ENE	3	ESE	3	29	27	1007	P CLDY
2100														
2200		315	317		ENE	4	ENE	4	ENE	3	29	25	1009.5	P CLDY
2300														
2400		319	318		ENE	4	ENE	3	ENE	4	28	25	1007	P CLDY

ARRIVAL/DEPARTURE-NOON POSITION

	DRAFT	FWD	AFT	MEAN	DENSITY
DEP	6.0		8.3	7.1	1.025

L ____ Lo ____ LOG

	DAILY	TOTAL/PASSAGE
Running Time		
Observed Distance		
Average Speed		
Fuel Departure	7170	
Fuel 0800/Noon	7682	
Fuel Consumed	34	
Fuel Arrival	—	
Lubes 0800/Noon	9178	
Lubes Consumed	0	
Water 0800/Noon		
Water Consumed		
Water Arrival		

TIME ON/TIME OFF	DECK WATCH/LOOKOUT OFFICER	CREW
0001 / 0400	(b) (6), (b) (7)(C)	
0400 / 0800		
0800 / 1200		
1200 / 1600		
1600 / 2000		
2000 / 2400		

TESTS, DRILLS & INSPECTIONS

1.C [illegible] (b) (6), (b) (7)(C)

1600 [illegible] PER SHIP CHECKLISTS

[illegible] AND THEIR LAUNCHING

[illegible] (b) (6), (b) (7)(C)

1500 [illegible] (b) (6), (b) (7)(C)

EVENTS AND REMARKS — Watch Condition 1 unless otherwise stated in this section

0000 3/M (b) (6), (b) (7)(C) ASSUMES THE WATCH PER D-137 AMI OPS 2.1 W/O EXCEPTION. FIRE AND SECURITY ROUND MADE PRIOR TO ASSUMING THE WATCH. CHOC CONTINUE DISCHARGE FM F-76 VIA #6 HEADER. LINES LIGHTS G/WAY TENDED FREQUENT ROUNDS MADE BY DECK NO POLLUTANTS NOTED SECURITY MAINTAINED. RLVD BY 3/M ATTHOWE (b) (6), (b) (7)(C)

0400 2/M A.ATTHOWE ASSUMES THE WATCH IAW C/L D-137 AND OPS 2.1 W/O EXCEPTION. FIRE AND SECURITY ROUND MADE PRIOR TO ASSUMING THE WATCH. 0800 CONTINUOUS DISCHARGING OF F76 VIA #6 PORT HEADER, G/WAY LTS LINES TENDED. SECURITY MAINTAINED WITH MSC RAMS FREQUENT ROUNDS MADE ABOUT THE DECK. NO POLLUTANTS NOTED. RELIEVED BY JH BECTOTH (b) (6), (b) (7)(C)

0800 3/M K. BECTOTH ASSUMES THE WATCH IAW C/L D-137 AND OPS-2.1 W/O EXCEPTION FIRE AND SECURITY ROUND MADE PRIOR TO ASSUMING CONTINUED DISCHARGING OF F76 VIA #6 PORT HEADER. [illegible] COMPLETE. 0815 INTERVAL STANDS. 1013 STRIPPING COMPLETE. 1030 RESUME DSCH 4 PORT WT. 1035 FINISH DSCH. 1041 MANIFOLD SECURE. 1112 [illegible] 1130 COMMENCE SOUNDG. 1200 FINISH SOUNDG VESSEL UNDERWAY P/S TO DELTA PIER AWAITING PILOT DOD FROM PORT. G/WAY AND LINES TENDED SECURITY MAINTAINED FREQUENT ROUNDS MADE ABOUT THE DECK NO POLLUTANTS NOTED RELIEVED BY 3/M. HARPER. [illegible] W/M.

1200 3/M H (b) (6), (b) (7)(C) ASSUMES THE WATCH IAW OPS 2.1 W/O EXCEPTION FIRE + SECURITY ROUND MADE PRIOR TO ASSUMING THE WATCH. VSL IDLE AWAITING PAPERWORK COMPLETE/PILOT 1400 2/R NOZZLE TO E/R 1500 ALL HANDS CALLED 1554 PILOT ON BOARD 1600 VSL EAST P/S TO DELTA PIER PREPARING FOR DEPARTURE LINES G/WAY TENDED FREQUENT ROUNDS MADE ON DECK NO POLLUTANTS NOTED SECURITY MAINTAINED RLVD BY 3/M ATTHOWE (b) (6), (b) (7)(C)

1554 3/M (b) (6), (b) (7)(C) ASSUMES THE WATCH IAW OPS 2.1 W/O EXCEPTION. VESSEL PREPARING FOR DEPARTURE FROM DELTA PIER, GUAM. PILOT ONBOARD (POB). WC III SET. CAPTAIN HAS THE CONN. 1600 ALL SHIPS GEAR TESTED SATISFACTORY. 1606 SBE 1607 AFT ENGINE TESTED AHEAD/ASTERN ALL SATISFACTORY. BOW THRUSTER CHUNE. MASTER/PILOT EXCHANGE COMPLETE. PILOT @ CONN "R. CARIGNAN". WC III. 1608 AFT TUG MADE FST. 1609 FWD TUG MADE FAST "QUIPUHA" 1630 CAST LINE. ~~45~~ BN WAS CASTING. 1647 THIS FWD AND AFT AWAY. 1632 ECHO PIER ⊀ 297°T @ 0.17NM ⇨ 1640 PILOT AWAY. CAPT AT CONN. 1642 FALSE CROTE PT ⊀ 253.2°T @ 1.18NM. 1645 CROTE PT ⊀ 247.0°T @ 0.78NM. 1649 BREAKWATER ⇦ BOW ⇨ BUOYS "1" AND "2". 700 DEPARTURE GUAM. CROTE PT ⊀ 098 4.4NM @ 1.97NM. ⊕ 13°37.11'N 144°55.24'E. 1703 ANCHORS SECURE FOR SEA. 1712 ALL HANDS IN HOUSE. DECKS SECURE FOR SEA WCI. OOW @ CONN. 2000 VSL ROLLING EASY IN MODERATE ENCLY WINDS AND SEAS WITH LOW ESELY SWELL. GOOD VISIBILITY. LIGHT TRAFFIC. HELM IN AUTO. SECURITY MAINTAINED RGIE+CO PER SAIS. (b) (6), (b) (7)(C)

2000 3/M K. BECTOTH ASSUMES THE WATCH AS STD-BY W/O EXCEPTION FIRE AND SECURITY ROUND MADE PRIOR TO ASSUMING WATCH. 2100 VESSEL IN EASY MOTION WITH TIMELY ROLLING IN LIGHT RVE SEAS AND WIND. ENE 4. FAIR. GOOD VISIBILITY WITH NO TRAFFIC. WCI. HELM IN AUTO. SECURITY MAINTAINED RECEIVED AT 3/M HARPER. (b) (6), (b) (7)(C)

(b) (6), (b) (7)(C)

CHIEF OFFICER (b) (6), (b) (7)(C)

PAGE NO 031

1015 (Rev 6-15)
PRONTO (800) 326-9937

MV SLNC GOODWILL VOY NO. 738 MARSEC LVL: 1 FROM APRA HARBOR, GUAM TOWARDS ONSAN, ROK DATE SAT 1 AUG 2020 ZD +10

HR	COURSE BASE CSE	COURSE GYRO	COURSE STEER	ERROR GYRO	WIND DIR	WIND FORCE	SEA DIR	SEA FEET	SWELL DIR	SWELL FEET	TEMPERATURES DRY	TEMPERATURES WET	BAR	SKY/WX
0100														
0200	315	317	316		ENE	4	ENE	2	NE	3	29	26	1005	M CLDY
0300														
0400	315	322	320		ENE	4	ENE	2	NE	3	29	26	1007	M CLDY
0500														
0600	315	322	321		E	4	E	3	NE	2	30	27	1008	P CLDY
0700														
0800	315	321	320		E	4	E	4	ENE	2	31	28	1008	P CLDY
0900														
1000	315	317	316		ENE	4	E	4	ENE	3	33	28	1009	P CLDY
1100														
1200	313	317	316		ENE	3	E	3	ENE	3	34	29	1009	M CLDY
1300														
1400	315	317	316		E	3	E	3	E	3	31	29	1009	P CLDY
1500														
1600	315	317	311		ENE	~~ESE~~ 4	ENE	3	E	3	32	29	1008	P CLDY
1700														
1800	315	321	321		E	3	E	3	ENE	3	32	28	1008	P CLDY
1900														
2000	315	321	321		ENE	3	NExE	3	SExE	3	30	27	1009	P CLDY
2100														
2200	315	320	321		E	4	ENE	2	ENE	3	29	25	1010	CLEAR SKY
2300														
2400	312	320	321		E	3	ENE	2	ENE	3	28	25	1010	CLEAR SKY

ARRIVAL/DEPARTURE/NOON NOON POSITION L 16-50.39 N ; 141-30.73 E LOD 24

DRAFT	FWD	AFT	MEAN	DENSITY
1200	6.0	8.3	7.1	1.025

	DAILY	TOTAL/PASSAGE
Running Time	19	19
Observed Distance	270	270
Average Speed	14.2	14.2
Fuel Departure	—	—
Fuel 0800/Noon	2359	—
Fuel Consumed	31	31
Fuel Arrival	—	—
Lubes 0800/Noon	4039	—
Lubes Consumed	130	130
Water 0800/Noon	393	—
Water Consumed	81	81
Water Arrival	—	—

DECK WATCH/LOOKOUT

TIME ON/TIME OFF	OFFICER	CREW
0000/0400	(b) (6), (b) (7)(C)	
0400/0800		
0800/1200		
1200/1600		
1600/2000		
2000/2400		

TESTS, DRILLS & INSPECTIONS

1200 IAW BRI 215.1 AND 46 CFR 199.190 COMPLETED DAILY NOON TEST OF THE SHIPS WHISTLES AND GENERAL ALARM CLOCKS STARED ALL IN GOOD ORDER (b) (6), (b) (7)(C)

EVENTS AND REMARKS — Watch Condition 1 unless otherwise stated in this section

0000 3/M (b) (6), (b) (7)(C) OV WATCH IAW BPG B-16 W/O EXCEPTION FIRE + SECURITY ROUND MADE PRIOR TO ASSUMING THE WATCH. 0400 VSL IN EASY MOTION LT ENE'LY WIND SEA NE'LY SWELL GOOD VIS N/O TRAFFIC WCI HELM IN AUTO SECURITY MAINTAINED. RLVD BY 3/M (b) (6), (b) (7)(C) AITHOWE

0400 2/M (b) (6), (b) (7)(C) ASSUMES THE WATCH IAW BPG-B16 W/O EXCEPTIONS. FIRE AND SECURITY ROUND MADE PRIOR TO ASSUMING THE WATCH. 0800 VESSEL IN EASY MOTION IN LIGHT E'LY SEAS AND WINDS WITH LOW ENE'LY SWELL. GOOD VISIBILITY W/ LT TRAFFIC. HELM IN AUTO, SECURITY MAINTAINED. RELIEVED PER SMS BY (b) (6), (b) (7)(C)

0800 3/M (b) (6), (b) (7)(C) ASSUMES THE WATCH IAW BPG-B16 W/O EXCEPTION. FIRE AND SECURITY ROUND MADE PRIOR TO ASSUMING THE WATCH. 0944 LPU 101 RPMS AS PER CAPT. 1356 LPU 120 RPMS. 1200 VESSEL IN EASY MOTION WITH TIMELY ROLL LIGHT E'LY WINDS AND SEA, ENE'LY SWELL. GOOD VISIBILITY WITH NO TRAFFIC. WCI HELM IN AUTO RELIEVED BY 3/M (b) (6), (b) (7)(C)

1200 3/M (b) (6), (b) (7)(C) ASSUMES THE WATCH IAW BPG-B16 W/O EXCEPTION. FIRE + SECURITY ROUND MADE PRIOR TO ASSUMING THE WATCH 1600 VSL IN EASY MOTION LT ENE'LY WIND SEA, E'LY SWELL GOOD VIS NO TRAFFIC WCI HELM IN AUTO SECURITY MAINTAINED RLVD BY 3/M (b) (6), (b) (7)(C) (b) (6), (b) (7)(C)

1600 3/M (b) (6), (b) (7)(C) ASSUMES THE WATCH IAW BPG-B16 W/O EXCEPTIONS. FIRE AND SECURITY ROUND MADE PRIOR TO ASSUMING THE WATCH. 1916 ↓ REDUCE SPEED TO FULL AHEAD. 2000 VESSEL ROLLING IN EASY MOTION IN LIGHT NExE'LY SEAS, ENE'LY WINDS AND LOW SExE'LY SWELL. GOOD VISIBILITY WITH NO TRAFFK. HELM IN AUTO. SECURITY MAINTAINED. WCI. PROPERLY RELIEVED PER SMS BY 3M (b) (6), (b) (7)(C), (b) (6), (b) (7)(C)

2000 3/M K. BENTON ASSUMES THE WATCH IAW BPG-B16 W/O EXCEPTION. FIRE AND SECURITY ROUND MADE PRIOR TO ASSUMING THE WATCH. 2044 LPU 120 RPM'S. 2400 VESSEL IN EASY MOTION, TIMELY ROLL IN LIGHT E'LY WIND. ENE'LY SEA AND SWELL. GOOD VISIBILITY WITH NO TRAFFIC. WCI HELM IN AUTO. SECURITY MAINTAINED. RELIEVED BY 3/M HARDEN. ZD

CHIEF OFFICER (b) (6), (b) (7)(C)

PAGE NO. 001

1015 (Est. 6-15)
PADonna (800) 324-9937

(b) (6), (b) (7)(C)

MV SING GOODWILL VOY NO. 755 MARSEC LVL: 1 FROM APRA HARBOR, GUAM TOWARDS BUSAN, ROK DATE SUN 2 AUG 2020 ZD -10

HR	COURSE BASE CSE	COURSE GYRO	COURSE STEER	ERROR GYRO	WIND DIR	WIND FORCE	SEA DIR	SEA FEET	SWELL DIR	SWELL FEET	TEMPERATURES DRY	TEMPERATURES WET	BAR	SKY/WX
0100														
0200	318	320	319		E	2	ENE	2	ENE	3	29	25	1009	P'CLDY
0300														
0400	318	320	321		E	3	ENE	2	ENE	3	29	25	1009	CLEAR
0500														
0600	318	319	320		ESE	3	ESE	3	SSW	3	28	24	1005	P'CLDY
0700														
0800	318	320	321		E	1	E	1	SW/NNE	3/3	30	26	1010	P'CLDY
0900														
1000	[illegible]	[illegible]	[illegible]		E	2	ENE	4	ENE	3	32	30	1010.5	OCAST
1100														
1200	318	317	319		ENE	2	ENE	3	NE	4	33	30	1010.5	O'CAST
1300														
1400	318	320	322		E	3	E	3	E	4	32	27	1010	M'CLDY
1500														
1600	318	320	322		ESE	3	E	3	E	4	32	27	1007	MCLDY, HZY
1700														
1800	318	317	318		E	3	E	2	ESE	4	31	25	1010	HAZE/OVCST
1900														
2000	318	317	318		ENE	3-4	E	2	ESE	4	30	25	1010	HAZE/OVCST
2100														
2200	318	319	322		ENE	2	E	2	NE	3	29	25	1011	SLT HZE, OCAST
2300														
2400	318	319	322		NE	2	E	2	NE	3	29	25	1011.5	SLT HZE, OCAST

ARRIVAL/DEPARTURE/NOON NOON POSITION L 21-12.9 N λ 137-25.58 E LoD 24

DRAFT	FWD	AFT	MEAN	DENSITY
1200	6.0	8.3	7.1	1.025

	DAILY	TOTAL/PASSAGE
Running Time	24	43
Observed Distance	350	620
Average Speed	14.6	14.4
Fuel Departure	—	—
Fuel 0800/Noon	692.6	—
Fuel Consumed	43.3	74.4
Fuel Arrival	—	—
Lubes 0800/Noon	3349	—
Lubes Consumed	190	320
Water 0800/Noon	356	—
Water Consumed	38	119
Water Arrival	—	—

DECK WATCH/LOOKOUT

TIME ON/TIME OFF	OFFICER	CREW
0000/0400	[redacted]	
0400/0800		
0800/1200		
1200/1600		
1600/2000		
2000/2400		

TESTS, DRILLS & INSPECTIONS

1200 IAW BRI 215.1 AND 46 CFR 199.190 COMPLETED DAILY NOON TEST OF THE SHIPS WHISTLES AND GENERAL ALARM. CLOCKS SYNCED. ALL IN GOOD ORDER [redacted]
[illegible] IAW 46 CFR 35.10-5 VESSEL EDG WAS OPERATED AND A VISUAL [illegible] CONDUCTED ALL IN GOOD ORDER [redacted]
1500 IAW 46 CFR [illegible] WEEKLY VISUAL INSP OF SURVIVAL CRAFT LIFEBOAT [illegible] COMPLETED LB/RB ENGINES RUN AND/OR [illegible] ALL IN GOOD ORDER [illegible]
1500 IAW 47 CFR [illegible] 46 CFR [illegible] SOLAS III 20.7.2 COMPLETED MONTHLY INSP OF [illegible] [illegible] SAFE, AND SET ALL SAT [illegible]

EVENTS AND REMARKS — Watch Condition 1 unless otherwise stated in this section

0000 3/M [redacted] ASSUMES THE WATCH IAW BPG B-16 W/O EXCEPTION. FIRE + SECURITY ROUND MADE PRIOR TO ASSUMING THE WATCH. 0400 VSL IN EASY MOTION LT E'LY WIND ENE'LY SEA + SWELL GOOD VIS NO TRAFFIC WCI HELM IN AUTO SECURITY MAINTAINED RLVD BY 2/M ATTHOWE [redacted]

0400 [redacted] ASSUMES THE WATCH IAW BPG-B16 W/O EXCEPTIONS. FIRE AND SECURITY ROUND MADE PRIOR TO ASSUMING THE WATCH. 0800 VESSEL IN EASY ROLLING MOTION TO LT E'LY AIRS AND SMOOTH SEAS, WITH A MIXED SWELL FROM THE SW/NNE. GOOD VIS NO TRAFFIC, HELM IN AUTO. SECURITY MAINTAINED. RELIEVED PER SMS BY [redacted]

0800 3/M [redacted] ASSUMES THE WATCH IAW BPG B16 W/O EXCEPTION. FIRE AND SECURITY ROUND MADE PRIOR TO ASSUMING WATCH. 1200 VESSEL IN LIGHT NE'LY WINDS, SEA, AND SWELL. GOOD VISIBILITY WITH NO TRAFFIC. WCI HELM IN AUTO. SECURITY MAINTAINED. RELIEVED BY 3/M HARPER. [redacted]

1200 3/M [redacted] ASSUMES THE WATCH IAW BPG B-16 W/O EXCEPTION. FIRE + SECURITY ROUND MADE PRIOR TO ASSUMING THE WATCH 1600 VSL IN EASY MOTION LT ESE'LY WIND, E'LY SEA/SWELL GOOD VIS NO TRAFFIC WCI HELM IN AUTO SECURITY MAINT RLVD BY [redacted]

1600 [redacted] ASSUMES THE WATCH IAW BPG-B16 W/O EXCEPTIONS. FIRE AND SECURITY ROUND MADE PRIOR TO ASSUMING THE WATCH. ↓ REDUCE SPEED TO FULL AHEAD MANEUVERING 2000 VESSEL ROLLING EASY MOTION TO SLIGHT E'LY SEAS, LIGHT ENE'LY WINDS, AND LOW ESE'LY SWELL. FAIR TO GOOD VISIBILITY THROUGH HAZE 8+NM VIS, NO TRAFFIC. WCI. HELM IN AUTO. SECURITY MAINTAINED. RELIEVED PER SMS BY [redacted]

2000 3/M K. BERTOTTI ASSUMES THE WATCH IAW BPG-B16 W/O EXCEPTION FIRE AND SECURITY ROUND MADE PRIOR TO ASSUMING WATCH. 2400 VESSEL IN EASY MOTION IN LIGHT NE'LY WINDS AND SWELL. GOOD VISIBILITY WITH SLIGHT HAZE NO TRAFFIC. WCI HELM IN AUTO. SECURITY MAINTAINED. RELIEVED BY 3/M HARPER. [redacted]

CHIEF OFFICER [redacted] PAGE NO 002

[redacted]

MV SLNC GOODWILL VOY NO. 738 MARSEC LVL: 1 FROM APRA HARBOR, GUAM TOWARDS OKSAN, ROK DATE MON 3 AUG 2020 ZD +10

HR	COURSE BASE CSE	COURSE GYRO	COURSE STEER	ERROR GYRO	WIND DIR	WIND FORCE	SEA DIR	SEA FEET	SWELL DIR	SWELL FEET	TEMPERATURES DRY	TEMPERATURES WET	BAR	SKY/WX
0100														
0200	315	319	322		NE	3	E	1	E	3	28	24	1011	P'CLDY
0300														
0400	315	321	323		NNE	3	E	1	E	3	28	24	1010	P'CLDY
0500														
0600	318	321	323		ESE	3	E	1	E	3	28	24	1010	P'CLDY
0700														
0800	315	319	322		SE	3	SE	1	E	3	30	26	1010	P'CLDY
0900														
1000	315	319	323		ExN	4	ExN	3	S	3	33	26	1010.5	P'CLDY
1100														
1200	316	319	323		E	4	E	4	SW	3	36	25	1011	P'CLDY
1300														
1400	315	319	323		ESE	4	E	3	E	3	34	30	1010.5	P'CLDY
1500														
1600	315	319	323		SE	4	E	3	SE	3	35	29	1010	P'CLDY
1700														
1800	315	315	316		ESE	3-4	ESE	3	ESE	3	33	27	1010	P'CLDY
1900														
2000	318	320	323		ESE	4	ESE	3	SW	3	32	27	1010.5	P'CLDY
2100														
2200	315	321	326		SE	4	ESE	3	SSW	3	29	25	1012	P'CLDY
2300														
2400	315	320	326		SE	4	ESE	3	SSW	4	27	25	1011.5	P'CLDY

ARRIVAL/DEPARTURE/NOON NOON POSITION L 25-09.5S λ 133-38.1E LOG 24

DRAFT	FWD	AFT	MEAN	DENSITY
1200	6.0	8.3	7.1	1.025

	DAILY	TOTAL/PASSAGE
Running Time	24	17
Observed Distance	316	936
Average Speed	13.2	13.9
Fuel Departure	—	—
Fuel 0800/Noon	670.3	—
Fuel Consumed	22.3	91.7
Fuel Arrival	—	—
Lubes 0800/Noon	3728	—
Lubes Consumed	12.0	44.0
Water 0800/Noon	349	—
Water Consumed	7	12.6
Water Arrival	✓	✓

DECK WATCH/LOOKOUT

TIME ON/TIME OFF	OFFICER	CREW
0000/0400	(b) (6), (b) (7)(C)	
0400/0800		
0800/1200		
1200/1600		
1600/2000		
2000/2400		

TESTS, DRILLS & INSPECTIONS

1700 IAW BRI 2.15.1 AND 46 CFR 199.190 COMPLETED DAILY NOON TEST OF THE SHIPS WHISTLES AND GENERAL ALARM CLOCKS SYNCED. ALL IN GOOD ORDER (b) (6), (b) (7)(C)

EVENTS AND REMARKS — Watch Condition 1 unless otherwise stated in this section

0000 3/M (b) (6), (b) (7)(C) ON WATCH PER BPG B-16 W/O EXCEPTION. FIRE & SECURITY ROUND MADE PRIOR TO ASSUMING THE WATCH 0400 VSL IN EASY MOTION LT NE'LY WIND E'LY SEA/SWELL GOOD VIS NO TRAFFIC WCI HELM IN AUTO SECURITY MAINT. RLVD BY (b) (6), (b) (7)(C)

0400 (b) (6), (b) (7)(C) ASSUMES THE WATCH IAW BPG-B16 W/O EXCEPTIONS. FIRE AND SECURITY ROUND MADE PRIOR TO ASSUMING THE WATCH. 0800 VESSEL IN EASY MOTION IN LIGHT SE'LY WINDS AND SEAS AND LOW E'LY SWELL. GOOD VISIBILITY WITH NO TRAFFIC. HELM IN AUTO. SECURITY MAINTAINED. RELIEVED AS PER SMS BY (b) (6), (b) (7)(C)

0800 (b) (6), (b) (7)(C) ON WATCH IAW BPG-B16 W/O EXCEPTION. 1200 VESSEL IN EASY MOTION IN LIGHT E'LY WINDS AND SEAS WITH LOW SWELL MIX. GOOD VISIBILITY, NO TRAFFIC. HELM IN AUTO. SECURITY MAINTAINED. RELIEVED AS PER SMS BY 3M (b) (6), (b) (7)(C)

1200 3/M (b) (6), (b) (7)(C) ON WATCH PER BPG B-16 W/O EXCEPTION. FIRE & SECURITY ROUND MADE PRIOR TO ASSUMING THE WATCH 1330 REDUCE TO HALF AHD 1600 VSL IN EAST MOTION LT SE'LY WIND E'LY SEA/SWELL GOOD VISIBILITY NO TRAFFIC WCI HELM IN AUTO SECURITY MAINTAINED RLVD BY 3/M ATTHOWE (b) (6), (b) (7)(C)

1600 (b) (6), (b) (7)(C) ASSUMES THE WATCH IAW BPG-B16 W/O EXCEPTIONS. FIRE AND SECURITY ROUND MADE PRIOR TO ASSUMING THE WATCH. 1726 ↑ SPEED TO FULL AHEAD MANEUVERING. 1800 RETARD SHIPS CLOCKS 20 MINUTES. LE 1736 COMMENCE ODME DISCHARGE - 80NM FROM NEAREST SHORE. POS L 26-00.8N λ 132-49.3E. 1812 COMPLETE ODME DISCHARGE IN POS L26-06.8N λ132-41.5E. 1815 ↓ REDUCE SPEED TO HALF AHEAD, 85 RPM. 2000 VESSEL IN EASY MOTION TO SLIGHT ESE'LY WINDS AND SEAS IN LOW SW'LY SWELL. GOOD VISIBILITY, LIGHT TRAFFIC, WCI HELM IN AUTO, SECURITY MAINTAINED. RELIEVED AS PER SMS BY (b) (6), (b) (7)(C) (b) (6), (b) (7)(C)

2000 3/M (b) (6), (b) (7)(C) ASSUMES THE WATCH IAW BPG-B16 W/O EXCEPTION. FIRE AND SECURITY ROUND MADE PRIOR TO ASSUMING WATCH. 2200 RETARD SHIP CLOCK 20 MIN. 2400 VESSEL IN EASY MOTION WITH TIMES RAIL THROUGH LIGHT SE'LY WIND AND SEAS SLT SWELL. GOOD VISIBILITY WITH NO TRAFFIC. WCI HELM IN AUTO SECURITY MAINTAINED (b) (6), (b) (7)(C)

CHIEF OFFICER (b) (6), (b) (7)(C) (6), (b) (7)(C)

PAGE NO. 003

1015 (Est 6/15)
PROforma (800) 324-9937

MV SLNC GOODWILL VOY NO. 736 MARSEC LVL: 1 FROM APRA HARBOR, GUAM TOWARDS ONSAN, ROK DATE TUE 4 AUG 2020 ZD -9

HR	COURSE BASE CSE	COURSE GYRO	COURSE STEER	ERROR GYRO	WIND DIR	WIND FORCE	SEA DIR	SEA FEET	SWELL DIR	SWELL FEET	TEMPERATURES DRY	TEMPERATURES WET	BAR	SKY/WX
0100														
0200	315	314	315		SE	3	SE	3	SW	4	28	26	1011	P'CLDY
0300														
0400	315	316	317		SE	3	SE	3	S	4	28	26	1011	P'CLDY
0500														
0600	000	000	005		ESE	4	ESE	3	SW	4	29	25	1011	P'CLDY
0700														
0800	010	010	013		ESE	4	SE	4	SW	4	30	26	1011	P'CLDY
0900														
1000	352.5	278	305		ESE	4-5	SE	5	SW	5	30	26	1012	P'CLDY
1100														
1200	302	295	298		SE	4	SE	5	SW	4	31	30	1012.5	P'CLDY
1300														
1400	302	295	303		SE	4	SE	3	SW	4	31	28	1013	P'CLDY
1500														
1600	302	300	305		SE	4	SE	5	SW	5	35	29	1013	P'CLDY
1700														
1800	305	309	310		SE	4	SE	5	W	6	34	28	1012	P'CLDY
1900														
2000	305	303	305		SSE	4-5	SE	5	WSW	6	31	27	1012	P'CLDY
2100														
2200	312	326	320		SE	4	SE	3	SW	6	27	26	1012.5	P'CLDY
2300														
2400	346	339	344		SSE	4	SE	3	SW	5	27	25	1013	P'CLDY

ARRIVAL/DEPARTURE/NOON NOON POSITION 38°15.67'N ; 131-19.67'E LOG 25

DRAFT	FWD	AFT	MEAN	DENSITY
1300	6.0	8.3	7.1	1.035

	DAILY	TOTAL/PASSAGE
Running Time	25	92
Observed Distance	283	1219
Average Speed	11.3	13.3
Fuel Departure	—	—
Fuel 0800/Noon	648.9	—
Fuel Consumed	21.4	118.1
Fuel Arrival	—	—
Lubes 0800/Noon	361	—
Lubes Consumed	110	550
Water 0800/Noon	344	—
Water Consumed	5	131
Water Arrival	—	—

DECK WATCH/LOOKOUT

TIME ON/TIME OFF	OFFICER	CREW
0000 / 0400	(b) (6), (b) (7)(C)	
0400/0800		
0800/1200		
1200 / 1600		
1600/2000		
2000/2400		

TESTS, DRILLS & INSPECTIONS

NAV. EQ. AT 38-09.3'N 131-37.3'E IAW 46 CFR 199.180 AND SOLAS III 20-2 COMPLETED

[illegible] OF LIFEBOATS AND DAVITS APPLICABLE ALL IN GOOD ORDER

1200 IAW 46 CFR 199.190 AND GRT 2151 COMPLETED DAILY NOW TEST OF THE SHIPS WHISTLES AND GENERAL ALARM CLOCKS STARTED ALL IN GOOD ORDER (b) (6), (b) (7)(C)

[illegible] 38-06.25'N λ131-27.27E SECURITY DRILL CONDUCTED IAW 33CFR 104.230(B)(1), ISPS 18.4, COMSCINST 5530.3 CH2(1)(G), AND MSP 10.5 COMPLETELY SECURITY DRILL WAS CONDUCTED. ALL CREW TRAINED, SEE DRILL 2 NOTE FOR DETAILS. (b) (6), (b) (7)(C)

EVENTS AND REMARKS

Watch Condition 1 unless otherwise stated in this section

0000 3/M (b) (6), (b) (7)(C) WATCH PER BPG B-16 W/O EXCEPTION. FIRE + SECURITY ROUND MADE PRIOR TO ASSUMING THE WATCH. 0200 CLOCKS RETARDED 30 MIN, SET 20-9 0400 VSL IN EASY MOTION LT SE'LY WIND/SEA S'LY SWELL GOOD VIS LT TRAFFIC WCI HELM IN AUTO SECURITY MAINTAINED RLVD BY 3/M ATTHOWE (b) (6), (b) (7)(C) 0400 (b) (6), (b) (7)(C) ASSUMES THE WATCH IAW BPG-B16 W/O EXCEPTIONS. FIRE AND SECURITY ROUND MADE PRIOR TO ASSUMING THE WATCH. 0518 POS L27-44.6'N λ131-05.9'E C/C TO 000°PGC 353°T 008°PSC. 0630 POS L27-58.9N λ131-05.7E C/C TO 090° PGC 098°PSC. 0636 ↑ INCREASE SPEED TO FULL AHEAD 101 RPM. 0643 POS L27-59.3N λ131-08.5E COMMENCE ODME OPS, 62NM FROM LAND. 0718 ↓ DECREASE SPEED TO HALF AHEAD 85 RPM. 0728 ↓ DECREASE SPEED TO SLOW AHEAD 75 RPM. 0800 VESSEL IN EASY MOTION IN LIGHT SE'LY SEAS AND ESE'LY WINDS AND SW'LY LOW SWELL. GOOD VISIBILITY W/LT TRAFFIC. WCI - HELM IN AUTO. SECURITY MAINTAINED. RELIEVED AS PER SMS BY (b) (6), (b) (7)(C) (b) (6), (b) (7)(C). 0000 3/M (b) (6), (b) (7)(C) ASSUMES THE WATCH IAW BPG-B16 W/O EXCEPTION FIRE AND SECURITY ROUND MADE PRIOR TO ASSUMING WATCH. 0825 CONFIRMED ODME C:28°05.5'N λ:131°27.2'E, 80nm FROM CLOSEST LAND, 8.1 KTS ↑27 ↑ HALF AHEAD AS PER CAPTAIN. 0837 ↑ FULL AHEAD AS PER CAPTAIN. 0850 C/C C:28° 02.0'N λ:131°44.0'E 300°PSC, 304°PSC. 0855 ODME SECURED C:28° 02.4'N λ: 131° 44.0'E 91nm FROM CLOSEST LAND, 12.4 KTS. 1200 VESSEL IN EASY MOTION IN LIGHT SE'LY WIND AND SEA. 1615 FUEL: GOOD VISIBILITY W/ TRAFFIC. WCI HELM IN AUTO. RELIEVED BY (b) (6), (b) (7)(C) 1200 3/M HARPER ON WATCH PER BPG B-16 W/O EXCEPTION. FIRE. SECURITY ROUND MADE PRIOR TO ASSUMING THE WATCH. 1600 VSL IN EASY MOTION LT SE'LY WIND/SEA LOW SW'LY SWELL GOOD VIS LIGHT TRAFFIC WCI HELM IN AUTO SECURITY MAINTAINED RLVD BY (b) (6), (b) (7)(C) (b) (6), (b) (7)(C) 1600 (b) (6), (b) (7)(C) ASSUMES THE WATCH IAW BPG-B16 W/O EXCEPTIONS, FIRE AND SECURITY ROUND MADE PRIOR TO ASSUMING THE WATCH. 2000 VESSEL IN EASY MOTION TO MOD- MODERATE SSE LY WINDS, SLIGHT SE LY SEAS, AND LOW WSW LY SWELL. GOOD VIS WITH LT TRAFFIC. WCI. HELM IN AUTO. SECURITY MAINTAINED. PROPERLY RELIEVED PER SMS BY (b) (6), (b) (7)(C) 2000 3/M K. BURDETT, ASSUMES WATCH IAW BPG-B16 W/O EXCEPTION, FIRE AND SECURITY ROUND MADE PRIOR TO ASSUMING WATCH. 2039 C/C ENTER 12NM N 004.2 AT 12.5 KTS. 312 PSC, 317 PSC. 2201 C/C LEAVE 12NM N 005.7' AT 13.8 KTS 332°PSC 338°PSC 343°T. 2400 VESSEL IN EASY MOTION, ROLLING FREQUENTLY THROUGH LIGHT SE'LY WIND AND SEA, SLY SWELL. GOOD VISIBILITY WITH LAND IN SIGHT, LIGHT TRAFFIC. WCI HELM IN AUTO. SECURITY MAINTAINED. RELIEVED B (b) (6), (b) (7)(C)

CHIEF OFFIC (b) (6), (b) (7)(C) (7)(C)

PAGE NO. 001

1015 (Rev. 8/15)
PRICEnome (860) 324-5937

(b) (6), (b) (7)(C)

MV SLNC GOODWILL VOY NO. 736 MARSEC LVL: 1 FROM APRA HARBOR, GUAM TOWARDS BUSAN, ROK DATE WED 5 AUG 2020 ZD -9

HR	COURSE BASE CSE	COURSE GYRO	COURSE STEER	ERROR GYRO	WIND DIR	WIND FORCE	SEA DIR	SEA FEET	SWELL DIR	SWELL FEET	TEMPERATURES DRY	TEMPERATURES WET	BAR	SKY/WX
0100														
0200	346	342	349		SSE	4	SE	3	SW	5	28	25	1013	P'CLDY
0300														
0400	346	342	349		S	4	S	3	SW	5	28	25	1013	P'CLDY
0500														
0600	354	350	358		SSE	4	S	3	SSW	6	28	25	1013	M'CLDY
0700														
0800	354	350	358		SSE	4	SSE	3	SW	6	29	26	1014	M'CLDY
0900														
1000	354	353	002		SSE	4	SSE	4	SW	6	33	26	1013	SLT HAZE CLDY
1100														
1200	315	318	329		SSE	4	SSE	5	SW	6	34	27	1013.2	SLT HAZE P'CLDY
1300														
1400	VAT UNDER OVERCAST				SSE	6	SSE	6	SW	6	34	27	1013	M'CLDY
1500														
1600	VAT UNDER OVERCAST				S	6	SSE	5	SW	6	33	27	1013	D'CAST
1700														
1800	VAT UNDER OVERCAST				S	6	SSE	5	SW	6	31	26	1013	D'CAST
1900														
2000														
2100														
2200		155	156		SSE	6	S	5	SSW	6	28	26	1012.5	MOSTLY CLEAR
2300														
2400		85	180		SSE	6	S	5	SSW	5	28	25	1012.5	MOSTLY CLEAR

ARRIVAL/DEPARTURE/NOON NOON POSITION L 32-15.0'N λ 128-39.5'E LOG 24

DRAFT	FWD	AFT	MEAN	DENSITY
1200	6.0	8.3	7.1	1.035

	DAILY	TOTAL/PASSAGE
Running Time	24	116
Observed Distance	301	1520
Average Speed	12.5	13.1
Fuel Departure	—	—
Fuel 0800/Noon	126.0	—
Fuel Consumed	22.9	141.0
Fuel Arrival	—	—
Lubes 0800/Noon	35.9	—
Lubes Consumed	1.00	6.60
Water 0800/Noon	32.9	—
Water Consumed	15	146
Water Arrival	—	—

DECK WATCH/LOOKOUT

TIME ON/TIME OFF	OFFICER	CREW
0000/0400	(b) (6), (b) (7)(C)	
0400/0800		
0800/1200		
1200/1600		
1600/2000		

TESTS, DRILLS & INSPECTIONS

1030 2-46 & DECK 16 ROOM SMOKE ISOLATED, 2-47 A DECK 14 ROOM PBT EXIT MCP ISOLATED, FOR REPAIR

1130 ALL DISCONNECTS BACK ONLINE. FIRE DETECTION ALL SYSTEMS NORMAL.

1300 IAW 46 CFR 199.190 AND BPT 9.15.1 COMPLETED DAILY NOON TEST OF SHIPS WHISTLES AND GENERAL ALARM. CLOCKS SYNCED ALL IN GOOD ORDER (b) (6), (b) (7)(C)

(b) (6), (b) (7)(C)

(b) (6), (b) (7)(C)

EVENTS AND REMARKS — Watch Condition 1 unless otherwise stated in this section

0000 (b) (6), (b) (7)(C) ON WATCH PER BPG B-16 W/O EXCEPTION. FIRE+ SECURITY ROUND MADE PRIOR TO ASSUMING THE WATCH. 0400 VSL ROLLING EAST IN MODERATE SW'LY SWELL LT S'LY WINDS GOOD VISIBILITY, LIGHT TRAFFIC. W/CI HELM IN AUTO SECURITY MAINTAINED. RLVD BY 2/M ATTHOVE (b) (6), (b) (7)(C)

0400 (b) (6), (b) (7)(C) ASSUMES THE WATCH IAW BPG-B16 W/O EXCEPTIONS. FIRE AND SECURITY ROUND MADE PRIOR TO ASSUMING THE WATCH. 0518 POS L 30-55.0N λ 128-55.3'E ⊖ W/P AS PER VOYAGE PLAN. C/C TO 354°T 352°PGC 000°PGC. 0800 VESSEL IN EASY MOTION TO SLIGHT SSE LY SEAS, WINDS, AND SW LY SWELL. GOOD VISIBILITY W/ LT TRAFFIC. HELM IN AUTO, SECURITY MAINTAINED. PROPERLY RELIEVED PERSMS BY (b) (6), (b) (7)(C)

0800 3/M R. BECAUSE I ASSUME THE WATCH IAW BPG-B16 W/O EXCEPTION, FIRE AND SECURITY ROUND MADE PRIOR TO ASSUMING THE WATCH. 1059 IN POS'N L 32°06.2'N λ 128°46.2'E WITH 6 261°T AT 18.75KN C/C 319°T 318°PGC 323°PGC. 1200 VESSEL ROLLING THROUGH LIGHT SE'LY WIND AND SEA, MODERATE SW'LY SWELL. GOOD VISIBILITY WITH LIGHT TRAFFIC AND CLOUD 3/4. W/CI HELM IN AUTO. SECURITY MAINTAINED. RLVD BY 7/M (b) (6), (b) (7)(C)

1200 3/M (b) (6), (b) (7)(C) W WATCH PER BPG B-16 W/ EXCEPTION. FIRE · SECURITY ROUND MADE PRIOR TO ASSUMING THE WATCH 1342 NOISE HEARD FROM BELOW, SMOKE/HEAT DETECTORS ALARM IN MULTIPLE E/R SPACES 1343 MASTER ON BRIDGE SOUND GENERAL ALARM POS 32°25.7'N/128°25.1'E SET NUC 1348 BAE REPORTED DOWN IN E/R GEN SPACE 1350 COMMS EST. WITH MOJI CG RADIO 1400 VESSEL REPORTS MEDICAL EMERGENCY TO JAPAN COAST GUARD (MOJI) ALL EMERGENCY GEARED. CONFIRM NO FIRE ABOARD. ALL CREW ACCOUNTED FOR 1402 MEDEVAC HELICOPTER REQUESTED 1403 PORT CAPTAIN NOTIFIED OF EMERGENCY ABOARD 1405 MEDEVAC MOS CONTACTED FOR INJURED CREWMEMBER. FOR FURTHER DETAILS SEE VESSEL INCIDENT REPORT 1528 HOSPITAL REPORTS NO PULSE, BEGIN CPR 1700 JAPAN COAST GUARD HELICOPTER ON STATION 1702 HELO CREW ON DECK 1725 BAE AWAY ON JAPAN COAST GUARD HELICOPTER 1731 ALL HELICOPTER CREW AWAY, HELO PROCEEDING TO HOSPITAL 1800 VESSEL NOT UNDER COMMAND AFTER ENGINE CASUALTY DRIFTING NORTH'LY IN DEEP WATER APPROX 10NM FROM SHORE, VESSEL INCIDENT REPORT UPDATED WITH FURTHER DETAILS. GOOD VISIBILITY, MODERATE S'LY WIND, SEA SWELL. BRIDGE WATCH RLVD BY (b) (6), (b) (7)(C)

1800 3/M (b) (6), (b) (7)(C) ASSUMES THE WATCH IAW BPG-B16 AND SMS W/O EXCEPTIONS. 1902 JAPAN COAST GUARD CUTTER ON STATION. 1931 CONFIRM WITH MOJI COAST GUARD THAT VESSEL IS NO LONGER IN IMMEDIATE DANGER. IF VESSEL DRIFTS WITHIN 6NM, WILL ACCEPT TOW. 1934 MOJI COAST GUARD INFORM SHIP HAS POWER BUT NO PROPULSION. 2000 VESSEL DRIFTING, NOT UNDER COMMAND RELIEVED BY (b) (6), (b) (7)(C)

2000 3/M (b) (6), (b) (7)(C) ASSUMES WATCH IAW BPG-B16, VESSEL NUC, PROPER LIGHTS ILLUMINATED. VESSEL DRIFTING IN N'LY DIRECTION APPROX 8NM FROM JAPANESE COASTLINE POS L 32°-33.1'N λ 129°-26.5'E. COMMUNICATIONS ESTABLISHED WITH MOJI COAST GUARD. 2052 MOJI COAST GUARD INFORMED OF VESSEL'S UPDATED STATUS. APPROX 1 HOUR ENGINE REPAIR AND 1 TUG INBOUND APPROX 7 HOURS. 2145 BE CONDUCTING PRE-START CHECKS. 2230 W/CI UNDERWAY ENGINE S.B.E. 2259 03/ 2204 MOJI COAST GUARD NOTIFIED OF VESSEL'S UPDATED STATUS. VESSEL U/W ENROUTE TO SALVAGE TUG AND PROCEED FURTHER FROM SHORE. 22.9 ✓ STEAM 190°PGC 196°PSC. W/CI. 2400 VESSEL IN EASY MOTION TAKING MODERATE S'LY WIND, LIGHT SEA AND SWELL. GOOD VISIBILITY, WITH LIGHT TRAFFIC. COAST GUARD CUTTER NOT ALONG VESSEL W/ CHANGE TO (b) (6), (b) (7)(C) RLVD BY 7/M (b) (6), (b) (7)(C)

CHIEF OFFICER (b) (6), (b) (7)(C)

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1045 (Rev. 6-15)
PPIC Forms (800) 324-8937

MV SONG GROWELL VOY NO. 0235 MARSEC LVL: 1 FROM APRA HARBOR, GUAM TOWARDS SASEBO, JAPAN DATE THURS 6 AUG 2020 ZD -9

HR	COURSE BASE CSE	COURSE GYRO	COURSE STEER	ERROR GYRO	WIND DIR	WIND FORCE	SEA DIR	SEA FEET	SWELL DIR	SWELL FEET	TEMPERATURES DRY	TEMPERATURES WET	BAR	SKY/WX
0100														
0200	030	030	020		S	5-6	S	5	S	6	27	25	1013	P CLDY
0300														
0400	090	075	086		S	5	S	5	S	6	28	25	1012	P CLDY
0500														
0600	083	087	097		S	4	S	4	S	5	28	26	1011	M. CLDY
0700														
0800	009	008	018		SSE	4	SSE	3	SW	3	29	27	1012	OVCST
0900														
1000	001	006	010		SSE	5	S	4	SW	4	29	26	1011.5	HAZE O'CAST
1100														
1200	AS PER PILOT				SSE	5	E	2	NE	2	31	27	1011.0	OVCAST
1300														
1400	SASEBO				S	4	E	1	—	—	34	28	1010	O'CAST
1500														
1600	SASEBO @ G-1				SSW	4	SSW	2	—	—	34	28	1009	HAZE
1700														
1800	SASEBO @ G-1				SSE	3	SSE	1	—	—	29	24	1009	OVCAST HAZE
1900														
2000	SASEBO @ G-1				SSW	3	SSW	1	—	—	28	24	1009	OVCST HAZE
2100														
2200	SASEBO @ G-1				SSW	3-4	S	2	NE	2	28	26	1009.5	SLT HAZE
2300														
2400	SASEBO @ G-1				SSW	3	S	2	NE	2	27	25	1009.5	CLDY, RAIN

ARRIVAL/DEPARTURE/NOON NOON POSITION L 33-06.37 N λ 129-38.42 E LOD 24

DRAFT	FWD	AFT	MEAN	DENSITY

	DAILY	TOTAL/PASSAGE
Running Time		
Observed Distance		
Average Speed		
Fuel Departure		
Fuel 0800/Noon		
Fuel Consumed		
Fuel Arrival		
Lubes 0800/Noon		
Lubes Consumed		
Water 0800/Noon		
Water Consumed		
Water Arrival		

DECK WATCH/LOOKOUT

TIME ON/TIME OFF	OFFICER	CREW
0000/0400	(b) (6), (b) (7)(C) [redacted]	
0400/0800		
0800/1200		
1200/1600		
1600/2000		
2000/2400		

TESTS, DRILLS & INSPECTIONS

[illegible] TESTED AND FOUND TO BE IN GOOD WORKING ORDER IAW [illegible] (b) (6), (b) (7)(C) [redacted]

EVENTS AND REMARKS

Watch Condition 1 unless otherwise stated in this section

0000 3/M (b) (6), (b) (7)(C) [redacted] WATCH PER BPG-B12 W/O EXCEPTION. FIRE & SECURITY ROUNDS MADE PRIOR TO ASSUMING THE WATCH VSL PROCEEDING IN SLT POSITION W/ JAPAN COAST GUARD CUTTER ESCORT. 0042 HELM IN AUTO. 0054 HELM TO HAND. EASY ESCORT TUG "TUBASA" ON STATION. 0400 VSL PROCEEDING TOWARDS SASEBO JAP W/ COAST GUARD AND TUG ESCORT. GOOD VIS. MODERATE S'LY WIND/SEA/SWELL. [illegible] LE-0136 C/C TO 090°T IN POS 32-27.3 N 129-26.1 E. 2 [illegible] TO ✓ 0400 WCI. HELM IN AUTO. SECURITY MAINTAINED. RLVD BY 2/M ATTHOWL (b) (6), (b) (7)(C) [redacted]

0400 (b) (6), (b) (7)(C) [redacted] ASSUMES THE WATCH IAW BPG-B12 AND SMS, NO EXCEPTIONS. FIRE AND SECURITY ROUND MADE PRIOR TO ASSUMING THE WATCH. 0706 L 32-30.3 N λ 129-24.6E C/C TO 009°T 008 PGC 018 PSC. 0800 VSL IN EASY MOTION TO SLIGHT SSE'LY SEAS, WINDS AND LOW SW'LY SWELL. GOOD VISIBILITY, WCI. HELM IN AUTO. LT TRAFFIC. SECURITY MAINTAINED. RELIEVED PER SMS (b) (6), (b) (7)(C) [redacted]

0800 3/M K. BERTOTTI ASSUMES WATCH IAW BPG-B12 WITH ESCORT TUG STEAMING AHEAD OF VESSEL. FIRE AND SECURITY ROUNDS MADE PRIOR TO ASSUMING WATCH. NO EXCEPTIONS. 1000 [illegible] ON BRIDGE WCI. 1026 [illegible] L: 32°57.9 N λ: 129° 29.9 E 027° PGC 038° PSC. 1045 A/C 030° PGC 040° PSC. 1058 [illegible] [illegible] SASEBO [illegible] MASTER CONNING, HAND STEERING. 1147 PILOT ON BOARD Y. HAMASHIDA. 1150 MASTER, PILOT EXCHANGE [illegible] 1151 PILOT CONNING. 1159 [illegible] BUOY [illegible] 120°T AT [illegible] STEERING 120° PGC AT 9.1 KTS. 1204 KOGOSHIKI LT Ø 073.5°T @ 0.75 NM. 1203 ENTERING HARBOR N END / 074.5°T @ 0.37 NM. [illegible] BUOY [illegible] 1213 SASEBO [illegible] 1221 SASEBO PASSAGE NO 2 [illegible] BEACON [illegible] 1225 TUG "ASAHI" MADE FAST AFT. 1229 SASEBO PASSAGE NO 4 LT BEACON [illegible] 1232 ANCHOR AT WATERS EDGE READY TO LET GO ON BRAKE. 1244 PORT ANCHOR LET GO [illegible] 33°05.88 N λ: 129°42.63 E [illegible] DEPTH. 1253 FWD TUG LET GO. 1254 [illegible] PORT ANCHOR FETCHED UP 7 SHOTS AT WATERS EDGE. TUG AWAY. PILOT OFF BRIDGE WCI. 1258 PILOT AWAY. GOOD [illegible] 7 SHOTS PORT ANCHOR AT WATER'S EDGE. MODERATE S'LY WINDS. LIGHT S'LY SEA AND SWELL. GOOD VISIBILITY. POSITION MONITORED BY VISUAL AND ELECTRONIC MEANS. SECURITY MAINTAINED. NO POLLUTANTS OBSERVED. RELIEVED BY 2/M [illegible] (b) (6), (b) (7)(C) [redacted]

1200 3/M (b) (6), (b) (7)(C) [redacted] WATCH PER BPG B12 AND OPS 2.1.9 W/O EXCEPTION. FIRE & SECURITY ROUNDS MADE PRIOR TO ASSUMING THE WATCH. 1600 VSL RIDING EASY 7 SHOTS PORT ANCHOR WATERS EDGE. LT SSW'LY WIND/SEA. GOOD VIS. POS'N CONTINUOUSLY MONITORED BY VISUAL + ELECTRONIC MEANS. FREQUENT ROUNDS MADE ON DECK. NO POLLUTANTS NOTED. SECURITY MAINTAINED. RLVD BY (b) (6), (b) (7)(C) [redacted]

1600 (b) (6), (b) (7)(C) [redacted] ASSUMES THE WATCH IAW BPG-B12 AND OPS 2.1.6 9 W/O EXCEPTIONS. FIRE AND SECURITY ROUND MADE PRIOR TO ASSUMING THE WATCH. 2000 VESSEL RIDING EASY 7 SHOTS, PORT ANCHOR AT THE WATERS EDGE IN LIGHT SSW'LY WINDS AND SEAS W/ NO SWELL. GOOD VIS. POSITION CONTINUOUSLY MONITORED VISUALLY AND ELECTRONICALLY. SECURITY MAINTAINED. RELIEVED PER SMS BY 3/M (b) (6), (b) (7)(C) [redacted]

2000 3/M (b) (6), (b) (7)(C) [redacted] ASSUMES THE WATCH IAW BPG-B12 AND OPS-2.1.9 W/O EXCEPTION. FIRE AND SECURITY ROUND MADE PRIOR TO ASSUMING WATCH. 2400 VESSEL RIDING EASY 7 SHOTS PORT ANCHOR AT WATER'S EDGE IN LIGHT WIND SEA SWELL. GOOD VISIBILITY WITH PASSING SQUALLS. POSITION CONTINUOUSLY MONITORED BY USUAL AND ELECTRONIC MEANS. SECURITY MAINTAINED. FREQUENT ROUNDS MADE ABOUT DECK. NO POLLUTANTS OBSERVED. RELIEVED BY 3/M [illegible] (b) (6), (b) (7)(C) [redacted]

CHIEF (b) (6), (b) (7)(C) [redacted] (b) (7)(C) [redacted] PAGE NO. 006

1016 (Est. 8/18)
PROforma (800) 324-9237

(b) (6), (b) (7)(C) [redacted]

1342 Noise heard from below decks, Smoke/heat detectors activated multiple spaces in ER

1343 Master on bridge, General alarm sounded in POS 32-28.7N 128- 25.1E NUC

1348 3AE Reported down in Engine Room Generator Space

1350 Comms established with Moji Coast Guard Radio on VHF 16

1400 Declare medical emergency to Moji Coast Guard Radio

1401 All engineering space cleared, confirm no fire onboard. All crewmembers accounted for

1402 Vessel requests helicopter medivac for injured crewmember, Moji Coast Guard Radio confirms

1403 Port captain notified of emergency onboard

1405 Medical Advisory Service contacted for injured crewmember

1410 Moji Coast Guard Radio confirms helicopter dispatch with doctor onboard, eta 1730

1516 Contact Moji Coast Guard on Inmarsat phone

1528 Hospital reports no pulse, begin CPR

1545 Contact made with Sasebo port agent, request salvage tugboat

1552 Contact made with MSC CTF73 Battle Watch Officer to inform of situation

1620 Per MAS and Master CPR suspended

1626 Moji Coast Guard Radio requests CPR resume per Japanese Doctor

1635 Fire wire towing arrangement rigged on the bow per Moji Coast Guard

1700 Moji Coast Guard Helicopter on station

1705 Helicopter hovering over forward deck

1706 First helicopter crewmember on deck

1707 Second helicopter crewmember on deck

1708 Stretcher lowered from helicopter to deck

1710 Helicopter crew proceeding to hospital to assess patient

1713 Helicopter crew start use AED and automatic CPR on patient outside hospital

1715 Begin moving patient to stern for extraction per helicopter crew request

1721 Patient on helicopter stretcher preparing for lift to helicopter

1722 Helicopter in position over stern preparing for extraction

1725 3AE away on helicopter

1731 All helicopter crew off the ship and onboard helicopter

[redacted]

1735 #3 Generator started

1815 Return to emergency generator power, #3 Gen stopped for high temperatures

1820 CM and Bosun on the preparing for emergency towing

1845 #3 Generator running and on-line

1902 Japan Coast Guard cutter on station

1921 Vessel confirms with Moji Coast Guard that vessel is no longer in an immediately dangerous situation. Coast Guard asks for vessel to inform them if vessel drifts within 6nm of land

1924 Moji Coast Guard informed that #3 generator is on line and vessel has power but no navigational propulsion

	GENERATOR 1			CURRENT HOURS			43821
	DONE LAST		SINCE DONE				
SPINNER	43821	24-Jul-20	0				100 hours
TURBO WRAP	43562	23-May-20	259				As Needed
WATER WASH	43562	23-May-20	259				150 hours
LO CARTRIDGE					Hours Switched Over	Service Hours	
LEFT	42781	11-Feb-20	1040			43821	As Needed
RIGHT	40672	31-Jan-19	3149		40880	2941	
GREEN OIL FILT	43567	5-Jun-20	254				every 2 months
VALVE LASH	42620	23-Dec-19	1201				2000 hours
	GENERATOR 2			CURRENT HOURS			40902
	DONE LAST		SINCE DONE				
SPINNER	40878	24-Jul-20	24				100 hours
TURBO WRAP	40902	25-Jul-20	0				As Needed
WATER WASH	40272	22-May-20	630				150 hours
LO CARTRIDGE					Hours Switched Over	Service Hours	
LEFT	39561	20-Mar-20	1341		38385	2517	As Needed
RIGHT	39561	20-Mar-20	1341			40902	
GREEN OIL FILT	40360	5-Jun-20	542				Every 2 Months
VALVE LASH	38848	15-Jan-20	2054				2000 hours
	GENERATOR 3			CURRENT HOURS			50256
	DONE LAST		SINCE DONE				
SPINNER	50210	13-Jun-20	46				100 hours
TURBO WRAP	50256	25-Jul-20	0				As Needed
WATER WASH	50210	21-Jul-20	46				150 hours
LO CARTRIDGE					Hours Switched Over	Service Hours	
LEFT	49573	13-Jun-20	683		0	50256	As Needed
RIGHT	47553	27-Jan-20	2703		46825	3431	
GREEN OIL FILT	49415	5-Jun-20	841				Every 2 Months
VALVE LASH	50210	19-Oct-19	46				2000 hours

(b) (6), (b) (7)(C)

CURRENT DATE	7/22/2020

Gen 1

	INJECTORS			PUMPS			TYPE	
	DONE LAST		SINCE DONE	DONE LAST		SINCE DONE		
1	43790	22-Jul-20	31	40964	23-Apr-19	2857	New Plunger and Bar	
2	43790	22-Jul-20	31	40964	23-Apr-19	2857	New Plunger and Bar	
3	43790	20-Jul-20	31	40964	23-Apr-19	2857	New Plunger and Bar	
4	43790	22-Jul-20	31	40964	23-Apr-19	2857	New Plunger and Bar	
5	43790	22-Jul-20	31	40964	23-Apr-19	2857	New Plunger and Bar	
6	43790	22-Jul-20	31	40964	23-Apr-19	2857	New Plunger and Bar	

Gen 2

	INJECTORS			PUMPS			TYPE	
	DONE LAST		SINCE DONE	DONE LAST		SINCE DONE		
1	39630	1-Apr-20	1272	35417	15-Jul-19	5485	New Plunger and Bar	
2	39630	1-Apr-20	1272	40446	27-Jun-20	456	New Plunger and Bar	
3	39630	1-Apr-20	1272	26325	17-Sep-17	14577	New Plunger and Bar	
4	39630	1-Apr-20	1272	26203	10-Sep-17	14699	New Plunger and Bar	
5	39630	1-Apr-20	1272	26674	15-Oct-17	14228	New Plunger and Bar	
6	39630	1-Apr-20	1272	39814	13-Apr-20	1088	New Plunger and Bar	

Gen 3

	INJECTORS			PUMPS			TYPE	
	DONE LAST		SINCE DONE	DONE LAST		SINCE DONE		
1	48838	1-May-20	1418	40543	16-Feb-19	9713	New Plunger and Bar	
2	48838	1-May-20	1418	40543	28-May-18	9713	New Plunger and Bar	
3	48838	1-May-20	1418	35108	20-Feb-17	15148	New Plunger and Bar	
4	48838	1-May-20	1418	43119	11-Feb-19	7137	New Plunger and Bar	
5	48838	1-May-20	1418	48907	6-May-20	1349	New Plunger and Bar	
6	48838	1-May-20	1418	49609	18-Jun-20	647	New Plunger and Bar	

PUMP SEALS (REWORKED)			OIL CHANGE	AIR COOLER
DONE LAST		SINCE DONE	DATE	DATE
40964	23-Apr-19	2857	23-Apr-19	23-Apr-19
40964	23-Apr-19	2857	HOURS DONE	DONE LAST
40964	23-Apr-19	2857	40964	40964
40964	23-Apr-19	2857	SINCE LAST	SINCE LAST
40964	23-Apr-19	2857	2857	2857
40964	23-Apr-19	2857		

NEW TURBO	WATER PUMP	L.O.THERMOSTATS
DATE	DATE	DATE
23-Apr-19		
HOURS DONE	HOURS DONE	HOURS DONE
40964		
SINCE LAST	SINCE LAST	SINCE LAST
2857		

PUMP SEALS (REWORKED)			OIL CHANGE	AIR COOLER
DONE LAST		SINCE DONE	DATE	DATE
35417	15-Jul-19	5485	15-Dec-19	15-Jul-19
30753	25-Jul-18	10149	DONE LAST	DONE LAST
39262	17-Feb-20	1640	38385	35417
26203	10-Sep-17	14699	SINCE LAST	SINCE LAST
26674	15-Oct-17	14228	2517	5485
39814	13-Apr-20	1088		

NEW TURBO	WATER PUMP	L.O.THERMOSTATS
DATE	DATE	DATE
7/15/2019	7/15/2019	12/15/2019
HOURS DONE	HOURS DONE	HOURS DONE
35417	35417	38385
SINCE LAST	SINCE LAST	SINCE LAST
5485	5485	2517

PUMP SEALS (REWORKED)			OIL CHANGE	AIR COOLER
DONE LAST		SINCE DONE	DATE	DATE
40543	16-Feb-19	9713	?	
40543	28-May-18	9713	HOURS DONE	DONE LAST
35108	20-Feb-17	15148	?	
43119	11-Feb-19	7137	SINCE LAST	SINCE LAST
48907	6-May-20	1349	#VALUE!	
n/a		#VALUE!		

NEW TURBO	WATER PUMP	L.O.THERMOSTATS
DATE	DATE	DATE
	4/10/2020	
HOURS DONE	HOURS DONE	HOURS DONE
	48567	
SINCE LAST	SINCE LAST	SINCE LAST
	1689	

(b) (6), (b) (7)(C)

FUEL PUMP CAM ROLLERS		
Cylinder	Hours	Date
1		
2		
3		
4	43119	8-Feb-19
5	48907	6-May-20
6		

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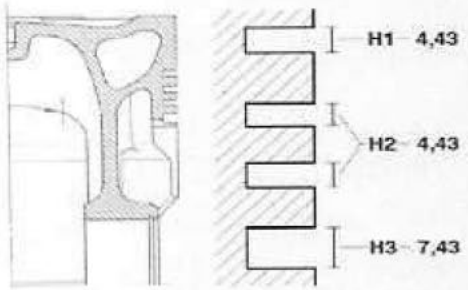
Vessel:	SLNC GOODWILL
Customer:	American Ship Management
Junma Job No.	JS-SVC-2019-03-006a
Date of Inspection:	31.03.2019

Document Title: **Connecting rod calibration report (Initial)**

Engine Maker: ZJMD-MAN B&W	Engine Model: 6L23/30H	Engine Serial No: 08365

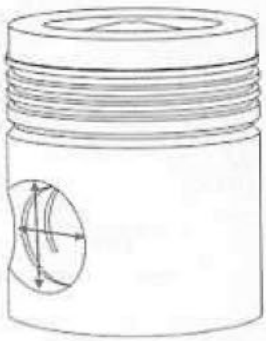
Calibration Tools Used:



	Piston and oil scraper ring. Nominal size.	New ring grooves. Tolerances	Ring grooves. Max. wear limit.
Piston ring 1	New 4.0 mm	4.0 mm +0.14 +0.12	4.43 mm
Piston ring 2	New 4.0 mm	4.0 mm +0.11 +0.09	4.43 mm
Piston ring 3	New 4.0 mm	4.0 mm +0.11 +0.09	4.43 mm
Scraper ring	New 7.0 mm	7.0 mm +0.10 +0.08	7.43 mm

Position	Unit.1				Unit.2				Unit.3			
	F	P	A	S	F	P	A	S	F	P	A	S
Top groove	4.41	4.42	4.37	4.38	4.24	4.23	4.26	4.24	4.31	4.35	4.32	4.35
2nd groove	4.17	4.17	4.15	4.16	4.16	4.14	4.16	4.15	4.12	4.10	4.08	4.10
3rd groove	4.17	4.14	4.13	4.13	4.13	4.14	4.16	4.13	4.09	4.09	4.08	4.09
Oil ring groove	7.06	7.06	7.06	7.06	7.06	7.06	7.06	7.06	7.06	7.06	7.06	7.06
REMARKS	Top groove found worn and near to max limit											

Position	Unit.4				Unit.5				Unit.6			
	F	P	A	S	F	P	A	S	F	P	A	S
Top groove	4.38	4.36	4.39	4.39	4.19	4.19	4.20	4.20	4.24	4.26	4.21	4.20
2nd groove	4.13	4.13	4.14	4.16	4.16	4.15	4.15	4.16	4.26	4.15	4.16	4.13
3rd groove	4.10	4.09	4.10	4.10	4.14	4.10	4.10	4.16	4.15	4.13	4.10	4.12
Oil ring groove	7.06	7.06	7.06	7.06	7.06	7.06	7.06	7.06	7.06	7.06	7.06	7.06
REMARKS	Top groove found worn and near to max limit, cavitation erosion on combustio surface								Cavitation erosion on combustio surface			



Position	Unit.1				Unit.2			
	FWD		AFT		FWD		AFT	
	T-B	P-S	T-B	P-S	T-B	P-S	T-B	P-S
	98.03	98.03	98.03	98.03	98.03	98.02	98.03	98.02
Remarks								

Position	Unit.3				Unit.4			
	FWD		AFT		FWD		AFT	
	T-B	P-S	T-B	P-S	T-B	P-S	T-B	P-S
	98.03	98.03	98.03	98.03	98.03	98.03	98.03	98.03
Remarks								

Position	Unit.5				Unit.6			
	FWD		AFT		FWD		AFT	
	T-B	P-S	T-B	P-S	T-B	P-S	T-B	P-S
	98.03	98.03	98.03	98.03	98.03	98.03	98.03	98.03
Remarks								

Remarks (if any): a). Renewed piston no.1, 4 & 6 from onboard spares.

JUNMA SERVICE ENGINEER

(b) (6), (b) (7)(C)

Name: (b) (6), (b) (7)(C)

JUNMA SERVICES PTE LTD

CUSTOMER REPRESENTATIVE

Name:

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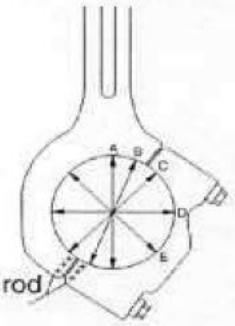
Vessel:	SLNC GOODWILL
Customer:	American Ship Management
Junma Job No.	JS-SVC-2019-03-006a
Date of Inspection:	31.03.2019

Document Title: Connecting rod calibration report (Initial)

Engine Maker: **ZJMD-MAN B&W**	Engine Model: **6L23/30H**	Engine Serial No: **08365**

Calibration Tools Used:



Connecting rod Ident. No

Big end bearing bore

Hydraulic pressure	750	Bar
Nominal Diameter	195	mm

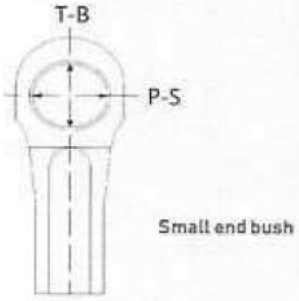
Small End bush mounted

Nominal Diameter	98	mm
Maximum allowable diameter		mm

Aux Engine No.1

Big end bearing bore (Measurement given in mm)

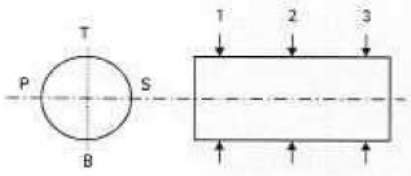
		Unit #1	Unit #2	Unit #3	Unit #4	Unit #5	Unit #6
A	FWD	Cracked on serration area	-0.11	Cracked on serration area	-0.01	-0.08	Cracked on serration area
	AFT		-0.10		0	-0.08	
B	FWD		-0.21		-0.01	-0.17	
	AFT		-0.22		+0.01	-0.17	
C	FWD		-0.20		-0.01	-0.18	
	AFT		-0.19		0	-0.16	
D	FWD		+0.04		0	+0.04	
	AFT		+04		+0.01	+0.04	
E	FWD		+0.08		-0.01	+0.07	
	AFT		+0.08		0	+0.07	
Max. deviation			0.30mm		0.02	0.25mm	
Remarks			beyond limit		Acceptable	beyond limit	



Small end bush

Small end bush mounted (Measurement given in mm)

		Unit #1	Unit #2	Unit #3	Unit #4	Unit #5	Unit #6
T-B	FWD	+0.20	+0.20	+0.20	+0.20	+0.20	+0.20
	AFT	+0.20	+0.20	+0.20	+0.20	+0.20	+0.20
P-S	FWD	+0.20	+0.20	+0.20	+0.20	+0.20	+0.20
	AFT	+0.20	+0.20	+0.20	+0.20	+0.20	+0.20
Remarks							



Gudgeon pin

Gudgeon Pin Diameter

		CYL.1	CYL.2	CYL.3	CYL.4	CYL.5	CYL.6
1	T-B	97.96	97.97	97.96	97.96	97.97	97.97
	P-S	97.96	97.97	97.96	97.96	97.97	97.97
2	T-B	97.96	97.97	97.96	97.96	97.97	97.97
	P-S	97.96	97.97	97.96	97.96	97.97	97.97
3	T-B	97.96	97.97	97.96	97.96	97.97	97.97
	P-S	97.96	97.97	97.96	97.96	97.97	97.97
Manufact. No.							
Remarks							

Remarks (if any): Finally renewed all 6pcs connecting rod onboard ship with owner supplied new spare.
no. 4 connecting rod return onboard and to be kept as emmergency spare.

(b) (6), (b) (7)(C)
ENGINEER

JUNMA SERVICES PTE LTD

CUSTOMER REPRESENTATIVE

Name:

VESSEL STAMP

(b) (6), (b) (7)(C)

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Singapore 608586

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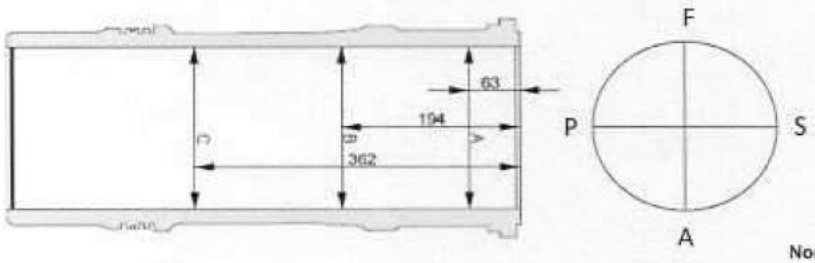
Website: www.junma.biz

Vessel:	SLNC Goodwill
Customer:	keppel shipyard Tuas
Junma Job No.	JS-SVC-2019-04-05
Date of Inspection:	27.03.2019

Document Title: Liner Calibration & Visual Inspection Report (initial) Before Honing

Engine Maker: **ZJMD MAN B&W**	Engine Model: **6L23/30H**	Engine Serial No: **08365**

Calibration Tools Used: **Inside micrometer**



Nominal Diameter: Ø225mm

Max. Wear Limit: +0.5mm

(Unit for measuring : mm)

AUXILIARY ENGINE NO. 1												
Point of Measurement	Cyl No.1		Cyl No.2		Cyl No.3		Cyl No.4		Cyl No.5		Cyl No.6	
	P-S	F-A	P-S	F-A	P-S	F-A	P-S	F-A	P-S	F-A	P-S	F-A
D1	+0.13	+0.10	+0.14	+0.12	+0.12	+0.11	+0.12	+0.11	+0.10	+0.11	+0.13	+0.14
D2	+0.12	+0.09	+0.12	+0.10	+0.11	+0.10	+0.11	+0.10	+0.11	+0.10	+0.12	+0.12
D3	+0.09	+0.09	+0.12	+0.09	+0.10	+0.09	+0.10	+0.11	+0.09	+0.09	+0.11	+0.09
REMARKS												

AUXILIARY ENGINE												
Point of Measurement	Cyl No.1		Cyl No.2		Cyl No.3		Cyl No.4		Cyl No.5		Cyl No.6	
	P-S	F-A	P-S	F-A	P-S	F-A	P-S	F-A	P-S	F-A	P-S	F-A
D1												
D2												
D3												
D4												
REMARKS												

Remarks (if any): Cylinder liner was found all units look very shining there was No sign of running surface wave roughness for oil film

Strongly recommended for Honing all units

Liner top flame ring to be renewed after the honing process

JUNMA SERVICE ENGINEER

Name: Siva

CUSTOMER REPRESENTATIVE

Name :

VESSEL STAMP

(b) (6), (b) (7)(C)

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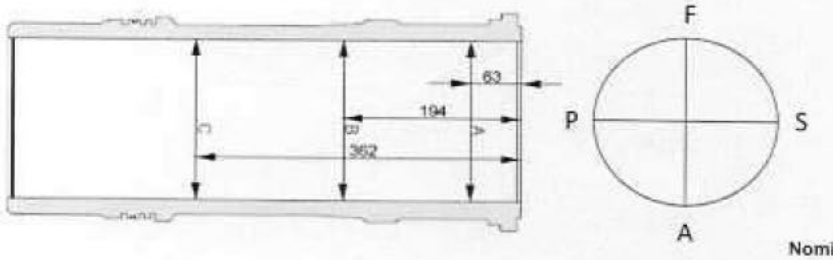
Website: www.junma.biz

Vessel:	SLNC Goodwill
Customer:	keppel shipyard Tuas
Junma Job No.	JS-SVC-2019-04-05
Date of Inspection:	31.03.2019

Document Title: Liner Calibration & Visual Inspection Report (After Honing)

Engine Maker: **ZJMD MAN B&W**	Engine Model: **6L23/30H**	Engine Serial No: **08365**

Calibration Tools Used: **Inside micrometer**



Nominal Diameter: Ø225mm

Max. Wear Limit: +0.5mm

(Unit for measuring : mm)

AUXILIARY ENGINE NO. 1												
Point of Measurement	Cyl No.1		Cyl No.2		Cyl No.3		Cyl No.4		Cyl No.5		Cyl No.6	
	P-S	F-A	P-S	F-A	P-S	F-A	P-S	F-A	P-S	F-A	P-S	F-A
D1	+0.13	+0.13	+0.14	+0.13	+0.12	+0.12	+0.13	+0.12	+0.12	+0.12	+0.14	+0.14
D2	+0.12	+0.11	+0.12	+0.12	+0.11	+0.10	+0.11	+0.11	+0.11	+0.11	+0.13	+0.12
D3	+0.09	+0.09	+0.12	+0.10	+0.10	+0.10	+0.12	+0.12	+0.10	+0.11	+0.11	+0.10
REMARKS												

AUXILIARY ENGINE												
Point of Measurement	Cyl No.1		Cyl No.2		Cyl No.3		Cyl No.4		Cyl No.5		Cyl No.6	
	P-S	F-A	P-S	F-A	P-S	F-A	P-S	F-A	P-S	F-A	P-S	F-A
D1												
D2												
D3												
D4												
REMARKS												

Remarks (if any): Cylinder liner was done honing in order and found satisfactory required roughness on the running surface for station of oil film

Honing was done all units

Liner top flame ring was renewed all units after the honing process

JUNMA SERVICE ENGINEER

Name: Siva

CUSTOMER REPRESENTATIVE

Name :

VESSEL STAMP

(b) (6), (b) (7)(C)

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Service and genuine spares provider for:

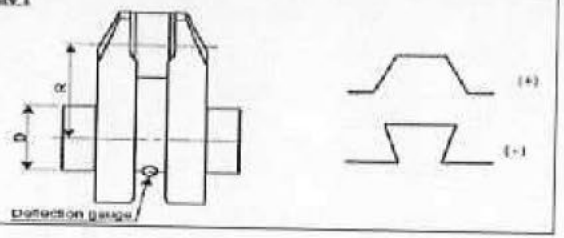
上海中船三井造船柴油机有限公司
CSSC-MES Diesel Co., Ltd.

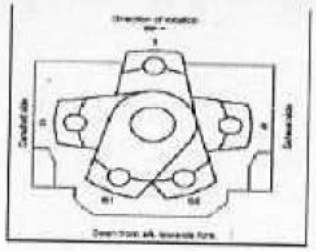
Name//Engine:	6L23/30 - Aux Engine No-1 (Berore)		Draught fore		Draught aft	
Temp.	30°				Date, time:	23/3/2019
Normal Max. Deflection	0.05 mm	(See Instruction Mannual)				
Max. Deflection value Flywheel crank throw:	0.00 mm	(See Instruction Mannual)			Engine Running hr	40.964 Hrs
Max. Deflection value ABS(C-D)	0.05 mm	(See Instruction Mannual)				

Unit: 1/100 mm.

Crank position		Fore ender No & deflections												Aft
		1	2	3	4	5	6	7	8	9	10	11	12	
Near bottom, camshaft side	B1	0	0	0	0	0	0							
Port side	P	0	-1	0	1	0	1							
Top	T	0	-1	0	1	1	1							
Starboard side	S	-2	-1	1	1	1	2							
Near bottom, exhaust side	B2	-1	-1	1	1	1	2							
Bottom 1/2(B1+B2)	B	-0.5	-0.5	0.5	0.5	0.5	1	0	0	0	0	0	0	
Calculated vertical deflection values														
Top - Bottom (T-B)	V	0.5	-0.5	-0.5	0.5	0.5	0							
Maximum deflection values, vertically		5	5	5	5	5	9							
OK = Inside limit, OUT = Outside limit		OK	OK	OK	OK	OK	OK							
Result: Inside limit														
Calculated horizontal deflection values														
Exhaust - Cam side (S-P)	H	-2	0	1	0	1	1							
Maximum deflection values, horizontally		5	5	5	5	5	5							
OK = Inside limit, OUT = Outside limit		OK	OK	OK	OK	OK	OK							
Result: Inside limit														
Calculated ovality deflection values														
Top + Bottom (T+B)	C	-0.5	-1.5	0.5	1.5	1.5	2							
Port side+Starboard side (P+S)	D	-2	-2	1	2	1	3							
Maximum deflection values, ovality	C-D	1.5	0.5	-0.5	-0.5	0.5	-1							
OK = Inside limit, OUT = Outside limit		OK	OK	OK	OK	OK	OK							
Result: Inside limit														

Figure 1





JUNMA SERVICE ENGINEER: (b) (6), (b) (7)(C)

CUSTOMER REPRESENTATIVE:

VESSEL STAMP:

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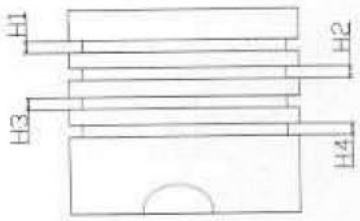
Website: www.junma.biz

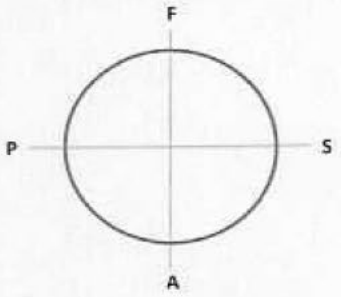
Vessel:	SLNC Goodwill
Customer:	SLNC
Junma Job No.	JS-SVC-2019-04-05
Date of Inspection:	12.April.2019

Document Title: **Piston Ring Groove Vertical clearance Report**

Engine Maker: **ZJMD MAN B&W** | Engine Model:**6L23/30H** | Engine Serial No: **08365**

Calibration Tools Used: **Feeler Gauge** | Engine Running hrs: **40,964**





H1 Standard Height:
H2 Standard Height:
H3 Standard Height:
H4 Standard Height:

H1 Max. Height Limit:
H2 Max. Height Limit:
H3 Max. Height Limit:
H4 Max. Height Limit:

	UNIT NO.1				UNIT NO.2				UNIT NO.3			
	P	A	S	F	P	A	S	F	P	A	S	F
H1	0.50	0.50	0.50	0.50	0.35	0.35	0.35	0.35	0.30	0.30	0.30	0.30
H2	0.25	0.25	0.25	0.25	0.20	0.20	0.20	0.20	0.15	0.15	0.15	0.15
H3	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15
H4	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.10	0.10	0.10	0.10
REMARKS												

	UNIT NO.4				UNIT NO.5				UNIT NO.6			
	P	A	S	F	P	A	S	F	P	A	S	F
H1	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30
H2	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15
H3	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15
H4	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
REMARKS												

Remarks (if any): **Ring groove size is 1 to 3 4.0 mm**

Ring groove size 4th groove is 7.0 mm

Max wear limit 0.43 to 0.45mm

Unit No-1 top ring groove was found already exceeding wear limit, we have renewed with new piston crown

unit No-4-5-6 was renewed with New Piston crown supplied by ship

JUNMA SERVICE ENGINEER | CUSTOMER REPRESENTATIVE | VESSEL STAMP

(b) (6), (b) (7)(C)

Name | Name: |

(b) (6), (b) (7)(C)

Junma

7-Tuas South Ave10,T99 Building,Singapore 637011
Tel: (65) 6863 6523 Fax: (65) 6863 6524
Email: service@junma.biz Website: www.junma.biz

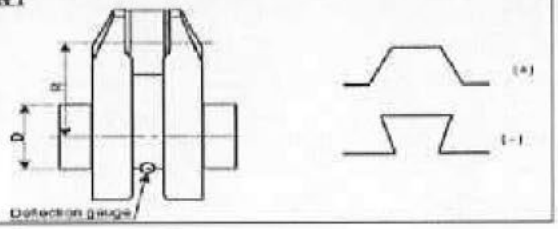
Authorized Sales and Service Agent for:
CSE CMD DMD YMD SXD

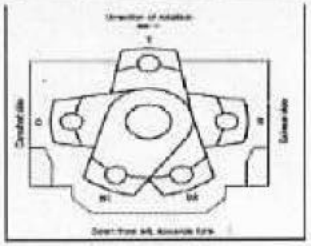
Service and genuine spares provider for:
CSSC 上海中船三井造船柴油机有限公司 CSSC-MES Diesel Co., Ltd.

Name//Engine:	6L23/30 - Aux Engine No-2 (Barora)		Draught fore		Draught aft	
Temp.	32°				Date, time:	23/3/2019
Normal Max. Deflection	0.05 mm	(See Instruction Mannual)				
Max. Deflection value Flywheel crank throw	0.09 mm	(See Instruction Mannual)			Engine Running hr	34,574 Hrs
Max. Deflection value ABS(C-D)	0.05 mm	(See Instruction Mannual)				

Unit: 1/100 mm. Crank position		Fore nder No & deflections												Aft
		1	2	3	4	5	6	7	8	9	10	11	12	
Near bottom, camshaft side	B1	0	0	0	0	0	0							
Port side	P	0	-1	0	-1	0	-1							
Top	T	-1	1	0	1	0	2							
Starboard side	S	1	-1	-1	0	1	1							
Near bottom, exhaust side	B2	-1	0	-1	-1	1	1							
Bottom 1/2(B1+B2)	B	-0.5	0	-0.5	-0.5	0.5	0.5	0	0	0	0	0	0	
Calculated vertical deflection values														
Top - Bottom (T-B)	V	-0.5	1	0.5	-0.5	-0.5	1.5							
Maximum deflection values, vertically		5	5	5	5	5	9							
OK = Inside limit, OUT = Outside limit		OK	OK	OK	OK	OK	OK							Result: Inside limit
Calculated horizontal deflection values														
Exhaust - Cam side (S-P)	H	1	0	-1	1	1	2							
Maximum deflection values, horizontally		5	5	5	5	5	5							
OK = Inside limit, OUT = Outside limit		OK	OK	OK	OK	OK	OK							Result: Inside limit
Calculated ovality deflection values														
Top + Bottom (T+B)	C	-1.5	1	-0.5	-1.5	0.5	2.5							
Port side+Starboard side (P+S)	D	1	-2	-1	-1	1	0							
Maximum deflection values, ovality	C-D	-2.5	3	0.5	-0.5	-0.5	2.5							
OK = Inside limit, OUT = Outside limit		OK	OK	OK	OK	OK	OK							Result: Inside limit

Figure 1





JUNMA SERVICE ENGINEER: (b) (6), (b) (7)(C)

CUSTOMER REPRESENTATIVE:

VESSEL STAMP:

Junma Services Pte Ltd
Company Reg. No.: 200709388D
48Toh Guan Road East Enterprise Hub, #05-120/121.
Singapore 608586

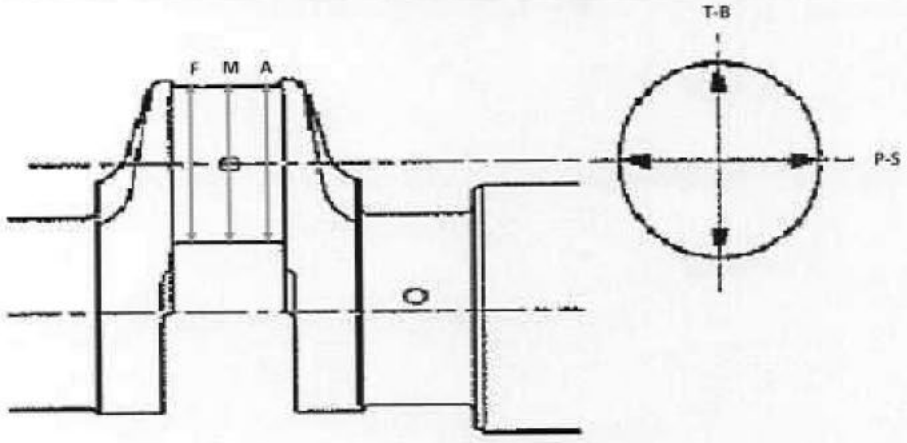
Tel: (65) 6863 6523
Fax: (65) 6863 6524
Email: (b) (6), (b) (7)(C)
Website: www.junma.biz

Vessel:	SLNC Goodwill
Customer:	SLNC
Junma Job No.	JS-SVC-2019-04-05
Date of Inspection:	31.Mar.2019

Document Title: **Crankpin calibration Report**

Engine Maker: **ZJMD MAN B&W**	Engine Model: 6L23/30H	Engine Serial No: 08365

Calibration Tools Used: Outside Micrometer Crank Pin Dia 185.0 mm



POSITION OF MEASUREMENT	CYL. NO.1		CYL. NO.2		CYL. NO.3	
	T-B	P-S	T-B	P-S	T-B	P-S
F	-0.02	-0.02	-0.03	-0.03	-0.02	-0.03
M	-0.02	-0.02	-0.04	-0.04	-0.02	-0.03
M	-0.01	-0.02	-0.03	-0.04	-0.03	-0.03
REMARKS						

POSITION OF MEASUREMENT	CYL. NO.4		CYL. NO.5		CYL. NO.6	
	T-B	P-S	T-B	P-S	T-B	P-S
F	-0.04	-0.04	-0.04	-0.04	-0.04	-0.04
M	-0.04	-0.04	-0.03	-0.04	-0.05	-0.04
M	-0.04	-0.04	-0.03	-0.04	-0.04	-0.04
REMARKS						

Remarks (if any): Crank pin was found all units arround the Lube oil hole got wear ridge,
it was polished with emery special film paper before installed theNew bearing
all units crank pin surface was checked with straight edge blue paste inspection before and after

JUNMA SERVICE ENGINEER

(b) (6), (b) (7)(C)
Name

CUSTOMER REPRESENTATIVE

Name:

VESSEL STAMP

(b) (6), (b) (7)(C)

Junma

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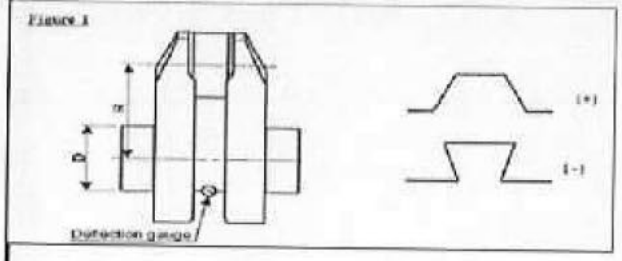
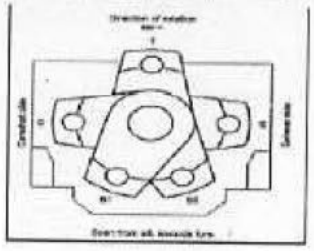
Authorized Sales and Service Agent for: CSE CMD DMD YMD SXD

Service and genuine spares provider for: CSSC 上海中船三井造船柴油机有限公司 CSSC-MES Diesel Co., Ltd.

Name//Engine:	6L23/30 - Aux Engine No-1 (After)					Draught fore							Draught aft				
Temp.	32°												Date, time:	16/4/2019			
Normal Max. Deflection	0.05 mm	(See Instruction Mannual)															
Max. Deflection value Flywheel crank throw:	0.09 mm	(See Instruction Mannual)											Engine Running hr	40,964 Hrs			
Max. Deflection value ABS(C-D)	0.05 mm	(See Instruction Mannual)															
Unit: 1/100 mm.		Fore ndder No & deflections											Aft				
Crank position		1	2	3	4	5	6	7	8	9	10	11	12				
Near bottom, camshaft side	B1	0	0	0	0	0	0										
Port side	P	0	0	0	1	0	1										
Top	T	0	-1	1	1	1	2										
Starboard side	S	-1	0	1	1	0	2										
Near bottom, exhaust side	B2	-1	-1	2	0	1	1										
Bottom 1/2(B1+B2)	B	-0.5	-0.5	1	0	0.5	0.5	0	0	0	0	0	0				
		Calculated vertical deflection values															
Top - Bottom (T-B)	V	0.5	-0.5	0	1	0.5	1.5										
Maximum deflection values, vertically		5	5	5	5	5	9										
OK = Inside limit, OUT = Outside limit		OK	OK	OK	OK	OK	OK							Result	Inside limit		
		Calculated horizontal deflection values															
Exhaust - Cam side (S-P)	H	-1	0	1	-1	0	1										
Maximum deflection values, horizontally		5	5	5	5	5	5										
OK = Inside limit, OUT = Outside limit		OK	OK	OK	OK	OK	OK							Result	Inside limit		
		Calculated ovality deflection values															
Top + Bottom (T+B)	C	-0.5	-1.5	2	1	1.5	2.5										
Port side+Starboard side (P+S)	D	-1	0	1	3	0	3										
Maximum deflection values, ovality	C-D	0.5	-1.5	1	-2	1.5	-0.5										
OK = Inside limit, OUT = Outside limit		OK	OK	OK	OK	OK	OK							Result	Inside limit		

Figure 1





JUNMA SERVICE ENGINEER: (b) (6), (b) (7)(C)

CUSTOMER REPRESENTATIVE:

VESSEL STAMP:

(b) (6), (b) (7)(C)

Authorized Sales and Service Agent for: CSE CMD DMD YMD SXD Junma

Service and genuine spares provider for: CSSC HHI 上海中船三井造船柴油机有限公司 CSSC-MES Diesel Co., Ltd.

The following inspection report is enclosed with this service report:

01. Deflection report (Crank shaft)
02. Crank pin big end brg clearance report
03. Cylinder liner calibration report
04. Crank pin dia calibration report
05. Piston ring groove inspection report
06. Con rod big end bore inspection report
07. Piston pin small end pin & bush inspection report

As per the supt requirement Sea trial has attended and all parameters found to be in normal

T(b) (6), (b) (7)(C)

25/4/2019

Service Engineer

Junma

Chief Engineer

SLNC GOODWILL

(b) (6), (b) (7)(C)

Authorized Sales and Service Agent for: CSE QMD DMD YMD SXD Junma

Service and genuine spares provider for: CSSC HHI 上海中船三井造船柴油机有限公司 CSSC-MES Diesel Co., Ltd.

Service Report

Ship Name: SLNC GOODWILL

Customer Name: SLNC

23 April 2019

(b) (6), (b) (7)(C)

Authorized Sales and Service Agent for: CSE QMD DMD YMD SXD Junma

Service and genuine spares provider for: CSSC HHI 上海中船三井造船柴油机有限公司 CSSC-MES Diesel Co., Ltd.

Engine Maker: ZJMD MAN B&W	**Engine No:** AE No1 08365
Engine Type: 6L23/30H	**Newbuilding yard:** ZJMD
Hull No:	**IMO No:** 9448334
Place: SINGAPORE	**Reason:** Drydocking Repair
Visit by [redacted]	**Location:** KEPPEL SHIPYARD TUAS
Owner: SLNC	**Supt:** [redacted]
Job order No: JS-SVC-2019-04-05	**Engine Running Hrs: 40,964**
Period From: 21.MAR.2019	**To:**23.APL.2019

GENERATOR ENGINE OVERHAULING (No-1)

01. **Generator engine crank shaft deflection Check** (Before No-1 & 2 and After No-1)
    a. As per the owner request crank shaft deflection was carried out and the readings taken as well. Deflection gauge was provided by junma
02. **Removed AE 1 engine cylinder head with Rocker arm & all mountings 6 Nos**
    a. Dismantled cylinder head all mountings hydraulic nut with 750 bar
    b. Removed the cylinder head to shore work shop for overhauling
    c. Removed inlet & Exhaust valve spindle and valve guide &valve seat as well, after the supt inspection renewed with ship spares accordingly.
    d. Cylinder head Combustion chamber surface DPI were checked found all 6 units were corroded at liner and cooling water jacket seating surface, valve seat surface was Dye checked for crack free.
    e. Injector were removed and overhauled as well and pressure tested 320 bar (6 pcs)
    f. New Nozzle were renewed in order, upon inspection boxed back as well
    g. Cooling water jacket space were cleaned and Dpi checked.
    h. Cylinder head related mountings were removed & cleaned & renewed gasket
    i. Upon completion of overhauling, cylinder head was assembled with cooling jacket and Cylinder liner together then pressure tested in order (7 bar)
    j. Fuel injector pocket were cleaned thoroughly and lapping as well
    k. Cylinder head & Exhaust manifold mounting coupling surface were cleaned as well
    l. All valve seat/guide/spindle/spring were renewed with new spares

03. Removed Connecting rod Big end bearing 6 Nos

a. Dismantled connecting rod bearing, and cleaned the big end & small end bore as well
b. Calibrate big end bore as per the manual instructions with tight Torque value (750 bar)
c. Calibrate small end bush bearing and piston pin as well, found small end bush some hard contact and scoring marks. Based on the running hours all 6 pcs were polished as well
d. Con rod big end serration and contact surface were dye checked found 5 pcs crack, also Big end bore was found Ovality 5 pcs
e. Con rod serration part was Found crack 5 pcs (DPI checked)
f. Con rod tightened as per the maintenance manual procedure 750 bar
g. Con rod all Bearing were renewed with ship spares. Clearance were checked before and after overhauling. Spec: 0.15mm to 0.2mm found 0.15 mm
h. Upon completion of overhaul all parts assembled back in order

04. Removed Piston 6 Nos

a. To cleaned piston ring groove with cold wash & calibrate as well
b. Piston crown top land was checked DPI (2 units was found eroded marks and one unit was found Top ring groove clearance overlimit)
c. To informed supt for inspection as well, as per his instructions renewed 3 piston with new spares
d. Piston Crown Ring groove vertical clearance were checked with new piston rings

05. Cylinder liner clean /Honing/ calibrate 6 Nos

a. To cleaned cylinder liner top surface carbon particles
b. Calibrate the cylinder liner in order and readings are recorded, found the liner bore readings within limit, but liner surface was found very shine condition.
c. Liner inner surface were found very shining without roughness cross marks, recommend to Honing all 6 nos in-situ, it was done as well
d. Cylinder liner Flame ring seating surface were cleaned as well
e. Upon cleaned liner surface, calibrate liner as well, it is usable condition

06. Removed Charging Air cooler 1 unit

a. Dismantled Charging air cooler from the engine to shore work shop
b. To cleaned the Air cooler inner space dirt and corroded part as well
c. Air Cooler was cleaned and dye checked as well
d. Air cooler was Pressure tested as well
e. Supplied Air cooler gasket 2 Nos together with cooler

07. Removed Fuel pump 6 Nos

a. Dismantled all fuel pumps and sent to shore ws in order

b. To cleaned all parts with cold wash and diesel oil as well
c. Plunger and barrel clearance were calibrated
d. Housing and timing gears were checked
e. Delivery valve and spring were checked and renewed
f. Plunger and barrel were renewed 6 Nos

08. Crank pin polishing were carried out AE #1 engines (All units)

a. Upon removal of crank pin bearing, crank journal were cleaned as well
b. Found scoring marks ridge wear on the journal and around the journal part
c. Informed to owner about this issue
d. As per the owner instructions crank pin was carried out wear ridge removal with special consumable parts and material as well as MAN service letter requirement.
e. Crank pin diameter was calibrated as well, found readings with in limit
f. Surface roughness were measured as well, found in order

09. Crank case sump were cleaned thoroughly at AE#1 & #2 engine

a. To removed out sump dirt and Oil as well
b. After cleaned informed to CE for inspection as well
c. Upon inspection filled new Lube oil into sump accordingly

10. AUX engine crank shaft deflection was checked (AE No-1 After)

b. AE #1 crank shaft deflection was carried out and the readings taken as well. Deflection gauge was provided by junma.

11. AE engine Rocker arm Tappet clearance were checked according to Firing Order

Inlet valve 0.5 mm
Exhaust valve 0.9 mm

12. AE No-1 Turbo charger overhauling

a. Removed T/C to shore work shop
b. Dismantle and cleaned/Dynamic balancing as well
c. Upon overhaul return back to ship in order

13. Leak Test:

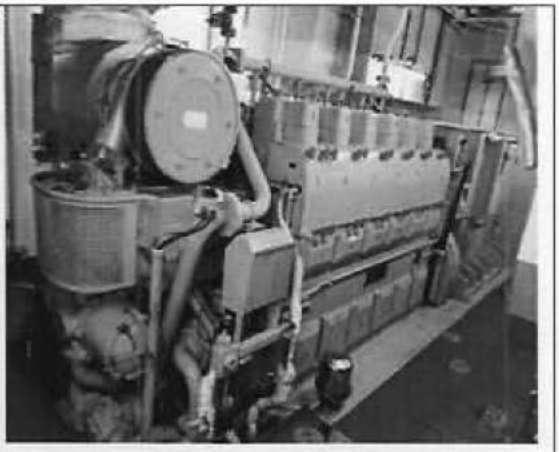
a. Upon completion of Aux engine overhauling and installation, to run the system check for leaks, found in normal. (Water, Air, fuel oil, Lube oil)
a. Upon completion of AE #1 engines have checked the all parameters were found in order and Engine Load tested found in normal.
b. SEA Trial was performed as well

Authorized Sales and Service Agent for:

Service and genuine spares provider for:

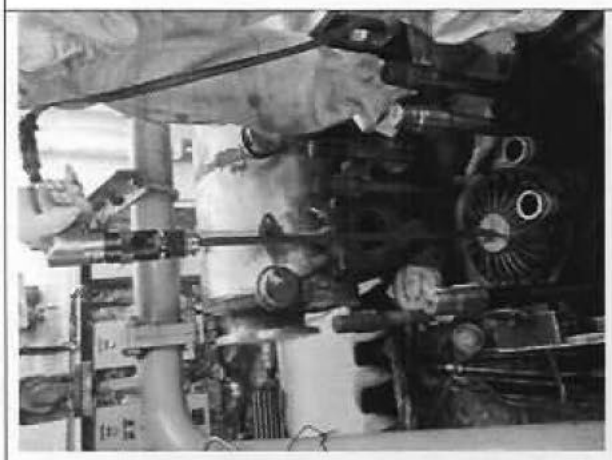
上海中船三井造船柴油机有限公司
CSSC-MES Diesel Co., Ltd.

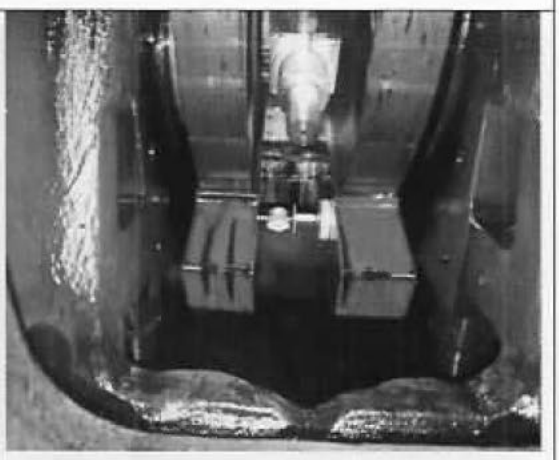
SERVICE PHOTOS:



Crank pin bearing after removal

Aircooler & Turbo charger being removed





Liner honing at insitu

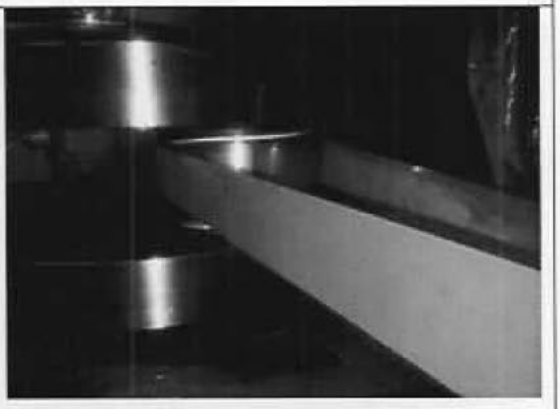
Crank shaft Deflection being taken

	
Crank pin Before polish condition	Crank pin with wear ridge condition
	
Crank pin found Wear ridge	Crank pin found Wear ridge
	
Crank pin found Wear ridge	Crank pin found Wear ridge

Crank pin being polished

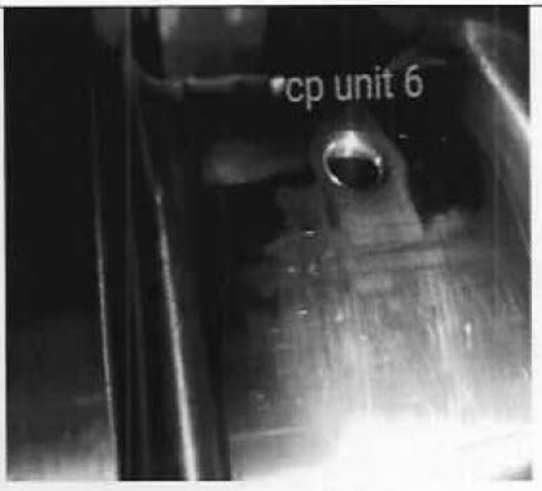
Cp wear ridge being checked with blue paste

Cp being polished



Cp being polished

Crank pin after polished



Crank pin before polish

Authorized Sales and Service Agent for:

Service and genuine spares provider for:

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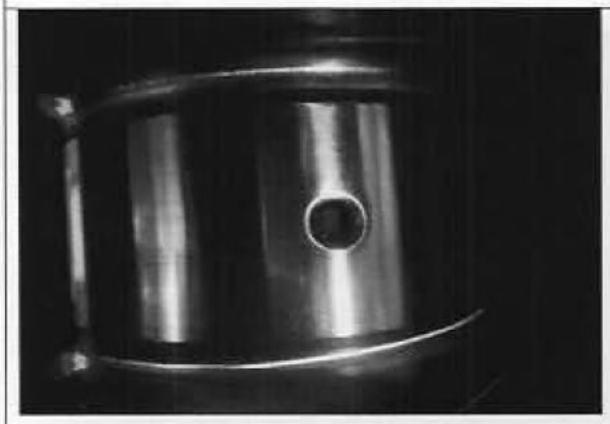
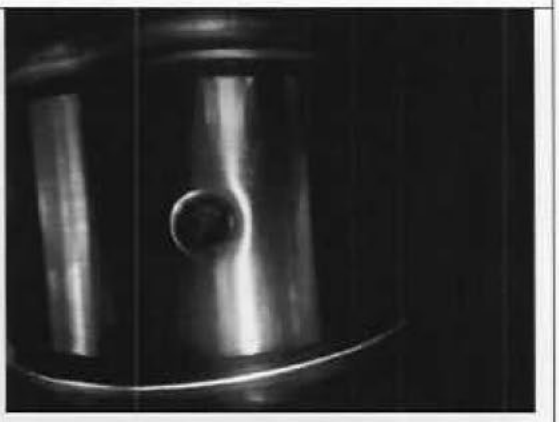
CSSC-MES Diesel Co., Ltd.

Crank pin after polished #1

Crank pin after polished #2



Crank pin after polished #3



Crank pin after polished #4

Crank pin after polished #5

Crank pin after polished #6

(b) (6), (b) (7)(C)

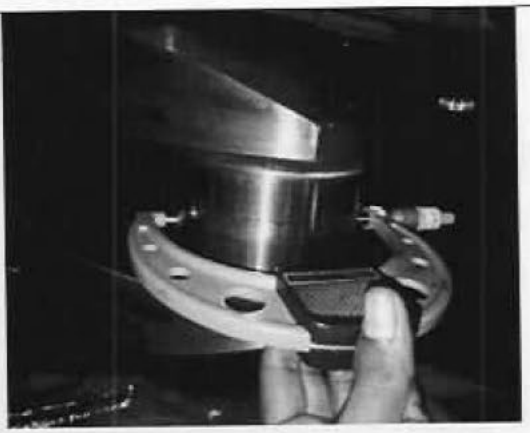
Piston crown #4 condition (found cavitation)

Piston crown #6 condition (found cavitation)

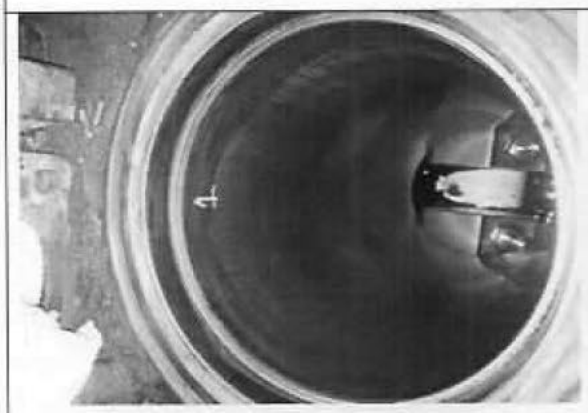
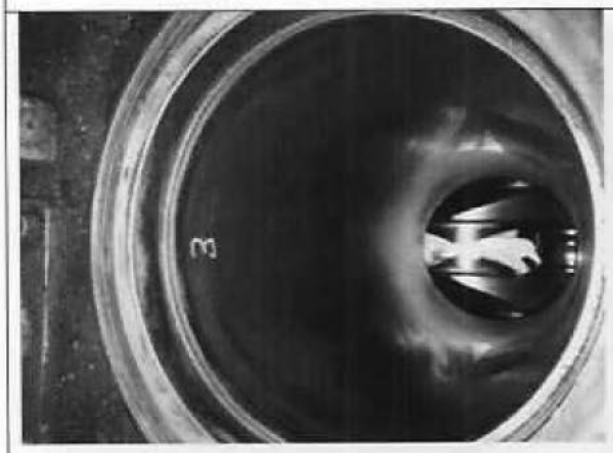
Cylinder liner condition Before honing

New Connecting rod being cleaned

Piston crown New spare used



Crank pin being checked dimensions

	
Before honing	Before honing
	
Before honing	Before honing
	
Before honing	Before honing

Liner After Honing

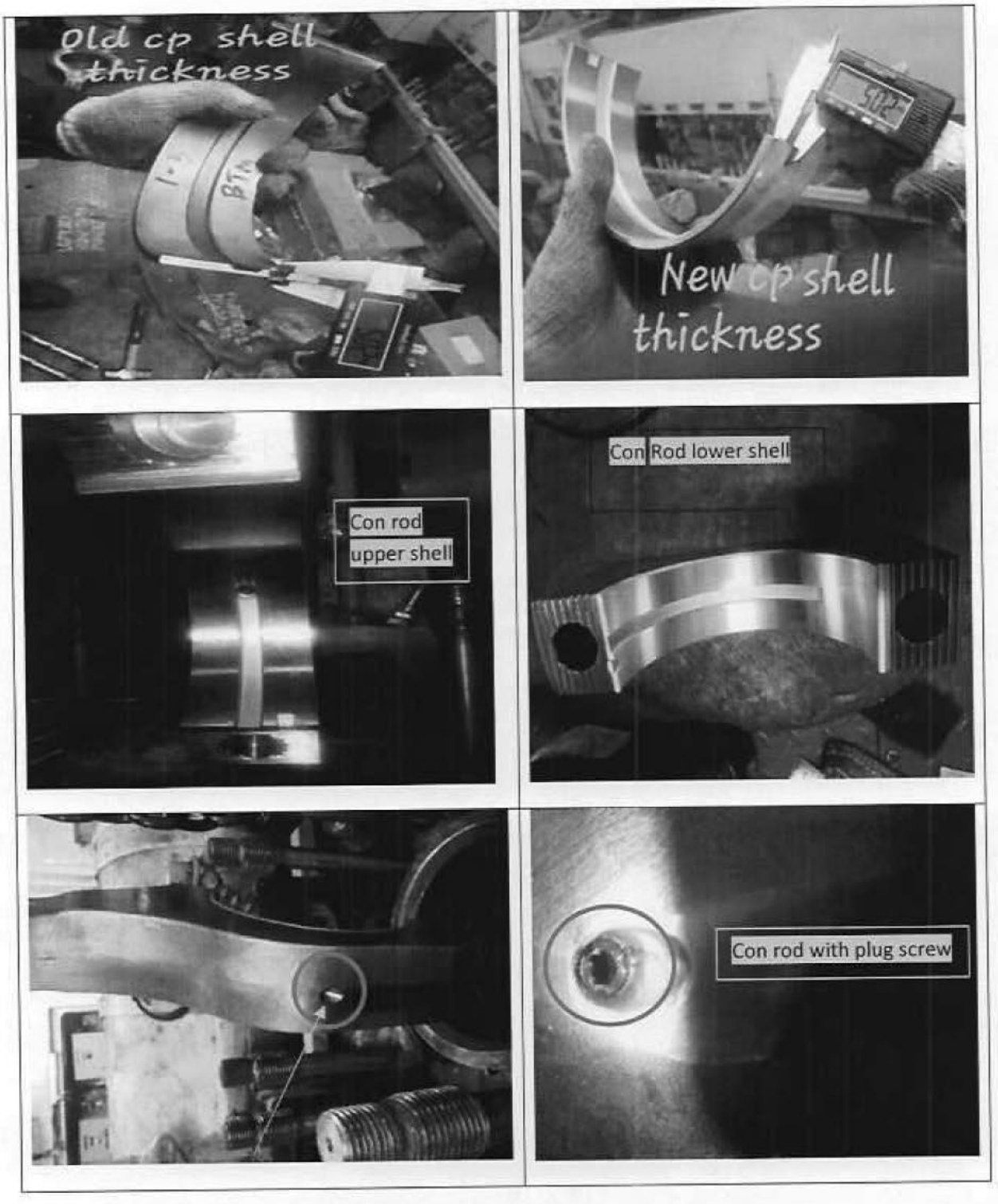
Liner After Honing

Liner After Honing

Liner After Honing

Liner After Honing

Liner After Honing


Old cp shell thickness
New cp shell thickness
Con rod upper shell
Con Rod lower shell
Con rod with plug screw

Authorized Sales and Service Agent for:

Service and genuine spares provider for:

上海中船三井造船柴油机有限公司
CSSC-MES Diesel Co., Ltd.

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Junma

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Singapore 637011

Tel: +65 - 6863 6523
Fax: +65 - 6863 6524

(b) (6), (b) (7)(C)

Work Done Report (Workshop)

Vessel Name	SLNC GOODWILL
IMO No.	9448334
Customer	American Ship Management
Junma Job Number	JS-SVC-2019-03-006a
Engine Maker/Model	ZJMD-MAN B&W 6L23/30H, E/No: 08365
Date	01.04.2019

This work done report is regarding below component of aux engine no.1

1. Cylinder head: 6 units
2. Rocker arm assembly: 6 units
3. Indicator valve: 6 pcs
4. Piston with connecting rod: 6 units
5. Fuel injection pump: 5 units
6. Fuel injector: 6 units
7. Turbocharger
8. Charge air cooler

1. Cylinder head: 6 units

Work done:

- Complete disassembled, clean all components.
- Extract out all valve seats due to corroded with worn step, Performed Dye Penetrant Inspection valve seat pockets and combustion surface, no crack detected. Inserted new valve seats inlet 12pcs & exhaust 12pcs.
- Extract out all 24pcs existing valve guides and inserted new valve guides.
- Removed all 6pcs cooling water jacket, cleaned and Dye checked. Refitted all cooling water jacket with new o-rings.
- Removed unit no.5 injector sleeve to renew o-ring
- Carried out hydro-test all 6 cylinder head at pressure 7kg/cm², no leak detected.
- Renewed all 24pcs valve due to worn at lid surface.
- 5pcs of valve rotators were renewed due to wear on ball seat, remaining 19pcs reused. All 24 sets of valve springs were reused.
- Assembled components as per maker's specification.

Extracted all valve seats

Valve seat pockets and combustion surface crack test

(b) (6), (b) (7)(C)

Junma

Junma Services Pte Ltd

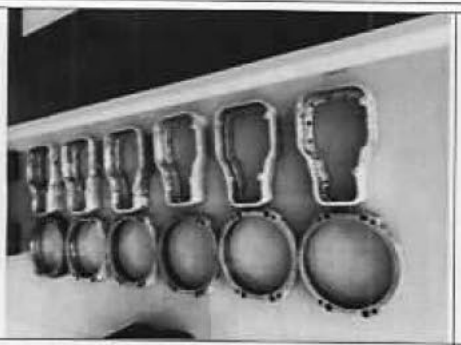
7 Tuas South Ave 10
Singapore 637011

Tel: +65 – 6863 6523
Fax: +65 – 6863 6524

Work Done Report (Workshop)

Vessel Name	SLNC GOODWILL
IMO No.	9448334
Customer	American Ship Management
Junma Job Number	JS-SVC-2019-03-006a
Engine Maker/Model	ZJMD-MAN B&W 6L23/30H, E/No: 08365
Date	01.04.2019

Valve seat pocket



Jacket and coaming after clean

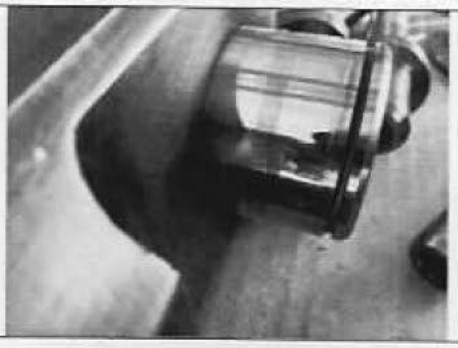
New valve guide insert

2. Rocker arm assembly: 6 units

Work done:

- Disassembled rocker arm, clean and inspect bearings and shaft. All the shaft journal found slightly worn at bottom, however clearance found within limit. 0.13-0.15 mm by feeler gauge.
  Note: Maximum clearance between rocker arm bush and rocker arm shaft 0.30mm

Rocker arm after disassembly



Bottom of the shaft journal

Bush

3. Indicator valve: 6 pcs

Work done:

- Disassembled, cleaned and inspect components.
- Carried out lapping on seat and lid surface and reassembled.

Indicator valve

(b) (6), (b) (7)(C)

Work Done Report (Workshop)

Vessel Name	SLNC GOODWILL
IMO No.	9448334
Customer	American Ship Management
Junma Job Number	JS-SVC-2019-03-006a
Engine Maker/Model	ZJMD-MAN B&W 6L23/30H, E/No: 08365
Date	01.04.2019

4. Piston with connecting rod: 6 units

Work done:

- Disassembled piston connecting rods, cleaned and inspect components.
- **Piston:** Carried out dye check on piston combustion surface, unit no.4 and 6 combustion surface found excessively corroded with cavitations. Unit no.1 piston ring groove height found worn and at max wear limit. Renewed no.1, 4 and 6 piston onboard ship from vessel spares.
- **Gudgeon pin:** All 6pcs gudgeon pin found within wear limit, super polished all 6 pcs gudgeon pin using micro film.
- **Connecting rods:** Clean & inspect all 6pcs connecting rod. Dye checked serration area, found cracked no.1, 3, and 6. No.2 & 5 big end bore diameter beyond maximum deviation. Only unit no.4 connecting rod found acceptable and return onboard as emergency spare.

  Note: all 6pcs connecting rod were renewed onboard with new spares.

Crack test of pistons | Corrosion cavitations on piston no. 4 & 6

Cracked con rod unit no.1 | Cracked con rod unit no.3 | Cracked con rod unit no.6

(b) (6), (b) (7)(C)

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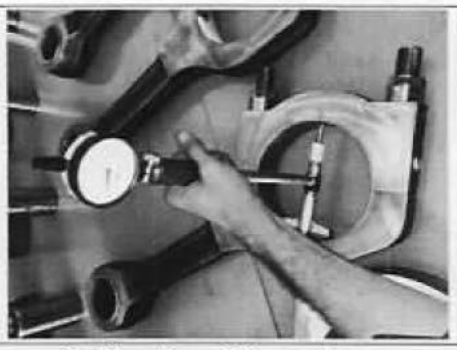
7 Tuas South Ave 10 Singapore 637011
Tel: +65 - 6863 6523
Fax: +65 - 6863 6524

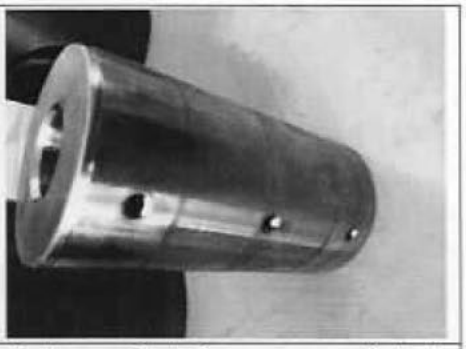
CSSC-MES Diesel Co., Ltd.

Work Done Report (Workshop)

Vessel Name	SLNC GOODWILL
IMO No.	9448334
Customer	American Ship Management
Junma Job Number	JS-SVC-2019-03-006a
Engine Maker/Model	ZJMD-MAN B&W 6L23/30H, E/No: 08365
Date	01.04.2019



Calibration of big end bore

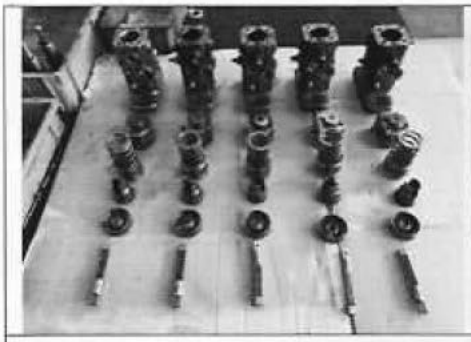


Gudgeon pin before super polished

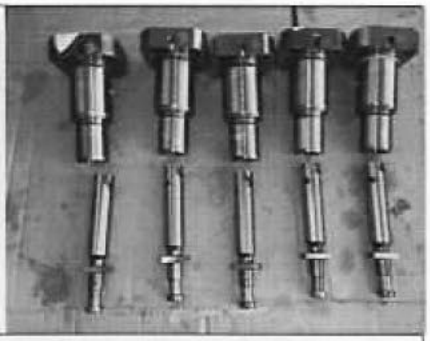
5. Fuel injection pump: 5 units (unit no. 2-6)

Work done:

- Disassembled, cleaned and inspect all components.
- Renewed 5 sets of plunger-barrels with owner supplied new spares.
- Lapped mating surfaces.
- Renewed all deliver valve springs.
- Renewed all o-rings, seals and gaskets.
- Reassembled as per maker's specification.



Components after disassembled and cleaned



New plunger-barrels

6. Fuel injector: 6 units

Work done:

- Disassembled, cleaned and inspect all components.
- Grinding Fuel injector surface, thrust spindle surface, nozzle cap nut surface.
- Set opening pressure at 320 bar

	Renewed spares	QTY	
a)	Fuel Nozzle	6 nos	Owner supplied
b)	Pressure adjusting rod washer	12 nos	Supplied by Junma
c)	Injector body external upper O-ring	12 nos	Supplied by Junma
d)	Injector body external lower O-ring	6 nos	Supplied by Junma

(b) (6), (b) (7)(C)

e)	Nozzle cap landing face washer	6	nos	Supplied by Junma
f)	Vent plug washer	6	nos	Supplied by Junma
g)	Nozzle steel guide pin	4	nos	Supplied by Junma

7. Turbocharger (N20/R, Serial No. 7024941)

Work done:

- Disassembled turbocharger including removing of gas inlet casing and compressor wheel.
- Fly ash blasting of turbine blades
- Dynamic balancing of rotorshaft
- Removed nozzle ring from gas inlet casing and inspect
- Fly ash blasting of nozzle ring
- Fly ash blasting of cover ring
- Chemical. cleaning of gas inlet casing. gas outlet casing and bearing casing
- Supplied bearing bush (P-N20/R-517.002). Qty 2pcs
- Supplied oil outlet gasket. Qty 1pc
- Supplied Copper ring. Qty 2pcs
- Supplied Copper gasket for GOC. Qty 1pc
- Supplied Copper gasket for gas admission casing. Qty 1pc
- Supplied Gasket for air casing. Qty 1pc
- Assembled TC as per maker's specification

8. Charge air cooler

Work done:

- Removed end covers. high pressure washed and applied a coat of coal tar epoxy.
- Airside ultrasonic degreased. seawater side descaled. high pressure washed. neutralized & blow dry.
- Vacuum leak tested on all tubes
- Close up end cover with new gaskets & cooler pressure tested on tube side at 4 kg/cm^2

Sign of representative Junma Services Pte Ltd	Sign of Master/Chief Eng. & Vessel Stamp	
(b) (6), (b) (7)(C) JUNMA SERVICES PTE LTD Date: 19.04.2019		Copy for: Junma Services / Master/Chief Eng. / Yard

(b) (6), (b) (7)(C)

TURBO SERVICES

JB 1903-0020

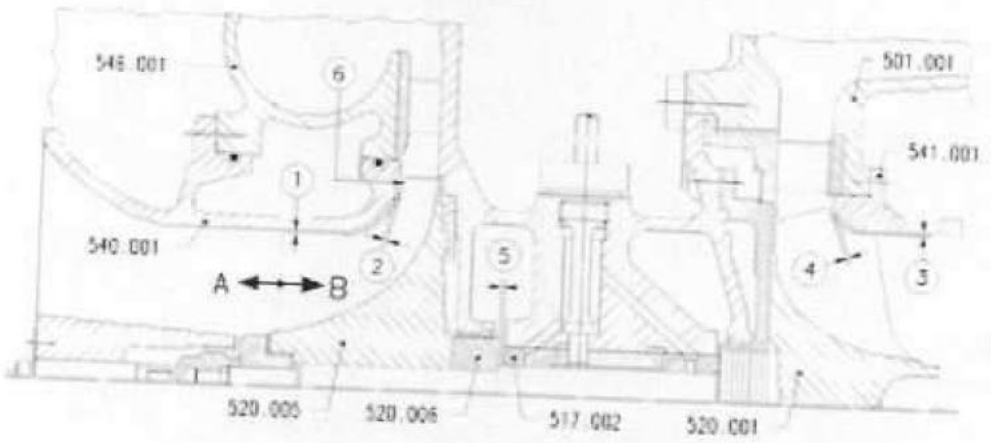
Service Report

NR20R / 172
SLNC GOODWILL

JUNMA SERVICES PTE LTD

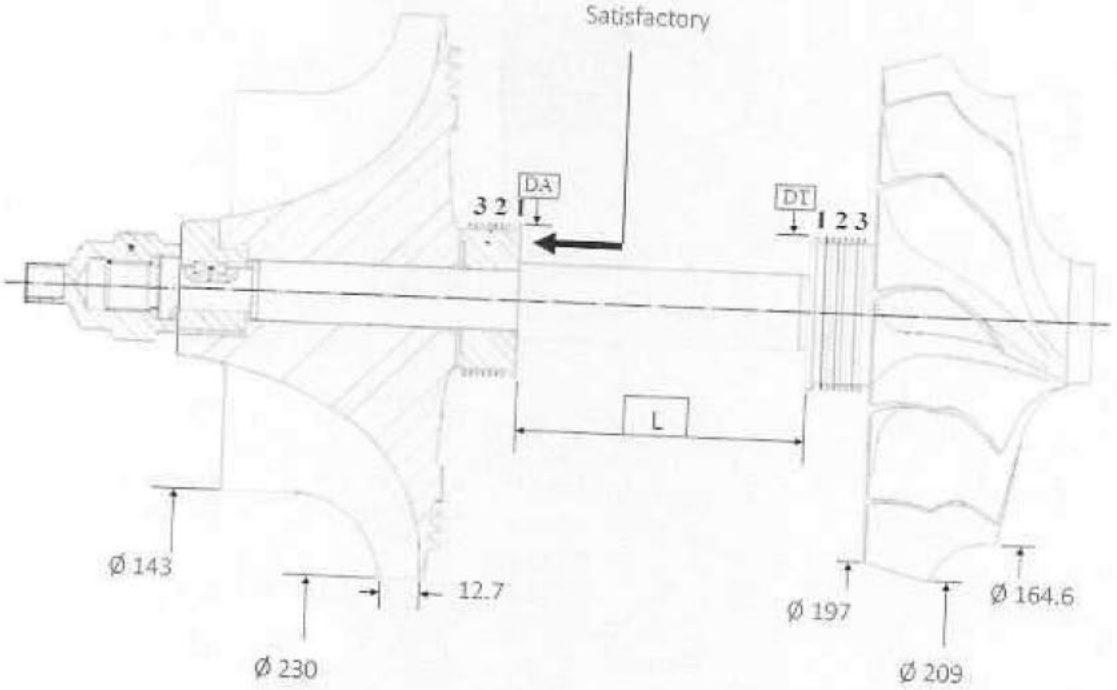
Clearances

ANNEX 1



Position			Top	Right	Bottom	Left	Min	Max
1	C/W-Insert Radial gap	Before	0.3	0.3	0.4	0.4	0.40	0.70
		After	0.5	0.6	0.6	0.6		
2	C/W-Insert Axial gap	After					0.25	0.90
3	Rotor-Insert Radial gap	Before	0.55	0.55	0.60	0.60	0.40	0.70
		After	0.60	0.60	0.60	0.60		
4	Rotor-Insert Axial gap	After					0.55	1.25
5	Loc.Bearing-Lab.Ring Axial Clearance		Measured value before = 0.22				0.22	0.36
			Measured value after = 0.22					
6	C/W face run out		Measured value after = 0.03				0.06	

	TURBOCHARGER Inspection Report	Date: 14 / 04 / 2019
	Rotor complete	Type: NR20/R 172
Job no: JB 1903 - 0020	Vessel: SLNC GOODWILL	



Compressor wheel no: -	Rotor shaft no: -

	Dia. 1 (mm)	Dia 2 (mm)	Dia 3 (mm)	TOLERANCES
Labyrinth ring 'DA'	Ø 64.88	Ø 64.86	Ø 69.89	Ø≤64.85
Locating ring 'DT'	Ø 64.92	Ø 64.87	Ø 64.86	Ø≤64.85
Thrust length 'L'	118.25			118.25-0.03

Remarks :

All parts of satisfactory condition , all to be reused

Reported by (b) (6), (b) (7)(C)

(b) (6), (b) (7)(C)

CHECK LIST

With Engineer's Report dtd. _____

Date : 14 / 04 / 2019

Turbocharger : NR20/R 172

Serial No. :

Job No. JB 1903-0020

Engine type :

Serial No. :

Name of customer JUNMA SERVICES

Address

Site/ship's name SLNC GOODWILL

Turbocharger inspected – on _____ by _____

Reason

Last inspection – overhaul on _____ by _____

Service hours since the last inspection - overhaul

Service hours since commissioning _____ h

_____ h

CONDITION OF COMPONENTS

Silencer + [x]

Air-intake casing + [ ]

condition of felt plates

- [ ] clean
- [ ] dusty
- [X] oily
- [ ] sooty
- [X] satisfactory
- [ ] bad

Compressor casing,
Insert piece +

traces of rotor contact

- [ ] clean
- [ ] dusty
- [X] oily
- [ ] sooty
- [X] no [ ] yes
- [ ] local _____ (clock)
- [ ] total circumference
- [ ] radial [ ] axial
- [X] reused
- [ ] replaced

Diffusor

- [X] satisfactory
- [ ] bent
- [ ] cracked
- [ ] Slight eroded
- [X] reused
- [ ] replaced

Turbine nozzle ring

- [X] satisfactory
- [ ] new
- [ ] cracked
- [ ] scaled
- [ ] eroded
- [ ] loose
- [ ] damaged by foreign matter
- [X] reused
- [ ] replaced

Gas-admission casing,
Insert piece +
Gas exit diffusor +

Trace of Contact —

- [ ] clean
- [ ] rusty
- [X] sooty
- [ ] worn
- [ ] cracked
- [X] satisfactory
- [ ] broken
- [X] no [ ] yes
- [ ] local _____ (clock)
- [ ] Total circumference
- [ ] radial [ ] axial
- [X] reused
- [ ] replaced

Cartridge in assembled state

Turbine side

Vanes slight thin
Turbine rotor (blades)

- [ ] clean
- [ ] oil traces
- [X] carbon residue of oil
- [ ] heavy fuel coating
- [X] satisfactory
- [ ] bent

Damaged by foreign matter

traces of contact

- [ ] cracked
- [ ] on leading edges
- [ ] on blades
- [X] no [ ] yes
- [ ] local
- [ ] total circumference
- [ ] radial [ ] axial

Compressor side

- [ ] clean
- [ ] dusty
- [ ] sooty
- [X] oily

+ If provided

(b) (6), (b) (7)(C)

compressor wheel (blades)
damaged by foreign matter
traces of contact
Cartridge (599.001)

X	satisfactory
	slight dented
	cracked
	on leading edges
	blades
X	no / yes
	local
	total circumference
	radial / axial
	reused
	replaced
X	disassembled

Gaps and clearances (section 1, sheet 52)

Transverse play of rotor ____ mm
Axial runout of compressor wheel ____ mm

Radial gap	1	mm
Axial gap	2	mm
Radial gap	3	mm
Axial gap	4	mm
Axial clearance	5	mm

Refer to annex 1

CONDITION OF SINGLE PARTS OF CATRIDGE

Bearing casing(517.001)

X	reused
	replaced
	clean
X	carbon covered

lock-air passages
oil passages

X	

X	clean
	restricted
	clogged

reason:

Sealing cover, compressor side (517.017) or (517.087) +

	reused
	replaced

reason

Turbine rotor (520.001)

X	reused
	replaced
X	no
	yes

Frictional oxidation
reason:

Bearing bush (517.002)

X	turbine side
X	compressor side

	reused
X	replaced

reason:

Compressor wheel (520.005)

X	reused
	replaced
X	satisfactory
	medium
	poor

quality of fit
reason:

Distance sleeve (517.003)

X	reused
	replaced

reason:

Labyrinth ring (520.006)

X	reused
	replaced

reason:

Holding sleeve (517.004)

X	reused
	replaced

reason:

Rotor (520.000)

rebalanced

	no
X	yes

condition before rebalancing

X	satisfactory
	bad

Cover (517.009)+

	reused
	replaced

reason:

Seals

	reused
X	replaced

Sealing cover, turbine side (517.017)+

X	reused
	replaced

reason:

+ if provided

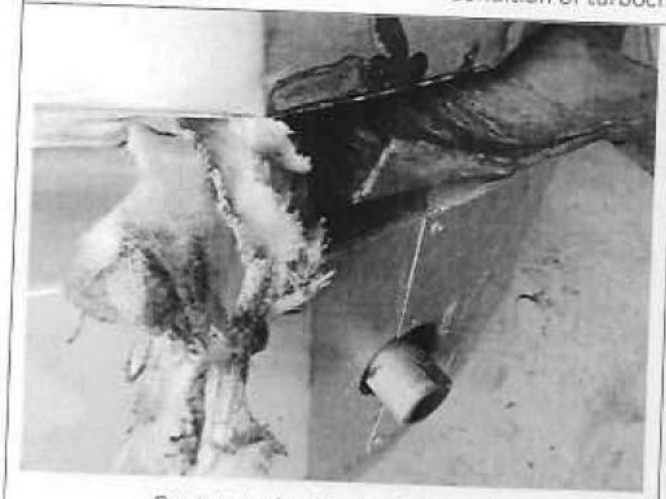
Remarks :

Inspected by: (b) (6), (b) (7)(C)

(b) (6), (b) (7)(C)

	TURBOCHARGER Inspection Report	Date: 14 / 04 / 2019
	PHOTO	Type: NR20/R 172
Job no: JB 1903-0020	Vessel: SLNC GOODWILL	

Condition of turbocharger before overhaul



Dent on turbocharger foundation

Clearance taken during dismantling

Air casing before cleaning

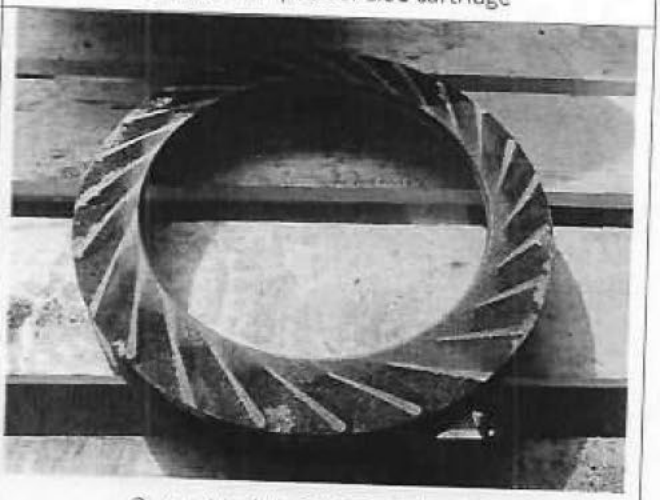
Inspected by: (b) (6), (b) (7)(C)

	TURBOCHARGER Inspection Report	Date: 14 / 04 / 2019
	PHOTO	Type: NR20/R 172
Job no: JB 1903-0020	Vessel: SLNC GOODWILL	

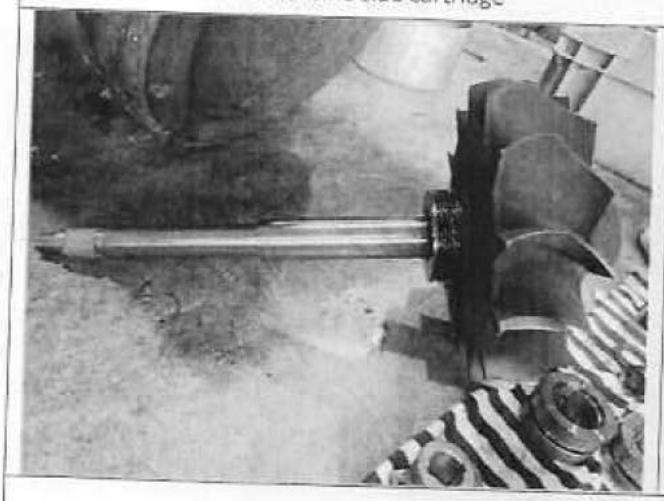
Clearance taken during dismantling

View of compressor side cartridge

View of turbine side cartridge



Cover ring disk before ash blasting



Rotor shaft before ash blasting

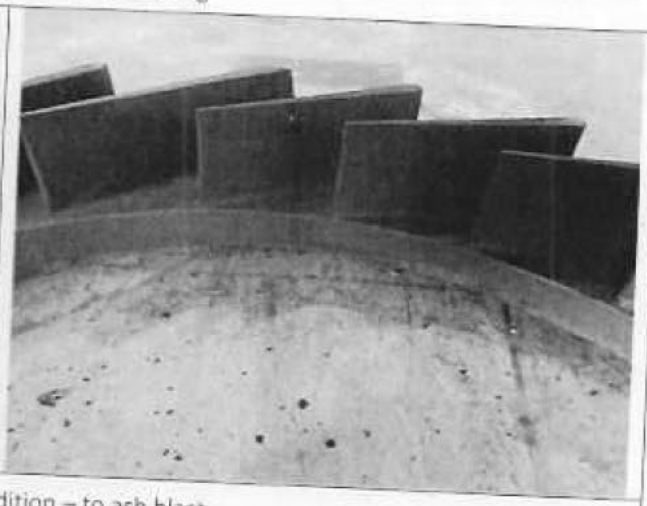
Inspected by: (b) (6), (b) (7)(C)

	TURBOCHARGER Inspection Report	Date: 14 / 04 / 2019
Job no: JB 1903-0020	PHOTO Vessel: SLNC GOODWILL	Type: NR20/R 172

Guide bush OD satisfactory – to reused

Labyrinth ring OD satisfactory – to reused

Intermediate ring before ash blasting



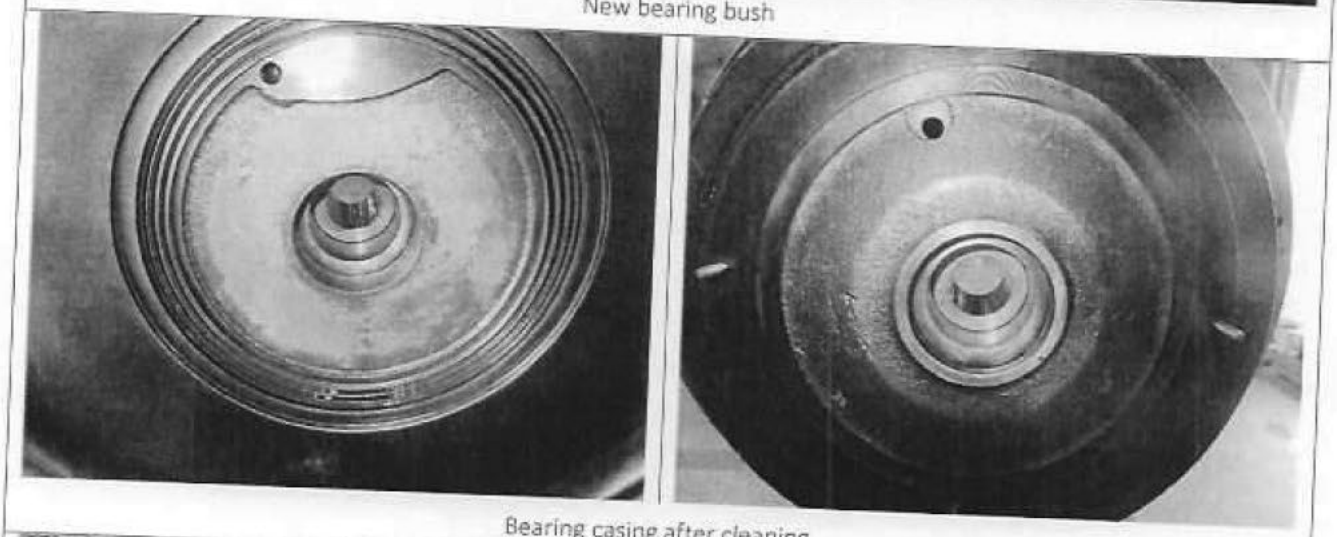
Nozzle ring good condition – to ash blast

Inspected by: (b) (6), (b) (7)(C)

(b) (6), (b) (7)(C)

	TURBOCHARGER Inspection Report	Date: 14 / 04 / 2019
	PHOTO	Type: NR20/R 172
Job no: JB 1903-0020	Vessel: SLNC GOODWILL	

New bearing bush



Bearing casing after cleaning

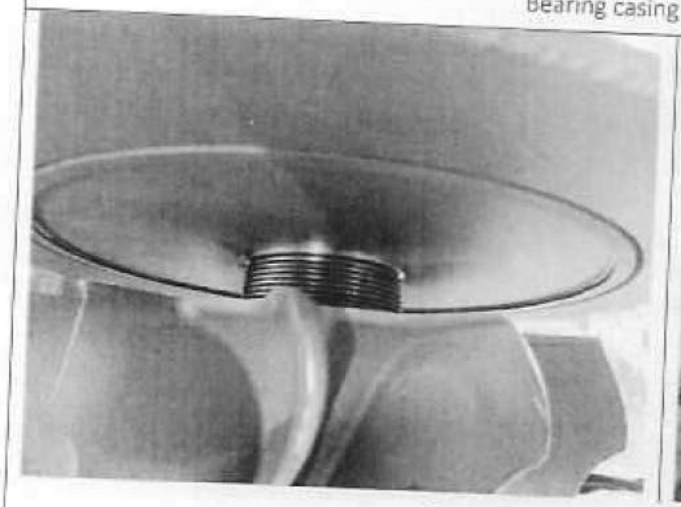
Intermediate ring after ash blasting

Inspected by: (b) (6), (b) (7)(C)

(b) (6), (b) (7)(C)

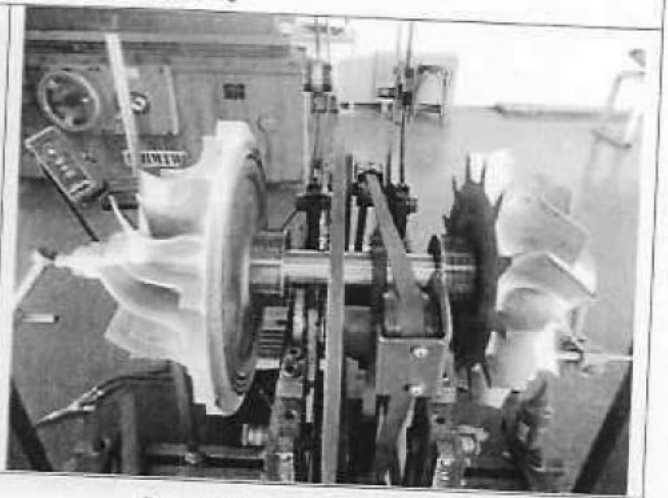
	TURBOCHARGER Inspection Report	Date: 14 / 04 / 2019
Job no: JB 1903-0020	PHOTO Vessel: SLNC GOODWILL	Type: NR20/R 172

Bearing casing after cleaning



Assembling of rotor shaft to bearing casing

Clearance taken during assembling



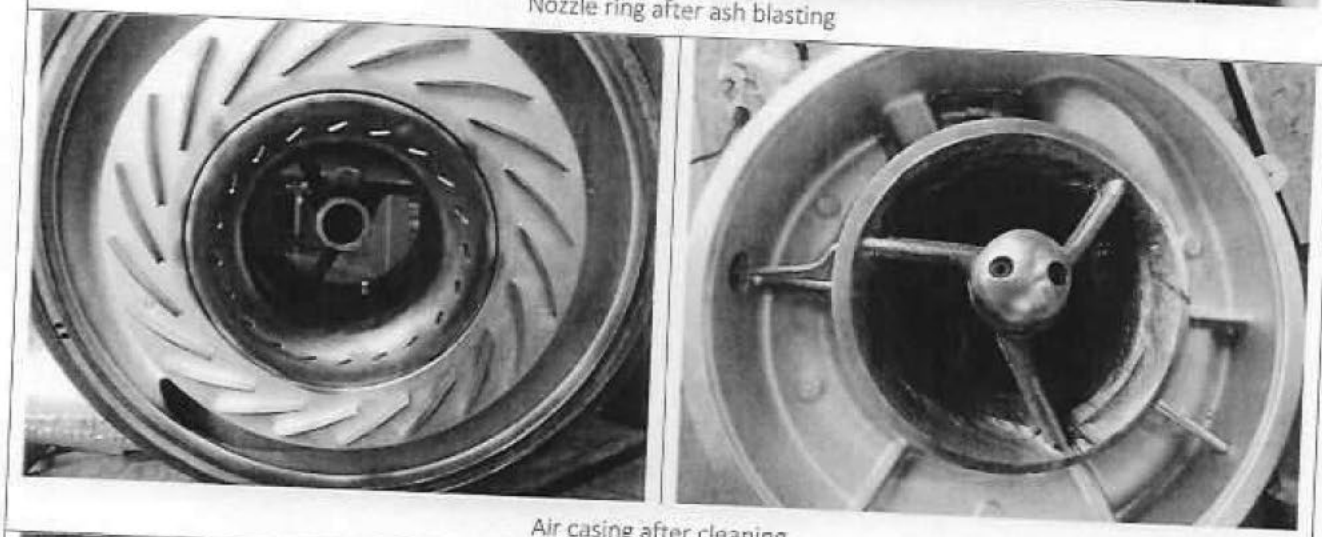
Dynamic balancing of rotor shaft

Inspected by: (b) (6), (b) (7)(C)

(b) (6), (b) (7)(C)

	TURBOCHARGER Inspection Report	Date: 14 / 04 / 2019
Job no: JB 1903-0020	PHOTO Vessel: SLNC GOODWILL	Type: NR20/R 172

Nozzle ring after ash blasting



Air casing after cleaning

Filter silencer after chemical clean and new air filter mat

Inspected by: (b) (6), (b) (7)(C)

Spare Parts Renewal

SN	PART NAME	PART NO.	QTY	RECOMMENDATION
1	Bearing Bush	517.002	2	Due for renewal – Discoloured and worn
2	Copper gasket for gas outlet casing	-	1	Due for renewal
3	Gasket	517.068	1	Due for renewal
4	Seal ring	517.064	2	Due for renewal
5	Seal	517.018	1	Due for renewal
6	Copper gasket for gas inlet casing	-	1	Due for renewal
7	Gasket for air casing	-	1	Due for renewal
8	Air filter mat	-	2.2 M	
9				
10				
11				
		LABOUR		
1	Bearing casing	517.001	1	Chemical clean
2	Turbine casing	501.001	2	Chemical clean
3	Compressor wheel	520.005	1	Chemical clean
4	Filter silencer		1	Chemical clean

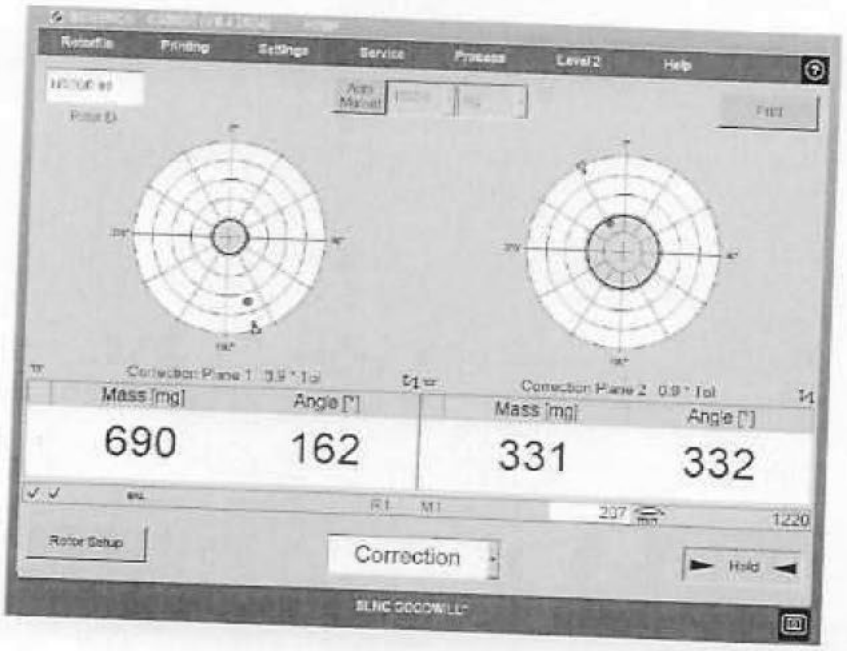
Remarks :

Report By: [redacted]

Balancing Print Screen

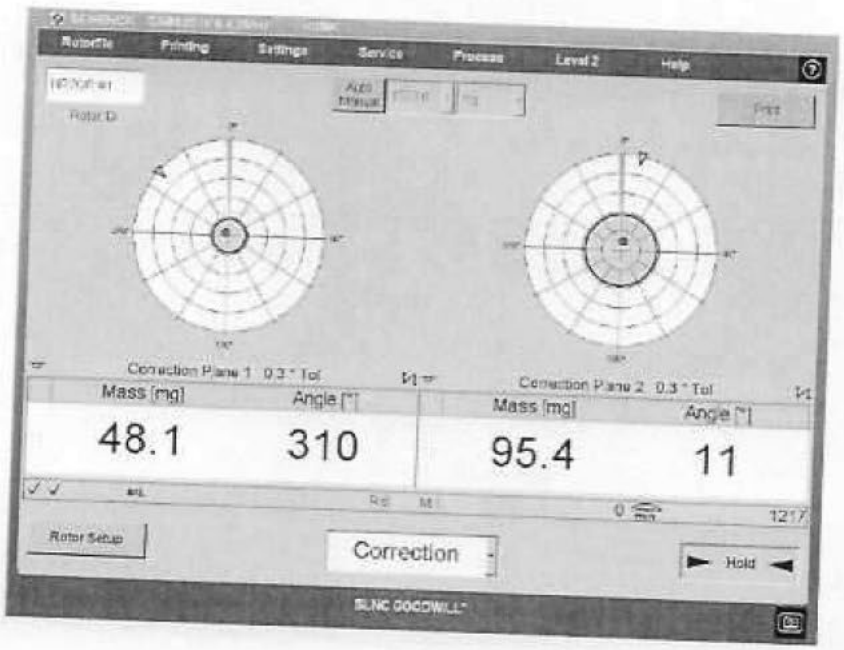
Before

Rotor Type: SLNC GOODWILL*
Rotor ID: NR20/R #1
User: JB1903-0020



After

Rotor Type: SLNC GOODWILL*
Rotor ID: NR20/R #1
User: JB1903-0020



(b) (6), (b) (7)(C)

Balancing Report

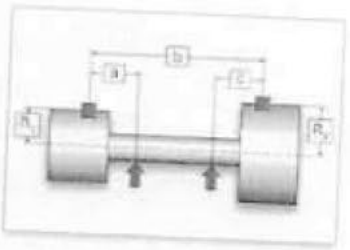
User (b) (6), (b) (7)(C)

Type data

Rotor type	SLNC GOODWILL*
Last change	3/27/2019 2:16 PM
Set speed	1200 rpm

ABC geometry

Position of correction planes



Distance a	42 mm
Distance b	175 mm
Distance c	38 mm
Radius 1	83 mm
Radius 2	56 mm

Tolerance

Tolerance	User defined
Selected planes	Correction planes

Dynamic Tolerance of Unbalance

Correction Plane 1	14.5 g·mm
Correction Plane 2	21.0 g·mm

Measuring Results, Run: 1

Rotor ID	NR20/R #1		3/27/2019
Measuring speed	1219 rpm		

Correction

Correction Plane 1 - Mass (Remove)	690 mg	162 °	3.9 ° Tol
Correction Plane 2 - Mass (Remove)	331 mg	332 °	in Tol

Measuring Results, Run: 6

Rotor ID	NR20/R #1		3/27/2019
Measuring speed	1216 rpm		

Correction

Correction Plane 1 - Mass (Remove)	48.1 mg	310 °	in Tol
Correction Plane 2 - Mass (Remove)	95.4 mg	11 °	in Tol

(b) (6), (b) (7)(C)

WORK ORDER/SERVICE REQUISITION FORM

Ship Name : SLNC GOODWILL
WO/SR No : 8052986
Performed By : WO/Crew

Title : AUXILIARY ENGINE 01 2000 HR PM

SCHEDULING DATA

Scheduled : 05/11/2019 **Event :**
Completed : 07/23/2020 goodwill, 3ae
Canceled :
Next Due Date : 12/13/2020 **Interval :** 2000 H

ADMINISTRATIVE DATA

Created By: (b) (6), (b) (7)(C) **On :** 05/09/2020
Auth. By: **On :**
Apprvd. By: **On :**
Account No:
Project No: **Priority :** D
Job Catg: PREVENTATIVE MAINTENANCE **Class Job No :**
Sugg Vend:
Dept.: ENGINE

EQUIPMENT PARTICULARS

Name: AUXILIARY ENGINE 01 **Class Equipment Name :** **Class Eq Code:**
Equip Code : NGOO01U2MA5 **Manufacturer :** ZHENJIANG MARINE AUX
Model : L23/30 **Serial No :** 08365
Size : 960KW@900RPM **Type :** 6L23/30
Equip. Location : **Criticality:** B

SPACE PARTICULARS

RESOURCES & COST DATA

Estimated Cost : 0.00 **Estimated Man-Hrs :** 8
Std. Job Cost : **Actual. Man-Hrs :** 8
Resource : 3RD ASST ENG , OILER

WO DESCRIPTION

AE #1 2000 hour maintenance

Check of valve rotators' rotation during engine rotation.
Fuel injection valve - adjustment of opening pressure
Fuel oil high-pressure pipe - dismantling and check
Check sleeve for injector and lap if necessary
Camshaft - inspection of gear wheels, bolts, connections etc.
Lubrication of camshaft bearing and roller running surfaces- check
Change Governor Oil
PSTP – alarm testing, shut downs, over speed and pressure alarms
Function test - main starting valve, starting valve, main valves and emergency start valve

WO FINDINGS

PTSP Testing conducted 13 JULY 2020 see WO# 8053518 at 43794hrs

7/21/2020 - Cylinder #3 injector replaced with new nozzle, set 320 hold 300. MAN nozzle. Off going nozzle failed the drip test as per MAN manual.
7/22/2020 - Remaining five injectors removed, pressure recalibrated, cleaned and reinstalled. Cylinder 5 injector nozzle fails drip test. Replaced with MAN new nozzle, replaced thrust spindle and washer. Other nozzles all passed atomization test and drip test.

Cam spaces inspected. Some marring of cam lobes noted, specifically a loss of polished coating on cylinder 2 intake push rod lobe. See attached photo. No ridges, bumps or otherwise disruptive wear noted.
Prelube energized, lubrication found on each fuel cam and in each camshaft bearing, observed as well on each crankshaft/connecting rod and upper cylinder assembly.

Governor lube oil changed.

Valve rotators marked, engine blown over on air and rotation observed.

Engine test run, no deficiencies noted.

3 A/E T. Lloyd-Rees

Perform By:

Tested By:

Signature:

Designation:

MATERIALS REQUIRED & USED

Equip Code / Main PartNo	Reference Equipment/ Part name/ Spares Location	Required	Used	Requisitioned Required / Used
NGOO01U2MD8	AE 1 CYLINDER COVERS W/VALVES			
50510-01H, ITEM 075	GASKET F. TOP COVER #075	0.00PC		
	H*ENG STORE		1.00PC	

Equip Code / Main PartNo	Reference Equipment/ Part name/ Spares Location	Required	Used	Requisitioned Required / Used
	AE 1 FO INJECTORS			
51420-01H-033	AEM NOZZLE #033, PLATE 51402-01	0.00EA		/
	J*ENG STORE		2.00EA	
51402-01H-069	THRUST SPINDLE #069, PLATE 51402-01	0.00EA		/
	J*ENG STORE		1.00EA	
51402-01H-189	WASHER #189, PLATE 51402-01	0.00EA		/
	J*ENG STORE		1.00EA	

IMAGES

IMAGES

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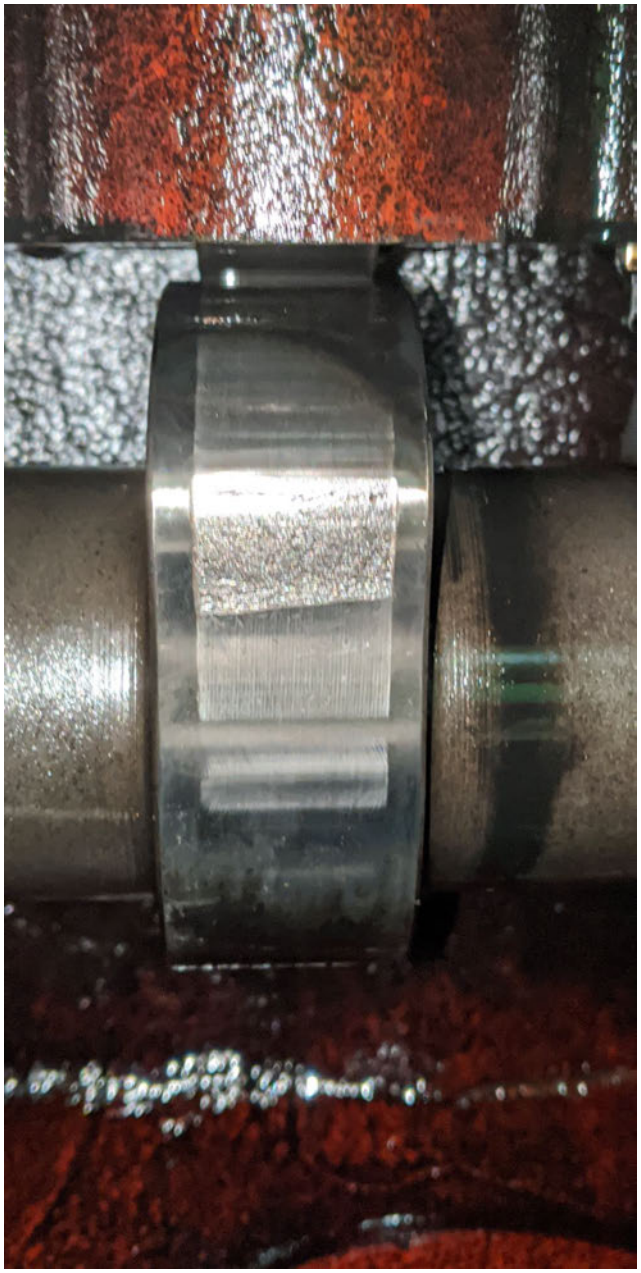

OTHER ATTACHMENTS

NSE Generator Jobs to Create.docx

JOB SAFETY ANALYSIS

JSA Required : NO **Use Template :**

M3-1

INSTRUCTION BOOK

ZHENJIANG MARINE DIESEL WORKS

ZJMD — MAN B&W

Instruction Book

L23/30H

Shipyard :

Ship name :

Hull No. :

Rule :

Add: 2[illegible]angtang[illegible]Zhenjiang

Jiangsu Province P.R.China

Tel: [redacted]

Fax: +86 511 451 0033

ZJMD — MAN B&W

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General

Warning !

(Marine engines only)

It is important that all MAN B&W Diesel A/S engines are operated within the given specifications and performance tolerances specified in the engines' Technical Files and are maintained according to the MAN B&W Diesel A/S maintenance instructions in order to comply with given emissions regulations.

In accordance with Chapter I of the Code of Federal Regulations, Part 94, Subpart C, §94.211 NOTICE is hereby given that Chapter I of the Code of Federal Regulations, Part 94, Subpart K, §94.1004 requires that the emissions related maintenance of the diesel engine shall be performed as specified in MAN B&W Diesel A/S instructions including, but not limited to, the instructions to that effect included in the Technical File.

08028-0D/H5250/94.08.12

General

The overhaul intervals are based on operation on a specified fuel oil quality at normal service output, which means 70-100% of MCR.

In the long run, it is not possible to obtain a secure and optimal economical running without an effective maintenance system.

With the structure and amount of information in the maintenance programme, it can be integrated in the entire ship's/power station's maintenance system or it can be used separately.

The crux of the maintenance system is the key diagram, see page 500.25, indicating the inspection intervals for the components/systems, so that the crew can make the necessary overhauls, based on the engines' condition and/or the time criteria.

The stated recommended intervals are only for guidance as different service conditions, the quality of the fuel oil and the lubricating oil, treatment of the cooling water, etc, will decisively influence the actual service results and thus the intervals between necessary overhauls.

Experience with the specific plant/crew is to be used for adjustment of time between overhaul. Further it is to be used for adjusting the timetable stated for guidance in the working cards.

Working Cards

Each of the working cards can be divided into two: a front page and one or several pages, describing and illustrating the maintenance work.

The front page indicates the following:

1. Safety regulations, which MUST be carried out before the maintenance work can start.

2. A brief description of the work.

3. Reference to work, which must be carried out, if any, before the maintenance work can start.

4. Related procedures - indicates other works, depending on this work - or works which would be expedient to carry out.

5. Indicates x number of men in x number of hours for accomplishing the work.

The stated consumption of hours is only intended as a guide.

Experience with the specific station/crew may lead to a bringing up-to-date.

6. Refers to data, which are required for carrying out the work.

7. Special tools, which must be used. Please note that not all tools are standard equipment.

8. Various requisite hand tools.

9. Indicates the components/parts, which it is advisible to replace during the maintenance work. Please note, that this is a condition for the intervals stated.

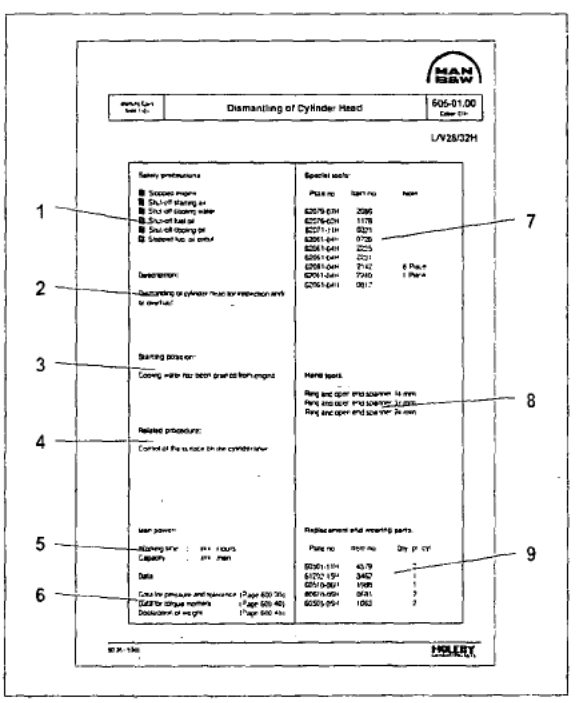

Fig 1. Guidance instruction for working cards.

L23/30H
900 RPM

Description ● = Overhaul to be carried out ■ = Check the condition	Check new/ overhauled parts after hours	Time Between Overhaul: 50	200	2000	6000	12000	24000	Daily	Weekly	Monthly	3rd month	Observations	Working Card No
Operating of Engine:													
Readings of data for engine and alternor, with reference to "Engine Performance Data", section 502.01									■				502-01.00
Cylinder Head:													
Inlet and exhaust valve - overhaul and regrinding of spindel and valve seat						●							505-01.10
Inspection of inlet, exhaust valves and valve guide						■							505-01.05
Check of valve rotators' rotation during engine rotation .				■									505-01.05
Sleeve for fuel injector						■							505-01.30
Safety valve - overhaul and adjustment of opening pressure						■							505-01.25
Indicator valve						■						■	505-01.26
Cylinder head cooling water space - inspection						■							505-01.45
Cylinder head nut - retightening	200												505-01.40
Piston, Connecting Rod and Cylinder Liner:													
Inspection of piston						■							506-01.10
Piston ring and scraper ring						●							506-01.10
Piston pin and bush for connecting rod - check of clearance						■							506-01.15
Connecting rod - measuring of big-end bore						■							506-01.15
Inspection of big-end bearing shells						■							506-01.16
Connecting rod - retightening	200				■								506-01.25
Cylinder liner - cleaning, honing and measuring						●							506-01.35
Cylinder liner removed - check the water space and wear ring in frame							■						506-01.40
Camshaft and Camshaft Drive:													
Camshaft - inspection of gear wheels, bolts, connections etc.	200					■							507-01.00
Camshaft bearing - inspection of clearance						■							507-01.05
Camshaft adjustment - check the condition						■							507-01.20
Lubrication of camshaft bearing - check						■							507-01.00

L23/30H

900 RPM

Description (● = Overhaul to be carried out, ■ = Check the condition)	Check new/ overhauled parts after hours	Time Between Overhaul: 50	200	2000	6000	12000	24000	Daily	Weekly	Monthly	3rd month	Observations	Working Card No
Operating Gear for Inlet Valves, Exhaust Valves and Fuel Injection Pumps:													
Roller guide for valve gear						■							508-01.00
Valve gear - valve bridge, spring, push rod, etc						■							508-01.10
Roller guide for fuel injection pump						■							508-01.05
Roller guide housing						■							508-01.10
Inlet and exhaust valve - check and adjustment of valve clearance				■									508-01.10
Lubricating of operating gear - check						■							508-01.00 508-01.05
Control and Safety System, Automatics and Instruments:													
Safety, alarm and monitoring equipment											■		509-01.00
Lambda controller - adjustment											■		509-10.00
Governor - check oil level, see governor instruction book, section 509											■		
Crankshaft and Main Bearing:													
Checking of main bearings alignment, (autolog)					■								510-01.00
Inspection af main bearing							■						510-01.05
Inspection of guide bearing					■								510-01.10
Vibration damper - check the condition						■							510-04.00
Lubricating of gear wheel for lub. oil pump and cooling water pump etc.							■						
Counterweight - retightening, see page 500.40	900*				■								
Main- and guide bearing cap - retightening	200				■								510-01.05 510-01.10

** If screw can be tightened then the screw have to be loosened and retightened after page 500.40.*

L23/30H
900 RPM

Description ● = Overhaul to be carried out ■ = Check the condition	Check new/ overhauled parts after hours	Time Between Overhaul: 50	200	2000	6000	12000	24000	Daily	Weekly	Monthly	3rd month	Observations	Working Card No
Engine Frame and Baseframe:													
Holding down bolts - retightening, see page 500.40	200				■								
Bolts between engine frame and base frame - retightening, see page 500.40	200				■								
For flexible mounted engines - check anti-vibration mountings	200				■								519-03.00
Safety cover - function test					■								511-01.00
Turbocharger System:													
Wet cleaning of turbine side										●			512-15.00
Water washing of compressor side		●											512-05.00
Cleaning of air filter - compressor side (see turbocharger instruction book)													
Turbocharger complete - dismantling, cleaning, inspection etc. (see turbocharger instruction book)													
Charging air cooler - cleaning and inspection												■	512-01.00
Charging air cooler housing - draining												●	
Exhaust pipe - compensator												■	
Compressed Air System:													
Air starter motor - dismantling and inspection												■	513-01.30
Function test - main starting valve, starting valve, main valves and emergency start valve											■		513-01.40
Dirt separator - dismantling and cleaning												●	
Muffler - dismantling and cleaning												●	
Compressed air system - draining												●	513-01.90
Compressed air system - check of the system											■		513-01.90

[redacted]

L23/30H
900 RPM

● = Overhaul to be carried out
■ = Check the condition

Description	Check new/ overhauled parts after hours	Time Between Overhaul: 50	200	2000	6000	12000	24000	Daily	Weekly	Monthly	3rd month	Observations	Working Card No
Fuel Oil System and Injection Equipment:													
Fuel oil filter - dismantling and cleaning												●	514-01.15
Fuel oil feed pump												●	514-10.00
Fuel oil injection pump - dismantling and cleaning												●	514-01.05
Fuel injection valve - adjustment of opening pressure	200			■									514-01.10
Fuel oil high-pressure pipe - dismantling and check				■									514-01.05
Adjustment of the maximum combustion pressure												●	514-05.01
Fuel oil system - check the system											■		514-01.90
Nozzle cooling system - check the system if installed											■		514-01.90
Fuel oil - oil samples after every bunkering, see sec.504													
Lubricating Oil System:													
Lubricating oil pump - engine driven						■							515-01.00
Lubricating oil filter - cleaning and exhange												●	515-01.10
Lubricating oil cooler												●	515-06.00
Prelubricating pump - el.-driven						■							515-01.05
Thermostatic valve												■	515-01.20
Centrifugal filter - cleaning and exhange of paper												●	515-15.00
Hand pump												●	515-10.00
Lubricating oil - oil samples, see section 504											■		
Lubricating oil system - check the system											■		515-01.90
Cooling Water System:													
Cooling water pump - engine-driven (sea water and fresh water)						■							516-04.00
Thermostatic valve											■		516-04.00
Cooling water system - check the system										■			516-01.90
Cooling water system - water samples, see sec. 504								■		■			

08028-0D/H5250/94.08.12

L23/30H
720/750 RPM

Description ■ = Off-line check of condition (engine shutdown) ⌐ = On-line check of condition (engine running) ● = Off-line service / overhaul (engine shutdown) ○ = On-line service / overhaul (engine running)	Check new/ overhauled parts after hours	Time Between Overhaul: 50	200	2000	* 6000	** 12000	*** 24000	Daily	Weekly	Monthly	3rd month	Observations	Working Card No
Operating of Engine:													
Readings of data for engine and alternator with reference to "Engine Performance Data", section 502.01									■				502-01.00
Cylinder Head:													
Inlet and exhaust valve - overhaul and regrinding of spindle and valve seat						●							505-01.10
Inspection of inlet, exhaust valves and valve guide						■							505-01.05
Check of valve rotators' rotation during engine rotation .				■									505-01.05
Sleeve for fuel injector						■							505-01.30
Safety valve - overhaul and adjustment of opening pressure						■							505-01.25
Indicator valve						■						■	505-01.26
Cylinder head cooling water space - inspection						■							505-01.45
Cylinder head nut - retightening	200												505-01.40
Piston, Connecting Rod and Cylinder Liner:													
Inspection of piston						■							506-01.10
Piston ring and scraper ring						●							506-01.10
Piston pin and bush for connecting rod - check of clearance						■							506-01.15
Connecting rod - measuring of big-end bore						■							506-01.15
Inspection of big-end bearing shells						■							506-01.16
Connecting rod - retightening	200				■								506-01.25
Cylinder liner - cleaning, honing and measuring						●							506-01.35
Cylinder liner removed - check the water space and wear ring in frame							■						506-01.40
Camshaft and Camshaft Drive:													
Camshaft - Inspection of gear wheels, bolts, connections etc.	200					■							507-01.00
Camshaft bearing - inspection of clearance						■							507-01.05
Camshaft adjustment - check the condition						■							507-01.20
Lubrication of camshaft bearing - check						■							507-01.00

Overhaul to be repeated:

* Repeat 2.000 hours maintenance, with activities mentioned under 6.000 hours maintenance.
** Repeat 6.000 hours maintenance, with activities mentioned under 12.000 hours maintenance.
*** Repeat 12.000 hours maintenance, with activities mentioned under 24.000 hours maintenance.

L23/30H

720/750 RPM

Description ■ = Off-line check of condition (engine shutdown) ❑ = On-line check of condition (engine running) ● = Off-line service / overhaul (engine shutdown) ○ = On-line service / overhaul (engine running)	Check new/ overhauled parts after hours	Time Between Overhaul: 50	200	2000	* 6000	** 12000	*** 24000	Daily	Weekly	Monthly	3rd month	Observations	Working Card No
Operating Gear for Inlet Valves, Exhaust Valves and Fuel Injection Pumps:													
Roller guide for valve gear						■							508-01.00
Valve gear - valve bridge, spring, push rod, etc						■							508-01.10
Roller guide for fuel injection pump						■							508-01.05
Roller guide housing						■							508-01.10
Inlet and exhaust valve - check and adjustment of valve clearance				■									508-01.10
Lubricating of operating gear - check						❑							508-01.00 508-01.05
Control and Safety System, Automatics and Instruments:													
Safety, alarm and monitoring equipment											■		509-01.00
Lambda controller - adjustment											■		509-10.00
Governor - check oil level, see governor instruction book, section 509											❑		
Crankshaft and Main Bearing:													
Checking of main bearings alignment, (autolog)					■								510-01.00
Inspection af main bearing							■						510-01.05
Inspection of guide bearing					■								510-01.10
Vibration damper - check the condition						■							510-04.00
Lubricating of gear wheel for lub. oil pump and cooling water pump etc.							■						
Counterweight - retightening, see page 500.40	900*				■								
Main- and guide bearing cap - retightening	200				■								510-01.05 510-01.10
** If screw can be tightened then the screw have to be loosened and retightened after page 500.40.*													

Overhaul to be repeated:

* Repeat 2.000 hours maintenance, with activities mentioned under 6.000 hours maintenance.

** Repeat 6.000 hours maintenance, with activities mentioned under 12.000 hours maintenance.

*** Repeat 12.000 hours maintenance, with activities mentioned under 24.000 hours maintenance.

L23/30H
720/750 RPM

Description ■ = Off-line check of condition (engine shutdown) ⌟ = On-line check of condition (engine running) ● = Off-line service / overhaul (engine shutdown) ○ = On-line service / overhaul (engine running)	Check new/ overhauled parts after hours	Time Between Overhaul: 50	200	2000	* 6000	** 12000	*** 24000	Daily	Weekly	Monthly	3rd month	Observations	Working Card No
Engine Frame and Baseframe:													
Holdingdown bolts - retightening, see page 500.40	200				■								
Bolts between engine frame and base frame - retightening, see page 500.40	200				■								
For flexible mounted engines - check anti-vibration mountings	200				⌟								519-03.00
Safety cover - function test					■								511-01.00
Turbocharger System:													
Dry cleaning of turbine side		○											512-10.00
Water washing of compressor side		●											512-05.00
Cleaning of air filter - compressor side (see turbocharger instruction book)													
Turbocharger complete - dismantling, cleaning, inspection etc. (see turbocharger instruction book)													
Charging air cooler - cleaning and inspection												■	512-01.00
Charging air cooler housing - draining												○	
Exhaust pipe - compensator												■	
Compressed Air System:													
Air starter motor - dismantling and inspection												■	513-01.30
Function test - main starting valve, starting valve, main valves and emergency start valve											■		513-01.40
Dirt separator - dismantling and cleaning												●	
Muffler - dismantling and cleaning												●	
Compressed air system - draining												○	513-01.90
Compressed air system - check of the system											⌟		513-01.90

Overhaul to be repeated:

* Repeat 2.000 hours maintenance, with activities mentioned under 6.000 hours maintenance.
** Repeat 6.000 hours maintenance, with activities mentioned under 12.000 hours maintenance.
*** Repeat 12.000 hours maintenance, with activities mentioned under 24.000 hours maintenance.

L23/30H

720/750 RPM

■ = Off-line check of condition (engine shutdown)
⌟ = On-line check of condition (engine running)
● = Off-line service / overhaul (engine shutdown)
○ = On-line service / overhaul (engine running)

Description	Check new/ overhauled parts after hours	Time Between Overhaul: 50	200	2000	* 6000	** 12000	*** 24000	Daily	Weekly	Monthly	3rd month	Observations	Working Card No
Fuel Oil System and Injection Equipment:													
Fuel oil filter - dismantling and cleaning												●	514-01.15
Fuel oil feed pump												●	514-10.00
Fuel oil injection pump - dismantling and cleaning												●	514-01.05
Fuel injection valve - adjustment of opening pressure	200			■									514-01.10
Fuel oil high-pressure pipe - dismantling and check				■									514-01.05
Adjustment of the maximum combustion pressure												●	514-05.01
Fuel oil system - check the system											■		514-01.90
Nozzle cooling system - check the system											■		
Fuel oil - oil samples after every bunkering, see sec.504													
Lubricating Oil System:													
Lubricating oil pump - engine-driven						■							515-01.00
Lubricating oil filter - cleaning and exhange												○	515-01.10
Lubricating oil cooler												●	515-06.00
Prelubricating pump - el. driven						❑							515-01.05
Thermostatic valve												■	515-01.20
Centrifugal filter - cleaning and exhange of paper												○	515-15.00
Lubricating oil - oil samples, see section 504											❑		
Lubricating oil system - check the system											❑		515-01.90
Cooling Water System:													
Cooling water pump - engine-driven (sea water and fresh water)						■							516-04.00
Thermostatic valve											■		516-04.00
Cooling water system - check the system										❑			516-01.90
Cooling water system - water samples, see sec. 504								❑		❑			

08028-0D/H5250/94.08.12

Overhaul to be repeated:

* Repeat 2.000 hours maintenance, with activities mentioned under 6.000 hours maintenance.
** Repeat 6.000 hours maintenance, with activities mentioned under 12.000 hours maintenance.
*** Repeat 12.000 hours maintenance, with activities mentioned under 24.000 hours maintenance.

Auxiliary equipment

The precondition of the reliability and operating economy of the GenSet will to a great extent depend on correct operation and proper maintenance of all equipment in the Power Plant.

All auxiliary equipment in the Power Plant must be operated as described in the operation- and maintenance instructions from the manufacturer of the components.

It is also essential that the engine room personnel is fully acquainted with the functions and mode of operation of the auxiliary equipment.

L23/30H

		Normal Value at Full load		Alarm Set point		Autostop of engine	
Lubricating Oil System							
Temp. before cooler (outlet engine)	SAE 30	TI 20	60-75° C	TAH 20	90° C		
	SAE 40	TI 20	65-82° C	TAH 20	100° C		
Temp. after cooler (inlet engine)	SAE 30	TI 22	45-65° C	TAH 22	75° C	TSH 22	85° C
	SAE 40	TI 22	50-72° C	TAH 22	85° C	TSH 22	95° C
Pressure after filter (inlet eng)		PI 22	3-4 bar	PAL 22	3 bar	PSL 22	2.5 bar
Elevated pressure i.g. when centrifugal filter installed		PI 22	4-5 bar	PAL 22	4 bar	PSL 22	2.5 bar
Pressure drop across filter		PDAH 21-22	0.5-1 bar	PDAH 21-22	1.5 bar		
Prelubricating pressure		PI 25	0.1-0.5 bar	LAL 25	level switch		
Pressure inlet turbocharger		PI 23	1.5 ±0.2 bar				
Lub. oil, level in base frame				LAL 28/LAH 28	low/high level		
Temp. main bearings		TE 29	75-85° C	TAH 29	95° C		
Fuel Oil System							
Pressure after filter	MDO	PI 40	2-3 bar	PAL 40	1.5 bar		
	HFO	PI 40	(A)	PAL 40	4 bar		
Leaking oil				LAH 42	leakage		
Press. nozz. cool. oil, inlet eng.		PI 50	2-3 bar	PAL 50	1.5 bar (C)		
Temp. nozz. cool. oil, outlet eng.		TI 51	80-90° C		(C)		
Cooling Water System							
Press. LT-system, inlet engine		PI 01	1-2.5 bar	PAL 01	0.4 bar + (B)		
Press. HT-system, inlet engine		PI 10	1-3.0 bar	PAL 10	0.4 bar + (B)		
Temp. HT-system, inlet engine		TI 10	60-75° C				
Temp. HT-system, outl. cyl.units		TI 11	70-85° C				
Temp. HT-system, outlet engine				TAH 12	90° C	TSH 12	95° C
				TAH 12-2	93° C		
Temp. raise across cyl. units			max. 10° C				
Exhaust Gas and Charge Air							
Exh. gas temp. before TC		TI 62	425-475° C	TAH 62	550° C		
				TAH 62-2	600° C		
Exh. gas temp. outlet cyl.		TI 60	280-390° C	TAH 60	420° C		
Diff. between individual cyl.				TAD 60	average ±50° C		
Exh. gas temp. after TC		TI 61	275-350° C*	TAH 61	500° C		
		TI 61	320-390° C**				
Ch. air press. after cooler		PI 31	2-2.5 bar				
Ch. air temp. after cooler		TI 31	35-55° C	TAH 31	65° C		
Compressed Air System							
Press. inlet engine		PI 70	7-9 bar	PAL 70	7 bar		
Speed Control System							
Engine speed							
Mechanical							
Elec.		SI 90	720 rpm	SAH 81	815 rpm	SSH 81	825 rpm
Mechanical						SSH 81	815 rpm
Elec.		SI 90	750 rpm	SAH 81	850 rpm	SSH 81	860 rpm
Mechanical						SSH 81	850 rpm
Elec.		SI 90	900 rpm	SAH 81	1015 rpm	SSH 81	1030 rpm
						SSH 81	1015 rpm
Turbocharger speed		SI 89		SAH 89	(D)		

Specific plants will not comprise alarm equipment and autostop for all parameters listed above. For specific plants additional parameters can be included. For remarks to some parameters, see overleaf.

* for 720/750 rpm ** for 900 rpm.

M3-1

[redacted]

ZHENJIANG MARINE DIESEL WORKS

ZJMD — MAN B&W

Instruction Book

L23/30H

Shipyard :

Ship name :

Hull No. :

Rule :

Add: 2[redacted]angtang[redacted]-Zhenjiang

Jiangsu Province P.R.China

Tel: [redacted]

Fax: +86 511 45[redacted]0033

ZJMD — MAN B&W

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General

Warning !

(Marine engines only)

It is important that all MAN B&W Diesel A/S engines are operated within the given specifications and performance tolerances specified in the engines' Technical Files and are maintained according to the MAN B&W Diesel A/S maintenance instructions in order to comply with given emissions regulations.

In accordance with Chapter I of the Code of Federal Regulations, Part 94, Subpart C, §94.211 NOTICE is hereby given that Chapter I of the Code of Federal Regulations, Part 94, Subpart K, §94.1004 requires that the emissions related maintenance of the diesel engine shall be performed as specified in MAN B&W Diesel A/S instructions including, but not limited to, the instructions to that effect included in the Technical File.

08028-0D/H5250/94.08.12

L23/30H

Trouble	Possible Cause	Trouble Shooting
Exhaust temperature(s) increase(s)	(All cyls.) Increased charging air temperature due to ineffective air coolers.	See Working Card 512-01.00.
	(All cyls.) Fouling or air and gas passages.	Reduce load and water-wash turbine. Clean air filters and coolers.
	(All cyls.) Insufficient cleaning of fuel oil or changed combustion characteristics.	See Description 504.25.
	(All cyls.) Wrong position of camshaft (maladjustment).	Check P_{max}. Check camshaft adjustment.
	(single cyls.) Fuel valve or valve nozzle defective.	See Working Card 514-01.10.
	(Single cyls.) Leaky exhaust valves (1).	Check the valve clearance. Replace cyl. head with defective valve.
	(Single cyls.) Blow-byleaky combustion chamber (2).	See Working Card 506-01.00.
	(Single cyls.) Damaged fuel pump cam.	Replace the single camshaft section.
Exhaust temperature(s) decrease(s)	(All cyls.) Decreased charging air temperature.	Check that thermostatic valve (bypass valve) in cold water system is working properly and correctly set.
	(Single cyls.) Air in fuel pump(s) and fuel injection valve(s).	Venting of fuel pump(s) until fuel without air bubbles appears. Check feed pump pressure.
	(Single cyls.) Spindle in fuel valve sticking (3).	Change and overhaul defective fuel valve.
	(Single cyls.) Fuel pump plunger sticking or leaking.	Change fuel pump plunger/barrel assembly.
Engine RPM decreases	Pressure before fuel pumps too low.	Raise fuel oil feed pump pressure to normal. Check filter.
	Fuel valve or fuel pump defective.	Change defective valve or pump.
	Water in the fuel.	Drain off water and vent the fuel pumps.
	Governor defective (4).	Replace defective governor.
	Increased internal friction in engine (5).	See "Ignition in Crankcase".

Cont.

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Trouble	Possible Cause	Trouble Shooting
Engine stops.	Shutdown.	Check pressure and temperatures. If OK, check for faults in shutdown devices. See also Starting Failures.
Smoky exhaust.	Turbine RPM lagging behind engine RPM.	Reasonably smoke is normal when RPM increases; no measures called for. If smoky exhaust during normal running, clean turbine(s) and check valves.
	Air supply too low.	Fouling of air and gas passages, see section 512.
	Fuel valves or nozzles defective.	See Working Card 514-01.10.
	"Trumpets" at nozzle holes. Failure of cooling (especially during heavy-oil operation) (6).	Overhaul fuel valves.
Exhaust valve knocking.	Adjusting screw for valve setting loose. Push rod thrust disc damaged.	Inspect and replace defective parts as necessary.
Rising cooling water temperature.	Pump stopped. Increased friction (7).	Stop the engine. Check the cooling water. Find cause of increased friction and remedy fault.
Lubricating oil pressure fails.	Lubricating oil pump defective. Filters/cooler fouled.	Stop the engine. For further details, see "Ignition in crankcase". See also Working Card 515-01.00 for lub. oil pump and Working Card 515-01.10 for the lub. oil filter

Remarks

1) This manifests itself by the exhaust temperature rising and falling of the compression and maximum combustion pressure of the respective cylinder dropping.

To limit the damage to the valves these should be changed immediately, if possible, or the fuel pump of the cylinder concerned should be put out of operation by moving the index to stop and locking it in this position.

2) Blow-by means a serious danger of piston seizure, and the engine must, if possible, be stopped and the piston in question pulled. If this is not possible, the fuel pump index must, as described above, be moved to stop. Leaky piston rings will normally result in a heavy excess pressure in the crankcase.

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3) If this happens the fuel pump barrel and plunger must be changed, and if, it is necessary to increase the fuel pump index by more than 10 index degrees, to obtain full load of the respective cylinder, the fuel pump is worn out in most cases. Usually this is confirmed by inspection of the fuel pump plunger on which the helical cut-off edge will show a pitted and corroded area where material is plucked out. In that case the pump can be provided with a new barrel and plunger.

4) The governor will not reduce the fuel pump delivery to zero in case of, for instance, failure of the governor oil pump, but the engine speed will start fluctuating.

When the governor is defective the engine is protected against racing by the overspeed trip, i.e. the engine is stopped automatically in case of excessive speed. It is therefore, essential, that the overspeed trip is kept in perfect order. Regarding governor failure, see special instruction book.

5) Usually a bearing failure will not slow down the engine appreciably, but the seizure of a piston in the cylinder liner might do so. Repair is necessary before starting the engine again. Feelover and look out for oil mist.

6) If the cooling water temperature for the entire engine has risen to 90-100° C, it should be checked whether steam has developed by opening the test cocks, if fitted on the discharge from cylinders. If this is the case, there is no water on the cooling surfaces, which may therefore be heated unduly. To avoid heat stresses arising in cylinder liners and cylinder heads, if the water returns too early, the engine should be stopped and left to cool, while the discharge valve is closed. After 15 minutes it is opened a little to allow the water to rise slowly in the cooling jackets. Check filling at test cocks. Make crankcase inspection to ascertain that internal water leakage has not arisen. Remember slow turning with open indicator valves at subsequent starting-up.

7) If the lubricating oil pressure drops below the minimum mentioned in "Data" find the cause of the pressure drop and remedy the defect before re-starting the engine. Feel over 5-15-30 minutes after starting, and again when full load is obtained. See section 502.

M3-1

(b) (7)(C), (b) (6)

ZHENJIANG MARINE DIESEL WORKS

ZJMD — MAN B&W

Instruction Book

L23/30H

Shipyard :

Ship name :

Hull No. :

Rule :

Add: 2[illegible]angtang[illegible]Zhenjiang

Jiangsu Province P.R.China

Tel: [redacted]

Fax: +86 511 451 0033

ZJMD — MAN B&W

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Description	Document no	Notes
Warning	000.00	-

Description	Document no	Notes
Main data for engine	500.00	-
Introduction	500.01 (02)	-
Safety	500.02 (01H)	-
Cross section	500.05 (06H)	-
Key for engine designation	500.10 (02)	-
Designation of cylinders	500.11 (01H)	-
Engine rotation clockwise	500.12 (02H)	-
Code identification for instruments	500.20 (01H)	-
Introduction to planned maintenance programme	500.24 (02H)	-
Planned maintenance programme	500.25 (19H)	-
Planned maintenance programme	500.25 (22H)	-
Operation data and set points	500.30 (35H)	-
Data for pressure and tolerance	500.35 (15H)	-
Data for tightening torque	500.40 (21H)	720/750 rpm
Data for tightening torque	500.40 (22H)	900 rpm
Declaration of weight	500.45 (01H)	-
Ordering of spare parts	500.50 (01H)	-
Service letters	500.55 (01H)	-
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General

Warning !

(Marine engines only)

It is important that all MAN B&W Diesel A/S engines are operated within the given specifications and performance tolerances specified in the engines' Technical Files and are maintained according to the MAN B&W Diesel A/S maintenance instructions in order to comply with given emissions regulations.

In accordance with Chapter I of the Code of Federal Regulations, Part 94, Subpart C, §94.211 NOTICE is hereby given that Chapter I of the Code of Federal Regulations, Part 94, Subpart K, §94.1004 requires that the emissions related maintenance of the diesel engine shall be performed as specified in MAN B&W Diesel A/S instructions including, but not limited to, the instructions to that effect included in the Technical File.

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General

The overhaul intervals are based on operation on a specified fuel oil quality at normal service output, which means 70-100% of MCR.

In the long run, it is not possible to obtain a secure and optimal economical running without an effective maintenance system.

With the structure and amount of information in the maintenance programme, it can be integrated in the entire ship's/power station's maintenance system or it can be used separately.

The crux of the maintenance system is the key diagram, see page 500.25, indicating the inspection intervals for the components/systems, so that the crew can make the necessary overhauls, based on the engines' condition and/or the time criteria.

The stated recommended intervals are only for guidance as different service conditions, the quality of the fuel oil and the lubricating oil, treatment of the cooling water, etc, will decisively influence the actual service results and thus the intervals between necessary overhauls.

Experience with the specific plant/crew is to be used for adjustment of time between overhaul. Further it is to be used for adjusting the timetable stated for guidance in the working cards.

Working Cards

Each of the working cards can be divided into two: a front page and one or several pages, describing and illustrating the maintenance work.

The front page indicates the following:

1. Safety regulations, which MUST be carried out before the maintenance work can start.

2. A brief description of the work.

3. Reference to work, which must be carried out, if any, before the maintenance work can start.

4. Related procedures - indicates other works, depending on this work - or works which would be expedient to carry out.

5. Indicates x number of men in x number of hours for accomplishing the work.

The stated consumption of hours is only intended as a guide.

Experience with the specific station/crew may lead to a bringing up-to-date.

6. Refers to data, which are required for carrying out the work.

7. Special tools, which must be used. Please note that not all tools are standard equipment.

8. Various requisite hand tools.

9. Indicates the components/parts, which it is advisible to replace during the maintenance work. Please note, that this is a condition for the intervals stated.

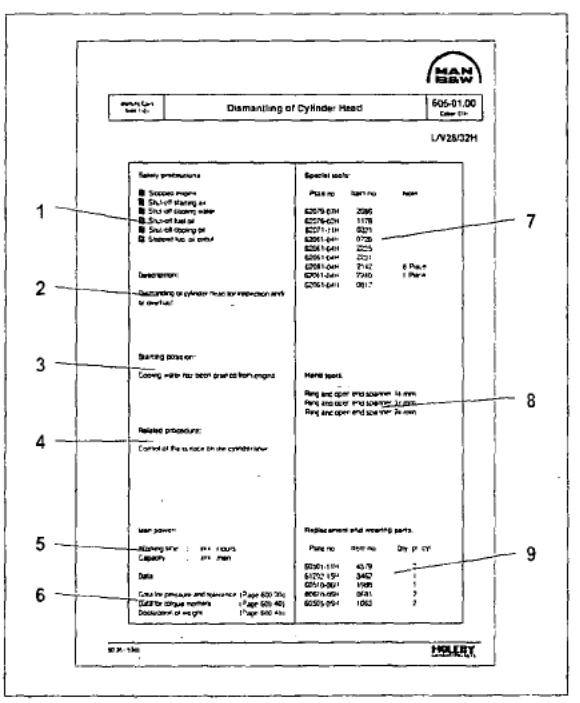

Fig 1. Guidance instruction for working cards.

L23/30H
900 RPM

Description ● = Overhaul to be carried out ■ = Check the condition	Check new/ overhauled parts after hours	Time Between Overhaul: 50	200	2000	6000	12000	24000	Daily	Weekly	Monthly	3rd month	Observations	Working Card No
Operating of Engine:													
Readings of data for engine and alternor, with reference to "Engine Performance Data", section 502.01									■				502-01.00
Cylinder Head:													
Inlet and exhaust valve - overhaul and regrinding of spindel and valve seat						●							505-01.10
Inspection of inlet, exhaust valves and valve guide						■							505-01.05
Check of valve rotators' rotation during engine rotation .				■									505-01.05
Sleeve for fuel injector						■							505-01.30
Safety valve - overhaul and adjustment of opening pressure						■							505-01.25
Indicator valve						■						■	505-01.26
Cylinder head cooling water space - inspection						■							505-01.45
Cylinder head nut - retightening	200												505-01.40
Piston, Connecting Rod and Cylinder Liner:													
Inspection of piston						■							506-01.10
Piston ring and scraper ring						●							506-01.10
Piston pin and bush for connecting rod - check of clearance						■							506-01.15
Connecting rod - measuring of big-end bore						■							506-01.15
Inspection of big-end bearing shells						■							506-01.16
Connecting rod - retightening	200				■								506-01.25
Cylinder liner - cleaning, honing and measuring						●							506-01.35
Cylinder liner removed - check the water space and wear ring in frame							■						506-01.40
Camshaft and Camshaft Drive:													
Camshaft - inspection of gear wheels, bolts, connections etc.	200					■							507-01.00
Camshaft bearing - inspection of clearance						■							507-01.05
Camshaft adjustment - check the condition						■							507-01.20
Lubrication of camshaft bearing - check						■							507-01.00

L23/30H

900 RPM

Description (● = Overhaul to be carried out, ■ = Check the condition)	Check new/ overhauled parts after hours	Time Between Overhaul: 50	200	2000	6000	12000	24000	Daily	Weekly	Monthly	3rd month	Observations	Working Card No
Operating Gear for Inlet Valves, Exhaust Valves and Fuel Injection Pumps:													
Roller guide for valve gear						■							508-01.00
Valve gear - valve bridge, spring, push rod, etc						■							508-01.10
Roller guide for fuel injection pump						■							508-01.05
Roller guide housing						■							508-01.10
Inlet and exhaust valve - check and adjustment of valve clearance				■									508-01.10
Lubricating of operating gear - check						■							508-01.00 508-01.05
Control and Safety System, Automatics and Instruments:													
Safety, alarm and monitoring equipment											■		509-01.00
Lambda controller - adjustment											■		509-10.00
Governor - check oil level, see governor instruction book, section 509											■		
Crankshaft and Main Bearing:													
Checking of main bearings alignment, (autolog)					■								510-01.00
Inspection af main bearing							■						510-01.05
Inspection of guide bearing					■								510-01.10
Vibration damper - check the condition						■							510-04.00
Lubricating of gear wheel for lub. oil pump and cooling water pump etc.							■						
Counterweight - retightening, see page 500.40	900*				■								
Main- and guide bearing cap - retightening	200				■								510-01.05 510-01.10

** If screw can be tightened then the screw have to be loosened and retightened after page 500.40.*

L23/30H
900 RPM

Description ● = Overhaul to be carried out ■ = Check the condition	Check new/ overhauled parts after hours	Time Between Overhaul: 50	200	2000	6000	12000	24000	Daily	Weekly	Monthly	3rd month	Observations	Working Card No
Engine Frame and Baseframe:													
Holding down bolts - retightening, see page 500.40	200				■								
Bolts between engine frame and base frame - retightening, see page 500.40	200				■								
For flexible mounted engines - check anti-vibration mountings	200				■								519-03.00
Safety cover - function test					■								511-01.00
Turbocharger System:													
Wet cleaning of turbine side										●			512-15.00
Water washing of compressor side		●											512-05.00
Cleaning of air filter - compressor side (see turbocharger instruction book)													
Turbocharger complete - dismantling, cleaning, inspection etc. (see turbocharger instruction book)													
Charging air cooler - cleaning and inspection												■	512-01.00
Charging air cooler housing - draining												●	
Exhaust pipe - compensator												■	
Compressed Air System:													
Air starter motor - dismantling and inspection												■	513-01.30
Function test - main starting valve, starting valve, main valves and emergency start valve											■		513-01.40
Dirt separator - dismantling and cleaning												●	
Muffler - dismantling and cleaning												●	
Compressed air system - draining												●	513-01.90
Compressed air system - check of the system											■		513-01.90

L23/30H
900 RPM

● = Overhaul to be carried out
■ = Check the condition

Description	Check new/ overhauled parts after hours	Time Between Overhaul: 50	200	2000	6000	12000	24000	Daily	Weekly	Monthly	3rd month	Observations	Working Card No
Fuel Oil System and Injection Equipment:													
Fuel oil filter - dismantling and cleaning												●	514-01.15
Fuel oil feed pump												●	514-10.00
Fuel oil injection pump - dismantling and cleaning												●	514-01.05
Fuel injection valve - adjustment of opening pressure	200			■									514-01.10
Fuel oil high-pressure pipe - dismantling and check				■									514-01.05
Adjustment of the maximum combustion pressure												●	514-05.01
Fuel oil system - check the system											■		514-01.90
Nozzle cooling system - check the system if installed											■		514-01.90
Fuel oil - oil samples after every bunkering, see sec.504													
Lubricating Oil System:													
Lubricating oil pump - engine driven						■							515-01.00
Lubricating oil filter - cleaning and exhange												●	515-01.10
Lubricating oil cooler												●	515-06.00
Prelubricating pump - el.-driven						■							515-01.05
Thermostatic valve												■	515-01.20
Centrifugal filter - cleaning and exhange of paper												●	515-15.00
Hand pump												●	515-10.00
Lubricating oil - oil samples, see section 504											■		
Lubricating oil system - check the system											■		515-01.90
Cooling Water System:													
Cooling water pump - engine-driven (sea water and fresh water)						■							516-04.00
Thermostatic valve											■		516-04.00
Cooling water system - check the system										■			516-01.90
Cooling water system - water samples, see sec. 504								■		■			

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L23/30H
720/750 RPM

Description ■ = Off-line check of condition (engine shutdown) ⌐ = On-line check of condition (engine running) ● = Off-line service / overhaul (engine shutdown) ○ = On-line service / overhaul (engine running)	Check new/ overhauled parts after hours	Time Between Overhaul: 50	200	2000	* 6000	** 12000	*** 24000	Daily	Weekly	Monthly	3rd month	Observations	Working Card No
Operating of Engine:													
Readings of data for engine and alternator with reference to "Engine Performance Data", section 502.01									■				502-01.00
Cylinder Head:													
Inlet and exhaust valve - overhaul and regrinding of spindle and valve seat						●							505-01.10
Inspection of inlet, exhaust valves and valve guide						■							505-01.05
Check of valve rotators' rotation during engine rotation .				■									505-01.05
Sleeve for fuel injector						■							505-01.30
Safety valve - overhaul and adjustment of opening pressure						■							505-01.25
Indicator valve						■						■	505-01.26
Cylinder head cooling water space - inspection						■							505-01.45
Cylinder head nut - retightening	200												505-01.40
Piston, Connecting Rod and Cylinder Liner:													
Inspection of piston						■							506-01.10
Piston ring and scraper ring						●							506-01.10
Piston pin and bush for connecting rod - check of clearance						■							506-01.15
Connecting rod - measuring of big-end bore						■							506-01.15
Inspection of big-end bearing shells						■							506-01.16
Connecting rod - retightening	200				■								506-01.25
Cylinder liner - cleaning, honing and measuring						●							506-01.35
Cylinder liner removed - check the water space and wear ring in frame							■						506-01.40
Camshaft and Camshaft Drive:													
Camshaft - Inspection of gear wheels, bolts, connections etc.	200					■							507-01.00
Camshaft bearing - inspection of clearance						■							507-01.05
Camshaft adjustment - check the condition						■							507-01.20
Lubrication of camshaft bearing - check						■							507-01.00

Overhaul to be repeated:

* Repeat 2.000 hours maintenance, with activities mentioned under 6.000 hours maintenance.
** Repeat 6.000 hours maintenance, with activities mentioned under 12.000 hours maintenance.
*** Repeat 12.000 hours maintenance, with activities mentioned under 24.000 hours maintenance.

L23/30H

720/750 RPM

Description ■ = Off-line check of condition (engine shutdown) ❑ = On-line check of condition (engine running) ● = Off-line service / overhaul (engine shutdown) ○ = On-line service / overhaul (engine running)	Check new/ overhauled parts after hours	Time Between Overhaul: 50	200	2000	* 6000	** 12000	*** 24000	Daily	Weekly	Monthly	3rd month	Observations	Working Card No
Operating Gear for Inlet Valves, Exhaust Valves and Fuel Injection Pumps:													
Roller guide for valve gear						■							508-01.00
Valve gear - valve bridge, spring, push rod, etc						■							508-01.10
Roller guide for fuel injection pump						■							508-01.05
Roller guide housing						■							508-01.10
Inlet and exhaust valve - check and adjustment of valve clearance				■									508-01.10
Lubricating of operating gear - check						❑							508-01.00 508-01.05
Control and Safety System, Automatics and Instruments:													
Safety, alarm and monitoring equipment											■		509-01.00
Lambda controller - adjustment											■		509-10.00
Governor - check oil level, see governor instruction book, section 509											❑		
Crankshaft and Main Bearing:													
Checking of main bearings alignment, (autolog)					■								510-01.00
Inspection af main bearing							■						510-01.05
Inspection of guide bearing					■								510-01.10
Vibration damper - check the condition						■							510-04.00
Lubricating of gear wheel for lub. oil pump and cooling water pump etc.							■						
Counterweight - retightening, see page 500.40	900*				■								
Main- and guide bearing cap - retightening	200				■								510-01.05 510-01.10
** If screw can be tightened then the screw have to be loosened and retightened after page 500.40.*													

Overhaul to be repeated:

* Repeat 2.000 hours maintenance, with activities mentioned under 6.000 hours maintenance.

** Repeat 6.000 hours maintenance, with activities mentioned under 12.000 hours maintenance.

*** Repeat 12.000 hours maintenance, with activities mentioned under 24.000 hours maintenance.

L23/30H
720/750 RPM

■ = Off-line check of condition (engine shutdown)
⌟ = On-line check of condition (engine running)
● = Off-line service / overhaul (engine shutdown)
○ = On-line service / overhaul (engine running)

Description	Check new/ overhauled parts after hours	Time Between Overhaul: 50	200	2000	* 6000	** 12000	*** 24000	Daily	Weekly	Monthly	3rd month	Observations	Working Card No
Engine Frame and Baseframe:													
Holdingdown bolts - retightening, see page 500.40	200				■								
Bolts between engine frame and base frame - retightening, see page 500.40	200				■								
For flexible mounted engines - check anti-vibration mountings	200				⌟								519-03.00
Safety cover - function test					■								511-01.00
Turbocharger System:													
Dry cleaning of turbine side		○											512-10.00
Water washing of compressor side		●											512-05.00
Cleaning of air filter - compressor side (see turbocharger instruction book)													
Turbocharger complete - dismantling, cleaning, inspection etc. (see turbocharger instruction book)													
Charging air cooler - cleaning and inspection												■	512-01.00
Charging air cooler housing - draining												○	
Exhaust pipe - compensator												■	
Compressed Air System:													
Air starter motor - dismantling and inspection												■	513-01.30
Function test - main starting valve, starting valve, main valves and emergency start valve											■		513-01.40
Dirt separator - dismantling and cleaning												●	
Muffler - dismantling and cleaning												●	
Compressed air system - draining												○	513-01.90
Compressed air system - check of the system											⌟		513-01.90

Overhaul to be repeated:

* Repeat 2.000 hours maintenance, with activities mentioned under 6.000 hours maintenance.
** Repeat 6.000 hours maintenance, with activities mentioned under 12.000 hours maintenance.
*** Repeat 12.000 hours maintenance, with activities mentioned under 24.000 hours maintenance.

L23/30H

720/750 RPM

■ = Off-line check of condition (engine shutdown)
⌟ = On-line check of condition (engine running)
● = Off-line service / overhaul (engine shutdown)
○ = On-line service / overhaul (engine running)

Description	Check new/ overhauled parts after hours	Time Between Overhaul: 50	200	2000	* 6000	** 12000	*** 24000	Daily	Weekly	Monthly	3rd month	Observations	Working Card No
Fuel Oil System and Injection Equipment:													
Fuel oil filter - dismantling and cleaning												●	514-01.15
Fuel oil feed pump												●	514-10.00
Fuel oil injection pump - dismantling and cleaning												●	514-01.05
Fuel injection valve - adjustment of opening pressure	200			■									514-01.10
Fuel oil high-pressure pipe - dismantling and check				■									514-01.05
Adjustment of the maximum combustion pressure												●	514-05.01
Fuel oil system - check the system											■		514-01.90
Nozzle cooling system - check the system											■		
Fuel oil - oil samples after every bunkering, see sec.504													
Lubricating Oil System:													
Lubricating oil pump - engine-driven						■							515-01.00
Lubricating oil filter - cleaning and exhange												○	515-01.10
Lubricating oil cooler												●	515-06.00
Prelubricating pump - el. driven						❑							515-01.05
Thermostatic valve												■	515-01.20
Centrifugal filter - cleaning and exhange of paper												○	515-15.00
Lubricating oil - oil samples, see section 504											❑		
Lubricating oil system - check the system											❑		515-01.90
Cooling Water System:													
Cooling water pump - engine-driven (sea water and fresh water)						■							516-04.00
Thermostatic valve											■		516-04.00
Cooling water system - check the system										❑			516-01.90
Cooling water system - water samples, see sec. 504								❑		❑			

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Overhaul to be repeated:

* Repeat 2.000 hours maintenance, with activities mentioned under 6.000 hours maintenance.
** Repeat 6.000 hours maintenance, with activities mentioned under 12.000 hours maintenance.
*** Repeat 12.000 hours maintenance, with activities mentioned under 24.000 hours maintenance.

Auxiliary equipment

The precondition of the reliability and operating economy of the GenSet will to a great extent depend on correct operation and proper maintenance of all equipment in the Power Plant.

All auxiliary equipment in the Power Plant must be operated as described in the operation- and maintenance instructions from the manufacturer of the components.

It is also essential that the engine room personnel is fully acquainted with the functions and mode of operation of the auxiliary equipment.

L23/30H

		Normal Value at Full load		Alarm Set point		Autostop of engine	
Lubricating Oil System							
Temp. before cooler (outlet engine)	SAE 30	TI 20	60-75° C	TAH 20	90° C		
	SAE 40	TI 20	65-82° C	TAH 20	100° C		
Temp. after cooler (inlet engine)	SAE 30	TI 22	45-65° C	TAH 22	75° C	TSH 22	85° C
	SAE 40	TI 22	50-72° C	TAH 22	85° C	TSH 22	95° C
Pressure after filter (inlet eng)		PI 22	3-4 bar	PAL 22	3 bar	PSL 22	2.5 bar
Elevated pressure i.g. when centrifugal filter installed		PI 22	4-5 bar	PAL 22	4 bar	PSL 22	2.5 bar
Pressure drop across filter		PDAH 21-22	0.5-1 bar	PDAH 21-22	1.5 bar		
Prelubricating pressure		PI 25	0.1-0.5 bar	LAL 25	level switch		
Pressure inlet turbocharger		PI 23	1.5 ±0.2 bar				
Lub. oil, level in base frame				LAL 28/LAH 28	low/high level		
Temp. main bearings		TE 29	75-85° C	TAH 29	95° C		
Fuel Oil System							
Pressure after filter	MDO	PI 40	2-3 bar	PAL 40	1.5 bar		
	HFO	PI 40	(A)	PAL 40	4 bar		
Leaking oil				LAH 42	leakage		
Press. nozz. cool. oil, inlet eng.		PI 50	2-3 bar	PAL 50	1.5 bar (C)		
Temp. nozz. cool. oil, outlet eng.		TI 51	80-90° C		(C)		
Cooling Water System							
Press. LT-system, inlet engine		PI 01	1-2.5 bar	PAL 01	0.4 bar + (B)		
Press. HT-system, inlet engine		PI 10	1-3.0 bar	PAL 10	0.4 bar + (B)		
Temp. HT-system, inlet engine		TI 10	60-75° C				
Temp. HT-system, outl. cyl.units		TI 11	70-85° C				
Temp. HT-system, outlet engine				TAH 12	90° C	TSH 12	95° C
				TAH 12-2	93° C		
Temp. raise across cyl. units			max. 10° C				
Exhaust Gas and Charge Air							
Exh. gas temp. before TC		TI 62	425-475° C	TAH 62	550° C		
				TAH 62-2	600° C		
Exh. gas temp. outlet cyl.		TI 60	280-390° C	TAH 60	420° C		
Diff. between individual cyl.				TAD 60	average ±50° C		
Exh. gas temp. after TC		TI 61	275-350° C*	TAH 61	500° C		
		TI 61	320-390° C**				
Ch. air press. after cooler		PI 31	2-2.5 bar				
Ch. air temp. after cooler		TI 31	35-55° C	TAH 31	65° C		
Compressed Air System							
Press. inlet engine		PI 70	7-9 bar	PAL 70	7 bar		
Speed Control System							
Engine speed							
Mechanical						SSH 81	825 rpm
Elec.		SI 90	720 rpm	SAH 81	815 rpm	SSH 81	815 rpm
Mechanical						SSH 81	860 rpm
Elec.		SI 90	750 rpm	SAH 81	850 rpm	SSH 81	850 rpm
Mechanical						SSH 81	1030 rpm
Elec.		SI 90	900 rpm	SAH 81	1015 rpm	SSH 81	1015 rpm
Turbocharger speed		SI 89		SAH 89	(D)		

Specific plants will not comprise alarm equipment and autostop for all parameters listed above. For specific plants additional parameters can be included. For remarks to some parameters, see overleaf.

* for 720/750 rpm ** for 900 rpm.

08028-0D/H5250/94.08.12

M3-2

(b) (7)(C), (b) (6)

ZJMD-MAN B&W 6L23/30H

MAIN DIESEL GENERATING-SETS

DRAWING FOR FINAL

Shipyard	:	GUANGZHOU SHIPYARD INTERNATIONAL CO., LTD. / 50500DWT
Subject	:	3 × 6L23/30H Gensets/Ship
Rule	:	ABS
Fuel oil	:	HFO, 380cSt/50℃
Power	:	3 × 910 kW
Speed	:	900 r/min

DATE: Jan. 30, 2008

ZHENJIANG CME CO., LTD

[redacted]

Main Particulars

B 10 01 1

L23/30H

Cycle	:	4-stroke
Configuration	:	In-line
Cyl. Nos. available	:	5-6-7-8
Power range	:	650-1280 kW (885-1740 BHP)
Speed	:	720/750/900 rpm
Bore	:	225 mm
Stroke	:	300 mm
Stroke/bore ratio	:	1.33:1
Piston area per cyl.	:	398 cm²
Swept volume per cyl.	:	11.9 ltr.
Compression ratio	:	13:1
Max. combustion pressure	:	130 bar*
Turbocharging principle	:	Constant pressure system and intercooling
Fuel quality acceptance	:	HFO up to 700 cSt/50° C (BSMA 100-M9)

Power lay-out		MCR version		
Speed	rpm	720	750	900
Mean piston speed	m/sec.	7.2	7.5	9.0
Mean effective pressure	bar	18.2	18.1	17.9
Max. combustion pressure	bar	130	130	130*
Power per cylinder	kW/cyl. BHP/cyl.	130 175	135 185	160 217

Overload rating (up to 10%) allowable in 1 hour for every 12 hours				
Power per cylinder	kW/cyl. BHP/cyl.	145 190	150 205	176 239

*For L23/30H-900 rpm version a pressure of 135 bar measured at the indicator cock correspond to 130 bar in the combustion chamber.

SPECIFICATION OF GENERATOR

USE:	DIESEL ENGINE GENERATOR	QUANTITY / SHIP:	3SETS / SHIP
TYPE OF ENCLOSURE:	IP44	APPLIED CLASS:	ABS
COOLING SYSTEM:	AIR TO WATER	AMBIENT TEMP.	45 ℃
EXCITING SYSTEM:	SELF EXCITING BRUSHLESS	INSULATION CLASS:	F
COUPLING METHOD	DIRECT RIGID	TEMPERATURE RISE:	F

SPECIFICATION

TYPE	HFJ6 508-84K
OUTPUT CAPACITY	1137.5KVA
RATING	CONTINUOUS
PHASES, WIRE, CONN.	3PH, 3W, Y (DAMPER WINDING)
VOLTAGE	AC 450 V
CURRENT	1459.4A
FREQUENCY	60 Hz
POLES	8 POLE
SPEED	900 RPM
POWER FACTOR	0.8 LAGGING
GD^2 / J	232.4 Kg.m^2 /58.1 Kg.m^2
ROTOR WEIGHT	1718Kg
TOTAL WEIGHT	5.2 ton

CHARACTERISTICS

OVER CURRENT	150 % / 2 min
VARIATION OF GENERATOR VOLTAGE	± 2.5%
OVER SPEED	120 % / 2 min
VOLTAGE ADJUST	± 5.0%
MOUNTING METHOD	B16

REACTANCE & TIME CONSTANT

(calculated value)

Xd : 335% (UNSATURATED)	T'd : 0.0784 SEC.
X'd : 18.4% (SATURATED)	T"d : 0.0026 SEC.
X''d : 10.3% (SATURATED)	Ta : 0.0216 SEC.
RA : 1.27%	

NOTE

BEARING

TYPE OF BEARING	ROLLER BEARING	
LOCATION	DRIVE END	NON DRIVE END
SIZE	-	NU326 C3
OIL QUANTITY	-	456g
LUB. SYSTEM	-	GREASE LUB.
OIL GRADE	ZL-3	
INLET PRESSURE	-	
INLET TEMP.	-	

AIR COOLER

CAPACITY	60 KW
FULID	FRESH WATER
QUANTITY	15m^3/h
INLET TEMP.	36℃
TEMP. RISE	4℃
PRESSURE DROP	
DRY WEIGHT	-kg

DETECTING SYSTEM

WINDING TEMP.	PT100 OHM x 2EA / PHASE
AIR FILTER	
BEARING TEMP.	PT100 OHM
COOLING AIR TEMP.	PT100 OHM
LEAKAGE DETECTOR	N/C CONTACT: 2EA/SET

CONFIRMED ITEM BY OWNER

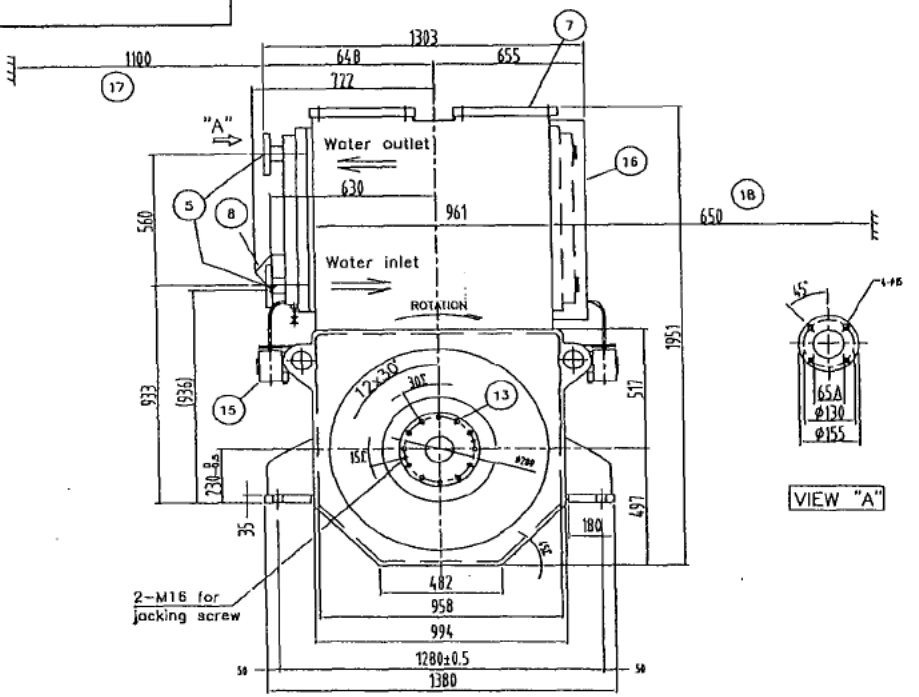
* LOCATION OF TERMINAL BOX. (VIEWED FROM PRIME MOVER)	
* CABLE ENTRY	
SPACE HEATER	1PH, 230V, 315W
PAINTING COLOR	
LOCATION OF AIR COOLER FLANGE (VIEWED FROM PRIME MOVER)	
ROTATING DIRECTION (VIEWED FROM PRIME MOVER)	C.C.W

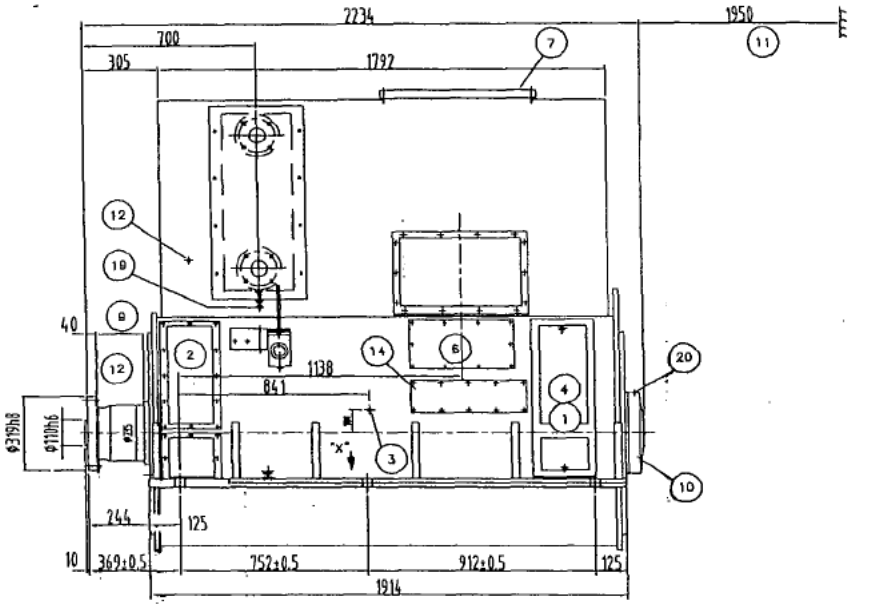
REV.	CONTENTS	DATE

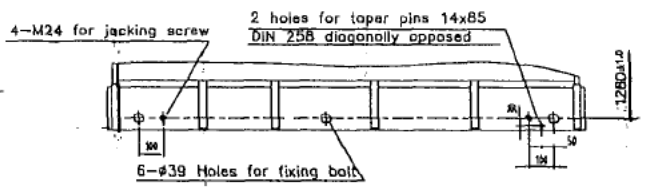
REMARK: THE SPECIFICATION OF * MARK SHOULD BE INFORMED ON YOUR APPROVED DRAWING.

HFJ6 508-84K

DATE	DESIGN	CHECKED	CHECKED	APPROVED
	张茂玲	方甫根	姚立元	







1. Air inlet with door open (for emergency operating)
2. Air outlet with door open (for emergency operating)
3. Center of gravity
4. Cover for rotating rectifier
5. Connection for cooling water (JIS-65A)
6. Cover for voltage regulator
7. Cover for terminals and excitation equipment
8. Cable gland box
9. Free space of fitting bolts 190mm
10. Ball bearing
11. Dimension for removing the rotor
12. AIR Temp. sensor(PT100 ohm.:option)
13. 12-φ21 pre drilled
14. Cover for space heater
15. Leakage water detector(2st)
16. In case of emergency operation with the doors open put in the air-stop plate furnished before the clooed-circuit cooler
17. Clearance for fitting the air-stop plate in case of emergency operation
18. Dimension for removing the air cooler
19. Leakage water drain R3/8"
20. PT100 TEMP.SENSOR

Weight of machine	Weight of rotor	Moment of inertia of rotor(J)
Approx. 5.2 ton	1718 kg	58.1 kgm²

Type of const : B16	Type of protection : IP44	No.of poles : 8

标记	处数	分区	更改文件号	签名	年月日
设计			标准化		
制图	张茂玲		批准		
校对	王雨根				
审核					

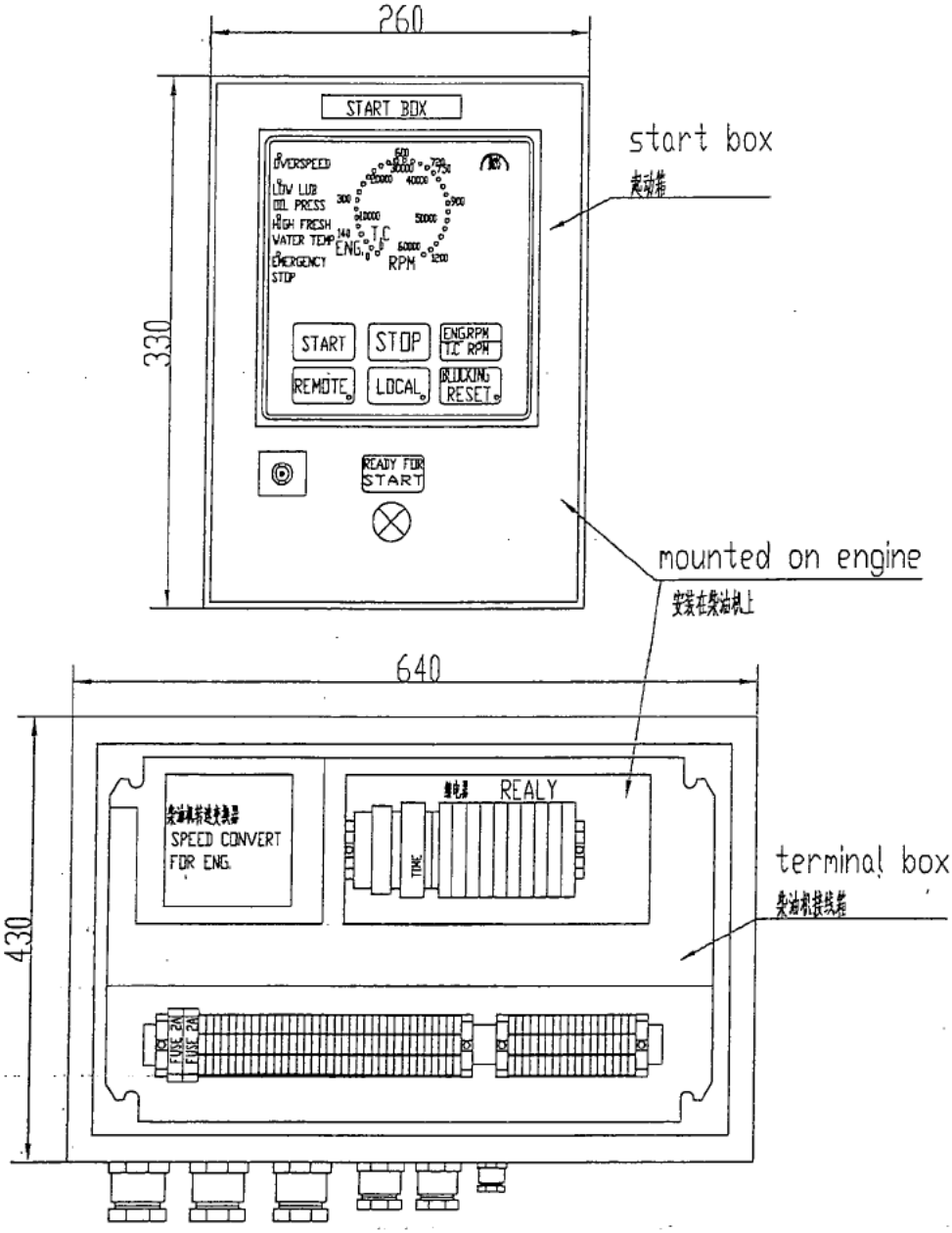
OUTLINE OF GENERATOR

镇江中船现代发电设备有限公司

TYPE	HFJ6 508-84K
REF NO	
DWG NO	XD-W060137

CM- HYUNDAI

描图	
描校	
印底图号	
底图号	
装订	日期



					L23/30H ENG. AUTOMATIC STARTBOX & TERMINALBOX	L23-663-00XL t81
标记	处数	文件号	签字	日期		
设计		审核			柴油机接线箱& 起动箱	
制图		图幅				
描图						
校对		日期				

材料标记	数量	重量(公斤)	比例
共 14 张		第 6 张	

镇江船用柴油机厂

底图号	装订号

日底图总号

描图

校核

M3-1

(b) (7)(C), (b) (6)

ZHENJIANG MARINE DIESEL WORKS

ZJMD — MAN B&W

Instruction Book

L23/30H

Shipyard :

Ship name :

Hull No. :

Rule :

Add: 2[redacted]angtang[redacted]-Zhenjiang

Jiangsu Province P.R.China

Tel: [redacted]

Fax: +86 511 45[redacted]0033

ZJMD — MAN B&W

IndexPage 1 (1)	Engine Data	500

General

Warning !

(Marine engines only)

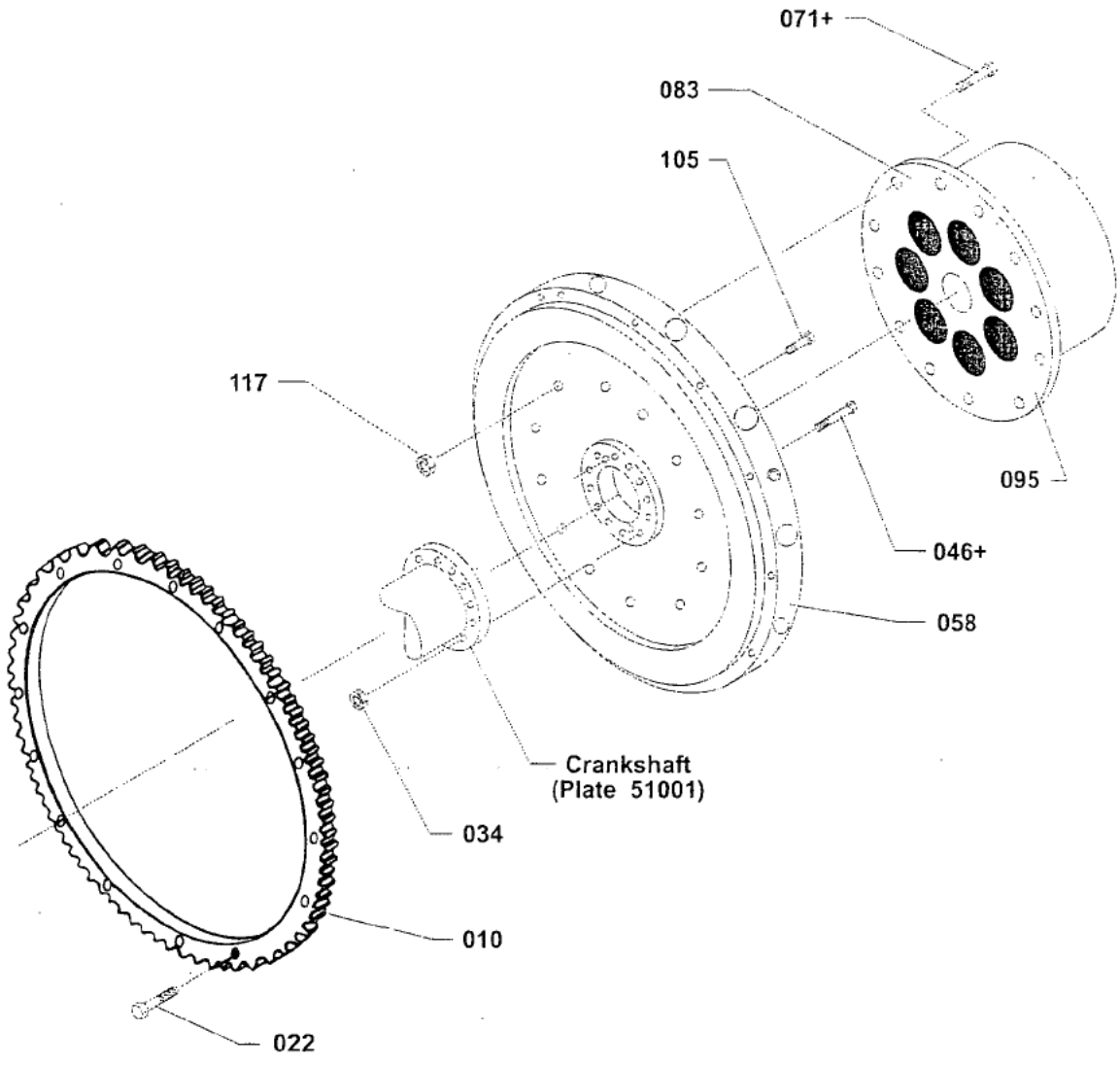
It is important that all MAN B&W Diesel A/S engines are operated within the given specifications and performance tolerances specified in the engines' Technical Files and are maintained according to the MAN B&W Diesel A/S maintenance instructions in order to comply with given emissions regulations.

In accordance with Chapter I of the Code of Federal Regulations, Part 94, Subpart C, §94.211 NOTICE is hereby given that Chapter I of the Code of Federal Regulations, Part 94, Subpart K, §94.1004 requires that the emissions related maintenance of the diesel engine shall be performed as specified in MAN B&W Diesel A/S instructions including, but not limited to, the instructions to that effect included in the Technical File.

08028-0D/H5250/94.08.12

Plate Page 1 (2)	Flywheel with Flexible Coupling and Gear Rim	51003-01H

L23/30H



08028-0D/H5250/94.08.12

L23/30H

Item No.	Qty.	Designation	Benævnelse
010	1/E	**Gear rim**	Tandkrans
022	14/E	**Screw**	Skrue
034	12/E	**Self locking nut, for item no. 046**	Selvlåsende møtrik for item nr. 046
046+	12/E	**Fitted bolt**	Pasbolt
058	1/E	**Flywheel**	Svinghjul
071+	12/E	**Fitted bolt**	Pasbolt
083	1/E	**Flexible coupling, complete**	Fleksibel kobling, komplet
095	24/E	**Rubber element**	Gummielement
105	2/E	**Screw**	Skrue
117	12/E	**Self locking nut, for item no. 071**	Selvlåsende møtrik for item nr. 071
		+ Item 046 and 071 require an individual matching, before mounting.	+ Item nr. 046 and 071 kræver en individuel tilpasning, før montering

Item No.	Qty.	Designation	Benævnelse

08028-0D/H5250/94.08.12

When ordering spare parts, see also page 500.50.

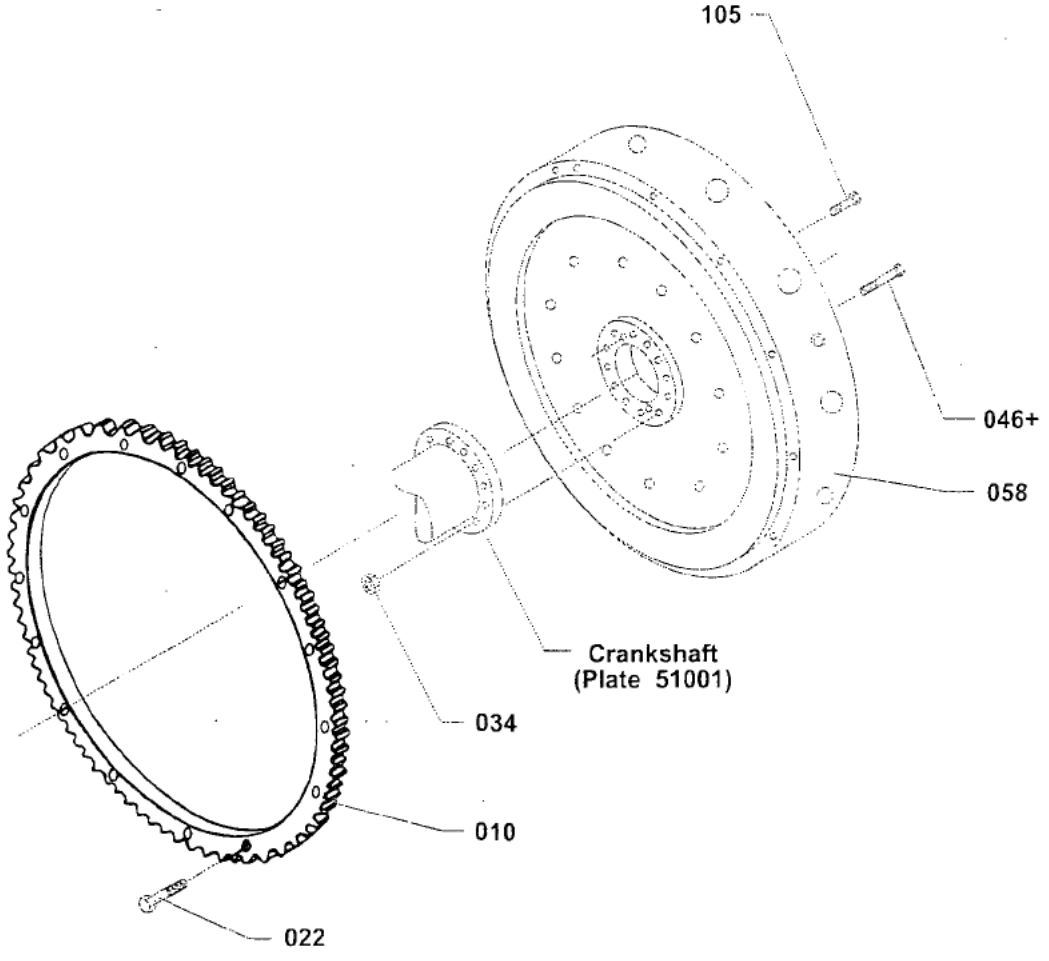
*** = Only available as part of a spare parts kit.**
Qty./E = Qty./Engine

Ved bestilling af reservedele, se også side 500.50.

* = Kun tilgængelig som en del af et reservedelssæt.
Qty./E = Antal/Motor

Plate Page 1 (2)	Flywheel with Gear Rim	51003-02H

L23/30H



08028-0D/H5250/94.08.12

L23/30H

Item No.	Qty.	Designation	Benævnelse
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		+ Item 046 require an individual matching before mounting.	+ Item nr. 046 kræver en individuel tilpasning før montering.

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Qty./E = Antal/Motor

08028-0D/H5250/94.08.12

M3-1

INSTRUCTION BOOK

(b) (7)(C); (b) (6)

ZHENJIANG MARINE DIESEL WORKS

ZJMD — MAN B&W

Instruction Book

L23/30H

Shipyard :

Ship name :

Hull No. :

Rule :

Add: 2[redacted]angtang[redacted]-Zhenjiang

Jiangsu Province P.R.China

Tel: [redacted]

Fax: +86 511 45[redacted]0033

ZJMD — MAN B&W

IndexPage 1 (1)	Engine Data	500

General

Warning !

(Marine engines only)

It is important that all MAN B&W Diesel A/S engines are operated within the given specifications and performance tolerances specified in the engines' Technical Files and are maintained according to the MAN B&W Diesel A/S maintenance instructions in order to comply with given emissions regulations.

In accordance with Chapter I of the Code of Federal Regulations, Part 94, Subpart C, §94.211 NOTICE is hereby given that Chapter I of the Code of Federal Regulations, Part 94, Subpart K, §94.1004 requires that the emissions related maintenance of the diesel engine shall be performed as specified in MAN B&W Diesel A/S instructions including, but not limited to, the instructions to that effect included in the Technical File.

08028-0D/H5250/94.08.12

ZJMD — MAN B&W

IndexPage 1 (1)	Operation of Engine	501

Description	Document no	Notes
Operating	501.01 (01H)	-
Out of service	501.05 (01H)	-
Starting-up after out of service periods	501.10 (01H)	-
Guidelines for longterm low-load operation on HFO	501.15 (02H)	-
Operating a diesel engines at low frequency	501.25 (01H)	only stationary engines

Preparations for Starting

The following describes what to do before starting, when the engine has been out of service for a longer period of time, or if major overhauls have been made.

1. Check the oil level in the base frame (or in the lub. oil tank, if the engine is with dry sump), air lubricator and in the govenor.

Start-up the prelubricating pump.

The engine shall be prelubricated at least 2 minutes prior to start.

Check oil pressures before and after the filter.

2. Open the cooling water supply, start separate cooling water pumps where installed, and check the cooling water pressure.

Note: To avoid shock effects owing to large temperature fluctuations just after the start, it is recommended:

a) to preheat the engine. Cooling water of at least 60 °C should be circulated through the frame and cylinder head for at least 2 hours before start:

- either by means of cooling water from engines which are running or by means of a built-in preheater (if installed).

or

b) When starting without preheated cooling water, the engine must only be started on MDO (Ma-rine Diesel Oil).

The engine should not be run up to more than 50% load to begin with, and the increase to 100% should take place gradually over 5 to 10 minutes.

Note: When starting on HFO (Heavy Fuel Oil), only item "a" applies.

3. Open the fuel oil supply to the feed pump.

Starting on HFO: circulate preheated fuel through the pumps until correct working temperatures have been obtained. This normally takes 30-60 minutes.

4. Check the pressure in the starting air receiver(s) and open the starting air supply (blow-off water, if any, and drain the starting air system before opening.

5. Regulating gear - please check:

- that all fuel pumps are set at index "0" when the regulating shaft are in STOP position.

- that each fuel pump can be pressed by hand to full index when the regulating shaft are in STOP position, and that the pumps return automatically to the "0" index when the hand is removed.

- that the spring-loaded pull rod is working correctly.

- that the stop cylinder for regulating the shaft works properly, both when stopping normally and at overspeed and shut down.

- that testing is made by simulating these situations.

6. Open the indicator valves and turn the engine some few revolutions, check that no liquid is flowing out from any of the indicator valves during the turning.

Slow-turning must always be carried out, before the engine is started after prolonged out of-service periods and after overhauls, which may involve a risk of liquid having collected in the cylinders.

7. Close the indicator valves.

8. Disengage the turning gear, if fitted. Check that it is locked in the "OUT" position.

Starting

1. Start the engine by activating the start buttom.

2. Check the lubricating oil pressure, cooling water pressure, fuel oil feed pressure. Check that the prelubricating oil pump is stopped.

3. Check that all alarms are connected.

See also "checks after starting-up".

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L23/30H

Testing during Running

When the engine is running, the planned maintenance programme and the following should be checked:

1. The lubricating oil pressure must be within the stated limits and must not fall below the stated minimum pressure. The paper filter cartridges must be replaced before the pressure drop across the filter reaches the stated maximum value, or the pressure after the filter has fallen below the stated minimum value. Dirty filter cartridges cannot be cleaned for re-use.

2. The lubricating oil temperature must be kept within the stated limits indicated on the data sheet.

3. The fuel oil pressure must be kept at the stated value, and the filter must be cleaned before the pressure drop across the filter reaches the stated maximum value.

4. The cylinder cooling water temperature must be kept within the limits indicated and the temperature rise across the engine should not exceed 10°C.

5. The cooling water temperature at the charging air cooler inlet should be kept as low as possible; however, not as low as to produce condensation water in the charging air space.

Adjustment takes place in the external system outside the engine, and the amount of cooling water must be adjusted so that the temperature rise across the charging air cooler is 3 - 5 °C.

6. The exhaust gases should be free from smoke at all loads. For normal exhaust temperatures, see the test report from shop and sea trials.

7. Keep the charging air pressure and temperature under control. For normal values, see the test report from shop and sea trials.

8. Recharge the starting air receivers when the pressure has dropped to about 20 bar. Stop recharging at 30 bar.

9. To ensure full operational liability, the condition of the engine should be continuously observed in order for preventive maintenance work to be carried out before serious breakdowns occur.

Stopping

1. Before stopping, it is recommended to run the engine at reduced load, or to idle for about 5 minutes for cooling-down purposes.

2. The engine is stopped by keeping the fuel pump delivery rate at "0", by turning the "load- limit" knob on the governor to "0", or by activating the remote stopping device.

Start and Stop on HFO

Start and stop of the engine should take place on HFO in order to prevent any incompatibility problems by change-over to MDO.

MDO should only be used in connection with maintenance work on the engine or longer periods of engine standstill.

Before starting on HFO the engine must be properly preheated as described in "Preparations for Starting" and as described below.

Stopping the engine on HFO is no problem, but it should be ensured that the temperature of fuel pipes are not reduced to a level below the pour point of the fuel, otherwise, reestabilishing of the circulation might cause problems.

Starting on MDO

For starting on MDO there are no restrictions except lubricating oil viscosity may not be higher than 1500 cSt (5° C SAE 30, or 10° C SAE 40).

Initial ignition may be difficult if the engine and ambient temperatures are lower than 5° C and 15° C cooling water temperature.

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1. Stand-by Engines

During engine standstill in stand-by position the media cooling water and fuel oil should be continuously circulated at temperatures similar to the operation conditions.

The engine shall be prelubricated 2 minutes prior to start, if there is not intermittent or continuous prelubricating installed. intermittent prelub. is 2 min every 10 minutes.

2. Maintenance during Standstill

In periods during stand-still of the engine (not in stand-by position) it is recommended to start the prelubricating oil pump minimum 10 minutes once every week and totum the engine during the prelubricating period by 2-3 revolutions.

3. Laid-up Vessels

During the lay-up period (and also when laying-up the vessel) we recommend that our special instructions for preservation of the engines are followed.

4. Work before Major Repairs

4.1 After stopping the engine, while the oil is still warm, start the el-driven prelub. pump, open up the crankcase and camshaft housings and check that the oil is flowing freely from all bearings. Also, take off the top covers on the cylinder heads and make sure that oil is not supplied for lubrication of rocker arms, as non-return valves are fitted which do not open until the oil pressure at the inlet to the rocker arms exceeds 1 bar.

After overhaul of pistons, bearings, etc. this check should be repeated before starting the engine.

4.2. After stopping the prelub. pump, check the bottom of the oil sump for fragments of babbitt from bearings

4.3. Open up all filters to check that filter elements are intact. Filter cartridges in the lub. oil filter is to be replaced before start, after repair, or after excessive differential pressure. After removal, dirty elements can be examined for particles of bearing metal at the bottom of the paper lamella. (the elements can not be used again).

4.4. Check the cylinder walls.

4.5. Take deflection measurements of the crankshaft.

4.6. A lubricating oil sample should be sent to a laboratory for immediate analysis.

4.7. Drain plugs are unscrewed from the bottom of turbochargers, or the drain cock is opened. If drain facilities are installed in the exhaust gas system this should be opened.

5. Work during Repairs

The following should be made during major repairs.

5.1. Retighten all bolts and nuts in the crankcase and check their locking devices. Also, retighten foundation bolts.

5.2. Check the various gear wheel drives for the camshaft(s).

5.3. Remedy leakages of water and oil in the engine, and blow through blocked-up drain pipes.

5.4. Drain starting air pipes of water.

5.5. Empty the oil sump of lubricating oil and remove the sludge, if not done within a period of one year. Clean the sump very thoroughly and subsequently coat with clean lubricating oil.

6. Work after Repairs

6.1. If an opening-up of engine or lubricating oil system may have caused ingress of impurities, cleaning should be carried out very carefully before starting the engine.

L23/30H

The differential pressure across the lub. oil filter must be watched very carefully after cleaning and starting-up the engine. Be sure to replace filter cartridges in due time.

6.2. After restoring normal lubricating oil circulation, turn the engine at least two revolutions by means of the turning rod to check the movability of the relevant parts of the engine.

6.3. Close the drain cocks in the turbocharger (or in the exhaust gas system, if mounted).

6.4. Lubricate thebearings and rod connections in the manoeuvring gear. Disconnect the governor and move the rod connections by hand to check that the friction in bearings and fuel pumps is sufficiently low. If repair of bearings or alignment of engine has been made, check no 1, 2, and 5 should be repated.

6.5. Checks to be made just before starting of the engine are mentioned under 501.01.

6.6. Add cooling water and check the leakage pressure system on at the upper and lower cy-linder liner sealings and at cooling water connections.

6.7. Check the governor as follows:
Start up the engine and run it at the synchronous number of revolutions.

6.7 a) Speed-setting: Before switching-in the alternator on the switchboard please check that the servomotor adjusts the rpm with a suitable quickness after actuation of the synchronizer knob on the switchboard. The range from - 5% to + 5% from the synchronous rpm should be tested.

6.7 b) Adjustment speed: Switch-in the alternator on the switchboard and set the load to about 40%. On reaching normal oil temperatures in governor and engine, increase the load instantly to about 80% (by starting the major pump or compressor). This must not cause the frequency to fall by more than some 8%, and the engine must return to a constant no rpm after about 3 seconds (although this rpm will be a little lower than before owing to the speed droop of the governor). If the engine is operated in parallel with other engines, an even sharing of load shall be established within about 3 seconds. If the governor reacts too slowly, compensating adjustment is effected as indicated in Woodward's instruction manual (Compensating Adjustment).

Note: It is a condition for this test that the engine and turbocharger are in perfect operating condition, so that possible sources of error immediately can be eliminated

6.7 c) Hunting: Run the engine at synchronous rpm, and without load. Provided the governor oil is warm, the regulating lever must not perform any major periodical movments, and neither must there be any variation in the engine speed. If that is the case, repeat the compensating adjustment according to Woodward's instruction manual.

6.7 d) Speed droop: in case of unsatisfactory load sharing between two ore more engines this can be rectified by increasing the speed droop of the engine that is subject to the greatest load (or by reducing the setting of the other engines).

The setting should not normally be increased beyond 70 on the scale, and satisfactory parallel operation can generally be obtained at settings between 40 and 60.

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The following enumerate checks are to be made immediately after starting, during load increase, and during normal running.

In the following it is assumed that the engine has been out of service for some time, for instance due to repairs and that checks during out of service periods have been carried out as described in the previous chapter.

When starting after such an out-of-service period, the following checks must be made in the stated order in addition to normal surveillance and recording.

1. To be Checked immediately after Starting:

1.1. Check that the turbocharger is running.

1.2. Check that the lubricating oil pressure is in order.

1.3. Check that all cylinders are firing (see exhaust temperatures).

1.4. Check that everyting is normal for the engine speed, fuel oil, cooling water and system oil.

1.5. Check by simulation of the overspeed shutdown device that the engine stops. The overspeed setting should be according to " Set Points and Operation Data " section 500.

2. To be Checked during Starting-up, but only if Required after Repairs or Alterations:

2.1. If the condition of the machinery is not well-known, especially after repairs or alterations, the "feel-over sequence" should always be followed, i.e.:

After 5-15 and 30 minutes' idle running, open the crankcase and the camshaft housing and perform feel-over on the surfaces of all moving parts where friction may arise and cause undue heating.

Feel: Main, crankpin, (alternator), and camshaft bearings, piston pins, cylinder liners, roller guides and gear wheels.

After the last feel-over, repeat check 4 page 501.05, see also **Ignition in Crankcase** page 503.04 in section 503.

After repair or renewal of cylinder liners, piston rings or bearings, allowance must be made for a running-in period, i.e. the engine load should be increased gradually as indicated in the tables below. The engine output is determined on the basis of the fuel index and the load on the electric switchboard. The turbocharger speed gives some indication of the engine output, but is not directly proportional to the output throughout the service period.

Begin the starting-up sequence at a reduced engine speed, e.g. 400 rpm, until it can be known for certain that there are no hot spots in the engine. Then, increase the speed to the normal rpm and connect to the switchboard and put on load.

The load increase during the starting-up sequence may, for instance, be:

25 % load for 2 hours
50 % load for 2 hours
75 % load for 2 hours
100 % load may be put on.

The pump index indicated in the tables has been given as a percentage of the index at full load. To enable the index to be read directly off the fuel pumps, the following formula can be employed:

$$I = \frac{I\%}{100} \times I_F$$

I_F = Index at full load (from testbed table)

I% = Index expressed as % of full load index (stated in the preceding starting-up sequence).

Following the alteration of the pump index of the one or two cylinders concerned it must be checked that when in STOP position the governor is able to move all the fuel pumps to an average pump index not exceeding 2 or 3.

After completing the starting-up sequence, make sure that all fuel pumps are set at the same index and that the governor can cause all fuel pumps to move to "0" index.

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General

Part load/low load operation

In certain ship operation situations the diesel-generator sets are sometimes exposed to part load/low load operation.

During manoeuvring all diesel-generator sets are often started up for safety reasons, resulting in low load conditions for all sets.

During harbour stay even one diesel-generator running could be lowloaded when hotel purposes are the only electricity consumers.

At part load/low load it is important to maintain constant media temperatures, i.e. for cooling water, lubricating oil and fuel oil, in order to ensure adequate combustion chamber temperature and thus complete combustion.

At loads lower than 20% MCR there is risk of timedependant retardation of the engine performance condition due to fouling of gas- and air channels, combustion chambers and the turbocharger.

HFO-operation at loads lower than 20% MCR should therefore only take place within certain time limitations according to the curves.

After a certain period of HFO-operation at a load lower than 20% MCR, a change to MDO should take place in order to prevent further retardation of the engine performance condition, or the engine load should over a period of 15 minutes be raised to 70% MCR and maintained here for a certain period of time in order to burn off the carbon deposits, thus reestablishing adequate performance condition. After such "cleanburning period" low-load operation on HFO can be continued.

However the operator must be aware of the fact that fouwling in the air inlet channels, if any, will not be cleaned with high load running. Extensive low-load running can therefore result in necessity off manual cleaning of the inlet channels.

If special application conditions demand continuous HFO-operation at loads lower than 20% MCR. and occasionally performed "clean-burning" periods are inconvenient or impossible, special equipment and arrangements must be established.

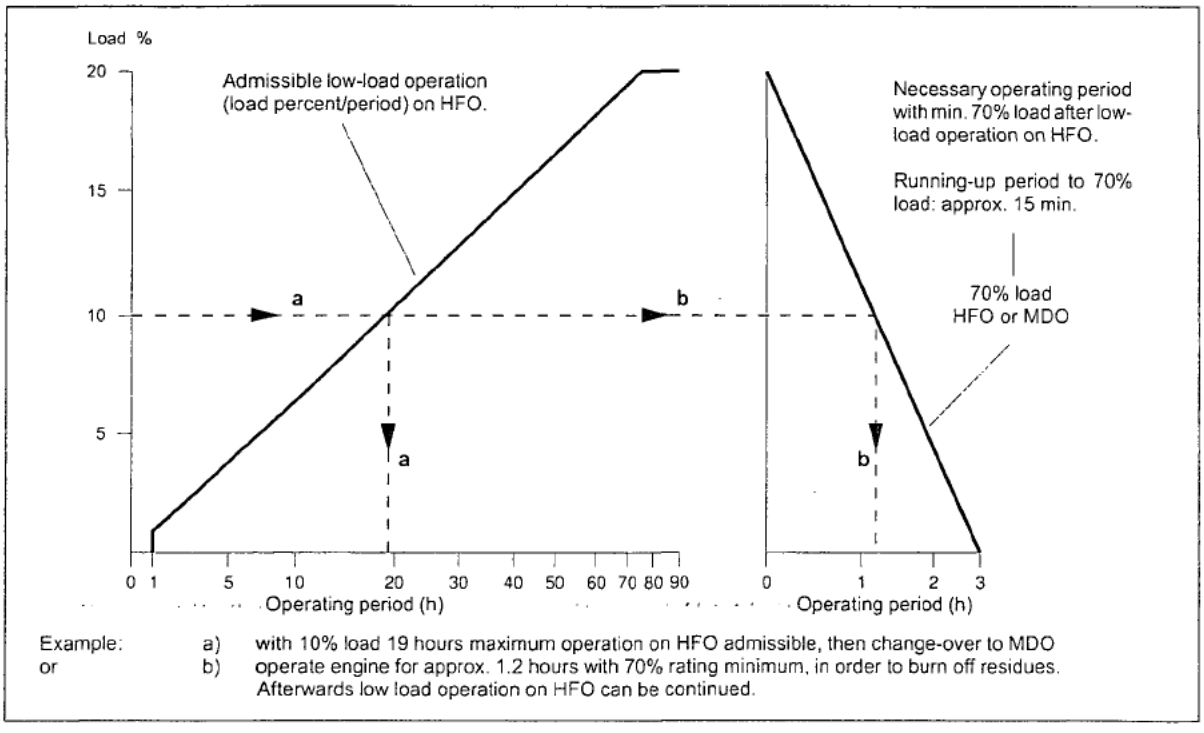

Fig 1 Low-load operation.

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General

Description

At land-based power stations the diesel generator is often connected to a common eletrical grid with more than one power producer.

Further the diesel engine is often small compared to the rest of the grid. Under these circumstances the diesel engine cannot control the frequency of the grid, because the other producers are dominating.

If the diesel engine is delivering full 100% power at lower speed (lower frequency), this is equal to overload on the engine. Thus, if the engine is designed for 50 Hz at 750 rpm and the actual running conditions are 100%, 45 Hz (675 rpm), this corresponds to 10% overload.

Running the diesel engine at overload condition for a long period is not recommendable, it will damage the engine and is therefore not acceptable. Such operating will immediately interrupt all guarantee obligations on the engine from MAN B&W, Holeby.

Therefore it is advisable to reduce the allowable max output of the diesel generator, in case of lower frequency/speed.

Maximum output should be lowered with the same percentage as the frequency/speed drop.

If the engine is controlled by an automatic power management system, the program of the system should take care of this output reduction.

In case of no automatic power management, the output reduction must be performed manually by the operator.

Furthermore, it is not advisable to operate the alternator at frequency lower than 6% under nominel frequency.

The alternator over/under frequency protection is normally:

$f_N \pm 6\%$, 5 sec delay

Below is illustrated a power curve for 50/60 Hz engines.

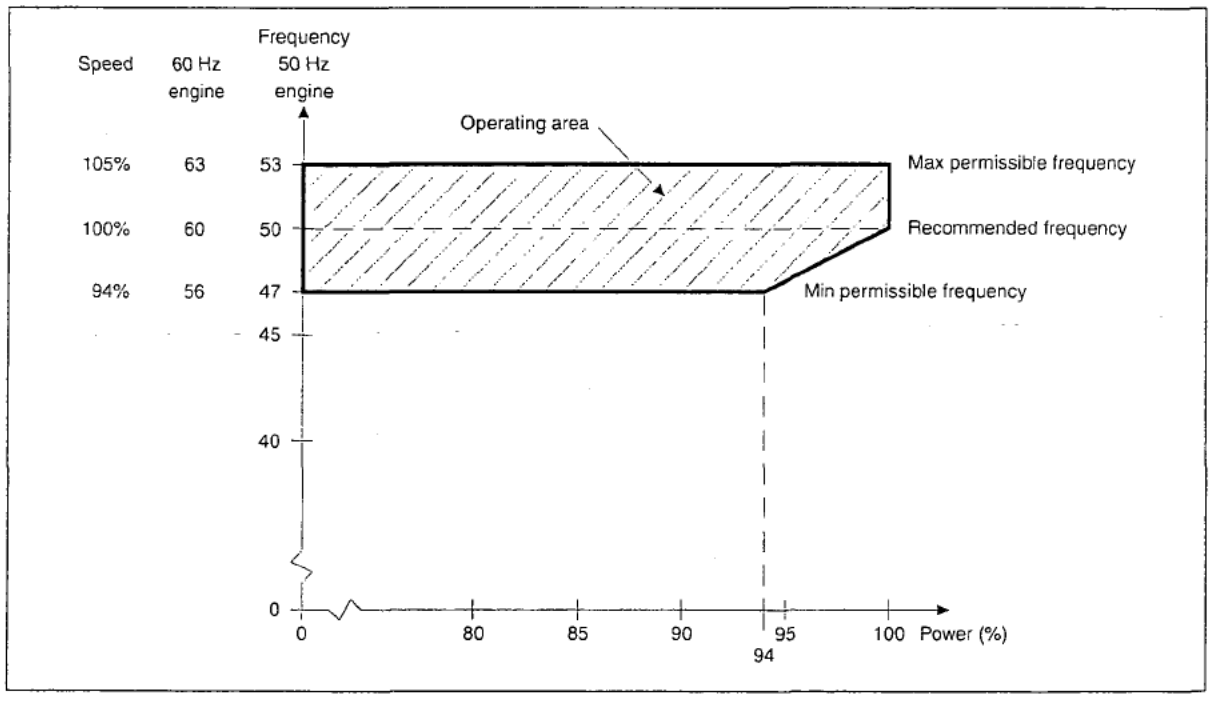

Fig 1 Power curve for 50/60 Hz engines.

M3-2

ZHENJIANG CME CO., LTD

ZJMD — MAN B&W

ZJMD-MAN B&W 6L23/30H

MAIN DIESEL GENERATING-SETS

DRAWING FOR FINAL

Shipyard	:	GUANGZHOU SHIPYARD INTERNATIONAL CO., LTD. / 50500DWT
Subject	:	3 × 6L23/30H Gensets/Ship
Rule	:	ABS
Fuel oil	:	HFO, 380cSt/50℃
Power	:	3 × 910 kW
Speed	:	900 r/min

DATE: Jan. 30, 2008

ZHENJIANG CME CO., LTD

(b) (6), (b) (7)(C)

L23/30H

Component	900 RPM	Hours Between Overhauls	Expected Service Life
Turbocharger	Dry cleaning of turbine side or Wet cleaning of turbine side Water washing of compressor side	every second day every week 25-75	
	Air filter cleaning : Based on observations.		
	Inspection: Check all mounting screws, casing screws and pipe line connections for tight fit by tapping, retighten if necessary	with new or overhauled turbocharger once aft 1000	
	Compressor cleaning in dismantled condition: compressor inner components, final diffusor, compressor wheel	6.000	
	Silencer cleaning in dismantled condition: silencer felt linings	6.000	
Regulating system	**Major overhaul**: Dismantling, cleaning, inspection, checking and cleaning cartridge, checking bearing clearances, checking gaps and clearances on reassembly	12.000	
Cylinder head	Function check of overspeed and shutdown devices. Check that the control rod of each individual fuel pump can easily go to "stop" position	monthly	
Fuel injection valve Exhaust valve	Checking and adjustment of valve clearance	2.000	
	Checking, cleaning and adjustment of opening pressure Overhaul and regrinding of spindle and valve seat	2.000 12.000	24.000
Air inlet valve Valve guide	Function check of rotocap	monthly	
	Overhaul in connection with exhaust valve overhaul	12.000	24.000
Cylinder head nuts	Measuring of inside diameter in connection with valve overhaul	12.000	24.000
	Retightening 200 hours after new or overhaul		
Compressed air system	Check of compressed air system Refill of air lubricator : Based on observations.	12.000	
Main bearings	Inspection according to classification survey, normally after 24.000 running hours or 4 years of service	24.000	36.000
	Retightening of main bearing cap. 200 hours after new or overhaul and every	6.000	
	Retightening of screws for counterweights. 200 hours after new or overhaul and every	6.000	
Supporting chocks and bolt connections	Retightening of holding-down bolts. 200 á 1000 hours after new or overhaul and every	6.000	
	Retightening of bolts between engine frame and base frame	6.000	
	For flexible mounted engines. Check anti-vibration mountings	6.000	
Autolog reading	Crankshaft deflection and main bearing clearance reading. Should be carried out in connection with retightening of main bearing and holding-down bolts	6.000	
Big-end bearing	Retightening and checking of bearing clearance. 200 hours after new or overhaul and every	6.000	
	Inspection in connection with piston overhaul	12.000	24.000
Piston	Overhaul, replacement of compression rings and scraper rings, measuring of ring grooves, inspection of big-end bearing and inspection of cylinder liner condition	12.000	60.000

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L23/30H

Component	900 RPM	Hours Between Overhauls	Expected Service Life
Cylinder liner	Inspection, measuring and reconditioning of running surface condition: In connection with piston overhaul	12.000	60.000
	Overhaul and reconditioning of surface between liner and frame and cleaning of surface in cooling water space	24.000	
Fuel pump	Fuel pump barrel/plunger assembly. Overhaul based on operational observations		24.000
Torsional vibration dampers	Overhaul A sample of silicone fluid must be taken and analysed in between.	36.000	
Lub. oil filter cartr.	Replacement based on observations of pressure drop		1.500
Filter cartrigdes	Replacement based on observations		1.500

0802B-OD/H5250/94.08.12

TANKER VESSEL OPERATIONS MANUAL (VOM)

Procedures adopted as Schuyler Line Navigation Company
Policy to Adhere to MARPOL Annex VI Requirements

Schuyler Line Navigation Co.
130 Severn Avenue, Suite 201
Annapolis, Maryland 21403

TKR-VOM-08 - PART 08-008 PLANNED PREVENTATIVE MAINTENANCE SYSTEM

1.0 Description of PPM System

1.1 In accordance with The International Safety Management Code (ISM) **SLNC** has established procedures in the Ship Management System, (SMS), to identify equipment and technical systems, the sudden operational failure of which may result in hazardous situations. The SMS provides for specific measures aimed at promoting the reliability of such equipment or systems. The measures include the regular testing of stand-by arrangements and equipment or technical systems that are not in continuous use. The procedures utilized by **SLNC** and its vessels are incorporated within a formal preventative maintenance program.

SLNC utilizes the ABS approved "NS5" system for its preventative maintenance tracking and reporting program. The system has made many changes over the years, and currently is known as "NS5." It should be noted that a critical equipment test & inspection reporting system is contained within this NS5 Program. NS5 incorporates an integrated information system which is generated at each company site (offices and ships). Each site is provided with its own database to store information and data received from the other sites. NS5's has a built in communications facility which performs data transfer automatically and on demand using satellite, mobile, or land-lines. The data is automatically loaded into the end user's work station. Continuous synchronicity is maintained between the central office and each remote location. See diagram 2.2. Further description of the system follows after 2.2.

1.2 Critical Equipment

The vessel's operating systems have been analyzed to identify a list of critical equipment, for which the failure of same would result in a critical or hazardous situation on the vessel. The vessel and the crew are protected from these critical failures by a combination of alarms, testing, inspections, fail-safe conditions, redundancy of hardware, critical spare parts and other devices or systems which warn of failures, ensuring the reliability of the ships operating systems and/or providing for the rapid restoration of critical functions in the event of a failure.

1.3 In the analysis of system failures, the following vital vessel systems were determined to be essential to the vessel's safe operation:

- Cargo Systems
- Safety Systems
- Navigation Systems
- Communications Systems
- Propulsion Systems
- Electrical Systems

1.4 The critical equipment list is a separate part of the M&R section and shall be specially treated as priority. This list will identify the system or component, the frequency of inspection or testing and the location of the record of the event. The critical equipment list shall be completed by the Chief Engineer. Procedures for reporting critical failures are outlined in the Emergency

Procedures section of this manual. As such, the Master is required to notify the ship manager of all failures to critical equipment via satellite phone, cell phone, or email. The reporting shall include the component nomenclature, the specific failure, the cause (if known), repairs made or recommended shore side follow up. An entry shall be made in the equipments maintenance and repair record. This procedure shall be inclusive of specific failures, and unplanned maintenance to critical equipment. The Critical Equipment list ***FORM SLNC-022*** provides for the item component or system, the interval of test or inspection, the "log" location, and date of inspection. The Critical Inspection Report is to be sent to the **SLNC** office each quarter. It will show the last date of the test or inspection for each component or system.

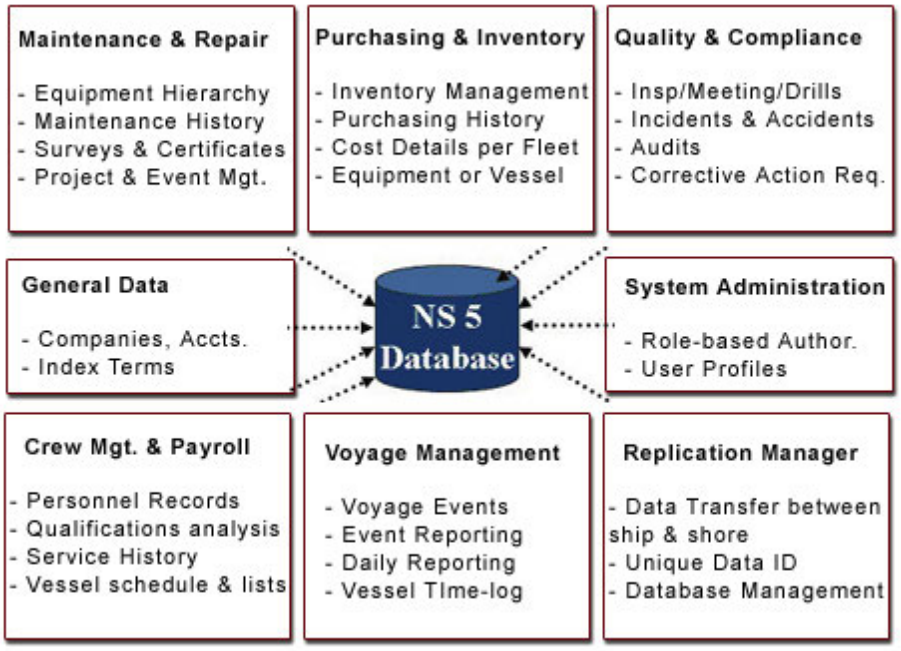
For routine planned maintenance of critical equipment, a dialogue will be established between the Master, Chief Engineer and Ship Manager to provide a risk assessment of shutting-down a particular piece of equipment or component. An assessment shall be made to determine use of back-up systems, modifications to operational procedures, or any additional safety procedures to be employed while that piece of equipment is secured. Any requirement for the use of outside vendors or contractors shall also be discussed and (if necessary) arranged.

If the maintenance of the critical equipment cannot be carried out, a further assessment shall be made between the Master, Chief Engineer, and Ship Manager. This may be due to environmental conditions (sea state etc), or crew fatigue (STCW hour parameters), or any outside forces. Communication and approval shall be made by the ship manager. The item shall be dealt with at the next opportune time and results recorded.

2.0 Shipboard Maintenance Programs

2.1 The Company has established a comprehensive maintenance program for each vessel. The maintenance program shall be carried out and documented by the Chief Engineer. The maintenance program shall be maintained in "ABS NS5" and reviewed by the Engineering Department ashore. NS-5 is an integrated information network that addresses every element of the ship management's day to day business functions and is supported by the ABS classification society. A complete suite of NS-5 modules handle the aspects of operational management including regulatory requirements, planned preventative maintenance, purchasing, payroll, and crew management.

The interface connections of NS5 are primarily a "hub and spoke" topology where the central database acts as the communications hub for the entire system as illustrated in the diagram below:



2.2 The preventive maintenance component records, schedules, and manages all data pertaining to the work performed on a vessel by the crew or an outside contractor / vendor. This includes, planned and scheduled maintenance items, which shall be performed on specified equipment or systems at specific intervals and under stipulated procedures.

The computerized NS5 system replicates with the company daily or as otherwise deemed necessary. This replication enables the company to see ongoing and completed maintenance, repair and inspection of all equipment onboard the vessel (critical and non-critical).

SLNC has a permanently assigned 'system administrator' who is responsible for maintaining the entire system. The administrator is assisted by other trained individuals for period where the administrator is unavailable. The administrator monitors and performs many actions and responsibilities:

- data entry and data modifications
- timely back-up of information
- oversight of al transmission of data
- system maintenance and upgrades

There are many modules within the NS5 system including:

- maintenance & repairs
- purchasing
- crew management
- crew payroll
- quality & compliance
- general data
- replication

For the purpose of this chapter we will discuss the maintenance and repair module and some aspects of the purchasing module as related to M&R.

2.3 Maintenance performed on the vessel's structure, its machinery or systems that is the result of a failure or damage to that element is considered to be corrective in nature. Corrective maintenance encompasses the maintenance, which falls outside the parameters of the preventive maintenance system. Any deficiencies found and repairs made to systems or machinery while performing preventive maintenance tasks become corrective maintenance items. The function of the corrective maintenance component of the maintenance program is primarily a record keeping procedure. The Chief Engineer establishes crew work orders and maintains the reporting system to record maintenance of a corrective nature. These work orders shall be completed and become a part of the ship's machinery history.

2.4 The documentation component ensures the timely completion of all Preventive Maintenance tasks required by the program.

2.5 The system is established and provides for a preventive and corrective maintenance program for the engine, deck and stewards departments. This maintenance program contains elements dealing with periodic inspection and testing of machinery and equipment, navigation and communication gear, tanks and compartments, decks, superstructures, accommodations the maintenance of safety related equipment and any other items of specific concern.

2.6 The vessels maintenance program shall ensure that maintenance tasks, repairs and relevant surveys are carried out in a well-planned, safe and timely manner.

2.7 A major benefit of the system is that it provides a menu to track surveys and certificates for classification, USCG, and other regulatory bodies and inspectors.

This will ensure that there will be no delay or disruption to the vessel due to outstanding conditions of class. The surveys and / or inspections can be scheduled in a timely and organized manner consistent with class regulations and charterer's requirements.

NS5 provides a back-up system to monitor certificates and surveys. Additionally **SLNC** maintains a duplicate set of certificates in the "Sharepoint" directory. The Sharepoint directory is an on-line database which stores information and is available to users in the office and users through a web- based access.

Sharepoint has true copies (scanned images) of all certificates as well as a "due date timeline". This is only one feature of sharepoint. It additionally contains vessel schedules, vessel data, voyage data, chartering data. ESQA safety and quality statistics, and a number of other items.

2.8 The system produces a maintenance plan for each vessel that includes all work to be performed, and sorted by specific predetermined categories. The system allows for the generation of shipboard work orders or service requisitions. The work order section is the area that deals with crew work and crew tasks. The service requisition section is the area that documents work to be carried out by outside contractors or company vendors. Each work order or service requisition includes details of the task to be accomplished, who is to do the tasks, and a listing of parts that are to be used. This, in turn allows the on board engineers and office staff to determine what parts and services may be needed in the future.

The reporting of specific defects and maintenance tasks will be recorded in the M&R module of NS5. As discussed previously, it is maintained and held in the computer system for ease in use and editing. The basic criteria for the maintenance tasks are based on equipment manufacturer's recommendations.

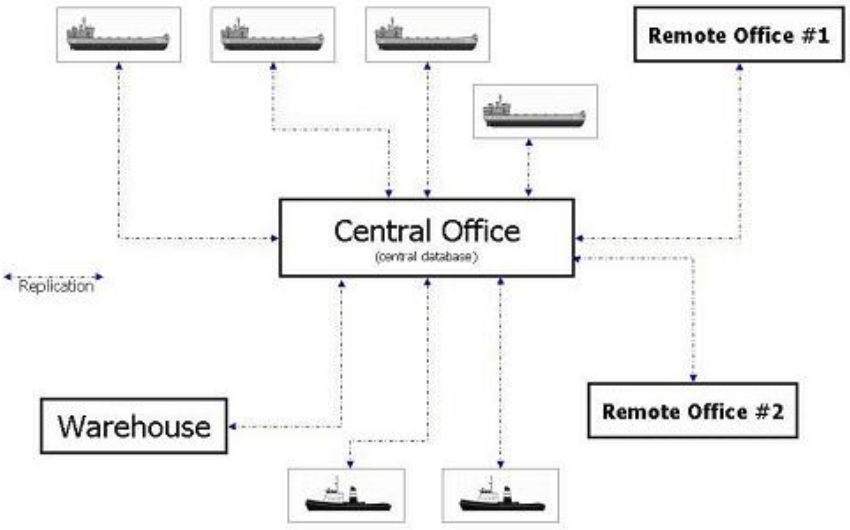
As the majority of work tasks are either hourly or time cycle based, any items coming due are highlighted and those jobs which are overdue are detected through the reports section of the NS5 program. Any overdue maintenance evolutions are listed in a concise report. This procedure is built into the program and is automatically brought to the attention of the vessel's chief engineer and the office staff. The ship manager has the capability to monitor the system from the office or remotely through internet access when traveling.

2.9 The NS5 system tracks ongoing projects. (i.e. drydockings or out of service periods). The project module will track and record all associated maintenance tasks, vendors, spare parts used etc. The project module will track and record costs for both service contractors and purchasing events. The project section of the M&R module allows for tracking and drydock work lists and out of service period work lists. These can be reviewed and edited as necessary by ship manager. This list is maintained in NS5 and as such available at all times for shore based and shipboard personnel.

2.10 Replication Manager Component

The centerpiece of the NS5 system is the Replication Manager. The replication manager is a built in communications facility that performs automatic data transfer (or on demand transfer) of information to and from the vessel and office. The data can be transmitted by satellite, cell phones, or land line. Once transmitted, the data is automatically distributed and loaded into each site's database and displayed at each user's personal computer. In this way the shore based management can monitor vessel status and in turn provide any assistance that may be required.

The benefit of the replication manager is that it provides consistent terminology and standards throughput each vessel. The basic system is illustrated below:



(It should be noted that **SLNC** does not employ a centralized warehouse (per the example) but maintains inventory through individual vessel class databases.

2.11 Spares inventory

The on-board spares inventory is monitored on board the vessel through the purchasing module. The system tracks the minimum and maximum levels of spares and equipment that is to be kept on board the vessel. The level for parts and equipment has been established using manufacturer's recommendations as well as established procedures and practices. The critically level of each part is evaluated and spares levels adjusted as necessary. Critical spares are maintained (where possible) on board each vessel. Any shortages are replenished through the purchasing system. A description of which is covered in a later chapter of this manual. However, the basic system is provided as follows:

- spare part or component used on board and inventory checked
- if needed, a requisition is prepared for the part and sent to chief engineer for verification
- requisition is approved by chief engineer or master
- requisition is replicated and sent to office
- requisition is distributed to ship manager

- requisition is either approved, edited, or deleted
- a record of the above is replicated to the vessel
- if approved or edited, the requisition is replicated to purchasing buyer
- the requisition may also be annotated that pricing is required for approval. in this case the buyer provides pricing to ship manager and the approval process begins again
- the buyer send out RFQs for prices of parts using **SLNC** purchasing guidelines (bid – no bid)
- prices are received and the best valued offer is provided with a purchase order
- the item is delivered to the vessel, and confirmation of receipt is provided to the purchasing department for invoice approval

As discussed previously, **SLNC** does not employ a centralized warehouse but maintains shore side inventory through individual vessel class databases. **SLNC** maintains warehouses in Houston, Texas and Portland, Oregon. A list of after hour contacts are maintained by the ship manager (should a particular part be urgently required after business hours).

2.12 Vessel Attendance

SLNC has stipulated that ship managers, (superintendents, port engineers, port captains) will attend the vessel at various times through the year and report on same. A guideline has been established that a recommendation of six (6) visits will be required annually. This may vary depending on drydock schedules and major out of service periods. Each ship manager will visit with the Captain and Chief Engineer (as a minimum) and inspect the vessel to ensure that safe and quality standards are being upheld. The inspection shall be limited to those spaces that can be safely and readily accessed. A review of vessel logs and work book shall be made as well as a review of the maintenance and repair program (NS5). The attendee shall prepare a "Vessel attendance Report" which shall contain certain inspection criteria and reporting of events as well as quality issues. A permanent record shall be kept of the attendance report in the **SLNC** offices.

The ship manager may also (as appropriate), sail on any of the vessels, to confirm that standards are being maintained. This is commonly done prior to shipyards for the preparation of work plans and shipyard specifications.

3.0 Preventive Maintenance

3.2 The system shall include applicable inspections, testing, lubrication and maintenance procedures as recommended or required in the equipment manufacturers operating manuals. Assigned tasks shall normally be performed at the interval recommended by the manufacturer. The Chief Engineer may specify alternative maintenance frequencies or procedures if appropriate for his particular vessel, if agreeable with **SLNC** Engineering staff.

3.3 The system shall include any additional maintenance requirements, which are required by regulatory statute or rule. Also include, any additional inspections, testing or maintenance which good engineering practice or experience dictates is necessary to maintain the dependability of the machinery or system.

3.4 Maintenance work orders are outlined and included in the NS5 Program for each vessel. Maintenance work orders are to be designed and carried out ensuring that the work will not impede the sea worthiness or overall operation of the vessel.

3.5 The primary goals of the NS5 System is to provide a well designed, preventive maintenance system and achieve a balance in the quantity of work required in each month's work cycle. The workload tasks for each month shall consist of tasks required to be performed on a monthly basis and a portion of the quarterly, semi-annual and annually scheduled tasks so as to obtain an equal distribution. Special attention needs to be given to special maintenance items, which are due at or around shipyard periods.

3.6 Preventive maintenance work orders for each month shall be printed and distributed to department heads for action.

4.0 Preventive Maintenance Procedures and Work Orders

4.1 Preventive maintenance procedures and work orders are established for the following systems and equipment:

- Main and Auxiliary Machinery
- Steering Gear
- Inert Gas and Vapor Recovery Systems
- Automation and Control Systems
- Cargo Loading and Discharging Equipment
- Anchoring and Mooring Equipment
- Waste Disposal and Sewage Treatment Systems
- Pipelines and Valves
- Safety and Fire Fighting Equipment
- Pollution Control Equipment
- Navigation Equipment
- Communications Equipment
- Lifting Gear
- Periodic Tank and Compartment Inspections
- Decks
- Accommodations
- Machinery Spaces
- Service Spaces
- Cargo Tanks
- Machinery and Piping Systems

5.0 Follow Up

5.1 The individual items on the Work Order shall be checked off as they are completed. The Work Order schedule shall then be signed and dated.

5.2 If for any reason an individual item on the Work Order is not completed by the end of that month, an explanation shall be given and signed before returning to the 1st Engineer and/or Chief Officer.

5.3 The 1st Engineer shall collect the Work Order's that have not already been turned in at the end of each month and provide a copy of the work order to the Chief Engineer for his/her review and comments.

5.4 Monthly Work Orders shall be completed in "ABS NS5" and reviewed by **SLNC** Engineering.

5.5 Uncompleted Work Orders shall be reissued on the 1st day of the following month. These items shall be completed at the earliest opportunity.

6.0 **Corrective Maintenance (Repairs)**

6.1 A Work Order report form shall be issued for corrective maintenance. This report shall detail the machinery or system name, the date of repair, the nature of the repair, materials used or components replaced in completing repairs, and any photographic documentation (if necessary) relevant to maintaining a permanent record.

6.2 The machinery history file in "ABS NS5" will be populated once the Work Order has been completed.

6.3 Corrective maintenance Service Requisition shall be prepared to record work or repairs carried out by contractors on vessel's machinery or equipment. Copies of the contractor's service reports shall be kept in a separate machinery history file.

6.4 Corrective maintenance Work Orders may be used for Class continuous survey purposes in order to obtain credit for overhauls and inspections performed by the crew while at sea.

7.0 Corrective Actions requiring shore side support contractors

7.1 There will be situations when the vessel's crew will not be able to handle to scope or magnitude of repairs needed. When a situation as this develops, the Chief Engineer shall contact the vessel's ship manager or superintendent to notify of such a request. The notification may be made via telephone, email, or through the NS5 system. The severity and timeliness and urgency of scheduling will be the factor to decide how the request is transmitted.

7.2 For routine requests, the NS5 system will track and monitor requests and follow up. The ship will generate a work order and then the chief engineer shall either approve or disapprove the request. For approved requests requiring outside contractors or vendors, then the work order will be transmitted through replication to the superintendent. The superintendent will either approve or disapprove the work order. This will be noted in the NS5 system - so that the chief engineer will be made aware of the denial.

Any approved work order requests shall be made into a Purchase Order The PO shall be written or edited and sent to a vendor or a number of vendors (if pre-pricing is required). The

superintendent is required to contact the vendor or contractor and make suitable arrangements for the work to be carried out at the earliest possibility or as expeditiously as possible. The superintendent is required to schedule the work so that there is as little disruption to the vessel's schedule and operational commitments. The superintendent shall also unsure that the vendor or contractor has suitable insurance as required in the company procedures. Arrangements shall be made through the vessel's agents to provide port or gate passes so that the vendors can gain access to the vessel.

If any hot work is required (in port) - a certified marine chemist shall inspect the vessel and determine suitability of hot work. Certificates shall be issued and signed by the Master of the vessel prior to any hot work taking place.

After the work is completed, the vessel shall 'sign off' the work in the NS5 system by "completing" the purchase order. This will be an indication to all that the work was satisfactorily completed and /or all goods and services were received and accounted for. Upon receipt of the "completion", the superintendent shall "complete" the final phase of the purchase order indicating the final price and agreement that the invoice may be paid.

7.3 The NS5 system will provide an entry into the particular vessel machinery or equipment and indicate what work was carried out as a historical reference.

TANKER VESSEL OPERATIONS MANUAL (VOM)

Procedures adopted as Schuyler Line Navigation Company
Policy to Adhere to MARPOL Annex VI Requirements

Schuyler Line Navigation Co.
130 Severn Avenue, Suite 201
Annapolis, Maryland 21403

(b) (6), (b) (7)(C)

TKR-VOM-03 - PART 03-022 THIRD ASSISTANT ENGINEER

8.1 Stand watch in accordance with the established watch schedule.

8.2 Assist in the maintenance and repair of equipment as directed by the Chief Engineer or 1st Assistant Engineer.

8.3 Maintain the electrical systems, distilling plant and Lubricating oil systems, lube oil purifiers and MSDS on the ship as directed by the Chief Engineer or 1st Assistant Engineer.

8.4 Obtain the consent of the 1st Assistant or Chief Engineer for any absence from the vessel.

The 3AE shall report to the First Assistant Engineer. The 1AE will assign the 3AE to duties, both at sea and in port.

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(b) (6), (b) (7)(C)

TKR-VOM-08 - PART 08-005 ENGINE DEPARTMENT EMERGENCY PROCEDURES

1.0 Emergency Preparedness

1.1 It is the responsibility of individuals aboard **SLNC** vessels to be prepared for emergency situations.

1.2 The licensed Engineer on watch shall record emergency events and times of such events in the Engine room Log Book.

2.0 Emergency Events

2.1 The following emergency events describe the responsibilities and actions to be taken by the engineering department when such an event occurs. This is not meant to limit the individual's responsibility to assess each situation and modify the actions taken based on the specific circumstances of each situation. These events shall be the focus of drills that shall be scheduled at the discretion of the Master as prescribed by regulatory requirements.

Abandon Ship

2.2 All personnel shall muster at their station as per the Station Bill and follow directions of the Master, personnel assigned to the Engine room shall:

- Maintain propulsion and steering until directed otherwise.
- Secure machinery, if time permits, so as to facilitate safe abandonment.
- Notify Bridge when evacuating the engine room.

Bridge Control Failure / Engine Order Telegraph Failures

2.3 The watch stander shall:

- Establish communication with the Bridge.
- Switch to Engine room Control.
- Notify Chief and 1st Engineer and activate engineer's assistance alarm.
- Maintain communication with the Bridge.

Collision

2.4 The watch stander, upon notification, shall do the following;

- Maintain the watch at the Control Station.
- Prepare to respond to communications from the Bridge.
- Ensure that the fire main is pressurized.
- Standby to take maneuvering orders if required.
- Close all watertight doors.

2.5 Non-watch standing personnel shall:

- Go to their Emergency Station.
- Complete muster.
- Follow directions of the Master.

2.6 The Chief Engineer, under the direction of the Master, shall be in charge of the Engine room to direct all engine related operations and procedures.

Fire (other than engine room)

2.7 The watch stander, upon activation of the General Alarm, shall:

- Prepare to respond to communications from the Bridge.
- Ensure that the fire main is pressurized.
- Standby to take maneuvering orders if required.
- Maintain their watch at the Control Station until properly relieved by the Chief or 1st Engineer.

2.8 Non-watch standing personnel shall:

- Go to their Emergency Station.
- Complete muster.
- Follow directions of the Master.

2.9 The Chief Engineer, under direction of the Master, shall be in charge of the Engine room to ensure the following:

- Fire main pressure is established and maintained.
- The engine room is adequately manned.
- That maneuvering orders are followed.

Engine room Fire

2.10 The watch stander, upon discovering fire in the Engine room, shall do the following:

- Report the fire to the Bridge & Chief Engineer.
- Respond as appropriate to contain and/or extinguish fire.
- Notify Bridge when evacuating engine room.

2.11 Non-watch standing personnel shall:

- Go to their Emergency Station.
- Complete muster.
- Follow directions of the Master.

- The Chief Engineer, under direction of the Master, shall be in charge of the Engine room.

Engine room Flooding

2.12 The watch stander, upon detecting flooding in the Engine room, shall:

- Report the condition of the Engine Room to the Bridge & Chief Engineer.
- Activate the Engineers assistance alarm.
- Take appropriate actions to stop source of flooding.
- Align emergency bilge suction for use, if so directed.
- Close all watertight doors (as applicable).

2.13 Non-watch standing personnel shall:

- Assemble at the Engine room Control Station.
- Follow directions of the Chief Engineer.
- The Chief Engineer, under the direction of the Master, shall be in charge of carrying out damage control measures as appropriate.

Abnormal Engine room Oil Leakage

2.14 The watch stander upon detecting oil leakage in the Engine room, shall:

- Report the condition to the Bridge &Chief Engineer.
- Activate the Engineers assistance alarm
- Attempt to secure the source of leakage and/or mitigate as appropriate.
- Non-watch standing personnel shall respond and assist in the containment as directed by the Chief Engineer.
- The Chief Engineer and 1st Engineer shall proceed to the Engine room.
- The Chief Engineer shall keep the Master advised of the conditions.

Helicopter Operations

2.15 Helicopter operations are assumed to be a planned event. The engine room watch stander shall be prepared to take maneuvering orders for positioning the vessel during the event.

2.16 The Chief Engineer shall evaluate the need for and assign additional watch personnel as appropriate for the conditions during the event.

Heavy Weather Operation

2.17 The watch stander or duty engineer, during heavy weather, shall make more frequent inspections of equipment and systems for the purpose of ascertaining adverse impacts that weather conditions may be having.

2.18 The watch stander or duty engineer, in the event that a given piece of equipment and/or system are being adversely affected by heavy weather, shall notify the Bridge and the Chief Engineer of the condition.

Propulsion Failure

2.19 The watch stander or duty engineer, when propulsion failure is detected, shall:

- Report the failure to the Bridge & Chief Engineer.
- Activate the Engineers assistance alarm.

2.20 Non-watch standing personnel shall:

- Assemble at the Engine room Control Station.
- Follow directions of the Chief Engineer.

2.21 The Chief Engineer, when in an unrestricted sea way, shall:

- Diagnose and repair the problem.
- Keep the Master apprised of the situation.
- Maintain other systems to the extent possible.

2.22 The Chief Engineer, in confined waters or while maneuvering, shall determine the immediate course of action in consultation with the Master.

Man Overboard

2.23 The watch stander, upon receiving information of a man overboard shall:

- Maintain the watch at the Control Station.
- Prepare the plant for maneuvering.
- Call the Chief Engineer for assistance in the Engine room.
- Standby to take maneuvering orders as required.
- Non-watch standing personnel shall assist as directed by the Master, if requested.

Search & Rescue

2.24 Search & Rescue operations are assumed to be a planned event. The engine room watch stander shall be prepared to take maneuvering orders for positioning the vessel during the event.

2.25 The Chief Engineer shall evaluate the need for and assign additional watch personnel, as appropriate, for the conditions during the event.

Steering Failure

2.26 For vessels constructed with two (2) separate Steering Gear rooms, if the steering gear failure is confined to either the port or starboard steering gear, then the watch engineer shall notify Chief Engineer; proceed to the location of the malfunction and follow procedures as defined to switch over control to the operable steering gear. Should both steering gears fail simultaneously, then the Watch Engineer shall proceed to the STARBOARD steering station and the First Assistant Engineer shall report to the PORT steering station and follow procedures as defined.

2.27 The Engine room watch stander, when notified by the Bridge of a Steering Failure:

- Activate the Engineers assistance alarm.
- Proceed directly to the Steering Gear room.
- Take corrective action and report to the Bridge or establish local control of the steering gear, if possible and notify the Bridge of readiness to take helm orders.

2.28 The Chief Engineer shall:

- Proceed to the Steering Gear room.
- Make an assessment of the condition and take corrective action.
- Assign personnel to appropriate duties for local steering of the vessel and watch keeping.
- Notify the Bridge of steering capabilities of the vessel.

Stranding or Grounding

2.29 The watch stander or duty engineer, upon notification by the Bridge of a stranding or grounding, shall:

- Maintain the watch at the Control Station.
- Activate the Engineers Assistance Alarm.
- Ensure that the fire main is pressurized.
- Assume maneuvering mode.
- Standby to take maneuvering orders as required.
- The Chief Engineer shall make an engine room inspection to access integrity and condition of the engine room and report conditions found to the Master.

2.30 Non-watch standing personnel shall, upon activation of the Engineers Assistance Alarm:

- Assemble at the Engine Room Control Station.
- Follow directions of the Master or Chief Engineer.

Loss of Ships Service Electrical Power - Emergency Diesel Generator Power Available. Ship Service Generator Failure - Emergency Generator Starts.

2.31 The watch stander shall:

- Detect and report failure to the Bridge & Chief Engineer.
- Stop the Main Engine.
- Activate the Engineers assistance alarm.

2.32 The watch Engineer shall re-establish electrical power and stabilize the plant by means of the following:

- Initiate feedback from the Emergency Buss.
- Start the standby Ship Service Generator and transfer load from the Emergency Generator.
- The Chief Engineer shall investigate cause of failure.
- Undertake measures to re-establish full normal plant operation.

Ship Service Generator Failure/Emergency Battery Lighting Only

2.33 With the Emergency Generator in the "auto start" mode and the standby generator fails to start and the emergency lighting batteries take the lighting load, the watch Engineer shall follow procedures as defined and establish electrical power, as follows:

- Start Emergency Air Compressor for Ship Service Generator starting.

Start the standby Ship Service Generator and re-establish power to the Main Switchboard.

- Off watch Personnel, when notified, shall muster and assist in damage control as directed by the Master.

Breakaway from Dock

2.34 The watch stander, upon receiving information of a breakaway from a dock shall:

- Maintain the watch at the Control Station.
- Prepare the plant for maneuvering.
- Call the Chief Engineer for assistance in the Engine room.
- Standby to take maneuvering orders as required.
- Secure cargo pumps.
- Ensure that the fire main is pressurized.
- Non-watch standing personnel shall assist as directed by the Master, if requested.

Unmanned Engine Room Operations

2.35 Should there be any emergencies as referenced above, then unmanned operations shall stop and full manned engine room status shall resume. The Chief Engineer shall assign duties to members of the engineering staff as necessary to assist in the emergency situation.

- Prepare towing equipment if required

3.0 Engine Room Fire

3.1 Use of fixed system should be considered in the first few minutes of a machinery space fire if it is not extinguished immediately with portable extinguishers.

- Inform Master
- Sound general alarm
- Muster crew – account for all hands
- If in port – advise terminal/port authority
- Secure all cargo/ballast/bunker operations – utilize emergency shoreside shut-down system (if available)
- Secure cross – ship's passageway and water tight doors as directed
- Secure fuel oil valves as directed by Chief Engineer
- Secure ventilation/dampers as required
- Isolate electrical power to affected areas
- Ensure fire pump is lined up and ready - start fire pump when requested
- Prepare foam pump as required
- Ensure emergency generator is ready for use – start if requested
- At sea – alert all traffic in the area and notify the local port state as required
- Sound appropriate signals
- Advise emergency teams of known situation/prepare plan of attack
- Commence boundary cooling
- Brief fire party prior to entering space – means of escape and anticipated firefighting requirements
- Contain and work to control and extinguish fire
- Commence fire patrols for flash back watch and to protect against fires in adjacent spaces
- At sea – prepare to transmit safety and/or distress message as needed
- Prepare lifesaving appliances for use
- Ensure back up equipment is available at the scene – recharge SCBA's bottles as needed
- Pump water out of affected spaces
- Maintain escape route throughout
- Consider use of fixed CO2 system
- Evacuate all personnel prior to use of fixed system
- Batten down all openings prior to use of fixed system
- Re-muster crew prior to use of fixed system
- After release leave space secured for adequate time to ensure fire is extinguished.
- Re-entry into enclosed spaces following CO2 activation requires prior notification and consultation with **SLNC** Operations Department. Where practical space re-entry will be cleared "safe for personnel" by a certified Marine Chemist.
- Transmit distress call if required
- Follow VRP (as applicable)
- Prepare emergency towing equipment as required

4.0 Machinery Space Fire

4.1 Use of fixed system should be considered in the first few minutes of a machinery space fire if it is not extinguished immediately with portable extinguishers.

4.2 Consider using foam.

- Sound general alarm
- Inform Master
- Muster crew – account for all hands
- If in port – advise terminal/port authority
- At sea – alert all traffic in the area and notify the local port state as required
- Sound appropriate signals
- Secure all cargo/ballast/bunker operations – utilize shore side emergency shut-down system (if available)
- Secure all appropriate emergency fuel shut-off valves
- Secure ventilation/dampers
- Consider use of fixed CO2 system or foam system
- Space evacuated
- Space secured
- Electrical power secured
- After release leave space secured for adequate time to ensure fire is extinguished.
- Re-entry into enclosed spaces following CO2 activation requires prior notification and consultation with **SLNC** Operations Department. Where practical space re-entry will be cleared “safe for personnel” by a certified Marine Chemist.
- Utilize tug fire pump for boundary cooling and additional fire protection

5.0 Deck Fire

5.1 Cargo Fire

- Inform Master
- Sound general alarm
- Muster crew – all hands accounted for
- If in port – advise terminal / port authority
- Secure all cargo/ballast/bunker operations – utilize emergency shoreside shut-down system (if available)
- Ensure fire pump is lined up and ready - start fire pump when requested
- Prepare foam pump
- Ensure emergency generator is ready for use – start if requested
- Start/utilize deck monitors
- At sea – consider course alteration for wind (vapor dispersal) and the avoidance of any prevailing dangers to navigation
- At sea alert all traffic in the area and notify the local port state as required
- Advise engine room and emergency teams of situation

TKR-VOM-11 - PART 11-030 INJURY OR ILLNESS

Recognizing that each emergency injury/illness case is unique, the following procedures shall be followed as conditions relative to a specific case allow:

1.0 First Aid

1.1 If an injury/illness requires no more attention than first aid, such aid may be rendered by crewmembers under the Master's supervision or by the Master. If it is determined that a treated injury/illness requires a follow-up visit to a clinic or doctor's office at the next port-of-call, such a visit (transportation, etc.) shall be scheduled through the Master via Agent next available port.

2.0 Injury/Illness Requiring Care Beyond First Aid

2.1 Injury/Illness requiring care beyond first aid, not necessarily requiring immediate professional medical attention (e.g., incapacitating, but not life-threatening illness). If the injury/illness requires a doctor's care, the employee shall be taken to the nearest medical facility. If at sea MAS (Medical Advisory Service) shall be contacted for guidance. The Master shall also consult the Operations office for guidance and, if necessary, deviation instructions.

3.0 Injury/Illness Requiring Immediate Doctor's Care

3.1 The Master (or crewman designated by the Master) shall apply the appropriate first aid measures that are possible without aggravating the patient's condition (remove patient from hazardous conditions, control bleeding, etc.) and monitor vital signs. In cases of patient bleeding, the Bloodborne Pathogens Kit shall be used to protect caregivers. The Master shall answer questions in the MAS (Medical Advisory Service) Manual pertaining to the patient's case, consult the MAS duty physician, and follow the physician's instructions. As soon as possible following the MAS consultation, the Master shall contact Operations personnel, and provide an appropriate briefing. Deviation or evacuation actions shall proceed, based on MAS physician recommendations. If helicopter evacuation is required, refer to Part Y of this section.

TKR-VOM-11 - PART 11-025 HELICOPTER EVACUATION

The following was prepared for use in evacuations carried out by USCG helicopters. Its applicability extends to helicopter operations conducted by private operators, as well as military helicopters. Helicopter evacuation is a hazardous operation to all concerned and shall be attempted only when life or health is gravely threatened.

1.0 Requesting Helicopter Assistance

1.1 Give accurate position, time, speed, course, weather conditions, wind direction and velocity.

1.2 If not already provided, give complete medical information, including whether or not the patient is ambulatory.

1.3 If beyond helicopter range, advise of diversion intentions so a rendezvous point may be selected.

1.4 If there are any changes, advise immediately.

2.0 Preparation Prior to Arrival of the Helicopter

2.1 Provide continuous radio guard on 2182 kHz, or specified voice frequency, if possible.

2.2 Select and clear the most suitable hoist area with the maximum clear deck area. This includes the securing of loose gear, antenna wires.

2.3 If the hoist is at night, light the pickup area as well as possible. Be sure to avoid shining lights on the helicopter, as that could blind the pilot. Put a light on any obstructions in the vicinity so the pilot will be aware of their positions.

2.4 Point searchlights vertically to provide the pilot an aid in locating the vessel, and secure them after the helicopter is on the scene.

2.5 Advise location of pickup area before the helicopter arrives so it may make best approach.

2.6 There will be a high noise level under the helicopter, making voice communications almost impossible. Arrange a set of hand signals among the assisting crew.

3.0 Hoist Operations

3.1 If possible, move the patient to a position as close to the hoist area as his condition permits - **TIME IS IMPORTANT**.

3.2 Normally, if a litter is required, it will be necessary to move the patient to a special litter, which will be lowered by the helicopter. Be prepared to do this as quickly as possible. Be sure the patient is strapped in, face up, wearing a life jacket, if conditions permit.

3.3 Be sure the patient is tagged to indicate what medication, if any was administered, and when.

3.4 Have information on the patient's medical status and necessary papers in an envelope or package ready for transfer with him.

3.5 Change course so the vessel rides as easily as possible with the wind on the bow, preferably on the port bow. Try to choose a course to keep stack gases clear of the hoist area.

3.6 Reduce speed if necessary to ease vessel's motion, but maintain steerageway.

3.7 If radio contact with the helicopter has not been established when the vessel is ready for the hoist, signal the helicopter in with a "come on" by hand, or at night, with a flashlight.

3.8 **Allow basket or stretcher to touch deck prior to handling in order to avoid static shock.**

3.9 Place the patient into the basket, sifting with hands clear of sides, or in the litter as described above. Signal the helicopter hoist operator when ready for the hoist. Patient should signal by nodding his or her head, if able. Deck personnel should signal thumbs up.

3.10 If it is necessary to take the litter away from the hoist point, unhook the hoist cable and keep free for the helicopter to haul in. Do not secure cable to vessel or attempt to move stretcher without unhooking.

3.11 When the patient is strapped onto the stretcher, signal the helicopter to lower the cable, hook up, and signal the hoist operator when ready to hoist. Steady the stretcher to keep it from swinging or turning.

3.12 If a tag line is attached to the basket or stretcher, use it to steady the hoist. Keep feet clear of line.

- Request helicopter assistance giving the accurate position, time, speed, course, weather conditions, wind direction and velocity.
- Chose a rendezvous point and prepare for arrival.
- Establish hand signals to be used by crew to maintain communication when the helicopter is in auditory range.
- Retrieve the patient's medical paperwork.
- Change course so the vessel rides as easily as possible with the wind on the bow, preferably on the port bow. Try to choose a course to keep stack gases clear of the hoist area.
- Work quickly to move the patient to the hoist area.
- Establish contact with the helicopter to direct a safe hoist.

Reference: ICS Helicopter/Ship Operations

M3-1

INSTRUCTION BOOK

(b) (7)(C), (b) (6)

ZHENJIANG MARINE DIESEL WORKS

ZJMD — MAN B&W

Instruction Book

L23/30H

Shipyard :

Ship name :

Hull No. :

Rule :

Add: 2[illegible]angtang[illegible]Zhenjiang

Jiangsu Province P.R.China

Tel: [redacted]

Fax: +86 511 451 0033

ZJMD — MAN B&W

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General

Warning !

(Marine engines only)

It is important that all MAN B&W Diesel A/S engines are operated within the given specifications and performance tolerances specified in the engines' Technical Files and are maintained according to the MAN B&W Diesel A/S maintenance instructions in order to comply with given emissions regulations.

In accordance with Chapter I of the Code of Federal Regulations, Part 94, Subpart C, §94.211 NOTICE is hereby given that Chapter I of the Code of Federal Regulations, Part 94, Subpart K, §94.1004 requires that the emissions related maintenance of the diesel engine shall be performed as specified in MAN B&W Diesel A/S instructions including, but not limited to, the instructions to that effect included in the Technical File.

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ZJMD — MAN B&W

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Description	Document no	Notes
Control and safety systems	509.01 (01H)	-
Instrument and automatics	509.05 (01H)	-
Lambda controller	509.10 (02H)	-
Starting box	509.35 (01H)	-
Converter for engine- and turbocharger RPM signal	509.40 (01H)	-

Working card	Document no	Notes
Functional test and adjustment of safety, alarm and monitoring equipment	509-01.00 (01H)	-
Function test and adjustment of overspeed trip	509-01.05 (01H)	-
Adjustment and test of ON/OFF pressostate	509-05.00 (01H)	-
Adjustment and test of ON/OFF thermostate	509-05.01 (01H)	-
Function and test of level switch (LAL 25)	509-05.02 (01H)	-
Adjustment and test of analogous pressure transmitter	509-05.03 (01H)	-
Adjustment and test of analogous temperature transmitter	509-05.04 (01H)	-
Adjustment of lambda controller	509-10.00 (08H)	-

Plates	Document no	Notes
Governor and governor drive	50901-22H	optional
Governor and governor drive	50901-21H	standard
Governor and governor drive	50901-23H	
Regulating device	50902-06H	optional
Regulating device	50902-07H	standard
Overspeed device	50903-02H	-
Fuel oil leakage alarm (LAH 42)	50905-02H	-
Prelubricating oil alarm (LAL 25)	50905-03H	-

Plates	Document no	Notes
Level switch in oil sump (LAL 28)	50905-05H	-
Instrument panel	50905-07H	-
Level switch in oil sump (LAL/LAH 28)	50905-09H	-
Level switch in oil sump (LAL/LAH 28)	50905-10H	-
Instrument panel	50905-11H	-
Pressostate, thermostate, difference pressostate and pressure transmitter	50907-01H	-
Thermometer	50907-02H	-
Pick-up	50908-01H	-
Lambda controller	50910-02H	-
Starting box	50935-01H	-

Governor

The engine speed is controlled by a hydraulic governor. The purpose of the governor is to regulate the rate of delivery from the fuel pumps, so that the engine speed is kept within certain limits, independing on the load.

Information about the design, function and operation of the governor is found in the special governor instruction book.

The governor is mounted on the flywheel end of the engine and is driven from the camshaft via a cylindrical gear wheel and a set of bevel gears.

Pick-up for Engine RPM

The pick-up for transfer of signal to the tachometer instrument for engine RPM is mounted on the flywheel end cover of the engine.

A signal varying proportionally to engine RPM is created in the pick-up by the rotating toothed impulse wheel mounted on the camshaft end.

Pick-up for Turbocharger RPM

See turbocharger instruction book, section 512.

Regulating Shaft

The governor movements are transmitted through a spring-loaded pull rod to the fuel pump regulating shaft which is fitted along the engine.

The spring-loaded pull rod permits the governor to give full deflection even if the stop cylinder of the manoeuvring system keeps the fuel pump regulating shaft at "no fuel" position.

Each fuel pump is connected to the common, longitudinal regulating shaft by means of a two-piece, spring-loaded arm.

Should a fuel pump plunger seize in its barrel, thus blocking the regulating guide, governing of the remaining fuel pumps may continue unimpede owing to the spring-loaded linkage between the blocked pump and the regulating shaft.

Stop Screw for Max. Delivery Rate

The bracket for stop cylinder/limiting cylinder is fitted with a stop screw which prevents the fuel pumps from being set to a higher delivery rate than what corresponds to the permissible overload rating.

This is effected by the arm on the regulating shaft being stopped by the stop screw, *see fig. 1.*

Mechanical Overspeed (SSH 81)

The engine is protected against overspeeding in the event of, for instance, governor failure by means of an overspeed trip.

The engine is equipped with a stopping device which starts to operate if the maximum permissible revolution number is exceeded.

The overspeed tripping device is fitted to the end cover of the lubricating oil pump and is driven through this pump.

If the pre-set tripping speed is exceeded, the spring-loaded flyweight (1), *see fig. 1*, will move outwards and press down the arm (2).

The arm is locked in its bottom position by the lock pin (3) which is pressed in by the spring (4).

At the same time the arm (2) presses down the spindle (5), and the pneumatic valve (6) opens, whereby compressed air will be led to the Lambda cylinder, see description 509.10, in which the piston is pressed forward and, through the arm, turns the fuel pump regulating rod to STOP position, thereby the engine stops, the spring-loaded pull rod connection to the governor being compressed.

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The engine can be stopped manually by pressing down the button (7), *see fig. 1*, which will activate the spring-loaded fly weight (1) through the lever (8).

If the overspeed has been activated the overspeed must be reset before the engine can be started. Reset is done by means of the button (10).

The overspeed alarm (SAH 81) is activated by means of the micro switch (9).

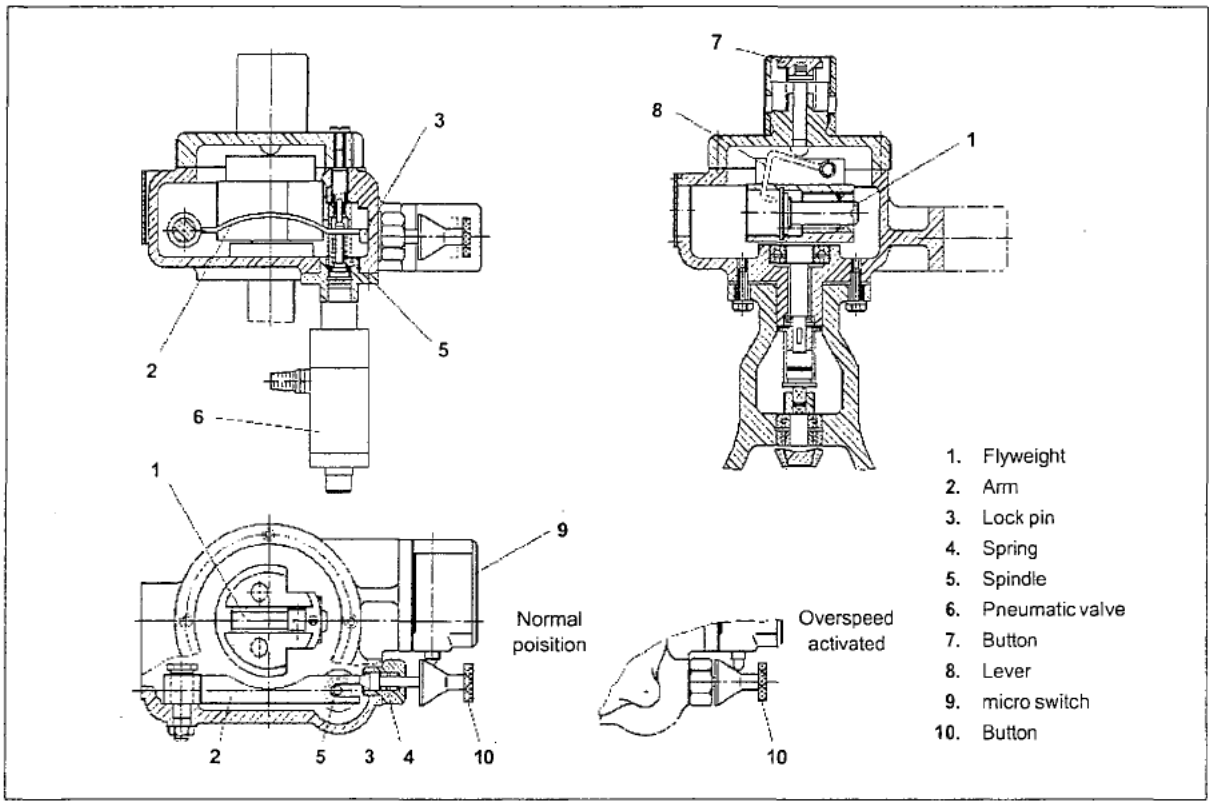

Fig 1. Mechanical overspeed (SSH 81).

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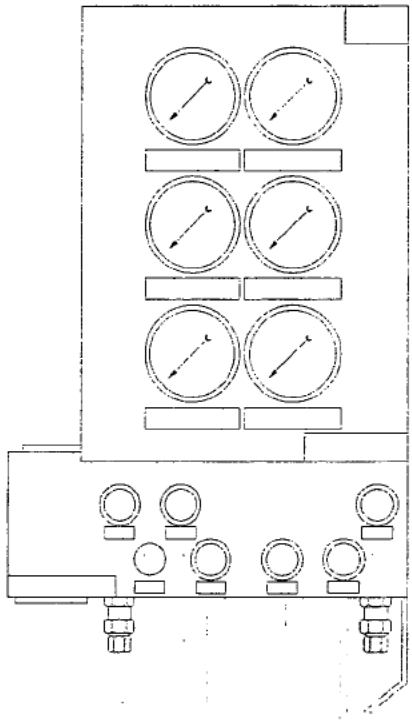
Main Instrument Panel

As standard the engine is equipped with an instrument panel, comprising instruments for visual indication of the most essential pressures.
Illustrated on *fig. 1.*

The instrument panel is mounted flexibly on rubber elements and all manometer connections are connected to the panel by means of flexible hoses, as shown on *fig. 2.*



On the engine is as standard mounted an instrument panel.

The following incorporating pressure gauges for the most essential pressures.

Pressure gauge for:

PI 01	LT fresh water, inlet to air cooler
PI 10	HT fresh water, inlet engine
PI 21/22	Lubricating oil, inlet/outlet to filter
PI 23	Lub. oil, inlet to turbocharger
PI 31	Charge air, outlet from cooler
PI 40	Fuel oil, inlet to engine

Fig. 1. Lay-out of instrument panel

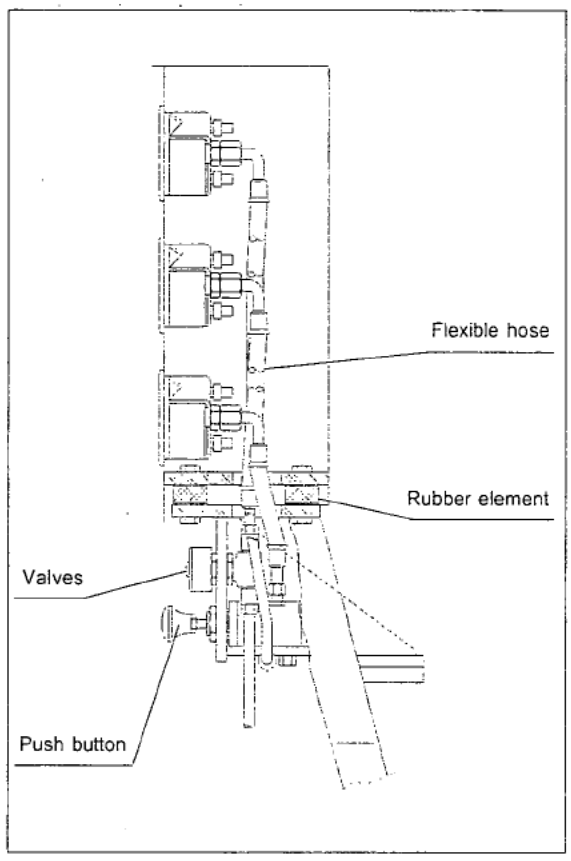


Fig. 2. Cross section of instrument panel

The connecting pipes to the manometers are equipped with valves which make it possible to replace the manometers during operation.

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Instrumentation

As standard the engine is supplied with the following instrumentation mounted local on the engine:

Thermometer	TI 01	LT water - inlet air cooler
Thermometer	TI 02	LT water - outlet from air cooler
Thermometer	TI 03	LT water - outlet from lub. oil cooler
Thermometer	TI 10	HT fresh water - inlet to engine
Thermometer	TI 11	HT fresh water - outlet each cylinder
Thermometer	TI 20	Lubricating oil - inlet to cooler
Thermometer	TI 22	Lubricating oil - outlet from filter
Thermometer	TI 30	Charge air - inlet to cooler
Thermometer	TI 31	Charge air - outlet from cooler
Thermometer	TI 40	Fuel oil - inlet to engine
Thermometer	TI 60	Exhaust gas - outlet each cylinder
Thermometer	TI 61	Exhaust gas - outlet turbocharger

The actual number of the instrumentation for the plant can be seen on the diagrams for the specific plant in the sections 512-513-514-515-516.
For code identification *see 500.20*.

Pressostates and Thermostates

The engine is supplied with a number of alarm- and shut-down functions. The alarms shall via the alarm panel worn against an abnormal working condition, which can lead to break down and the shut-down functions shall stop the engine before a break down. I.e. a shut-down is "worse" than an alarm because a shut-down is given if the engine could be severe damage by running on these conditions.

As standard the engine is equipped with:

Shut-down Switches for

- too low lubricating oil pressure - inlet engine
- too high HT FW temperature - outlet engine
- too high engine speed (over speed)

Alarm Switches for

- leaking fuel oil
- too low lubricating oil pressure - inlet engine
- too low prelubricating oil pressure (level alarm)
- too high press. drop across lub. oil filter
- too high HT FW temperature - outlet engine
- too low starting air pressure - inlet engine
- too high engine speed (overspeed)

The actual number and type of the alarm- and shut-down switches for the plant can be seen in the list "Engine Automatic part list" in this section.

Leakage Alarm (LAH 42)

Waste and leak oil from the comparement, for the injection equipment, fuel valves, high-pressure pipes and engine feed pump (if mounted) is led to a fuel leakage alarm unit.

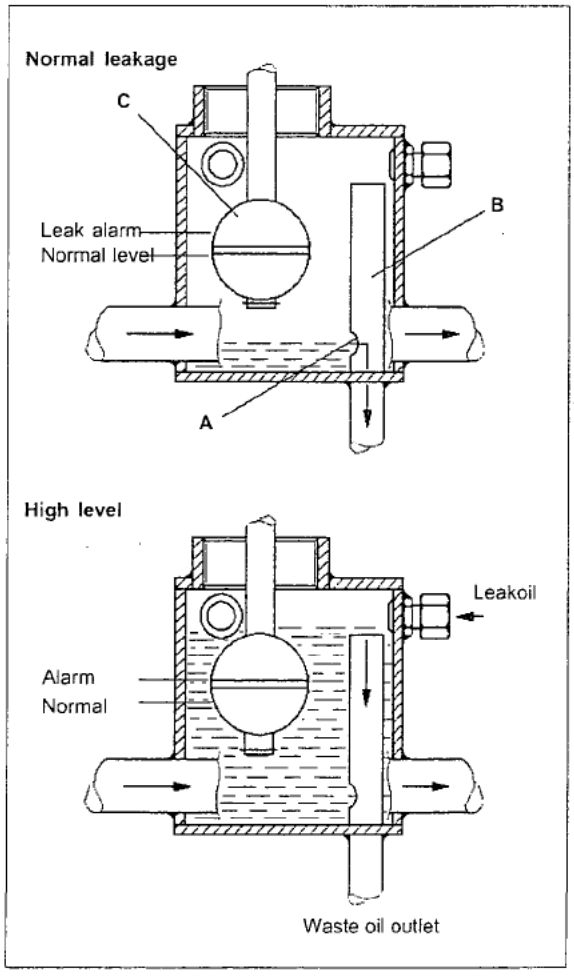

Fig. 4. Fuel oil leakage alarm.

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The alarm unit consists of a box with a float switch for level monitoring, *see fig. 4*.

The supply fuel oil to the engine is led through the unit in order to keep heated up, thereby ensuring free drainage passage even for high-viscous waste/leak oil.

Under normal conditions there will always be a smaller amount of waste/leak oil from the comparement, this will be led out through the bore "A" in the pipe "B" as illustrated.

In case of a larger than normal leakage, the level in the box will rise and the level switch "C" will be activated. The larger amount of leak oil will be lead out through the top of the pipe "B".

Alarm for Prelubricating (LAL 25)

Alarm for missing prelubricating, when the engine is stopped is given by means of a level switch (LAL 25) mounted in the main lubricating oil pipe.

Alarm and Shut-down for Overspeed

When the mechanical overspeed is activated, *see 509.01 fig. 2*, a micro-switch will release the alarm for overspeed (SAH 81) and activate the shut-down solenoid in the governor.

The latter function is a back-up for the mechanical overspeed.

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Purpose

The purpose with the lambda controller is to prevent injection of more fuel in the combustion chamber than can be burned during a momentary load in-crease. This is carried out by controlling the relation between the fuel index and the charge air pressure.

The Lambda controller is also used as stop cylinder.

Advantages

The lambda controller has the following advantages:

- Reduction of visible smoke in case of sudden momentary load increases.
- Improved load ability.
- Less fouling of the engine's exhaust gas ways.
- Limitation of fuel oil index during starting procedure.

Principles for functioning

Figure 1 illustrates the controller's operation mode. In case of a momentary load increase, the regulating device will increase the index on the injection pumps and hereby the regulator arm (1) is turned, the switch (2) will touch the piston arm (3) and be pushed downwards, whereby the electrical circuit will be closed.

Thus the solenoid valve (4) opens. The jet system is activated, the turbocharger accelerates and increases the charge air pressure, thereby pressing the piston (3) backwards in the lambda cylinder (5). When the lambda ratio is satisfactory, the jet system will be de-activated.

At a 50% load change the system will be activated for about 3-8 seconds.

If the system is activated more than 10 seconds, the solenoid valve will be shut off and there will be a remote signal for "system failure".

Fuel oil limiting during start procedure

During the start procedure the lambda controller is used as an index limiter.

Hereby heavy smoke formation is prevented during start procedure and further the regulating device cannot over-react.

The jet system is blocked during the starting procedure until the engine has reached 710 RPM.

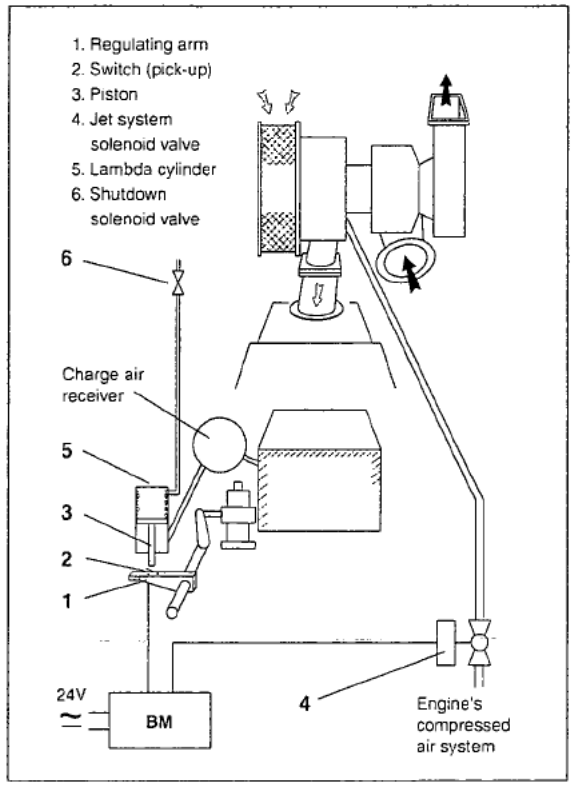

Fig 1 Principle drawing of lambda controller.

L23/30H

Description

The starting box is mounted on the engine's control side. On front of the box there are the following indications/pushbuttons:

- Indication of engine or turbocharger RPM
- Indication of electronic overspeed
- Pushbutton for "Manual Start"
- Pushbutton for "Manual Stop"
- Pushbutton for "Remote" *
- Pushbutton for "Local" *
- Pushbutton for "Blocking" *
- Pushbutton for change-over between engine and turbocharger RPM

* The function chosen is indicated in the pushbutton. See fig 1.

Manual Start

The engine can be started by means of the start button, but only if the button "Local" is activated.

The manual, local start is an electrical, pneumatic start, i.e. when activating the start button a solenoid valve opens for air to the air starter, thereby engaging the starter and starting the diesel engine. Throughout the starting cycle the start button must be activated.

The air starter is automatically disengaged when the diesel engine exceeds 140 RPM. If the start button is disengaged before the diesel engine has exceeded 140 RPM, further starting cycles are blocked, until 5 sec. after the engine is at standstill.

Remote Start

Remote start can only take place if the pushbutton for "Remote" is activated.

Manual Stop

The "Manual Stop" button is connected to the stop coil on the governor.

Blocking

If "Blocking" is activated, it is not possible to start the diesel engine.

Engine / Turbocharger RPM

By activating the "Engine RPM/TC RPM" button, the indication is changed.

Engine RPM indication is green light-emitting diodes and turbocharger RPM indication is red light-emitting diodes.

External Indications

There are output signals for engine RPM and turbocharger RPM.

Engine: 0 - 1200 RPM ~ 4-20 mA
TC: 0 - 60000 RPM ~ 4-20 mA

The pushbuttons for "Remote", "Local" and "Blocking" have potential free switches for external indication.

All components in the starting box are wired to the built-on terminal box.

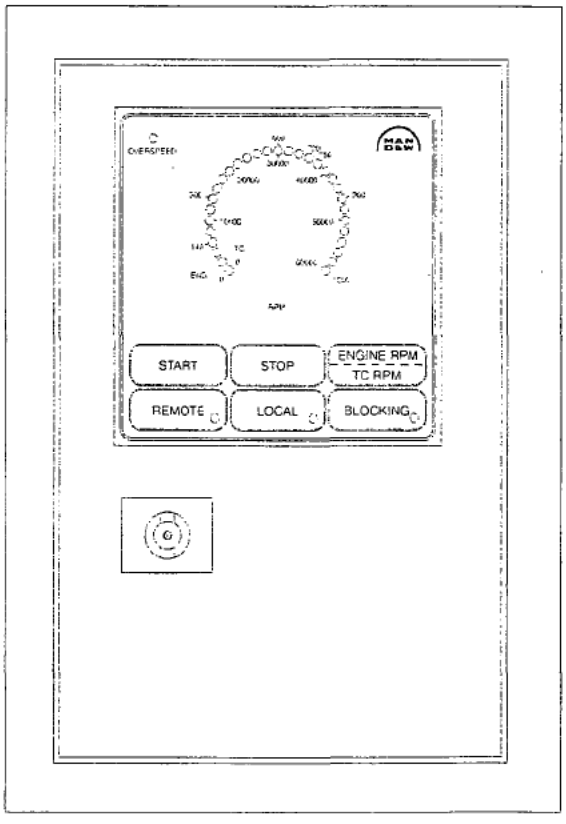

Fig 1. Starting box

Engine RPM signal

For measuring the engine's RPM, a pick-up mounted on the engine is used giving a frequency depending on the RPM. To be able to show the engine's RPM on an analogue tachometer, the frequency signal is sent through an f/I converter (frequency/current converter), where the signal is transformed into a proportional 4-20 mA ~ 0-1200 RPM signal.

Further, the converter has following signals:

- overspeed
- engine run
- safe start
- tacho fail

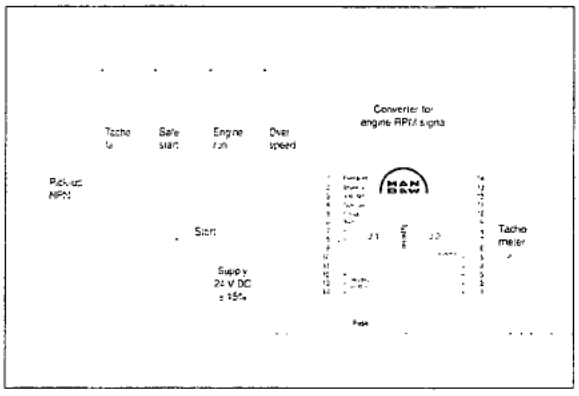

Fig 1. Converter for engine RPM.

Overspeed

When the engine speed reach the setpoint for electronic overspeed the converter gives a shutdown signal and a alarm signal through a relay.

Engine run

When the engine speed reach 710 RPM or 200 RPM + 10 seconds the converter gives a "engine run" signal.

The engine run signal will be deactivated when the speed is 640 RPM. If the engine speed haven't been over 710 RPM the signal will be deactivated at 200 RPM.

The "engine run" signals will be given through a relay. One for synchronizing and one for start/stop of pre. lub. oil pump or alarm blocking at start/stop.

Safe start

When the safe start signal is activated the engine can start. When the engine reach 140 RPM the air starter will be shut-off.

Further, the safe start signal is a blocking function for the air starter during rotation.

Tacho fail

The tacho fail signal will be on when everything is normal. If the pick-up or the converter fails the signal will be deactivated. E.g. if there is power supply failure.

The converter for engine RPM signal is mounted in the terminal box on the engine.

Turbocharger RPM signal

For measuring the turbocharger RPM, a pick-up mounted on the engine is used giving a frequency depending on the RPM. To be able to show the turbocharger's RPM on an analogue tachometer, the frequency signal is sent through a f/I converter (frequency/current converter), where the signal is transferred into a proportional 4-20 mA ~ 0-60000 RPM.

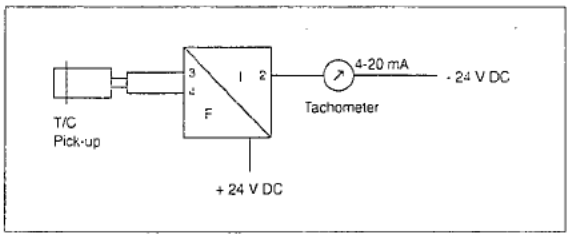

Fig 2. Converter for TC RPM.

The converter is mounted in the terminal box on engine.

L23/30H

Safety precautions

- ☐ Stopped engine
- ☐ Shut-off starting air
- ☐ Shut-off cooling water
- ☐ Shut-off fuel oil
- ☐ Shut-off cooling oil
- ☐ Stopped lub. oil circul.

Description

Function test and adjustment of safety, alarm and monitoring equipment.

Starting position

Related procedure

Overspeed trip	509-01.05
Pressostate	509-05.00
Thermostate	509-05.01
Level switch (LAL 25)	509-05.02
Analog pressure transmitter	509-05.03
Analog temperature transmitter	509-05.04

Man power

Working time : hours
Capacity : man

Data

Data for pressure and tolerance	(Page 500.35)
Data for torque moment	(Page 500.40)
Declaration of weight	(Page 500.45)

Special tools

Plate No	Item No	Note.

See Related Procedure

Hand tools

See Related Procedure

Replacement and wearing parts

Plate No	Item No	Qty. /

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L23/30H

Maintenance of monitoring and safety systems

One of the most important parameters in the preventive work is that the alarm system as well as the shutdown and overspeed devices are functioning 100%.

If some of these functions are out of operation, they have to be repaired immediately. If this is not possible because of the present working situation, the engine has to be under constant observation until it can be stopped.

It is recommended that all functions are tested every three months according to the mentioned working cards.

The extent of the alarm and safety functions is variable from plant to plant.

For check of these functions use the working cards mentioned under related procedure on page 1.

Alarm System

It is important that all alarms lead to prompt investigation and remedy of the error.
No alarm is insignificant. It is therefore important that all engine crew members are
familiar with and well trained in the use and importance of the alarm system.
The most serious alarms are equipped with slowdown and/or shutdown functions.

08028-0D/H5250/94.08.12

Working Card Page 1 (2)	Functional Test and Adjustment of Overspeed Trip	509-01.05 Edition 01H

L23/30H

Safety precautions:

- ☐ Stopped engine
- ☐ Shut-off starting air
- ☐ Shut-off cooling water
- ☐ Shut-off fuel oil
- ☐ Shut-off cooling oil
- ☐ Stopped lub. oil circul.

Description:

Functional test and adjustment of overspeed trip.

Starting position:

Functional test and adjustment of safety alarm and monitoring equipment, 509-01.00

Related procedure:

Manpower:

Working time : 1 hour
Capacity : 1 man

Data:

Data for pressure and tolerance (Page 500.35)
Data for torque moment (Page 500.40)
Declaration of weight (Page 500.45)

Special tools:

Plate no	Item no	Note
52009	016	

Hand tools:

Allen key, 4 mm.
Allen key, 2 mm.

Replacement and wearing parts:

Plate no	Item no	Qty/

08028-0D/H5250/94.08.12

L23/30H

1) The engine is run up manually, (on governor "synchronizer") and at no load, while watching the tachometer.

On reaching the revolution number indicated *on page 500.30* or in "Test Report", the overspeed tripping device must function, thus actuating the stop cylinders. The fuel injection pump control rods are now moved to zero index, and the engine stops.

2) If the overspeed device trip at a revolution number different from that stated *on page 500.30* or in the "Test Report" the overspeed device must be adjusted.

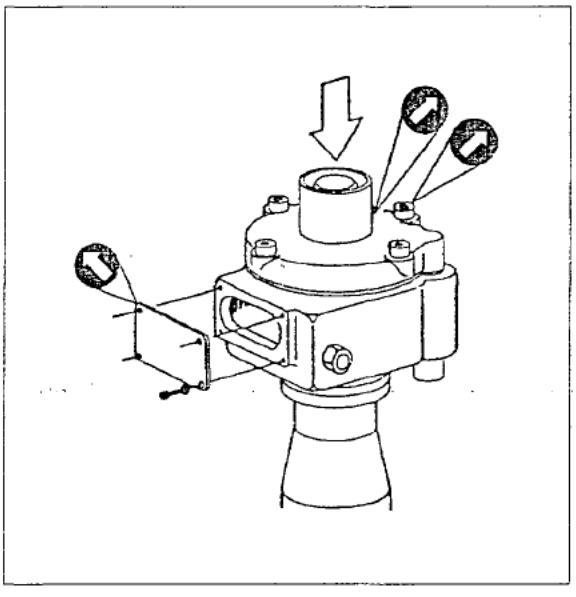


Fig 1.

Adjustment of Overspeed Trip.

3) Remove both covers on the housing of the overspeed tripping device, *see fig 1.*

Turn the engine until the adjusting screw is opposite the opening on the side of the housing. Now loosen the lock screw and turn the adjusting screw, using the tubular pin spanner supplied, *see fig 2.*

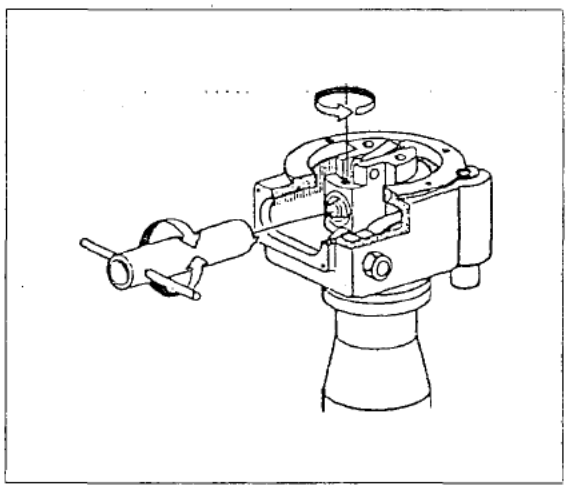


Fig 2.

Turn the adjusting screw outwards (slacken flyweight spring) to reduce the revolution number. Be careful not to screw the adjusting screw so far out that it may touch the release arm. Tighten the lock screw and test the overspeed device again.

4) Refit the covers when the overspeed device functions at correct revolution number.

5) The overspeed device can be tested manually by depressing the button on top af the housing, *see fig 1. This will activate the flyweight and the arm for* release of the air valve for the stop cylinders and the engine should thus stop. (This test must also be carried out without load).

6) It is recommended now and then, while the engine is at a standstill, to move the flyweight by means of the push button to ensure that the flyweight can always move with sufficient ease.

08028-0D/H5250/94.08.12

Working Card Page 1 (2)	Adjustment and Test of On/Off Pressostate	509-05.00 Edition 01H

L23/30H

Safety precautions:

- Stopped engine
- Shut-off starting air
- Shut-off cooling water
- Shut-off fuel oil
- Shut-off cooling oil
- Stopped lub. oil circul.

Description:

Adjustment and test of on/off pressostate. (lub. oil,fuel oil, water etc.).

Starting position:

Functional test and adjustment of safety alarm and monitoring equipment, 509-01.00

Related procedure:

Manpower:

Working time : 1/2 hour
Capacity : 1 man

Data:

Data for pressure and tolerance	(Page 500.35)
Data for torque moment	(Page 500.40)
Declaration of weight	(Page 500.45)

Special tools:

Plate no	Item no	Note

Hand tools:

Screw driver.
Testing pump.
Ring and open end spanner, 10 mm.

Replacement and wearing parts:

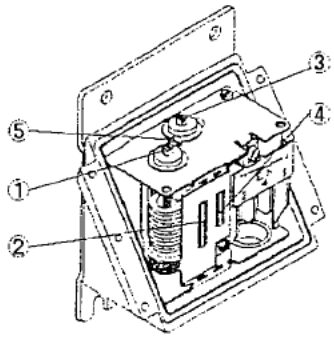
Plate no	Item no	Qty/

08028-0D/H5250/94.08.12

L23/30H

Adjustment:

1) When the pressostate cover is removed and locking screw pos. 5, *fig 1* is loosened, the range can be set with the spindle pos. 1 while at the same time the scale pos. 2 is read.



1. Range spindle.
2. Range scale.
3. Differential spindle.
4. Differential scale.
5. Locking screw.

Fig 1.

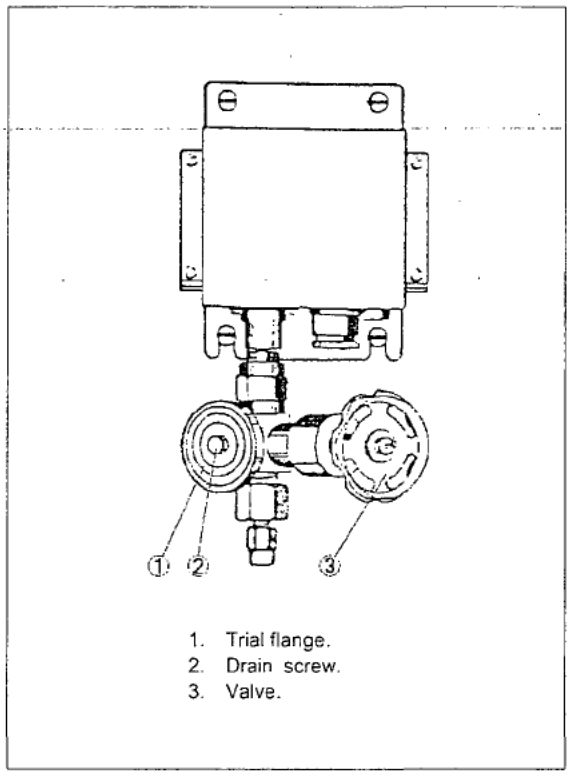
2) In pressostates having an adjustable differential, the spindle pos. 3 must be used to make the adjusment. The differential obtained can be read directly on the scale pos. 4.

Set points, *see page 500.30.*

Test:

It is possible to make a functional test of the pressure switch. This is to be carried out according to the following procedure.

3) Shut off system pressure with the valve pos 3, *fig 2.*



1. Trial flange.
2. Drain screw.
3. Valve.

Fig 2.

4) Remove the screw pos. 2.

5) Mount the testing pump on the trial flange pos. 1.

Alarm for Falling Pressure:

6) Pump up the pressure until the switch has changed. The pressure will slowly be relieved and it must be checked that the switch change back to the pressure stated as the alarm point.

Alarm for Rising Pressure:

7) Pump up the pressure until the switch changes, and check that it happens at the stated alarm point.

8) After the final check and adjustment, remove the testing pump, mount the screw pos 2 and open the valve pos 3.

08028-0D/H5250/94.08.12

Working Card Page 1 (2)	Adjustment and Test of On/Off Thermostate	509-05.01 Edition 01H

L23/30H

Safety precautions:

- Stopped engine
- Shut-off starting air
- Shut-off cooling water
- Shut-off fuel oil
- Shut-off cooling oil
- Stopped lub. oil circul.

Description:

Adjustment and test of on/off thermostate. (lub. oil, fuel oil, water etc.).

Starting position:

Functional test and adjustment of safety alarm and monitoring equipment, 509-01.00

Related procedure:

Manpower:

Working time : 1/2 hour
Capacity : 1 man

Data:

Data for pressure and tolerance (Page 500.35)
Data for torque moment (Page 500.40)
Declaration of weight (Page 500.45)

Special tools:

Plate no	Item no	Note

Hand tools:

Screw driver.
Special testing devices.

Replacement and wearing parts:

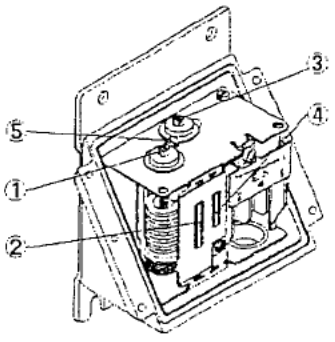
Plate no	Item no	Qty/

08028-0D/H5250/94.08.12

L23/30H

Adjustment:

1) When the thermostate cover is removed and locking screw pos. 5, *fig 1* is loosened, the range can be set with the spindle pos. 1 while at the same time the scale pos. 2 is read.



1. Range spindle.
2. Range scale.
3. Differential spindle.
4. Differential scale.
5. Locking screw.

Fig 1.

2) Thermostates having an adjustable differential, the spindle pos. 3 can be used while the scale pos. 4 is read.

Set points, *see page 500.30.*

Test:

3) The funcional test of the thermostate is to be carried out according to the following procedure.

4) Take out the sensor of the pocket.

5) Test the sensor in a water bath, where the temperature can be controlled.

Alarm for Falling Temperature:

6) Raise the temperature until the switch has changed.

Then the temperature must slowly be reduced, and check that the switch changes back at the temperature stated in the list *page 500.30.*

Alarm for Rising Temperature:

7) Raise the temperature until the switch changes and check that is happens at the stated alarm points.

8) Adjust if necessary.

9) The sensor is mounted again.

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Working Card Page 1 (2)	Function and Test of Level Switch (LAL 25)	509-05.02 Edition 01H

L23/30H

Safety precautions:

- [x] Stopped engine
- [x] Shut-off starting air
- [ ] Shut-off cooling water
- [ ] Shut-off fuel oil
- [ ] Shut-off cooling oil
- [ ] Stopped lub. oil circul.

Description:

Function and test of level switch, LAL 25, in lubricating oil system.

Starting position:

Functional test and adjustment of safety alarm and monitoring equipment, 509-01.00

Related procedure:

Manpower:

Working time : 1/2 hour
Capacity : 1 man

Data:

Data for pressure and tolerance (Page 500.35)
Data for torque moment (Page 500.40)
Declaration of weight (Page 500.45)

Special tools:

Plate no:	Item no:	Note

Hand tools:

Replacement and wearing parts:

Plate no	Item no	Qty/

08028-0D/H5250/94.08.12

L23/30H

The level switch LAL 25, which is mounted on the main lubricating oil pipe of the engine, gives alarm for missing prelubricating oil.

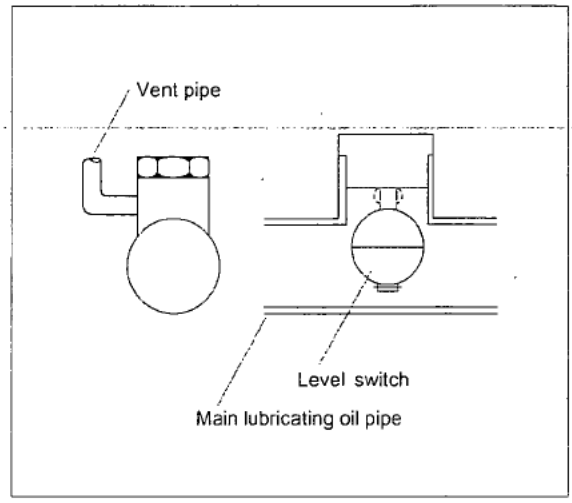


Fig 1.

Function.

1) By starting the prelubricating oil pump the main lubricating oil pipe will be filled with lubricating oil, which means that the level switch is lifted and the alarm is disconnected.

2) When the prelubricating is interrupted, the lub. oil will run out of the system through the bearings, which means that level switch is lowered and the alarm starts.

Test:

The test is carried out when the engine is stopped.

3) Start the lubricating oil pump, and let the pump run about 5 min.

4) Stop the prelubricating oil pump. The alarm must be released after 0 - 5 min., depending of the oil viscosity.

Working Card Page 1 (2)	Adjustment and Test of Analogous Pressure Transmitter	509-05.03 Edition 01H

L23/30H

Safety precautions:

- Stopped engine
- Shut-off starting air
- Shut-off cooling water
- Shut-off fuel oil
- Shut-off cooling oil
- Stopped lub. oil circul.

Description:

Adjustment and test of analogous pressure transmitter.

Starting position:

Functional test and adjustment of safety alarm and monitoring equipment, 509-01.00

Related procedure:

Manpower:

Working time : 1/2 hour
Capacity : 1 man

Data:

Data for pressure and tolerance	(Page 500.35)
Data for torque moment	(Page 500.40)
Declaration of weight	(Page 500.45)

Special tools:

Plate no	Item no	Note

Hand tools:

Ring and open end spanner, 10 mm.
Testing pump.

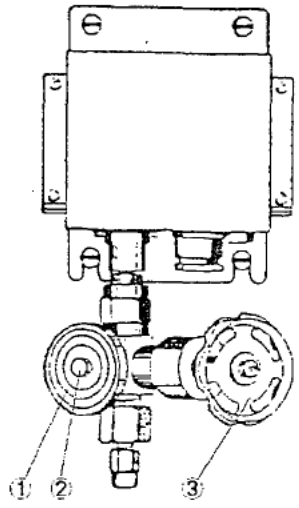
Replacement and wearing parts:

Plate no	Item no	Qty/

08028-0D/H5250/94.08.12

L23/30H

The pressure transmitter registers the actual pressure and marks the change to an electrical signal, which adjusts the pressure.



1. Trial flange.
2. Drain screw.
3. Valve.

Fig 1.

Adjustment:

1) The pressure transmitter shall not be adjusted, but the alarm limit must be set on the alarm plant. Kindly see the instruction book for the alarm plant.

Set points, *see page 500.30.*

Test:

2) It is possible to make a functional test of the pressure transmitter. This is carried out according to the following procedure:

3) Shut off system pressure with the valve pos. 3.

4) Remove the screw pos. 2.

5) Mount the testing apparatus on the trial flange pos. 1. and pump on a pressure within the working area of the transmitter.

If the alarm plant has an instrument unit, the pressure can be read on this. Otherwise the test can be carried out by watching if the alarm plant gives any alarm, when the alarm limit which is stated *on page 500.30* is exceeded (if the alarm plant is adjusted).

6) The screw pos. 2 is mounted, and the valve pos. 3. is opened after the test is finished.

08028-0D/H5250/94.08.12

Working Card Page 1 (2)	Adjustment and Test of Analogous Temperature Transmitter	509-05.04 Edition 01H

L23/30H

Safety precautions:

- ☐ Stopped engine
- ☐ Shut-off starting air
- ☐ Shut-off cooling water
- ☐ Shut-off fuel oil
- ☐ Shut-off cooling oil
- ☐ Stopped lub. oil circul.

Description:

Adjustment and test of analogous temperature transmitter, (PT 100 sensor).

Starting position:

Functional test and adjustment of safety alarm and monitoring equipment, 509-01 00

Related procedure:

Mampower:

Working time : 1/2 hour
Capacity : 1 man

Data:

Data for pressure and tolerance (Page 500.35)
Data for torque moment (Page 500.40)
Declaration of weight (Page 500.45)

Special tools:

Plate no	Item no	Note

Hand tools:

Special testing devices.

Replacement and wearing parts:

Plate no	Item no	Qty/

08028-0D/H5250/94.08.12

L23/30H

The PT 100 sensor consists of a resistance wire which changes resistance depending on the temperature.

Look and design varify depending on the place of measurement and manufacture.

Adjustment:

1) The PT 100 sensor cannot be adjusted, but the alarm limit must be set on the alarm plant.

Set point, *see page 500.30.*

Test:

2) The functional trial of the PT 100 sensor can be carried out according to the following procedure.

3) Take out the sensor of the pocket.

4) Test the sensor by diving the sensor in the water. Compare the signal from the sensor with the water temperature.

If the alarm plant has an instrument unit, the temperature can be read on this.

Otherwise the test can be carried out by watching if the alarm plant gives any alarm, when the alarm limit which is stated *on page 500.30* is exceeded (if the alarm plant is adjusted).

5) The sensor is mounted again.

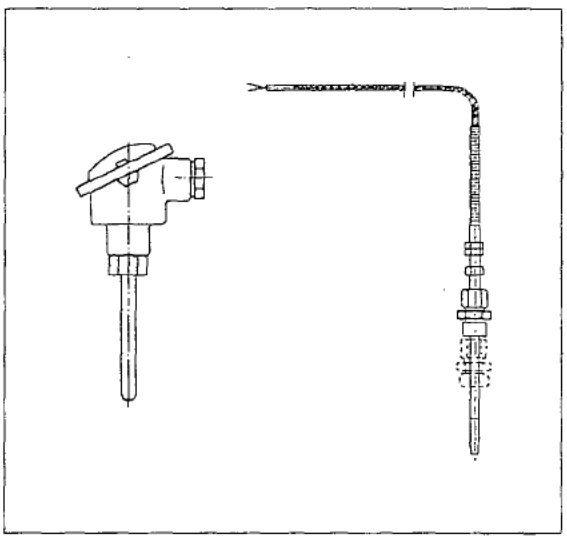


Fig 1.

L23/30H

Safety precautions

- [x] Stopped engine
- [ ] Shut off starting air
- [ ] Shut off cooling water
- [ ] Shut off fuel oil
- [ ] Shut off cooling oil
- [ ] Stopped lub. oil circul.

Description

Adjustment of lambda controller.

Starting position

Related procedure

Manpower

Working time : 1 hour
Capacity : 1 man

Data

Data for pressure and tolerance (Page 500.35)
Data for torque moment (Page 500.40)
Declaration of weight (Page 500.45)

Special tools

Plate no	Item no	Note

Hand tools

Allen key.

Replacement and wearing parts

Plate no	Item no	Qty /

08028-0D/H5250/94.08.12

L23/30H

Lambda Controller

Normally the lambda controller does not need adjustment. The only time adjustment is needed, is when the controller or the governor has been dismantled. The adjustment is to be carried out in standstill position.

1. Check that the free space between the pick-up and the band steel on the regulating arm is min 1 mm, see fig 1.

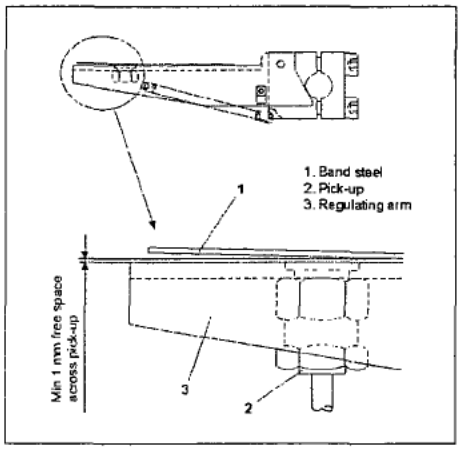


Fig 1.

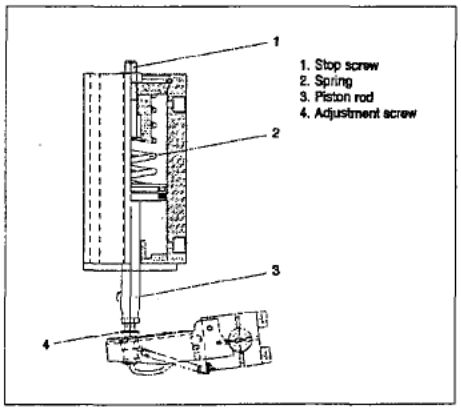


Fig 2.

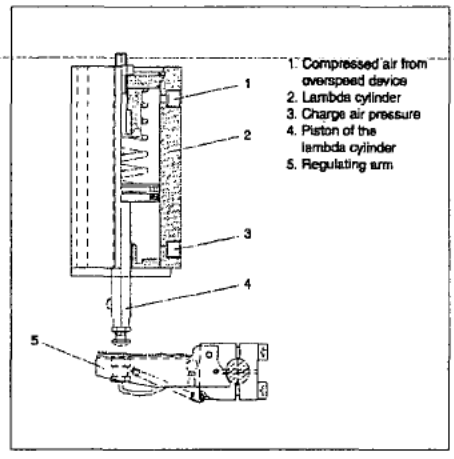


Fig 3.

2. Set the index of the fuel pumps at 17 by means of the governor arm, see plate 50902, item 039.

Note: Set the "load limit" control knob at max in order to protect the governor.

3. Fit the adjustment screw (4), fig 2, until the piston has contact with the spring without compressing the spring.

4. Fasten the adjustment screw.

5. Adjustment finished.

Adjustment of the stop screw

6. Remove pipe for charge air pressure, see fig 3.

7. Supply air pressure until the piston rod reaches its upper position.

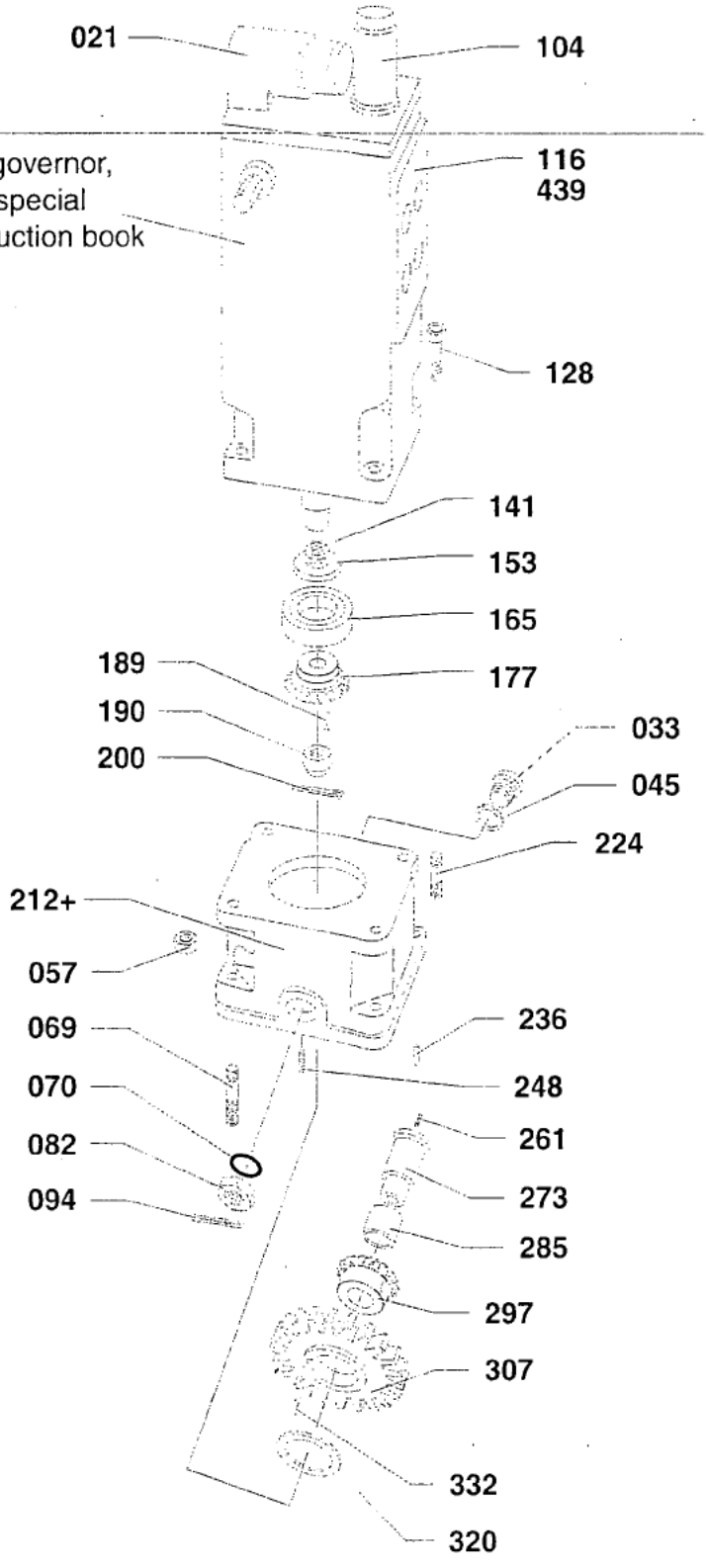
8. Adjust the stop screw, see fig 2, to 110% load according to the test bed, plus 1.5 index.
Use the index-arm on the fuel pump nearest to the lambda controller as control for the index.

9. Adjustment finished.

08029-0D/H5250/94.08.12

Plate Page 1 (2)	Governor and Governor Drive	50901-22H

L23/30H



08028-0D/H5250/94.08.12

L23/30H

Item No.	Qty.	Designation	Benævnelse
021	1/E	Synchronnizing motor	Synchroniserings-motor
033	1/E	Plug screw	Propskrue
045	1/E	Gasket	Pakning
057	4/E	Nut	Møtrik
069	2/E	Stud	Tap
070	1/E	O-ring	O-ring
082	1/E	Castle nut	Kronemøtrik
094	1/E	Split pin	Split
104	1/E	Shut down solenoid	Shut-down spole
116	1/E	Governor 720/750 rpm	Regulator 720/750 rpm
128	4/E	Screw	Skrue
141	1/E	Shim (set 0,1 - 0,3 - 0,5 - 1,0 mm)	Mellemlæg (sæt 0,1 - 0,3 - 0,5 - 1,0 mm)
153	1/E	Disc	Skive
165	1/E	Ball bearing	Kugleleje
177	1/E	Bevel gear wheel	Konisk tandhjul
189	1/E	Key	Feder
190	1/E	Castle nut	Kronemøtrik
200	1/E	Split pin	Split
212+	1/E	Housing	Hus
224	2/E	Stud	Tap
236	2/E	Pin	Stift
248	1/E	Plug	Prop
261	1/E	Plug	Prop
273	1/E	Axle journal	Akseltap
285	1/E	Bush	Bøsning
297	1/E	Bevel gear wheel	Konisk tandhjul
307	1/E	Gear wheel	Tandhjul
320	1/E	Wear disc	Slidskive
332	1/E	Key	Feder
439	1/E	Governor 900 rpm	Regulator 900 rpm
		+ Item No. 212 require an individual matching (by shims) before mounting, contact, MAN B&W, Holeby	+ Item nr. 212 kræver en individual tilpasning (med shims) før montering, kontakt MAN B&W, Holeby.

When ordering spare parts, see also page 500.50.

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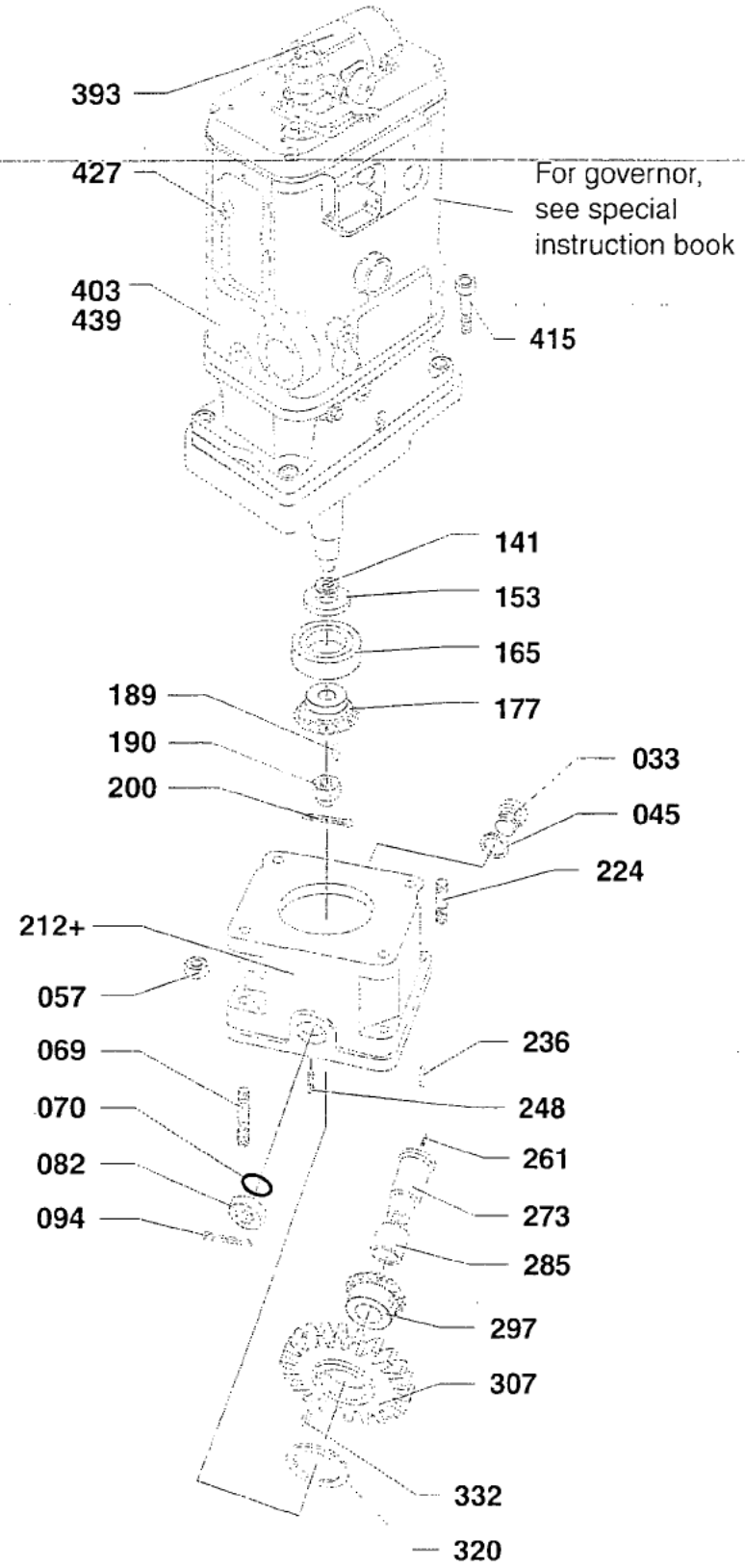
Qty./E = Qty./Engine

Ved bestilling af reservedele, se også side 500.50.

* = Kun tilgængelig som en del af et reservedelssæt.
Antal/E = Antal/Motor

08028-0D/H5250/94.08.12

L23/30H



68028-GD/H5250/94.08.12

L23/30H

Item No.	Qty.	Designation	Benævnelse
033	1/E	Plug screw	Propskrue
045	1/E	Gasket	Pakning
057	4/E	Nut	Møtrik
069	2/E	Stud	Tap
070	1/E	O-ring	O-ring
082	1/E	Castle nut	Kronemøtrik
094	1/E	Split pin	Split
141	1/E	Shim (set 0,1 - 0,3 - 0,5 - 1,0 mm)	Mellemlæg (sæt 0,1 - 0,3 - 0,5 - 1,0 mm)
153	1/E	Disc	Skive
165	1/E	Ball bearing	Kugleleje
177	1/E	Bevel gear wheel	Konisk tandhjul
189	1/E	Key	Feder
190	1/E	Castle nut	Kronemøtrik
200	1/E	Split pin	Split
212+	1/E	Housing	Hus
224	2/E	Stud	Tap
236	2/E	Pin	Stift
248	1/E	Plug	Prop
261	1/E	Plug	Prop
273	1/E	Axle journal	Akseltap
285	1/E	Bush	Bøsning
297	1/E	Bevel gear wheel	Konisk tandhjul
307	1/E	Gear wheel	Tandhjul
320	1/E	Wear disc	Slidskive
332	1/E	Key	Feder
393	1/E	Synchronizing motor	Synkromiseringsmotor
403	1/E	Governor, Europa (720/750 rpm)	Regulator, Europa (720/750 rpm)
415	4/E	Screw	Skrue
427	1/E	Shutdown solenoid	Shutdown spole
439	1/E	Governor, Europa (900 rpm)	Regulator, Europa (900 rpm)
		+ Item No. 212 require an individual matching (by shims) before mounting, contact, MAN B&W, Holeby	+ Item nr. 212 kræver en individual tilpasning (med shims) før montering, kontakt MAN B&W, Holeby.

When ordering spare parts, see also page 500.50.

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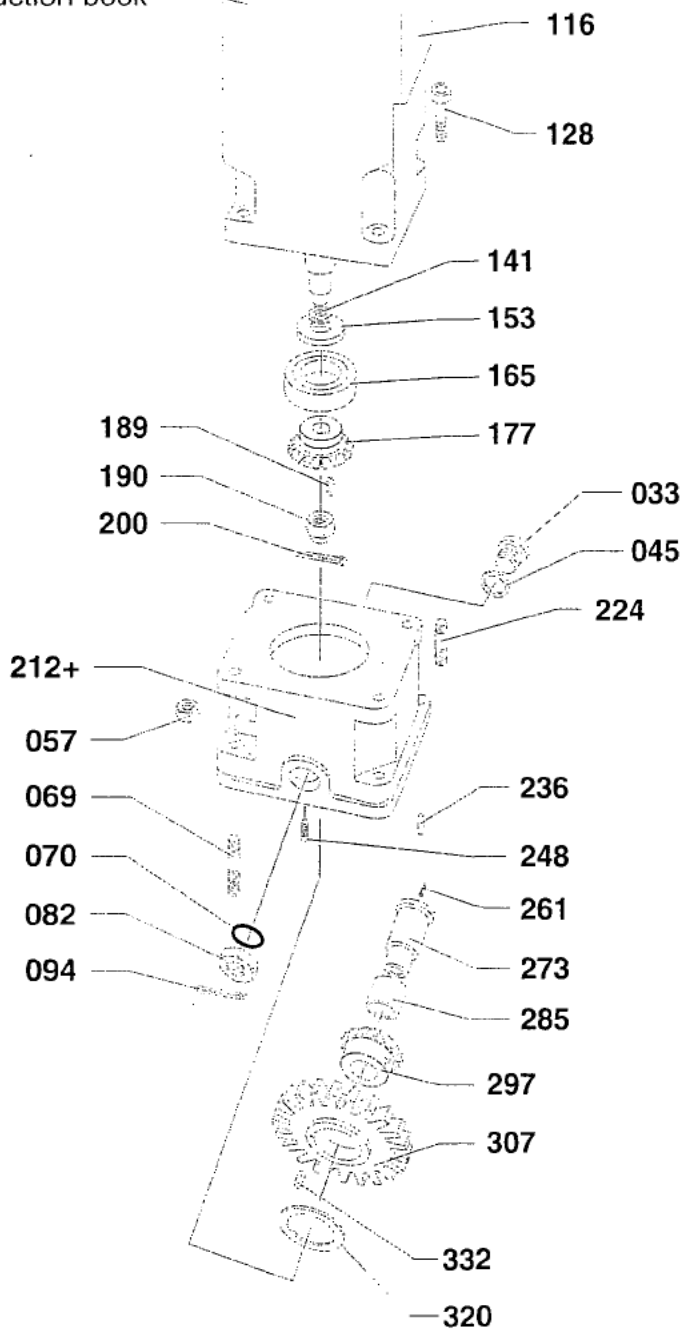
Plate Page 1 (2)	Governor and Governor Drive	50901-23H

L23/30H

For actuator,
see special
instruction book



08028-0D/H5250/94.08.12

L23/30H

Item No.	Qty.	Designation	Benævnelse
033	1/E	Plug screw	Propskrue
045	1/E	Gasket	Pakning
057	4/E	Nut	Møtrik
069	2/E	Stud	Tap
070	1/E	O-ring	O-ring
082	1/E	Castle nut	Kronemøtrik
094	1/E	Split pin	Split
116	1/E	Actuator	Aktuator
128	4/E	Screw	Skrue
141	1/E	Shim (set 0,1 - 0,3 - 0,5 - 1,0 mm)	Mellemlæg (sæt 0,1 - 0,3 - 0,5 - 1,0 mm)
153	1/E	Disc	Skive
165	1/E	Ball bearing	Kugleleje
177	1/E	Bevel gear wheel	Konisk tandhjul
189	1/E	Key	Feder
190	1/E	Castle nut	Kronemøtrik
200	1/E	Split pin	Split
212+	1/E	Housing	Hus
224	2/E	Stud	Tap
236	2/E	Pin	Stift
248	1/E	Plug	Prop
261	1/E	Plug	Prop
273	1/E	Axle journal	Akseltap
285	1/E	Bush	Bosning
297	1/E	Bevel gear wheel	Konisk tandhjul
307	1/E	Gear wheel	Tandhjul
320	1/E	Wear disc	Slidskive
332	1/E	Key	Feder

+ Item No. 212 require an individual matching (by shims) before mounting, contact, MAN Diesel A/S.

+ Item nr. 212 kræver en individual tilpasning (med shims) for montering, kontakt MAN Diesel A/S.

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When ordering spare parts, see also page 600.50.

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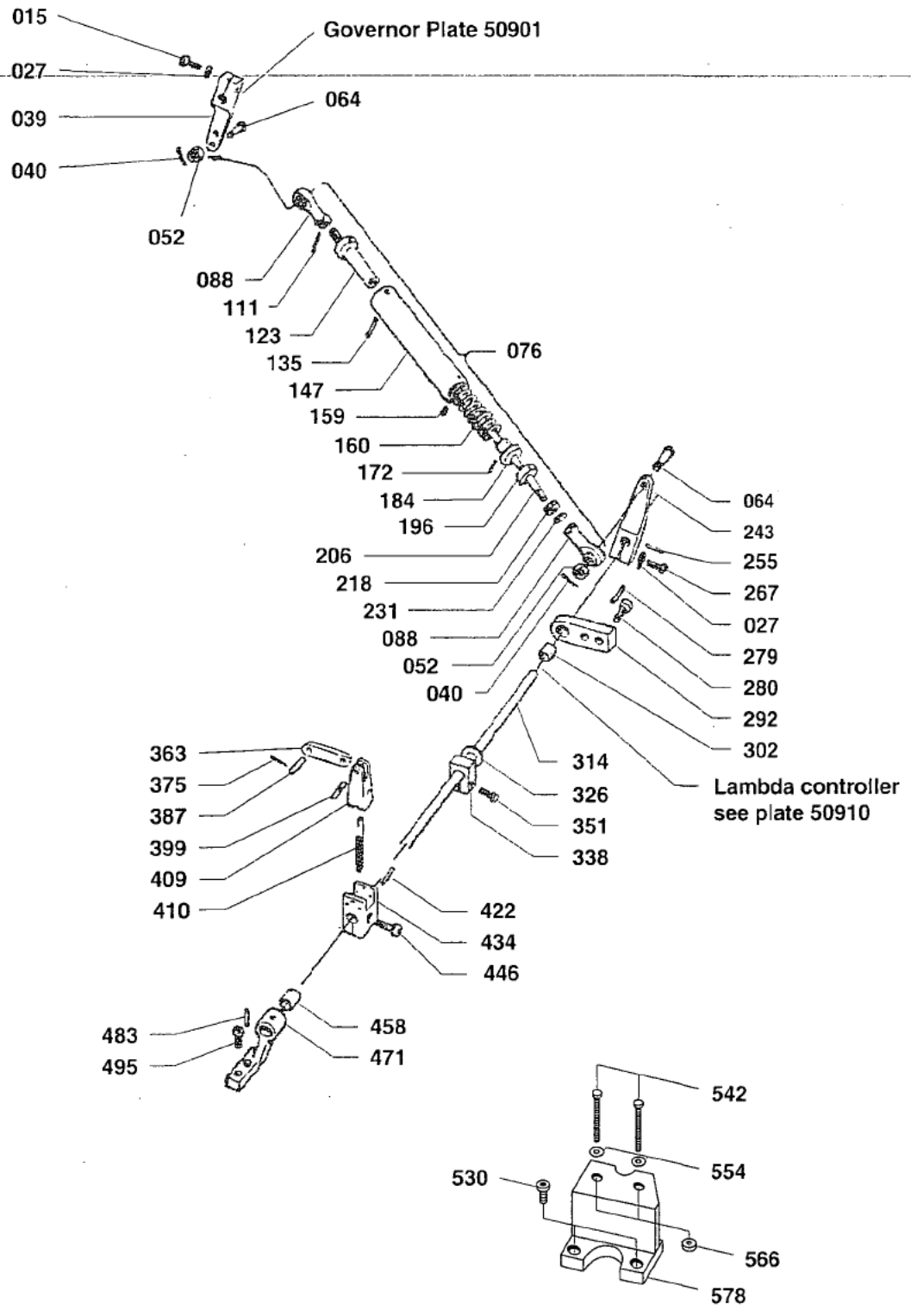
Ved bestilling af reservedele, se også side 600.50.

* = Kun tilgængelig som en del af et reservedelssæt.
Antal/E = Antal/Motor

Plate Page 1 (2)	Regulating Device	50902-06H

L23/30H



08028-0D/H5250/94.08.12

L23/30H

Item No.	Qty.	Designation	Benævnelse
015	1/R	Screw	Skrue
027	2/R	Locking plate	Låseblik
039	1/R	Governor arm	Regulatorarm
040	2/R	Split pin	Split
052	2/R	Self locking nut	Selvlåsende møtrik
064	2/R	Screw for ball head	Skrue for kuglehoved
076	1/R	Spring loaded pull rod, complete	Fjederbelastet træk-stang, komplet
088	2/R	Pull rod head	Trækstangshoved
111	1/R	Split pin	Split
123	1/R	Pull rod end	Trækstangsende
135	1/R	Cylindrical pin	Cylindrisk stift
147	1/R	Spring housing	Fjederhus
159	1/R	Pointed screw	Pinolskrue
160	1/R	Spring	Fjeder
172	1/R	Cylindrical pin	Cylindrisk stift
184	1/R	Guide ring	Styrering
196	1/R	Guide ring	Styrering
206	1/R	Pull rod	Trækstang
218	1/R	Nut	Møtrik
231	1/R	Locking plate	Låseblik
243	1/R	Arm	Arm
255	1/R	Spring pin	Fjederstift
267	1/R	Screw	Skrue
279	1/R	Guide pin	Styrestift
280	1/R	Screw	Skrue
292	1/R	Bearing	Leje
302	1/R	Bushing	Bøsning
314	1/E	Regulating shaft	Reguleringsaksel
326	1/E	Washer	Skive
338	1/E	Stop ring	Stopring
351	1/E	Screw	Skrue
363	1/C	Linkage	Lænkeled
375	1/C	Split pin	Split
387	1/C	Pin	Stift
399	1/C	Pin	Stift
409	1/C	Spring arm	Fjederarm
410	1/C	Spring	Fjeder
422	3/C	Spring pin	Fjederstift
434	1/C	Armholder	Armholder
446	1/C	Screw	Skrue
458	1/C	Bushing	Bøsning
471	1/C	Bearing bracket	Lejeblik
483	2/C	Spring pin	Fjederstift
495	2/C	Screw	Skrue
530	2/E	Screw	Skrue
542	2/E	Screw	Skrue
554	2/E	Washer	Skive
566	2/E	Nut	Møtrik
578	1/E	Bracket	Konsol

When ordering spare parts, see also page 500.50.

* = **Only available as part of a spare part kit.**
Qty./E = **Qty./Engine**
Qty./C = **Qty./Cylinder**
Qty./R = **Qty./Regulating device**

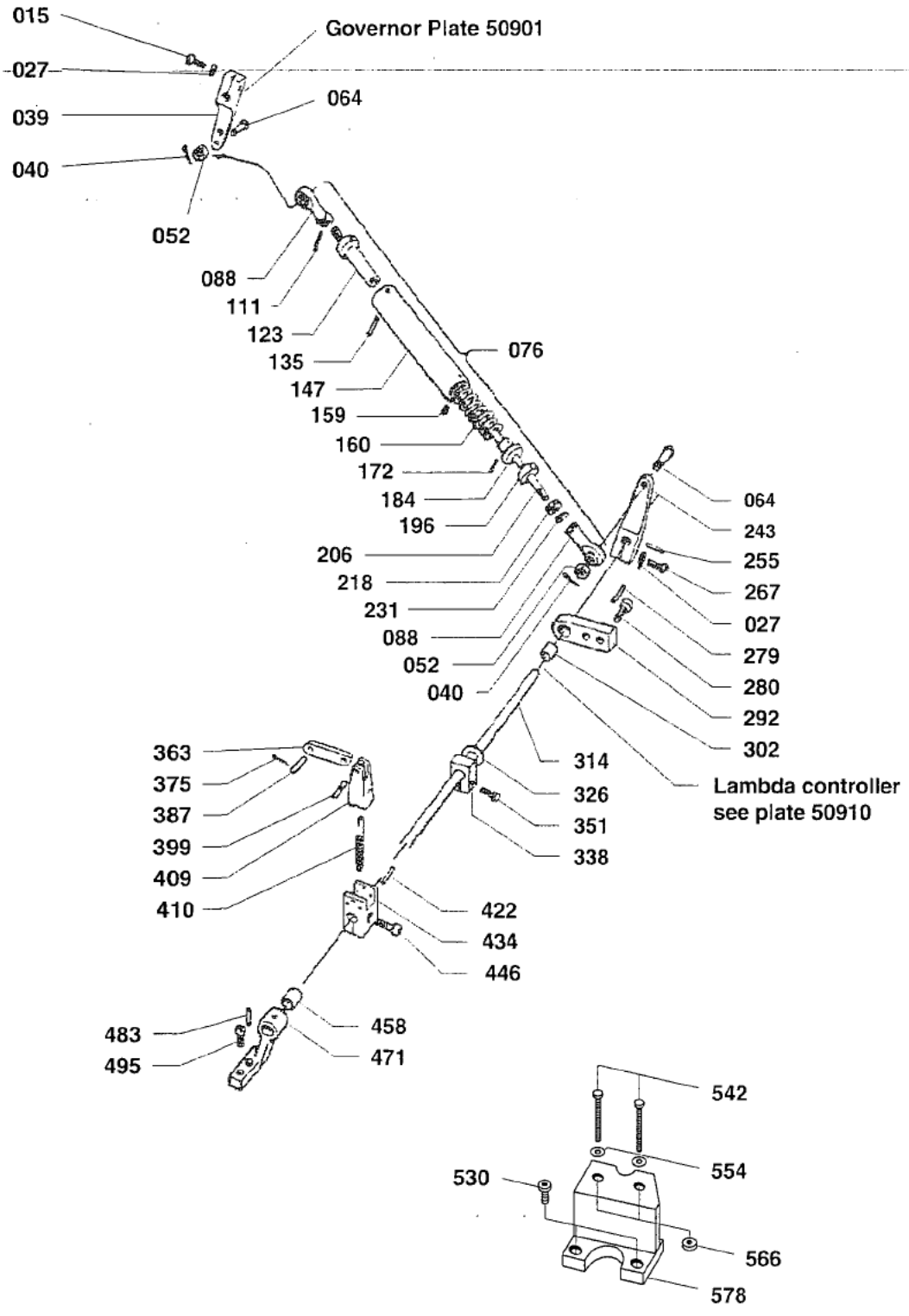
Ved bestilling af reservedele, se også side 500.50.

* = Kun tilgængelig som en del af et reservedelssæt.
Antal/E = Antal/Motor
Antal/C = Antal/Cylinder
Antal/R = Antal/Reguleringsmekanisme

08028-0D/H5250/94.08.12

Plate Page 1 (2)	Regulating Device	50902-07H

L23/30H



08028-0D/H5250/94.08.12

L23/30H

Item No.	Qty.	Designation	Benævnelse
015	1/R	Screw	Skrue
027	2/R	Locking plate	Låseblik
039	1/R	Governor arm	Regulatorarm
040	2/R	Split pin	Split
052	2/R	Self locking nut	Selvlåsende møtrik
064	2/R	Screw for ball head	Skrue for kuglehoved
076	1/R	Spring loaded pull rod, complete	Fjederbelastet trækstang, komplet
088	2/R	Pull rod head	Trækstangshoved
111	1/R	Split pin	Split
123	1/R	Pull rod end	Trækstangsende
135	1/R	Cylindrical pin	Cylindrisk stift
147	1/R	Spring housing	Fjederhus
159	1/R	Pointed screw	Pinolskrue
160	1/R	Spring	Fjeder
172	1/R	Cylindrical pin	Cylindrisk stift
184	1/R	Guide ring	Styrering
196	1/R	Guide ring	Styrering
206	1/R	Pull rod	Trækstang
218	1/R	Nut	Møtrik
231	1/R	Locking plate	Låseblik
243	1/R	Arm	Arm
255	1/R	Spring pin	Fjederstift
267	1/R	Screw	Skrue
279	1/R	Guide pin	Styrestift
280	1/R	Screw	Skrue
292	1/R	Bearing	Leje
302	1/R	Bushing	Bøsning
314	1/E	Regulating shaft	Reguleringsaksel
326	1/E	Washer	Skive
338	1/E	Stop ring	Stopring
351	1/E	Screw	Skrue
363	1/C	Linkage	Lænkeled
375	1/C	Split pin	Split
387	1/C	Pin	Stift
399	1/C	Pin	Stift
409	1/C	Spring arm	Fjederarm
410	1/C	Spring	Fjeder
422	3/C	Spring pin	Fjederstift
434	1/C	Armholder	Armholder
446	1/C	Screw	Skrue
458	1/C	Bushing	Bøsning
471	1/C	Bearing bracket	Lejeblik
483	2/C	Spring pin	Fjederstift
495	2/C	Screw	Skrue
530	2/E	Screw	Skrue
542	2/E	Screw	Skrue
554	2/E	Washer	Skive
566	2/E	Nut	Møtrik
578	1/E	Bracket	Konsol

When ordering spare parts, see also page 500.50.

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Qty./E = Qty./Engine
Qty./C = Qty./Cylinder
Qty./R = Qty./Regulating device

Ved bestilling af reservedele, se også side 500.50.

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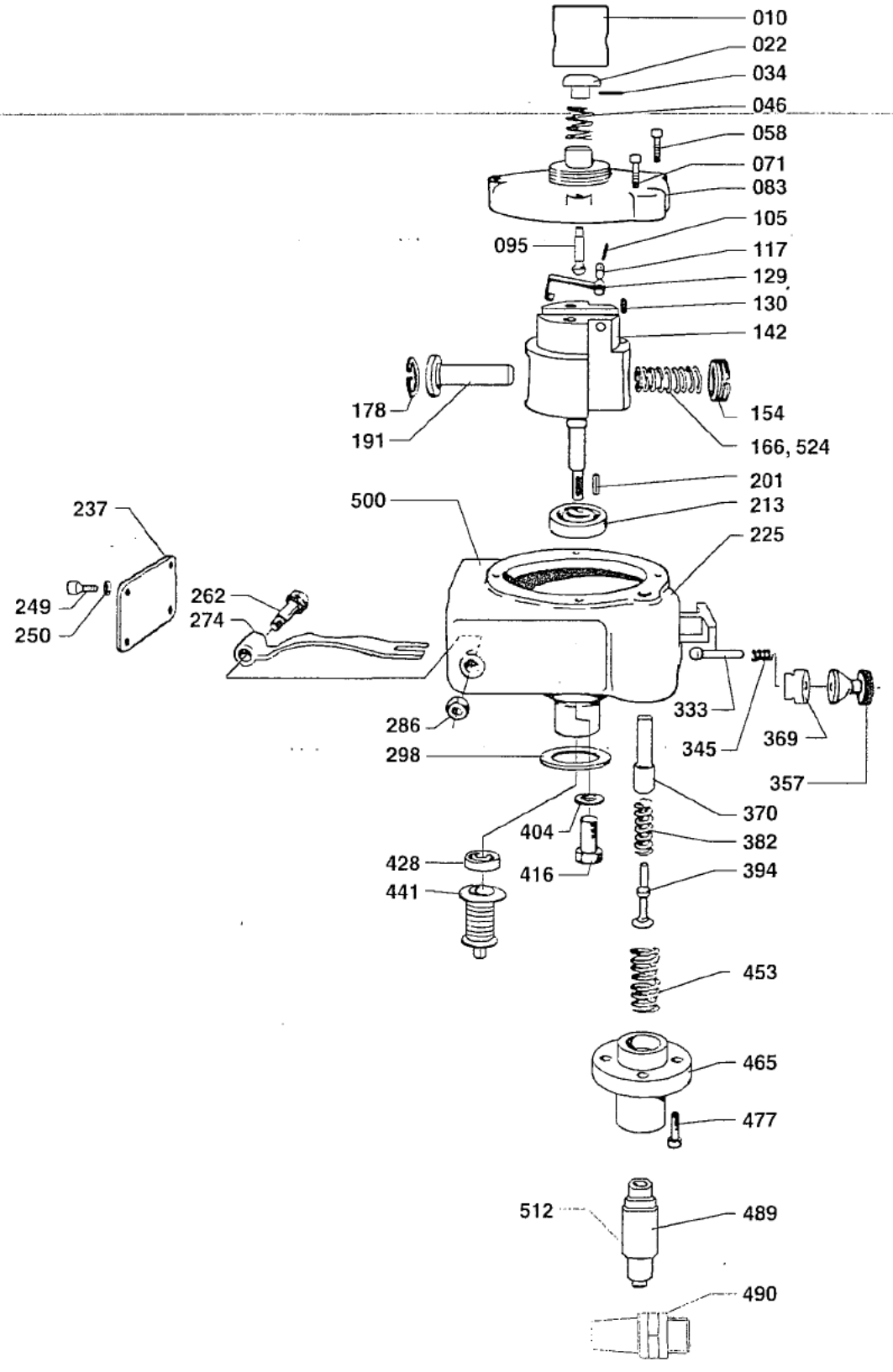
Antal/C = Antal/Cylinder
Antal/R = Antal/Reguleringsmekanisme

08028-0D/H5250/94.08.12

Plate Page 1 (2)	Overspeed Device	50903-02H

L23/30H



08028-0D/H5250/94.08.12

L23/30H

Item No.	Qty.	Designation	Benævnelse
010	1/E	Socket	Muffe
022	1/E	Button	Knap
034	1/E	Spring pin	Fjederstift
046	1/E	Spring	Fjeder
058	4/E	Screw	Skrue
071	1/E	Screw	Skrue
083	1/E	Cover	Dæksel
095	1/E	Spindle	Spindel
105	1/E	Spring pin	Fjederstift
117	1/E	Cylindrical pin	Cylindrisk stift
129	1/E	Lever	Arm
130	1/E	Screw	Skrue
142	1/E	Flyweight housing	Hus for svingvægt
154	1/E	Adjusting screw	Justeringsskrue
166	1/E	Spring 720/750 rpm	Fjeder 720/750 rpm
178	1/E	Circlip	Sikringsring
191	1/E	Flyweight	Svingvægt
201	1/E	Key	Not
213	1/E	Ball bearing	Kugleleje
225	1/E	Housing	Hus
237	1/E	Cover	Dæksel
249	4/E	Washer	Skive
250	4/E	Screw	Skrue
262	1/E	Pin	Stift
274	1/E	Lever	Arm
286	1/E	Nut	Møtrik
298	1/E	Gasket	Pakning
333	1/E	Spindle	Spindel
345	1/E	Spring	Fjeder
357	1/E	Button	Knap
369	1/E	Nipple	Nippel
370	1/E	Spindle	Spindel
382	1/E	Spring (left)	Fjeder (venstre)
394	1/E	Spindle	Spindel
404	2/E	Washer	Skive
416	2/E	Screw	Skrue
428	1/E	Ball bearing	Kugleleje
441	1/E	Elastic coupling	Elastisk kobling
453	1/E	Spring (right)	Fjeder (højre)
465	1/E	Valve attachment	Ventilholder
477	4/E	Screw	Skrue
489	1/E	Pneumatic valve	Pneumatisk ventil
490	1/E	Silencer	Lyddæmper
500	1/E	Overspeed device, complete	Overspeed anordning, komplet
512	1/E	Spare parts kit for item 489	Reservedelskit for item 489
524	1/E	Spring 900 rpm	Fjeder 900 rpm

When ordering spare parts, see also page 500.50.

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Qty./E = Qty./Engine

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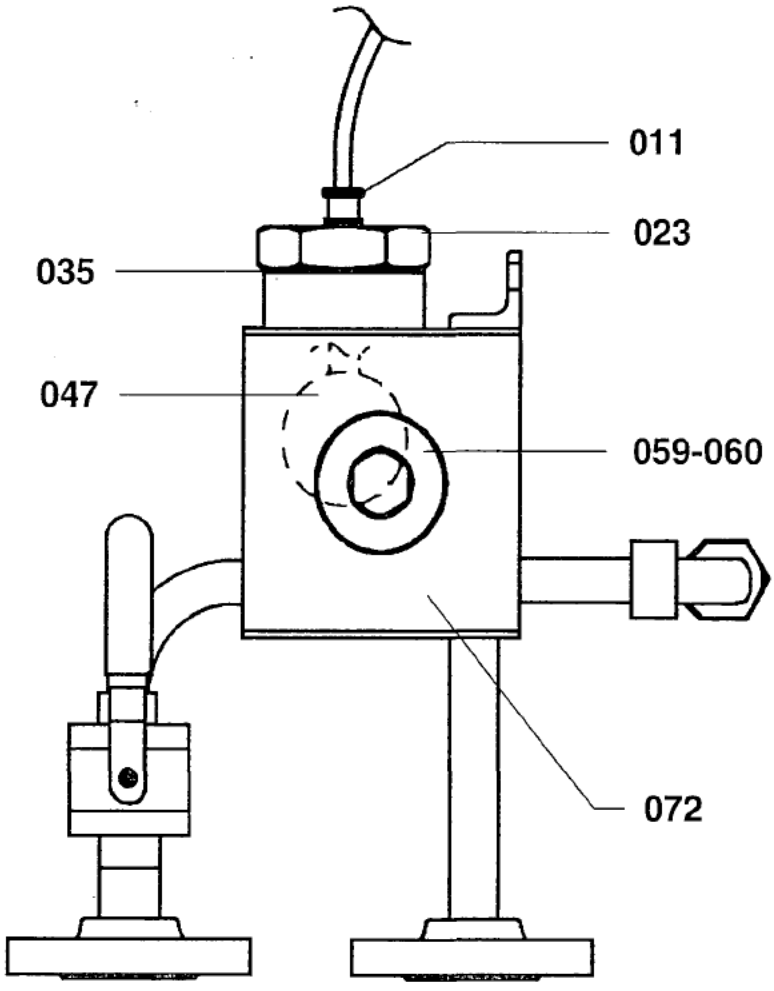
Antal/E = Antal/Motor

08028-0D/H5250/94.08.12

Plate Page 1 (2)	Fuel Oil Leakage Alarm (LAH 42)	50905-02H

L23/30H



08028-0D/H5250/94.08.12

L23/30H

Item No.	Qty.	Designation	Benævnelse
011	1/E	**Cable union**	Kabelunion
023	1/E	**Plug screw**	Propskrue
035	1/E	**Packing ring**	Tætningsring
047	1/E	**Level switch**	Niveaukontakt
059	1/E	**Plug screw**	Propskrue
060	1/E	**Packing ring**	Tætningsring
072	1/E	**Fuel leakage alarm, complete**	Brændolie lækage-alarm, komplet

Item No.	Qty.	Designation	Benævnelse

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When ordering spare parts, see also page 500.50.

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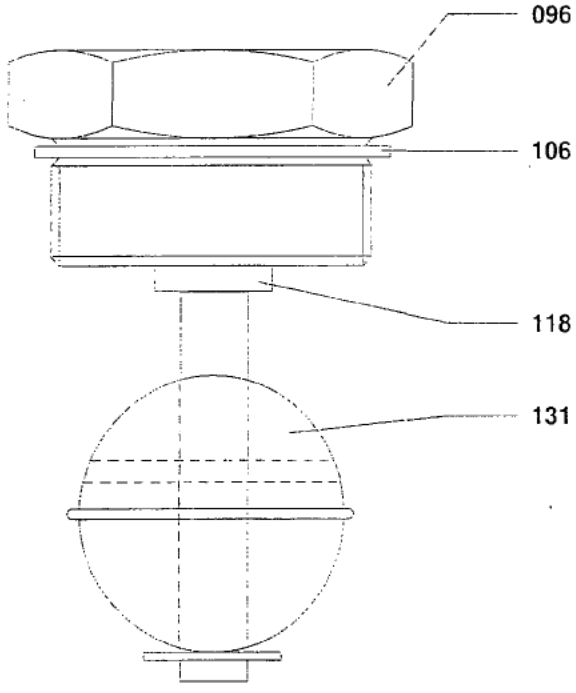
Qty./E = Antal/Motor

Plate Page 1 (2)	Prelubricating Oil Alarm (LAL 25)	50905-03H

L23/30H



08028-0D/H5250/94.08.12

(b) (6), (b) (7)(C)

L23/30H

	Qty.	Designation	Benævnelse		Qty.	Designation	Benævnelse
096	1/E	**Plug screw**	Propskrue				
106	1/E	**Packing ring**	Pakningsring				
118	1/E	**Loctite 577**	Loctite 577				
131	1/E	**Level switch**	Niveauafbryder				

When ordering spare parts, see also page 500.50.

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Ved bestilling af reservedele, se også side 500.50

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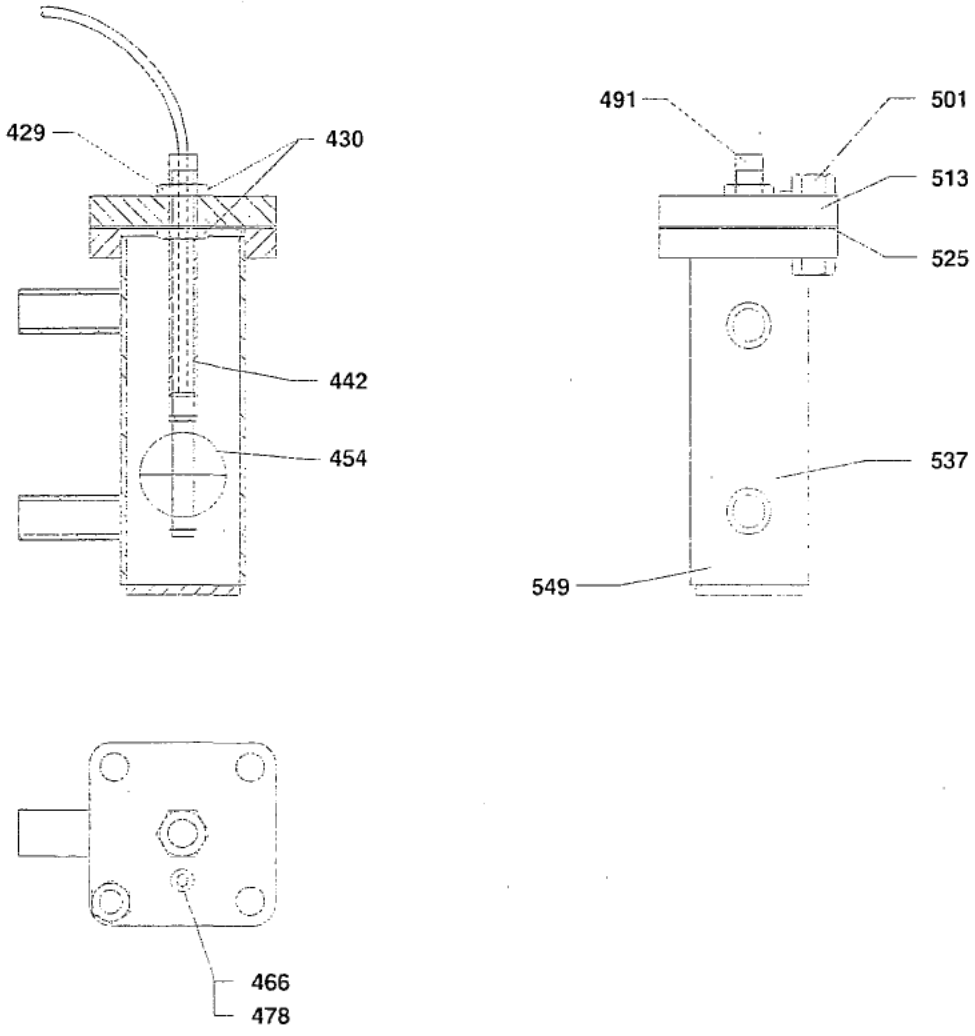
Qty./E = Antal/Motor

08028-0D/H5250/94.08.12

Plate Page 1 (2)	Level Switch in Oil Sump (LAL 28)	50905-05H

L23/30H



08028-0D/H5250/94.08.12

(b) (6), (b) (7)(C)

L23/30H

	Qty.	Designation	Benævnelse		Qty.	Designation	Benævnelse
429	1/E	Gasket	Pakning				
430	2/E	Nut	Møtrik				
442	1/E	Pipe for level alarm	Rør for niveau-alarm				
454	1/E	Level switch with cabel	Niveaualarm med kabel				
466	1/E	Plug screw	Propskrue				
478	1/E	Gasket	Pakning				
491	1/E	Red. adaptor	Red. adapter				
501	4/E	Nut	Møtrik				
513	1/E	Flange	Flange				
525	1/E	Gasket	Pakning				
537	1/E	Box for level alarm	Boks for niveaualarm				
549	1/E	Level switch, complete	Niveaualarm, komplet				

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Ved bestilling af reservedele, se også side 500.50

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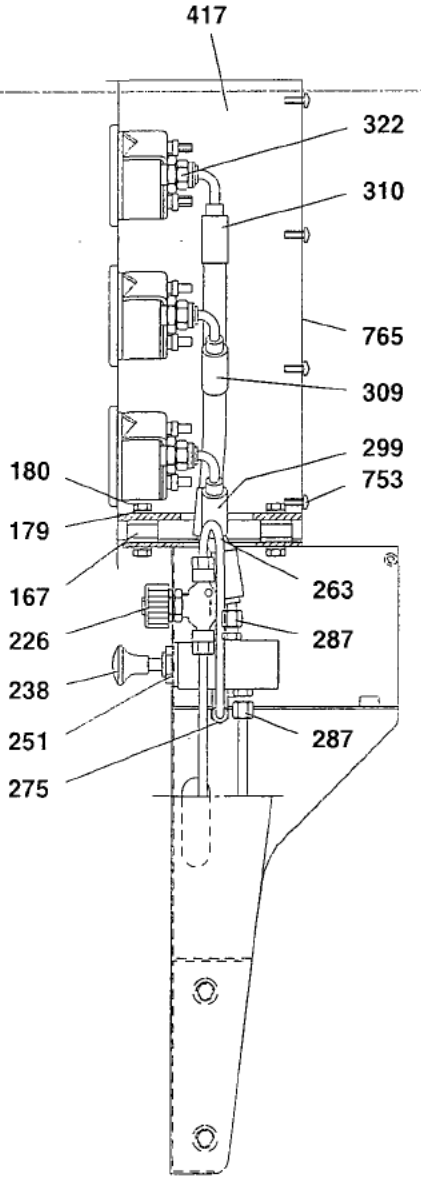
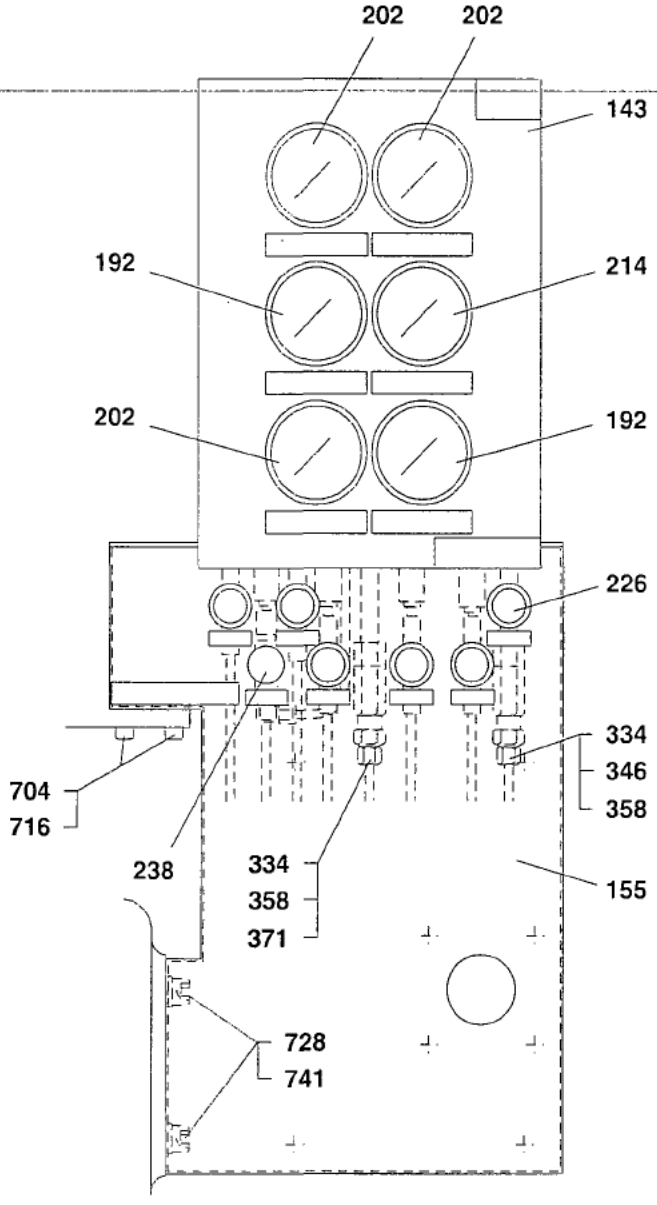
Qty./E = Antal/Motor

Plate Page 1 (2)	Instrument Panel	50905-07H

L23/30H





PI 01	LT fresh water, inlet to air cooler
PI 10	HT fresh water, inlet engine
PI 21/22	Lubricating oil, inlet/outlet to filter
PI 23	Lub. oil, inlet to turbocharger
PI 31	Charge air, outlet from cooler
PI 40	Fuel oil, inlet to engine

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L23/30H

Item No	Qty.	Designation	Benævnelse
143	1/E	Housing for instrument panel	Hus for instrumentpanel
155	1/E	Bracket for instrument panel	Konsol for instrumentpanel
167	4/E	Rubber clutch	Gummikobling
179	8/E	Nut	Møtrik
180	8/E	Spring lock	Fjederskive
192	2/E	Pressure gauge 0-3 bar (PI 31 and PI 23)	Manometer 0-3 bar (PI 31 og PI 23)
202	3/E	Pressure gauge 0-6 bar (PI 01, PI 10, PI 21-22)	Manometer 0-3 bar (PI 01, PI 10, PI 21-22)
214	1/E	Pressure gauge 0-10 bar (PI 40)	Manometer 0-10 bar (PI 40)
226	6/E	Needle valve	Nåleventil
238	1/E	3-way valve for PI 21-22	3-vejsventil for PI 21-22
251	1/E	Washer	Skive
263	1/E	Pipe	Rør
275	1/E	Angle union	Vinkelforskruning
287	2/E	Straight union	Ligeforskruning
299	2/E	Pressure gauge hose 140 mm	Manometer slange 195 mm
309	2/E	Pressure gauge hose 195 mm	Manometer slange 140 mm
310	2/E	Pressure gauge hose 340 mm	Manometer slange 300 mm
322	6/E	Packing ring	Pakningsring
334	2/E	Reduction	Reduktion
346	1/E	Damper (fuel oil)	Dæmper (fuel oil)
358	2/E	Coupling for manometer	Kobling for manometer
371	1/E	Damper (charging air)	Dæmper (ladeluft)
704	4/E	Screw	Skrue
716	4/E	Serrated lock washer	Stjernefjederskive
728	2/E	Screw	Skrue
741	2/E	Serrated lock washer	Stjernefjederskive
753	8/E	Screw	Skrue
765	1/E	Side plate	Sideplade
417	1/E	Instrument panel, complete	Instrument panel, komplet

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When ordering spare parts, see also page 500.50.

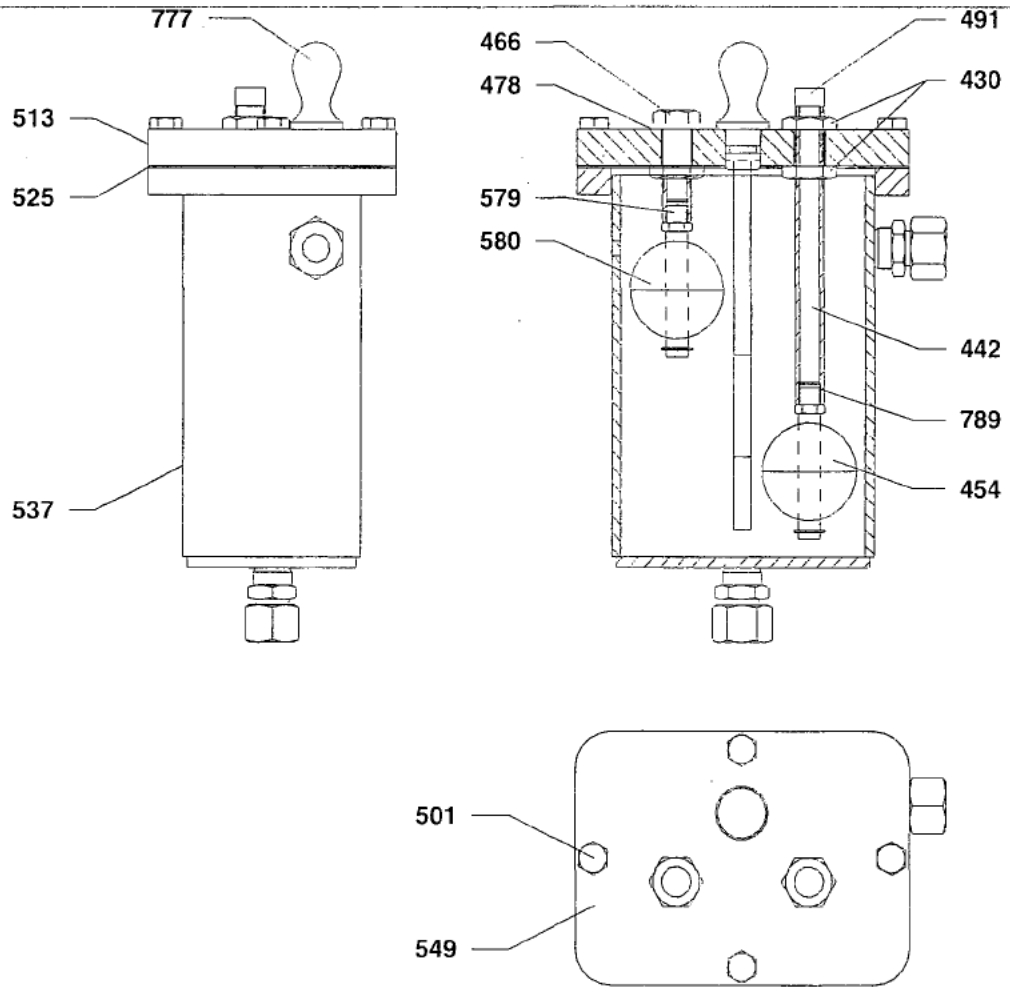
* = Only available as part of a spare parts kit.
Qty./E = Qty./Engine

Ved bestilling af reservedele, se også side 600.50.

* = Kun tilgængelig som en del af et reservedelssæt.
Antal/E = Antal/Motor

Plate Page 1 (2)	Level Switch in Oil Sump (LAL/LAH 28)	50905-09H

L23/30H



08028-0D/H5250/94.08.12

L23/30H

	Qty.	Designation	Benævnelse		Qty.	Designation	Benævnelse
430	2/E	Nut	Møtrik				
442	1/E	Pipe for level switch	Rør for niveau-alarm				
454	1/E	Level switch with cabel	Niveaualarm med kabel				
466	1/E	Plug screw	Propskrue				
478	1/E	Packing	Pakningsring				
491	1/E	Red. adaptor	Red. adapter				
501	4/E	Screw	Skrue				
513	1/E	Flange	Flange				
525	1/E	Gasket	Pakning				
537	1/E	Box for level switch	Boks for niveaualarm				
549	1/E	Level switch, complete	Niveaualarm, komplet				
579	1/E	Pipe	Rør				
580	1/E	Level switch incl. cable	Niveauafbryder incl. kabel				
777	1/E	Dipstick, complete	Pejlestok, komplet				
789	/I	Loctite 577	Loctite 577				

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When ordering spare parts, see also page 500.50.

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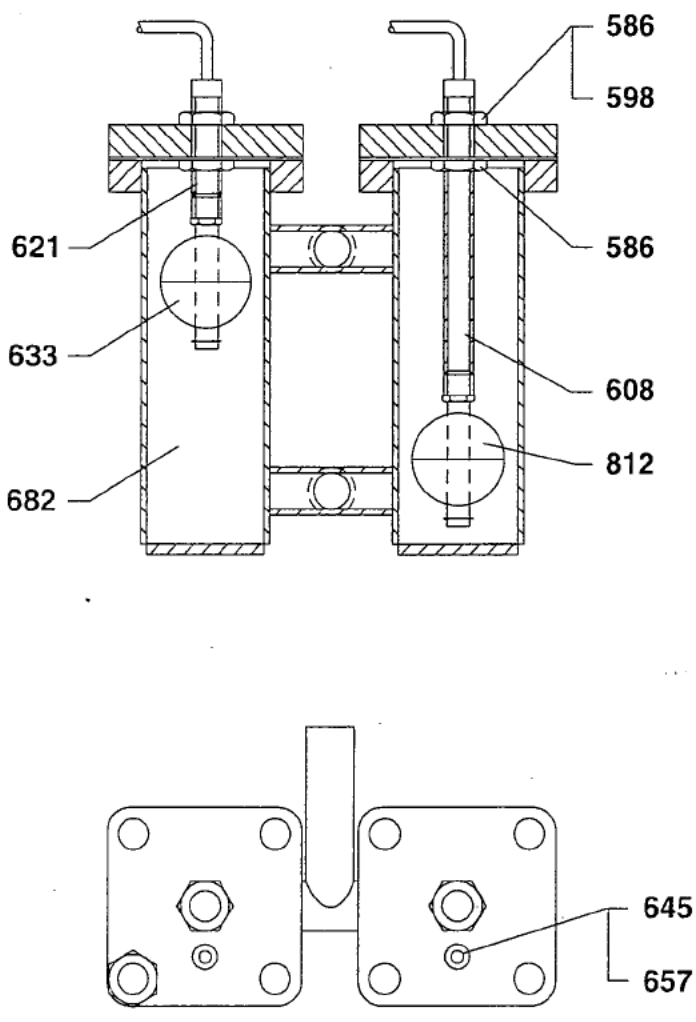
Qty./E = Qty./Engine
Qty./I = Qty./Individual

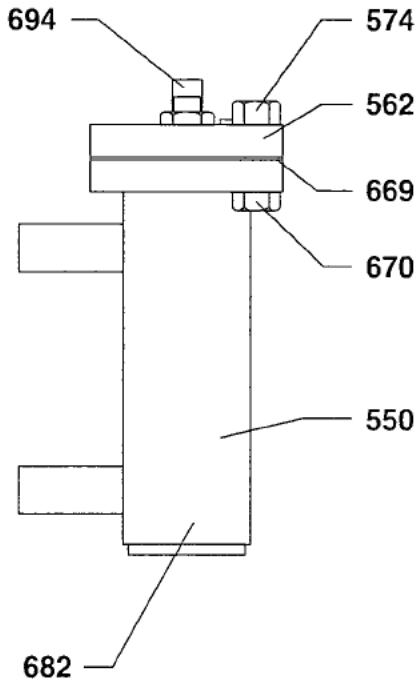
Ved bestilling af reservedele, se også side 500.50

* = Kun tilgængelig som en del af et reservedelssæt.
Qty./E = Antal/Motor
Qty./I = Antal/Individuel

Plate Page 1 (2)	Level Switch in Oil Sump (LAL/LAH 28)	50905-10H

L23/30H





08028-0D/H5250/94.08.12

L23/30H

Item No.	Qty.	Designation	Benævnelse
550	2/E	Box for level alarm	Box for niveaualarm
562	2/E	Flange	Flange
574	8/E	Nut	Møtrik
586	4/E	Nut	Møtrik
598	2/E	Gasket	Pakning
608	1/E	Pipe	Rør
621	1/E	Pipe	Rør
633	1/E	Level switch incl. cable "NC"	Niveauafbryder inkl. kabel "NC"
645	2/E	Plug screw	Propskrue
657	2/E	Gasket	Pakning
669	1/E	Gasket	Pakning
670	8/E	Screw	Skrue
682	1/E	Level alarm, complete	Niveaualarm, komplet
694	2/E	Red. adapter	Red. adapter
812	1/E	Level switch incl. cable "NO"	Niveauafbryder inkl. kabel "NO"

Item No.	Qty.	Designation	Benævnelse

08028-0D/H5250/94.08.12

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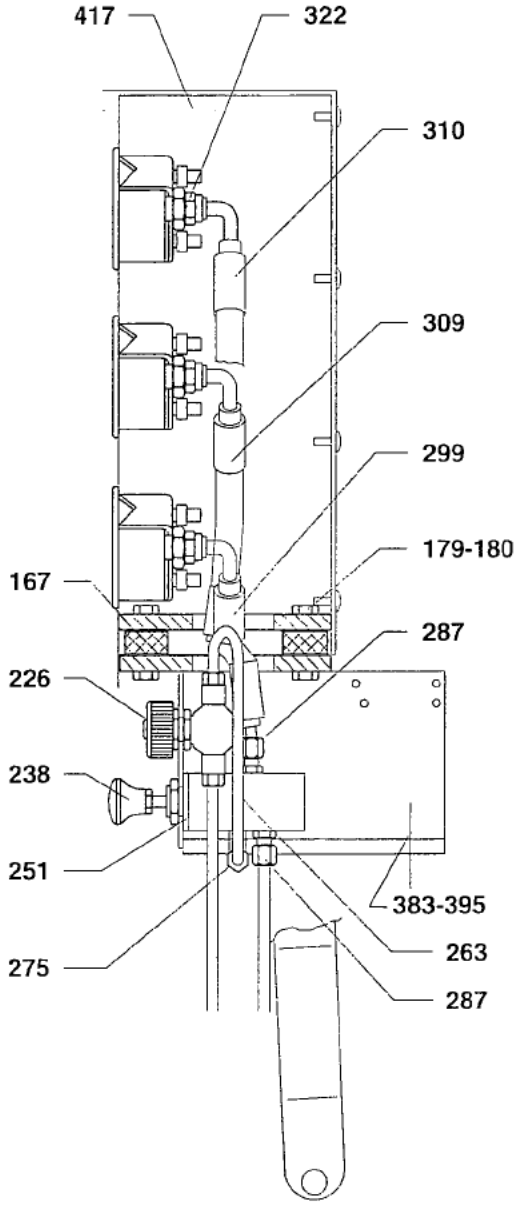
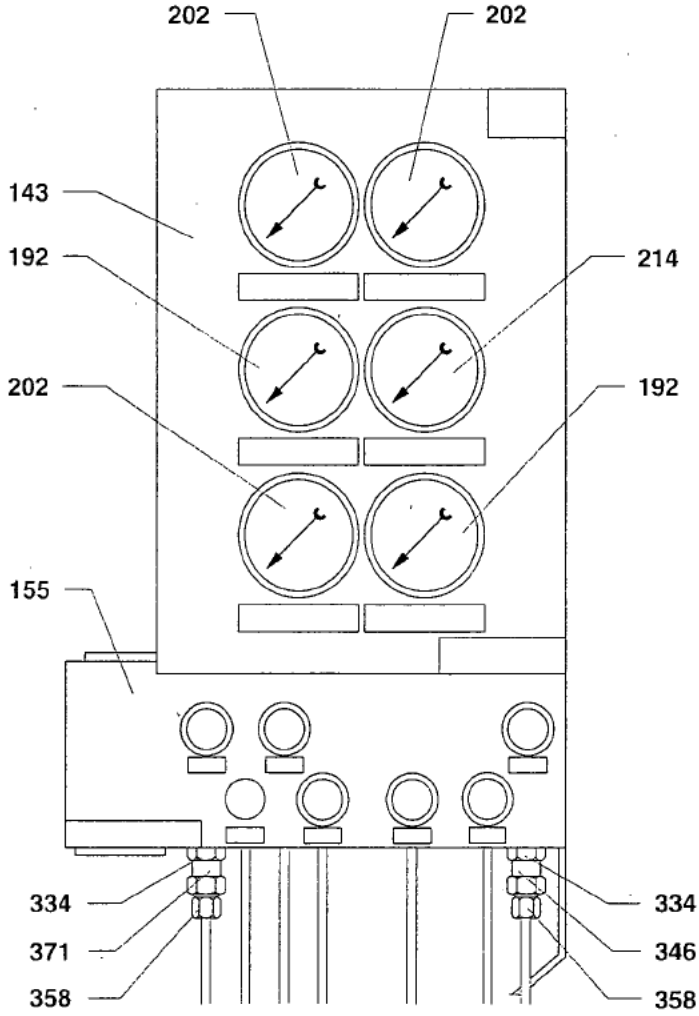
Antal/E = Antal/Motor

Plate Page 1 (2)	Instrument Panel	50905-11H

L23/30H





08028-0D/H5250/94.08.12

L23/30H

	Qty.	Designation	Benævnelse
143	1/E	Housing for instrument panel	Hus for instrument panel
155	1/E	Bracket for instrument panel , L23/30H	Konsol for instrument panel, L23/30H
167	4/E	Rubber clutch	Gummikobling
179	8/E	Nut	Møtrik
180	8/E	Spring locks	Fjedrende skive
192	2/E	Pressure gauge 0-3 bar (PI 31 and PI 23)	Manometer 0-3 bar (PI 31 og PI 23)
202	3/E	Pressure gauge 0-6 bar, PI 01, PI 10, PI 21-22	Manometer 0-3 bar, PI 01, PI 10, PI 21-22
214	1/E	Pressure gauge 0-10 bar (PI 40)	Manometer 0-10 bar (PI 40)
226	6/E	Needle valve	Nåleventil
238	1/E	3-way valve for PI 21-22	3-vejsventil for PI 21-22
251	1/E	Washer	Skive
263	1/E	Steel pipe	Stålrør
275	1/E	Screwed connection	Forskruning
287	2/E	Union	Forskruning
299	2/E	Pressure gauge hose 140 mm	Manometer slange 140 mm
309	2/E	Pressure gauge hose 195 mm	Manometer slange 195 mm
310	2/E	Pressure gauge hose 340 mm	Manometer slange 340 mm
322	6/E	Gasket	Pakning
334	2/E	Reduction adapter	Reduktionsforskruning
346	1/E	Damper (fuel oil)	Dæmper (fuel oil)
358	2/E	Coupling for manometer	Kobling for manometer
371	1/E	Damper (charging air)	Dæmper (ladeluft)
383	4/E	Screw	Skrue
395	4/E	Lock washer	Låseskive
417	1/E	Instrument panel, complete, L23/30H	Instrument panel, komplet, L23/30H

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When ordering spare parts, see also page 500.50.

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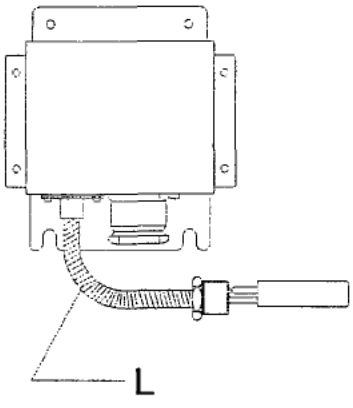
Qty./E = Antal/Motor

MAN B&W

Plate Page 1 (2)	Pressostate, Thermostate Difference Pressostate and Pressure Transmitter	50907-01H

L23/30H

Fig. and Description	Range	Code	L	Item No.
Pressostate	0-8 bar	PSL 22 PAL 10 PAL 22		012
	6-18 bar	PAL 70 PAL 24		024
	10-35 bar			036
	1-10 bar	PAL 40		048
Thermostate 	20-60°C	TAL 10	2 m 5 m	061 073
	50-100°C		2 m 5 m 8 m	085 097 107
	70-120°C	TAH 12 TSH 12 TAH 20 TSH 22	2 m 5 m 8 m	119 120 132
Difference Pressostate	0.2-2.5 bar	PDAH 21-22		144

08028-0D/H5250/94.08.12

50907-01H	Pressostate, Thermostate Difference Pressostate and Pressure Transmitter	Plate Page 2 (2)

L23/30H

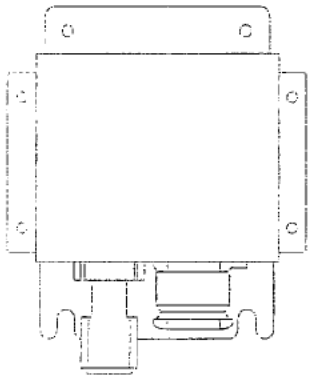
Fig. and Description	Range	Code	L	Item No.
 Pressure Transmitter	0-2.5 bar	PT 31		156
	0-4 bar	PT 10		168
	0-6 bar	PT 22		181
	0-10 bar	PT 40		193
	0-16 bar	PT 70		203
	0-40 bar			215
	0-400 bar			227
 Needle Valve	Needle Valve with 3/8" pipe thread			239
	Needle valve with 1/2" pipe thread			240

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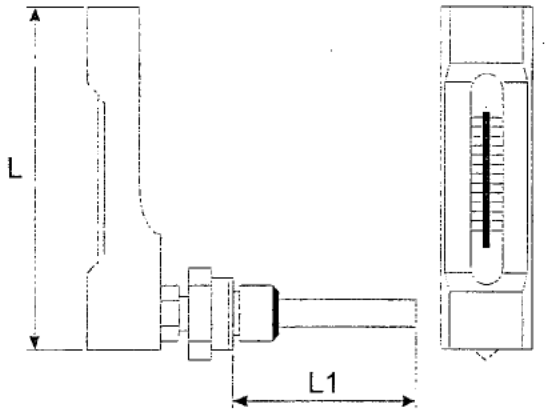
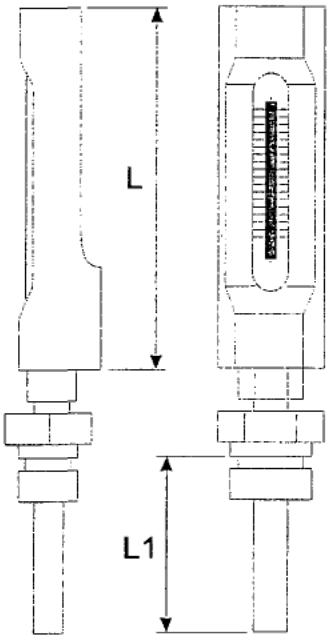
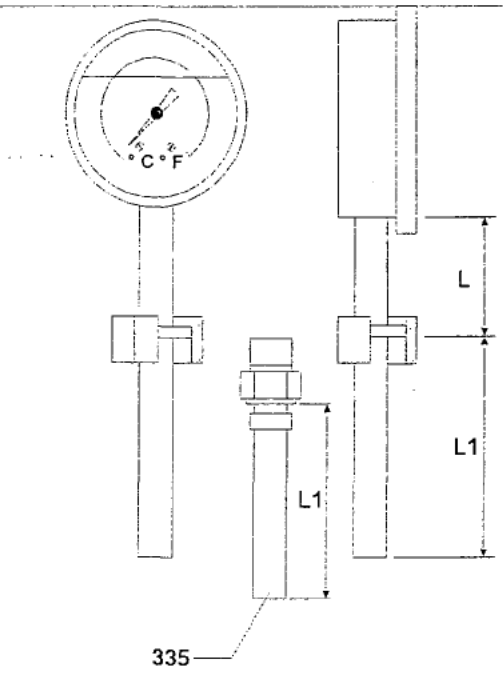
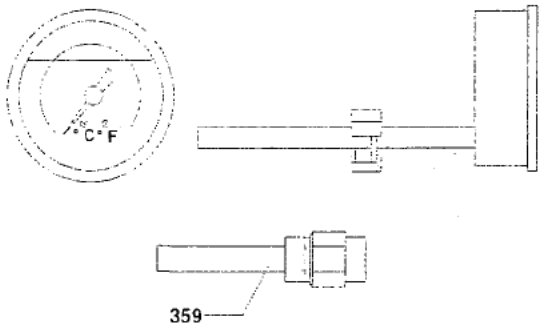
Plate Page 1 (2)	Thermometer	50907-02H

L23/30H

Fig.	Scale °F	Scale °C	Length L	Length L1	Code	Item No.
	40-240	0-120	110	100	TI 01 TI 02 TI 31	252
	40-240	0-120	110	63	TI 22 TI 20	264
	40-600	0-300	150	100	TI 30	276
	40-400	0-200	110	40	TI 40 TI 51	288
	40-220	0-120	110	100	TI 03 TI 10 TI 11	311

08028-0D/H5250/94.08.12

L23/30H

Fig.	Scale °F	Scale °C	Length L	Length L1	Code	Item No.
	100-1300	50-650	100	115	TI 60	323
	Pocket			115		335
	100-1300	50-650	65	215	TI 61	347
	Pocket			215		359

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MAN B&W

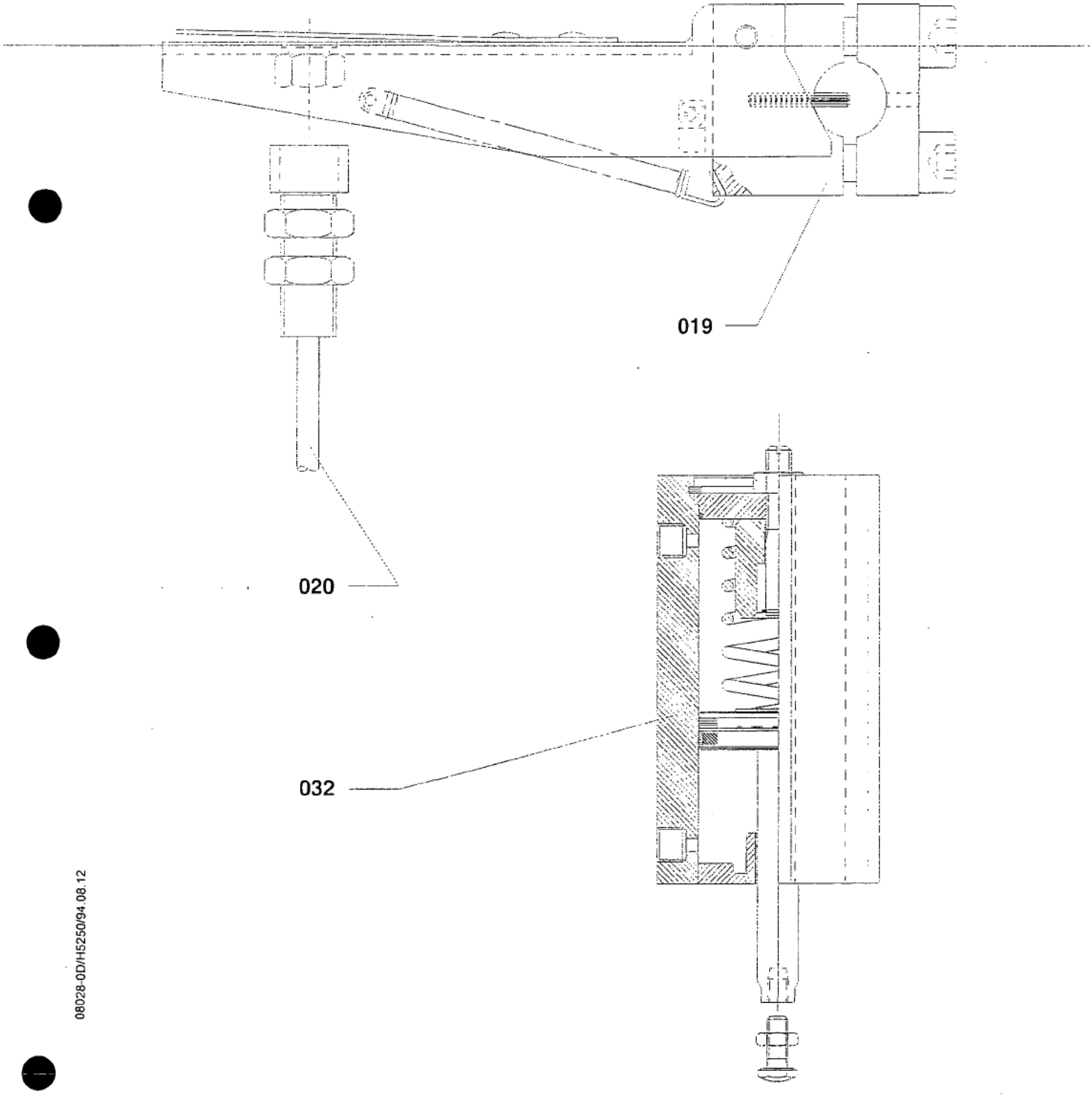
Plate Page 1 (1)	Pick-up	50908-01H

L23/30H

Fig. and Description		Range	Item No.
 Cabel length: 3 M.		Working temp. -25°C - 70°C	018

Plate Page 1 (2)	Lambda Controller	50910-02H

L23/30H



08028-0D/H5250/94.08.12

(b) (6), (b) (7)(C)

L23/30H

Item No.	Qty.	Designation	Benævnelse
019	1/E	**Regulating arm, complete**	Reguleringsarm, komplet
020	1/E	**Pick-up, incl. sleeve**	Pick-up, incl. afstandsring
032	1/E	**Lambda cylinder, complete**	Lambdacylinder, komplet

Item No.	Qty.	Designation	Benævnelse

08028-0D/H5250/94.08.12

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Qty./E = **Qty./Engine**

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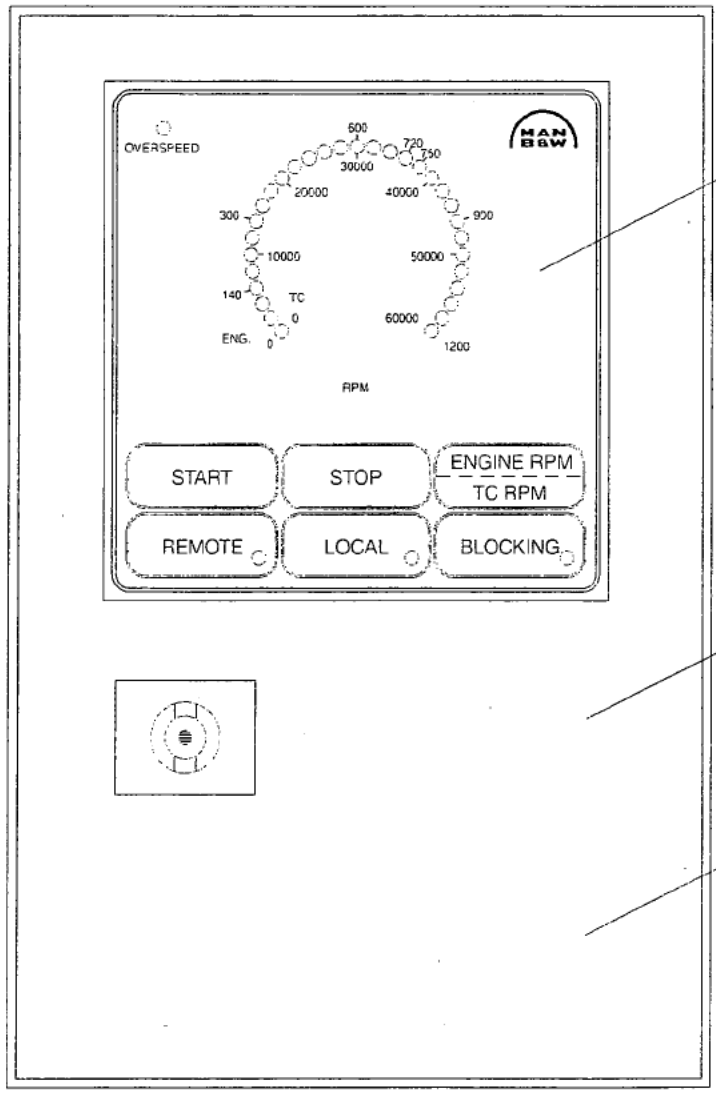
Antal/E = Antal/Motor

Plate Page 1 (2)	Starting Box	50935-01H

L23/30H



(b) (6), (b) (7)(C)

50935-01H	Starting Box	Plate Page 2 (2)

L23/30H

Item No.	Qty.	Designation	Benævnelse
017	1/E	Starting box	Startboks
029	1/E	Terminal box	Terminalboks
030	1/E	Starting box, complete	Startboks, komplet

When ordering spare parts, see also page 500.50.

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Qty./E = Qty./Enigne.

Ved bestilling af reservedele, se også side 500.50.

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Qty./E = Qty./Motor

WOODWARD

Product Manual 03045
(Revision NEW)
Original Instructions

UG-8 Speed Adjusting Devices

Pneumatic and Manifold Speed Setting for UG Type Governors

Operation Manual

General Precautions

Read this entire manual and all other publications pertaining to the work to be performed before installing, operating, or servicing this equipment.

Practice all plant and safety instructions and precautions.

Failure to follow instructions can cause personal injury and/or property damage.

Revisions

This publication may have been revised or updated since this copy was produced. To verify that you have the latest revision, check manual *26311* , *Revision Status & Distribution Restrictions of Woodward Technical Publications*, on the *publications page* of the Woodward website:

www.woodward.com/publications

The latest version of most publications is available on the *publications page*. If your publication is not there, please contact your customer service representative to get the latest copy.

Proper Use

Any unauthorized modifications to or use of this equipment outside its specified mechanical, electrical, or other operating limits may cause personal injury and/or property damage, including damage to the equipment. Any such unauthorized modifications: (i) constitute "misuse" and/or "negligence" within the meaning of the product warranty thereby excluding warranty coverage for any resulting damage, and (ii) invalidate product certifications or listings.

Translated Publications

If the cover of this publication states "Translation of the Original Instructions" please note:

The original source of this publication may have been updated since this translation was made. Be sure to check manual *26311* , *Revision Status & Distribution Restrictions of Woodward Technical Publications*, to verify whether this translation is up to date. Out-of-date translations are marked with ⚠. Always compare with the original for technical specifications and for proper and safe installation and operation procedures.

Revisions—Changes in this publication since the last revision are indicated by a black line alongside the text.

Warnings and Notices

Important Definitions

This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.

- **DANGER**—Indicates a hazardous situation which, if not avoided, will result in death or serious injury.
- **WARNING**—Indicates a hazardous situation which, if not avoided, could result in death or serious injury.
- **CAUTION**—Indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.
- **NOTICE**—Indicates a hazard that could result in property damage only (including damage to the control).
- **IMPORTANT**—Designates an operating tip or maintenance suggestion.

⚠WARNING

Overspeed / Overtemperature / Overpressure

The engine, turbine, or other type of prime mover should be equipped with an overspeed shutdown device to protect against runaway or damage to the prime mover with possible personal injury, loss of life, or property damage.

The overspeed shutdown device must be totally independent of the prime mover control system. An overtemperature or overpressure shutdown device may also be needed for safety, as appropriate.

⚠WARNING

Personal Protective Equipment

The products described in this publication may present risks that could lead to personal injury, loss of life, or property damage. Always wear the appropriate personal protective equipment (PPE) for the job at hand. Equipment that should be considered includes but is not limited to:

- **Eye Protection**
- **Hearing Protection**
- **Hard Hat**
- **Gloves**
- **Safety Boots**
- **Respirator**

Always read the proper Material Safety Data Sheet (MSDS) for any working fluid(s) and comply with recommended safety equipment.

⚠WARNING

Start-up

Be prepared to make an emergency shutdown when starting the engine, turbine, or other type of prime mover, to protect against runaway or overspeed with possible personal injury, loss of life, or property damage.

⚠WARNING

Automotive Applications

On- and off-highway Mobile Applications: Unless Woodward's control functions as the supervisory control, customer should install a system totally independent of the prime mover control system that monitors for supervisory control of engine (and takes appropriate action if supervisory control is lost) to protect against loss of engine control with possible personal injury, loss of life, or property damage.

NOTICE

Battery Charging Device

To prevent damage to a control system that uses an alternator or battery-charging device, make sure the charging device is turned off before disconnecting the battery from the system.

Electrostatic Discharge Awareness

NOTICE

Electrostatic Precautions

Electronic controls contain static-sensitive parts. Observe the following precautions to prevent damage to these parts:

- **Discharge body static before handling the control (with power to the control turned off, contact a grounded surface and maintain contact while handling the control).**
- **Avoid all plastic, vinyl, and Styrofoam (except antistatic versions) around printed circuit boards.**
- **Do not touch the components or conductors on a printed circuit board with your hands or with conductive devices.**

To prevent damage to electronic components caused by improper handling, read and observe the precautions in Woodward manual *82715*, *Guide for Handling and Protection of Electronic Controls, Printed Circuit Boards, and Modules*.

Follow these precautions when working with or near the control.

1. Avoid the build-up of static electricity on your body by not wearing clothing made of synthetic materials. Wear cotton or cotton-blend materials as much as possible because these do not store static electric charges as much as synthetics.
2. Do not remove the printed circuit board (PCB) from the control cabinet unless absolutely necessary. If you must remove the PCB from the control cabinet, follow these precautions:
   - Do not touch any part of the PCB except the edges.
   - Do not touch the electrical conductors, the connectors, or the components with conductive devices or with your hands.
   - When replacing a PCB, keep the new PCB in the plastic antistatic protective bag it comes in until you are ready to install it. Immediately after removing the old PCB from the control cabinet, place it in the antistatic protective bag.

Pneumatic and Manifold Speed Setting for UG Type Governors

Introduction

This manual provides general information, installation, adjustment and replacement parts for the Pneumatic Speed Adjustment and the Manual Speed Setting Screw options.

Description

The Pneumatic Speed Adjustment device makes it possible to adjust speed pneumatically from a location remote from the prime mover. It is mounted on top of the UG-8 Lever governor in a separate housing. The housing also accepts Woodward's standard shutdown devices such as solenoid, pneumatic, or low lube units.

The Manual Speed Setting Screw allows for on-site setting of the governor should the pneumatic pressure be lost.

Figure 1 shows a UG-8L with Pneumatic Speed Adjustment, a solenoid shutdown, and Manual Speed Setting Screw.

References

Prod. Spec. 03037	Pneumatic Speed Adjustment for UG-5.7/8/10 Lever Governor
Prod. Spec. 03029	UG-5.7/8/10 Governor
Manual 03036	UG-5.7/8/10 Lever Governor
Manual 03016	Low Lube Oil Pressure Shutdown for the UG Governor

Installation

A connection to an air supply is needed to operate the device on an engine or turbine. See Figure 1 for size and location of the air supply connection.

The Manual Speed Setting Screw is normally installed as a optional feature only on governors with the Pneumatic Speed Adjustment feature. Either feature will operate without association with the other.

The Manuel Speed Setting Screw can be easily installed on any existing UG-8L governor. No special tools are needed. The governor does not have to be disassembled to accept the new pieces, but the nameplate must be removed for the installation of a new stop lever and return spring.

Operation

Two styles of plumbing are available to carry governor pressure oil to the pneumatic head.

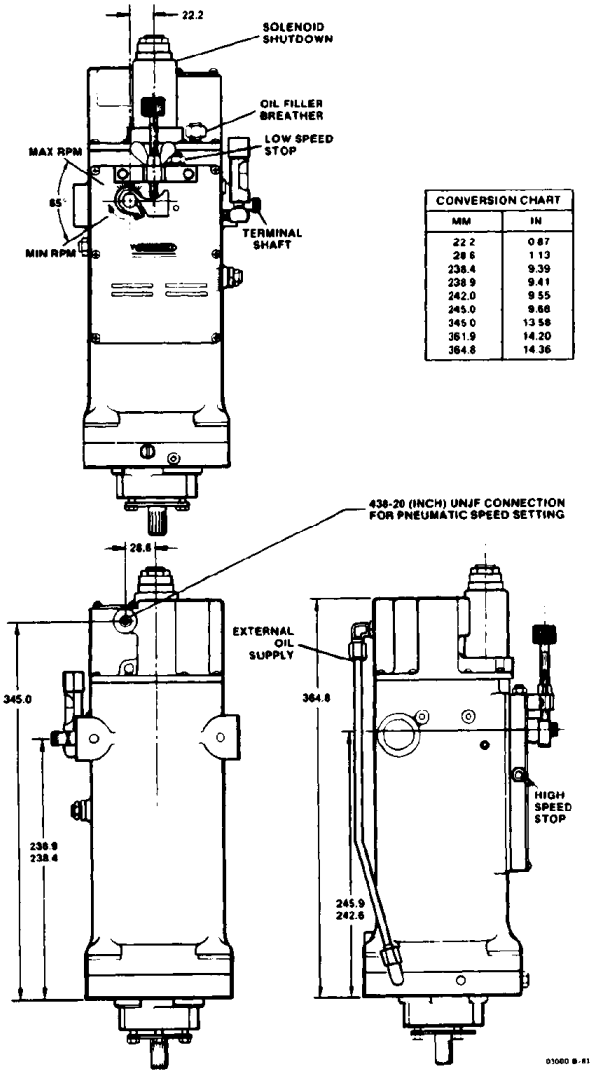


Figure 1. Outline of UG-8 Lever Governor with Pneumatic Speed Adjustment and Manual Speed Setting Screw

Internally plumbed units carry pressure oil from the controlet inside the governor to the speed-setting head. The internally plumbed units require a special pilot-valve bushing to regulate the amount of oil supplied to the head and a specially machined controlet to accept the plumbing connection. The governor is normally returned to the factory for installation of the internally plumbed speed-setting head.

Externally plumbed units receive pressure oil from the governor base through an external pipe. An orifice in the cover regulates the amount of oil available to the speed-setting head. The externally plumbed unit may be installed on a lever governor in the field. Installation instructions are included with a conversion kit.

Figure 2 is a schematic of the UG-8 Lever governor which has a pneumatic speed adjusting device. This description of operation covers only the speed adjusting devices. Manual 03036 covers the UG-8 Lever governor operation. Reference numbs are from Figures 2 and 4 below.

⚠WARNING **To prevent overspeed, return the lever to the minimum speed position before applying control air pressure.**

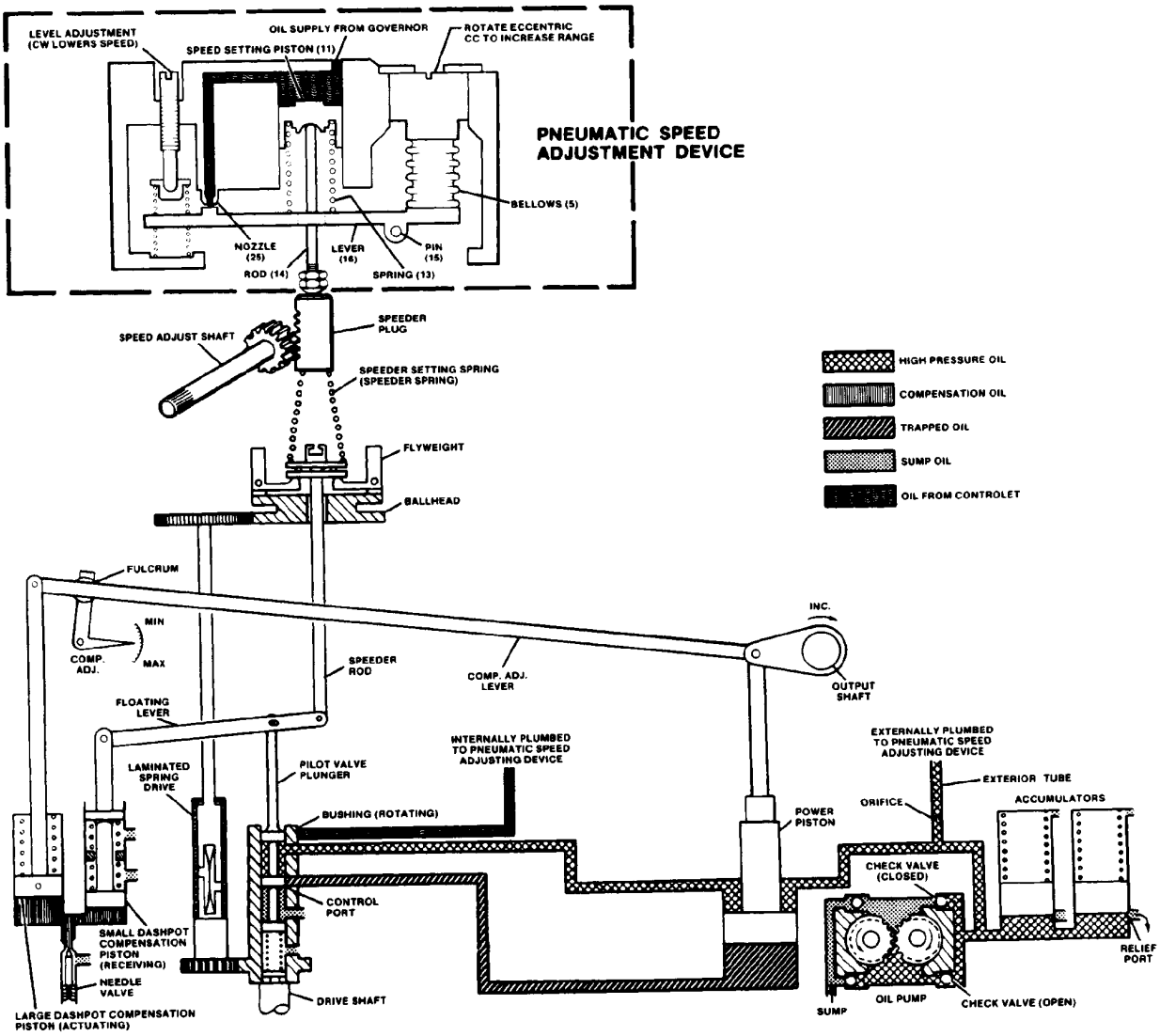


Figure 2. Schematic of UG-8 Lever Governor with Pneumatic Speed Adjustment

The speed setting air signal is connected to the bellows (5). Lever (16) balances between the force of the bellows and the force of spring (13) under the speed setting piston (11). When the bellows force is more than the spring force, the lever rotates about pin (15). The left end of the lever moves up to close nozzle (25). Oil pressure increases on the speed setting piston, moving it down and increasing the spring load on the lever. When the spring force exceeds the value required to balance the lever against the bellows force the lever rotates counterclockwise, releasing oil through the nozzle. Oil pressure stops increasing and piston movement stops.

When the piston moves down, rod (14) increases the load on the speeder spring, which raises the governor speed setting.

The governor will go to minimum fuel or shutdown in case of failure or interruption of the pneumatic signal. The Manual Speed Setting Screw will act as a minimum speed stop if it is not backed out of the way during normal operation.

Should the pneumatic pressure fail, the manual speed setting screw may be used to set the speed of the governor mechanically. Speed setting increases when the screw is turned clockwise and decreases when it is turned counterclockwise.

The screw is normally locked with the wing nut at minimum speed setting position with visible clearance between the speed setting screw and the speed setting lever. The wing nut provides positive lock of the speed setting screw.

When the pneumatic signal is used for setting the speed, the screw adjustment must be in the minimum speed setting position. Failure to follow this instruction increases the pneumatic speed setting by the amount of the manual setting.

The speed setting shaft must be free to rotate between high and low speed stops during pneumatic operation.

Adjustment

External

There are two external adjustments on the pneumatic speed adjustment device:

- The eccentric bellows (5 – Figure 4) changes the range.
- Screw (33 – Figure 4) is used to change the speed setting level.

The speed setting functions of the Speed Setting Screw Assembly are all visible. As the screw is threaded down, it increases speed; and retracting it lowers the speed setting.

⚠WARNING

Be prepared to make an emergency shutdown when starting the engine, turbine, or other type of prime mover, to protect against runaway or overspeed with possible personal injury, loss of life, or property damage.

Internal

Make the initial setting of rod (14) with the unit off the governor.

1. Set the low speed stop on the governor panel approximately 10 rpm lower than the required low air speed setting.

IMPORTANT

Any time the low speed stop is changed, the length of rod (14) must be changed or the new low speed selling may not be attained.

2. See Figure 3. Measure the distance from the top surface of the governor case to the top of the rod with the governors speed setting against the low speed stop.

   This distance should be 2.500 inches +0.005 or –0.010 inches (63.50 mm +0.13 or –0.25 mm).

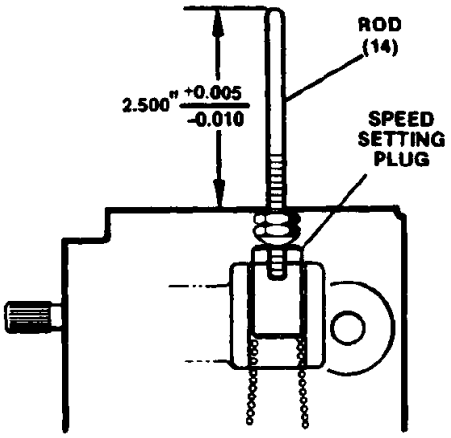


Figure 3. Speed Setting Plug

3, Lock the nuts in place.

IMPORTANT **If the rod length is too long or too short, it may not be possible to attain the low air set speed.**

4. Install the speed adjusting device on the governor. Rod (14) should enter the hole in lever (16) below the piston. (Figure 4).

5. Use a thin screwdriver and force the oil pipe into the hole in the cover until the O-ring enters the hole.

6. Tighten screws (34).

7. Connect the air supply pipe.

8. Apply the minimum air signal.

9. Adjust screw (33) until the specified speed, at minimum air signal, is reached. Turn the screw clockwise to decrease the speed and counterclockwise to increase the speed.

10. Apply the maximum speed air signal and check the speed. A range adjustment must be made if speed is incorrect at the maximum air signal.

    To make a range adjustment:
    A. Reduce the air signal to zero.
    B. Loosen the bellows clamp screws.
    C. Rotate the bellows clockwise to increase the range and counterclockwise to decrease the range.

IMPORTANT **Adjustment is limited to 90 degrees in either direction from the alignment marks on the cover and the top of the eccentric.**

11. Re-check the minimum and maximum speeds and repeat steps 8 through 10 as required.

12. Set the maximum speed stop screw located on the front panel.

Parts List For Figure 4

Ref. No.	Part Name	Quantity
03045-1	Cover	1
03045-2	Screw, 10-32 x 0.500	2
03045-3	Lock Washer, No. 10, 0.190 ID	9
03045-4	Strap	1
03045-5	Eccentric Bellows	1
03045-6	O-ring, 1.364 ID x 0.070	1
03045-7	O-ring, 1.234 ID x 0.070	1
03045-8	O-ring, 0.145 ID x 0.070, See Fig. 6	1
03045-9	Tube, See Fig. 6	1
03045-10	O-ring, 0.208 ID x 0.070, See Fig. 6	1
03045-11	Piston	1
03045-12	Rod Seat	1
03045-13	Spring	1
03045-14	Rod	1
03045-15	Shaft	1
03045-16	Lever	1
03045-17	Needle Bearing	2
03045-18	Nozzle Seat	1
03045-19	Nut, 10-32	1
03045-20	Spring	1
03045-21	Nut	1
03045-22	Spring	1
03045-23	Spring Seat	1
03045-24	Ball, 0.156	1
03045-25	Nozzle	1
03045-26	Filler Cap	1
03045-27	Retaining ring, 0.338	1
03045-28	Rod	1
03045-29	Body	1
03045-30	Spring	1
03045-31	Cap	1
03045-32	O-ring, 0.176 ID x 0.070	2
03045-33	Screw	1
03045-34	Screw	7
03045-35	Screw	1
03045-36	Plug	1
03045-37	Gasket	1
03045-38	Plug, See Fig.6	1
03045-39	O-ring, See Fig. 6	1
03045-40	Not Used	
03045-41	Not Used	
03045-42	Not Used	
03045-43	See Fig. 6	
03045-44	See Fig. 6	
03045-45	Not Used	
03045-46	Jet Insert	1
03045-47	Expander Pin	1
03045-48–50	Not Used	
03045-51–55	See Fig. 6	
03045-56	Not Used	
03045-57	Not Used	
03045-58–66	See Fig. 6	
03045-67	Not Used	
03045-68	Filter	1
03045-69	Spring	1
03045-70	O-ring	1
03045-71	Plug	1
03045-72	Elbow, Straight Thread	1
03045-73	Orifice Assy .1251 -4 Elbow	1
03045-74	Tube Assy	1
03045-75–100	Not Used	

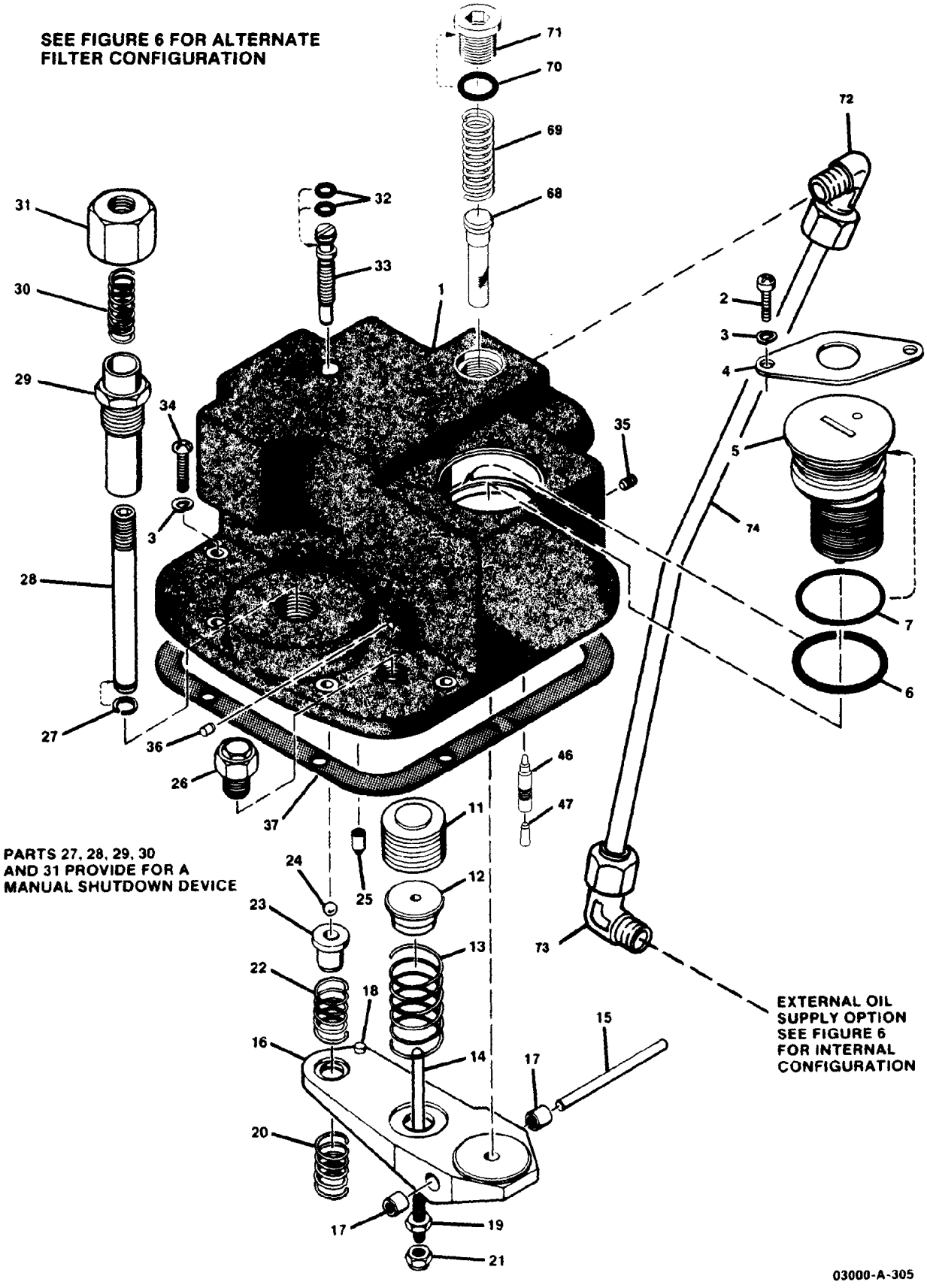


Figure 4. Parts of UG-8 Pneumatic Speed Adjustment with Manual Shutdown

Parts List For Figure 6

Ref. No.	Part Name	Quantity
03045-1	Not Used	
03045-2	Screw, 10-32 x 0.500	2
03045-3	Lock Washer, No. 10, 0.190 ID	9
03045-4	Strap	1
03045-5	Eccentric Bellows	1
03045-6	O-ring, 1.364 ID x 0.070	1
03045-7	O-ring, 1.234 ID x 0.070	1
03045-8	O-ring, 0.145 ID x 0.070	1
03045-9	Tube	1
03045-10	O-ring, 0.208 ID x 0.070	1
03045-11	Piston	1
03045-12	Rod Seat	1
03045-13	Spring	1
03045-14	Rod	1
03045-15	Shaft	1
03045-16	Lever	1
03045-17	Needle Bearing	2
03045-18	Nozzle Seat	1
03045-19	Nut, 10-32	1
03045-20	Spring	1
03045-21	Nut	1
03045-22	Spring	1
03045-23	Spring Seat	1
03045-24	Ball, 0.156	1
03045-25	Nozzle	1
03045-26	Filler Cap	1
03045-27–31	Not Used	
03045-32	O-ring, 0.176 ID X 0.070, See Fig. 4	2
03045-33	Screw, See Fig. 4	1
03045-34	Screw	7
03045-35	Screw	1
03045-36	Plug	1
03045-37	Gasket	1
03045-38	Plug, Hex Head	1
03045-39	O-ring	1
03045-40	Not Used	
03045-41	Not Used	
03045-42	Not Used	
03045-43	Screw, Filter Retention	1
03045-44	Filter	1
03045045	Not Used	
03045-46	See Fig. 4	
03045-47	See Fig. 4	
03045-48–50	Not Used	
03045-51	Screw	2
03045-52	Lockwasher	2
03045-53	Clamp. 0.188 ID	2
03045-54	Tube, 0.337 ID	2
03045-55	Connector, No. 16	1
03045-56	Not Used	
03045-57	Not Used	
03045-58	Bushing	1
03045-59	Potting Stop	1
03045-60	Solenoid Assembly (see manual 03013 for individual parts)	1
03045-61	Cover	1
03045-62	Tubing	2
03045-63	Set Screw 10-32 x 0.250	1
03045-64	Diode	1
03045-65	Lock Washer	1
03045-66	Screw	1
03045-67	Not Used	
03045-68–74	See Fig. 4	
03045-75–-100	Not Used	

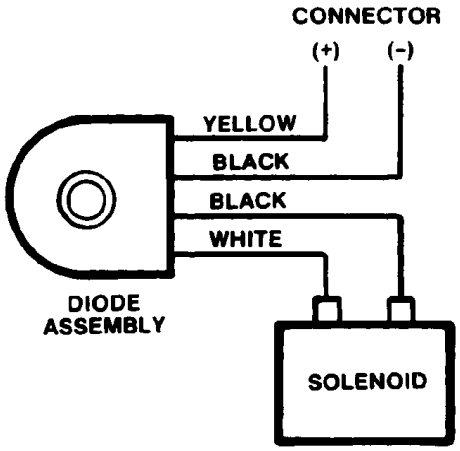


Figure 5. Wiring Diagram

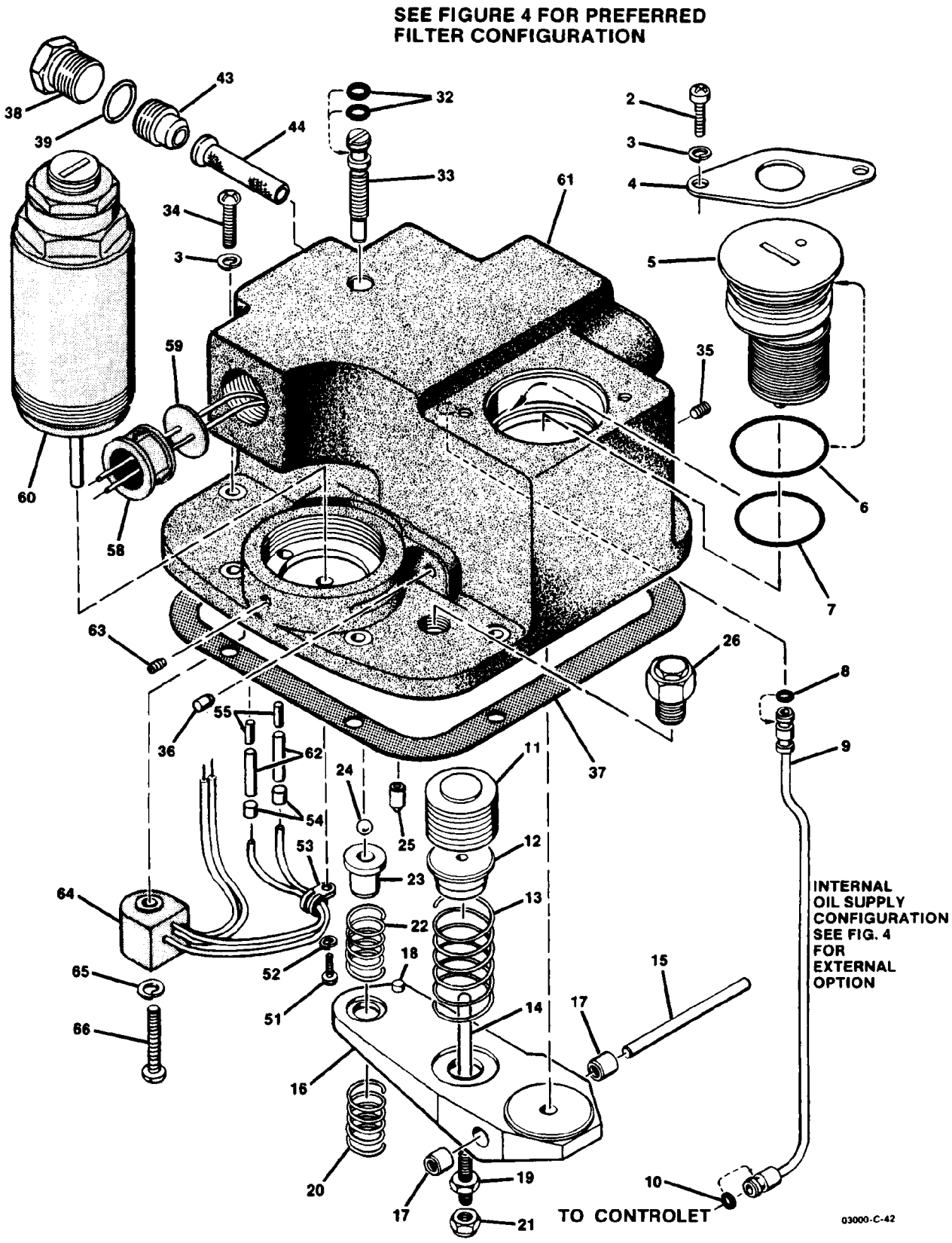


Figure 6. Parts for UG-8 Pneumatic Speed Adjustment with Solenoid Shutdown

Parts List For Figure 7

Ref. No.	Part Name ..... Quantity
03045-101	Front Plate .....
03045-102	Screw. 8-32 x .250 Soc. Set .....
03045-103	Disc.....
03045-104	Lever, Speed Setting .....
03045-105	Washer, Spring Lock No. 10.....
03045-106	Screw, 10-32 x .500 Soc. Hd Cap.....
03045-107	Bracket .....
03045-108	Washer. Spring Lock No. 10.....
03045-109	Screw. 10-32 x 1.250 Socket Cap .....
03045-110	Nut. M8 Wing.....
03045-111	Screw. M8. Knurled Head.....
03045-112	Stop Lever .....
03045-113	Lock Washer.....
03045-114	Screw, 10-32 Socket Cap .....
03045-115	Return Spring.....

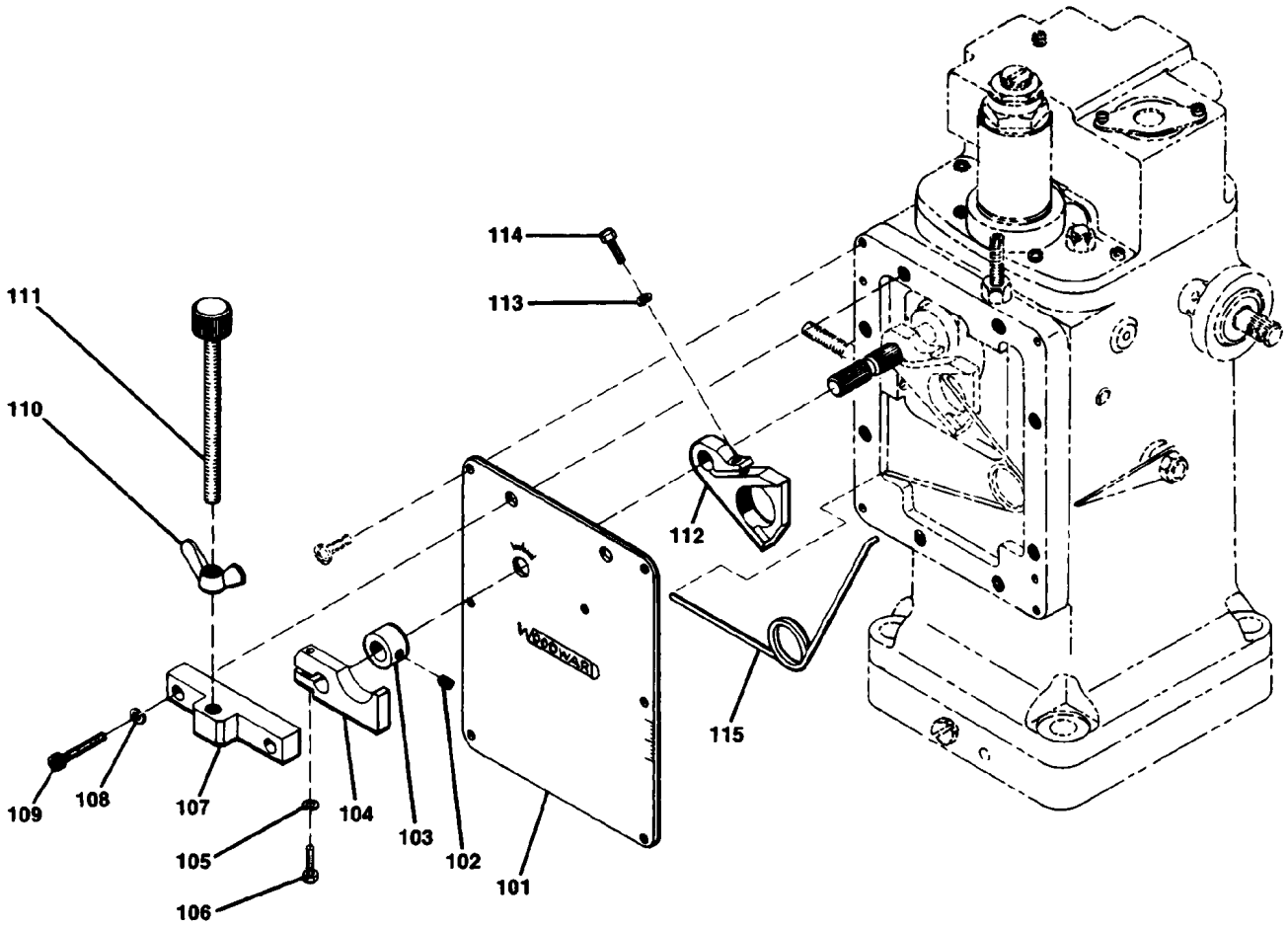


Figure 7. Parts for UG-8 Manual Speed Adjustment

Speed Setting Filter

The speed setting filter is provided to protect the small orifices In the head from accumulations of dirt. The filter should be removed and backflushed if the speed setting head becomes sluggish or during overhaul of the governor.

SLNC Goodwill Governor testing outline protocol

1. Photographic images should record the condition of the governors before they are packed. This includes the setting positions of the dials on the governor front plate and the position of the compensation arm.
2. Serial numbers and unique identifying features should be recorded.
3. The governor(s) should be packed in suitable casing to ensure that damage or further damage cannot be incurred during transit.
4. Photographic images should record the condition of the governors before sealing of the crates.
5. The packing crates should be sealed with tamper proof tape to ensure that ingress into the crates does not occur during transit to the approved Woodward governor test location.
6. The approved Woodward test location should beforehand nominate staff who will undertake the governor testing.
7. Photographic images should record the condition of the sealed crate. The sealing should be signed off by witnessing personnel. Witness names should be recorded in block capitals. Senior ships staff are best placed to fulfil such roles.
8. On arrival at the testing location, photographic images should be recorded of the received crate(s). comparison with images taken before despatch should be made.
9. It is considered appropriate for independent witness to be in attendance when the crates are opened and for the period of testing of the governors. If independent witnesses are not available, then it is considered prudent that high quality video recordings of the opening, removal, inspection, repair and testing processes should be made.
10. On opening of the crates, a decision will need to be made as to the order in which the testing is carried out.
11. On removal from the packaging, the condition of both governors should be recorded. The inspection should detail:
    - The general condition and state of the packaging
    - The position of the dials on the governor front plate
    - The position of the compensation lever
    - The position of the output spindle and attached lever. If no lever attached, then it should be recorded.
    - All damages to the governors
12. Given that one of the governors is damaged, an assessment will need to be made as to repairs required in order to return the governor to a functioning condition. The degree of repair require will need to be confirmed with owners and/or owners representatives before being undertaken.
13. If it is deemed that the damaged governor is uneconomical to repair and be tested, then investigation should be undertaken to examine the governor internal components to assess whether the condition as found: Aspects to consider are :
    - error in re-assembly, bearing in mind the governor had been overhauled in 2019 and had not been fitted to any engine
    - impacts caused by the damaged flywheel
    - normal wear and tear
14. The dismantling should be undertaken in a controlled manner nominally in accordance with Woodward overhaul procedures. This should include the recording of all fastener tightness or torque values where applicable.,
15. Assessment should be made as to whether the found condition could be attributable to the cause of overspeed immediately after installation on the engine.
16. It is however, important to ensure that where feasible, no adjustments are made to the governor settings before they are installed on the test rig.
17. If possible, the governors should be installed on the rig and connected in accordance with test requirements

18. As a first test before commencing the TSP 152 procedures, if possible and advice from Woodward test engineers will need to be sought if this is possible, the rig should be run up to assess the as received or as repaired condition of the respective governors. The response to this test should be recorded. Photographic images of test rig indicators should be recorded if allowed.
19. If the response to the as received or as repaired tests are unsatisfactory, then investigation should be undertaken to understand the cause of the response.
20. The findings will then be assessed in relation to the ongoing investigation and the cause of engine overspeed and previously, the cause of engine speed instability.

WORK ORDER/SERVICE REQUISITION FORM

Ship Name : SLNC GOODWILL
WO/SR No : 1121478
Performed By : SO
PO No : 1100180(1)
Net Cost : 4,146.24 USD

Title : AUX ENGINE #1 GOVERNOR TROUBLE SHOOTING & OVERHAUL

SCHEDULING DATA

Scheduled : 06/18/2019
Completed : 05/31/2019 (b) (6), (b) (7)(C)
Canceled :
Next Due Date :
Event :
Interval :

ADMINISTRATIVE DATA

Created By: (b) (6), (b) (7)(C) **On :** 06/01/2019
Auth. By (b) (6), (b) (7)(C) **On :** 06/01/2019
Apprvd. By (b) (6), (b) (7)(C) **On :** 06/01/2019
Account No: 51104 - Ship Maintenance
Project No:
Priority : A
Job Catg: ENGINE REPAIRS
Class Job No :
Sugg Vend: Jewon Engineering Co LTD
Dept.: ENGINE

EQUIPMENT PARTICULARS

Name: AE 1 GOVERNOR
Class Equipment Name :
Class Eq Code:
Equip Code : NGOO01U2SUL
Manufacturer :
Model : MAN B&W 6L23/30H
Serial No : 08365/08366/08367
Size :
Type :
Equip. Location :
Criticality: C

SPACE PARTICULARS

RESOURCES & COST DATA

Estimated Cost : 0.00
Estimated Man-Hrs : 0
Std. Job Cost :
Actual. Man-Hrs : 0
Resource :

WO DESCRIPTION

vendor to attend vessel for AUX ENGINE #1 GOVERNOR TROUBLE SHOOTING & OVERHAUL

WO FINDINGS

after inspection it was confimerd that governor unit ned an overhaul it recomed every 2 years service interval

Perform By:

Tested By:

Signature:

Designation:

(b) (6), (b) (7)(C)

JOB SAFETY ANALYSIS

JSA Required : NO **Use Template :**

WORK ORDER/SERVICE REQUISITION FORM

Ship Name : SLNC GOODWILL
WO/SR No : 8052082
Performed By : WO/Crew

Title : AE 1 GOVERNOR ANNUAL TEST

SCHEDULING DATA

Scheduled : 11/16/2019
Completed : 12/26/2019 [redacted]
Canceled :
Next Due Date : 12/24/2020

Event :
Interval : 52 W

ADMINISTRATIVE DATA

Created By: [redacted] **On :** 12/26/2019
Auth. By: **On :**
Apprvd. By: **On :**
Account No:
Project No: **Priority :** C
Job Catg: ENGINE REPAIRS **Class Job No :**
Sugg Vend:
Dept.: ENGINE

EQUIPMENT PARTICULARS

Name: AE 1 GOVERNOR **Class Equipment Name :** **Class Eq Code:**
Equip Code : NGOO01U2SUL **Manufacturer :**
Model : MAN B&W 6L23/30H **Serial No :** 08365/08366/08367
Size : **Type :**
Equip. Location : **Criticality:** C

SPACE PARTICULARS

RESOURCES & COST DATA

Estimated Cost : 0.00 **Estimated Man-Hrs :** 0
Std. Job Cost : **Actual. Man-Hrs :** 0
Resource :

WO DESCRIPTION

GOVERNOR CHECK

TASK: CONDITION AND FUNCTION CHECK OF GOVERNOR

INSPECT WHILE UNDER NORMAL OPERATING CONDITIONS
CHECK OIL LEVELS
CHECK FOR AIR, OIL LEAKS, INSPECT FITTINGS, CONNECTORS
EXAMINE LINKAGE, LUBRICATE AS NEEDED.
CLEAN SENSORS AS REQUIRED.
CHECK ALL ALARMS, TRIPS, READOUTS, SENSORS.

ALL REMARKS, DEFICIENCIES, ACTIONS TAKEN/PERFORMED, OR NOTEWORTHY COMMENTS SHALL BE REPORTED IN THE WO FINDINGS TAB. INCLUDE CORRESPONDING REQUISITION NUMBER FOR ORDERING OF NEW/REPLACEMENT ITEMS/PARTS IN WO FINDINGS TAB.

ANY DEFICIENCIES NOTED REQUIRING ADDITIONAL ATTENTION, ARE SAFETY RELATED OR ARE BEYOND THE SCOPE OF NORMAL MAINTENANCE ACTIVITIES SHALL HAVE AN ASSOCIATED SERVICE REQUISITION WRITTEN.

[redacted]

WO FINDINGS

In May 2019 rebuilt governor installed and topped off with 827. New micro switch installed on over speed device. Work done at 41114

Governor observed at idle and at multiple loads, holds 900 rpm and reacts to change in load with no erratic movement or hunting

Oil level checked and oil is clear with a 'new" appearance
Linkage, fitting and wires all checked for tightness and leakage
Fuel rack checked, lubricated and exercised weekly by 3ae
Speed sensor checked

Current run hours 42617, roughly 1500 hours on rebuilt governor

Completed by 1ae (b) (6), (b) (7)(C) 12/26/2019

Perform By:

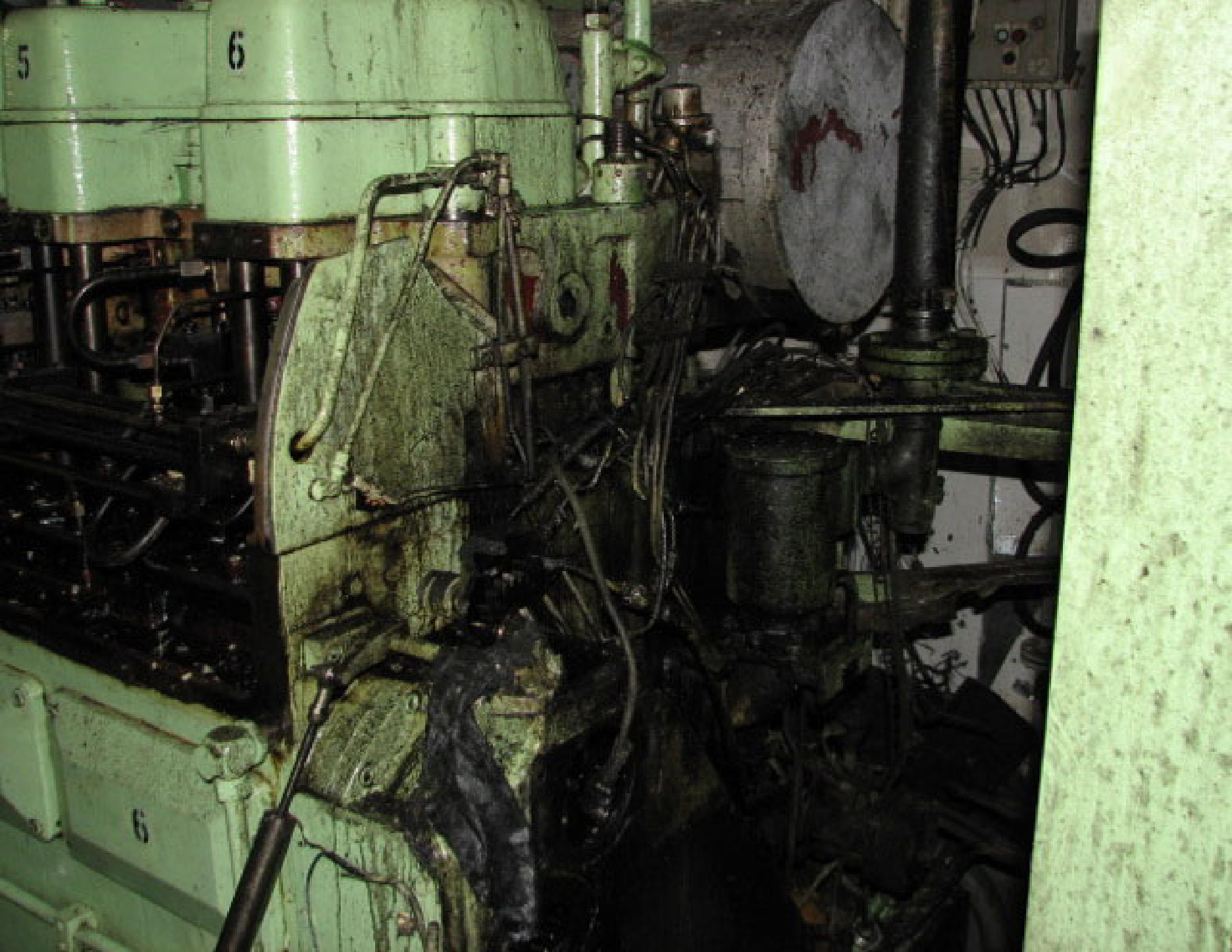
Tested By:

Signature:

Designation:

JOB SAFETY ANALYSIS

JSA Required : NO **Use Template :**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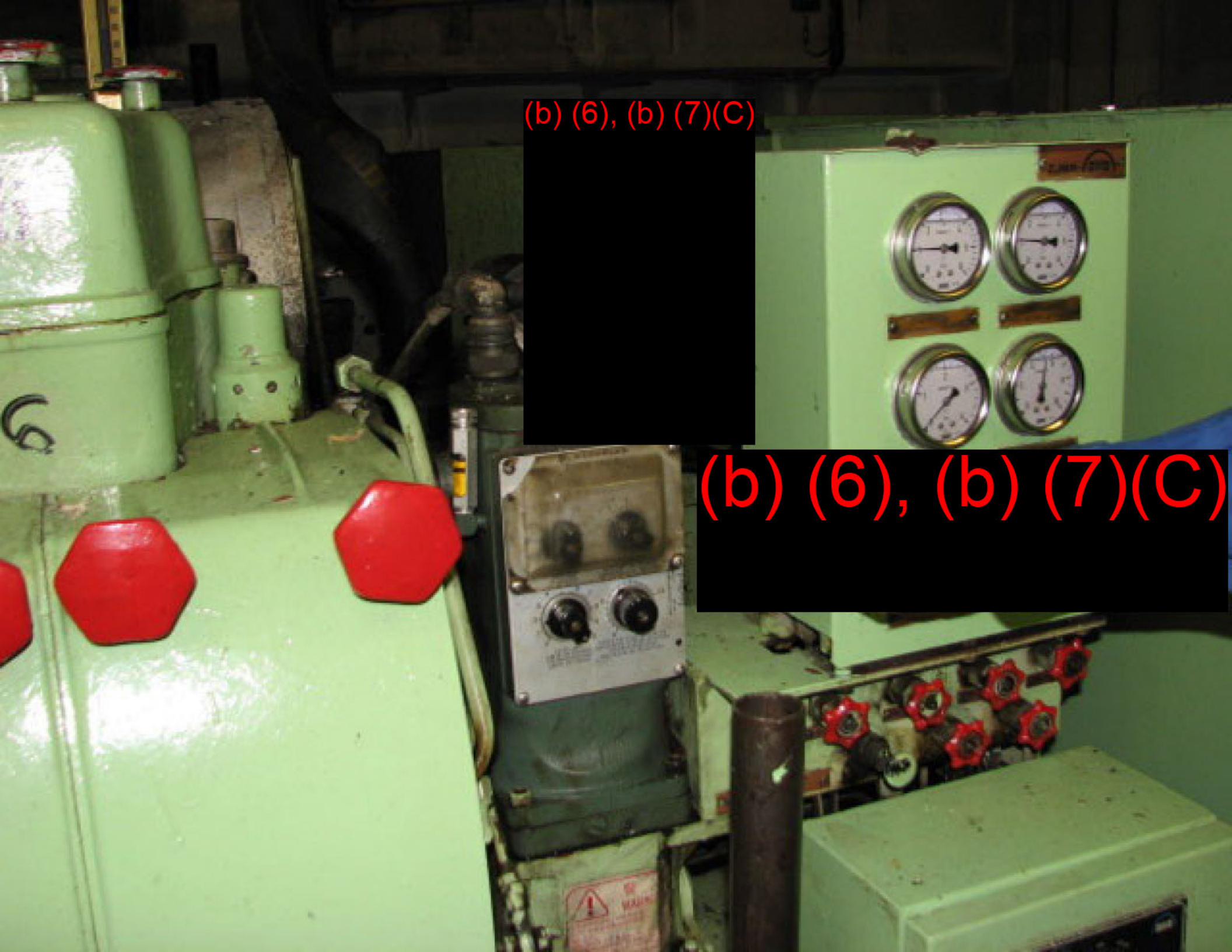
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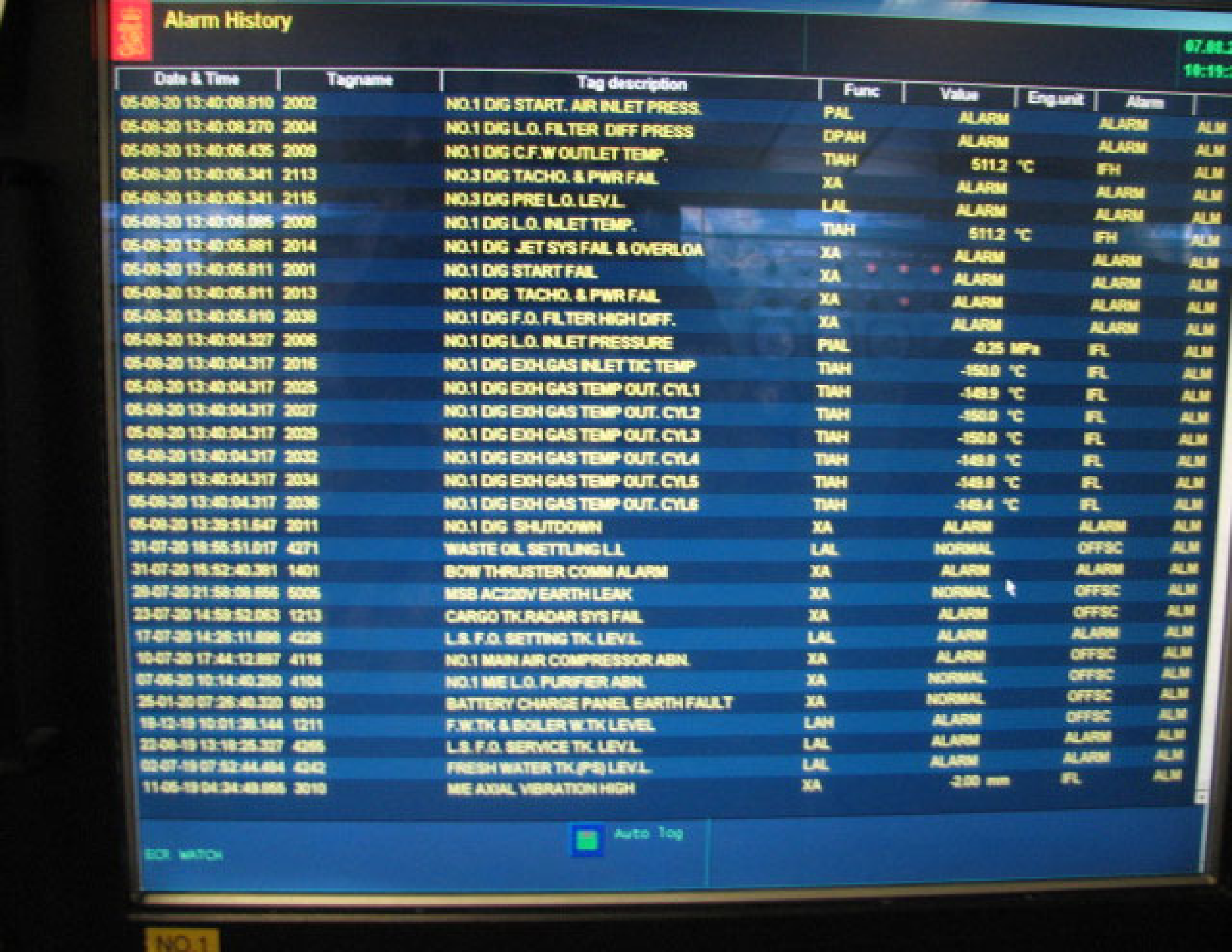
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05-09-20 13:40:08.270 2004 NO.1 DIG L.O. FILTER DIFF PRESS DPAH ALARM ALARM ALM
05-09-20 13:40:06.435 2009 NO.1 DIG C.F.W OUTLET TEMP. TIAH 511.2 ℃ IFH ALM
05-09-20 13:40:06.341 2113 NO.3 DIG TACHO. & PWR FAIL XA ALARM ALARM ALM
05-09-20 13:40:06.341 2115 NO.3 DIG PRE L.O. LEV.L LAL ALARM ALARM ALM
05-09-20 13:40:06.095 2008 NO.1 DIG L.O. INLET TEMP. TIAH 511.2 ℃ IFH ALM
05-09-20 13:40:05.891 2014 NO.1 DIG JET SYS FAIL & OVERLOA XA ALARM ALARM ALM
05-09-20 13:40:05.811 2001 NO.1 DIG START FAIL XA ALARM ALARM ALM
05-09-20 13:40:05.811 2013 NO.1 DIG TACHO. & PWR FAIL XA ALARM ALARM ALM
05-09-20 13:40:05.810 2039 NO.1 DIG F.O. FILTER HIGH DIFF. XA ALARM ALARM ALM
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31-07-20 18:55:51.017 4271 WASTE OIL SETTLING L.L LAL NORMAL OFFSC ALM
31-07-20 15:52:40.391 1401 BOW THRUSTER COMM ALARM XA ALARM ALARM ALM
29-07-20 21:59:08.856 5035 MSB AC220V EARTH LEAK XA NORMAL OFFSC ALM
23-07-20 14:59:52.063 1213 CARGO TK.RADAR SYS FAIL XA ALARM OFFSC ALM
17-07-20 14:26:11.696 4226 L.S. F.O. SETTING TK. LEV.L LAL ALARM ALARM ALM
10-07-20 17:44:12.897 4116 NO.1 MAIN AIR COMPRESSOR ABN. XA ALARM OFFSC ALM
07-05-20 10:14:40.250 4104 NO.1 ME L.O. PURIFIER ABN. XA NORMAL OFFSC ALM
25-01-20 07:26:40.320 5013 BATTERY CHARGE PANEL EARTH FAULT XA NORMAL OFFSC ALM
19-12-19 10:01:38.144 1211 F.W.TK & BOILER W.TK LEVEL LAH ALARM OFFSC ALM
22-08-19 13:18:25.327 4205 L.S. F.O. SERVICE TK. LEV.L LAL ALARM ALARM ALM
03-07-19 07:52:44.464 4242 FRESH WATER TK.(PS) LEV.L LAL ALARM ALARM ALM
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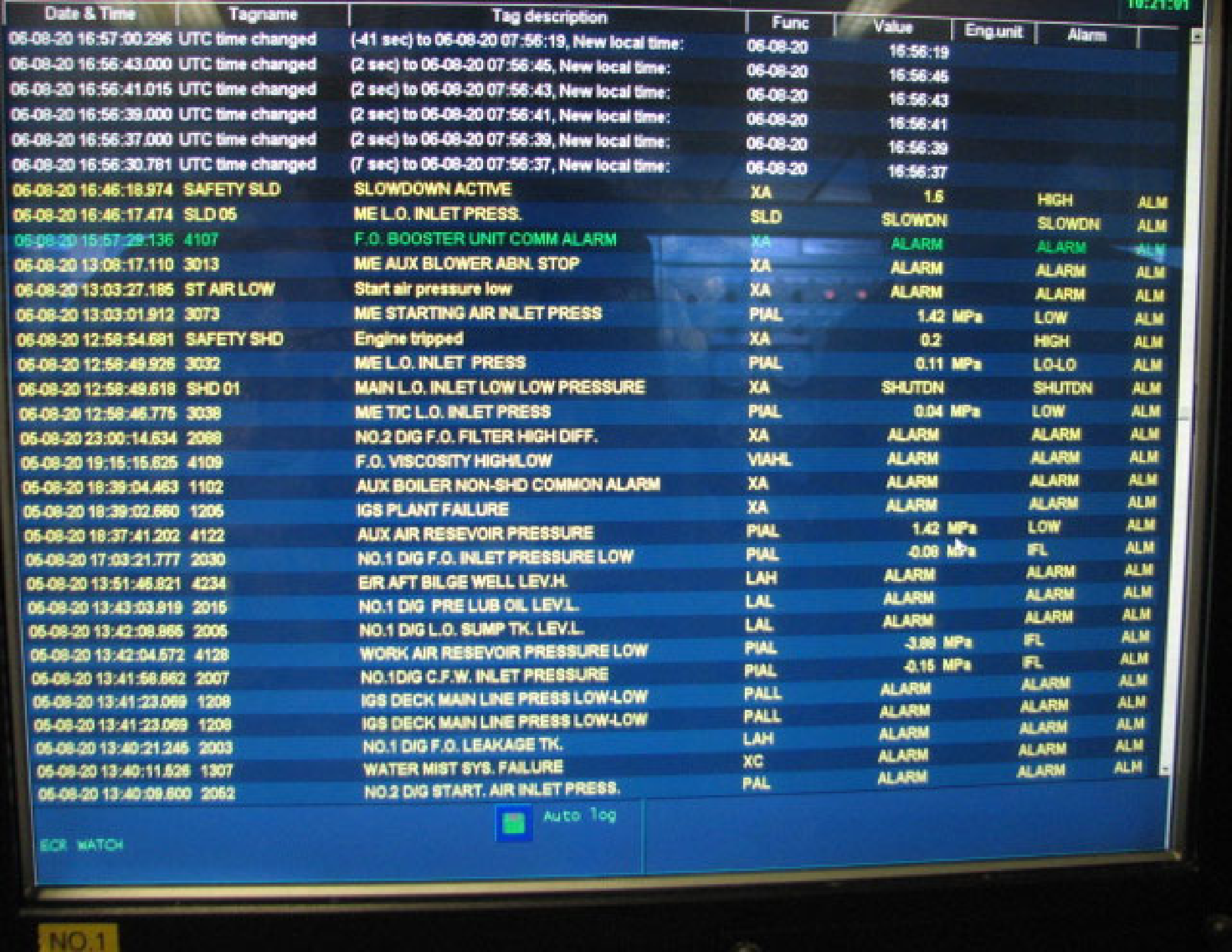
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06-08-20 16:46:17.474 SLD 05 ME L.O. INLET PRESS. SLD SLOWDN SLOWDN ALM
06-08-20 15:57:29.136 4107 F.O. BOOSTER UNIT COMM ALARM XA ALARM ALARM ALM
06-08-20 13:08:17.110 3013 ME AUX BLOWER ABN. STOP XA ALARM ALARM ALM
06-08-20 13:03:27.185 ST AIR LOW Start air pressure low XA ALARM ALARM ALM
06-08-20 13:03:01.912 3073 ME STARTING AIR INLET PRESS PIAL 1.42 MPa LOW ALM
06-08-20 12:58:54.681 SAFETY SHD Engine tripped XA 0.2 HIGH ALM
06-08-20 12:58:49.926 3032 ME L.O. INLET PRESS PIAL 0.11 MPa LO-LO ALM
06-08-20 12:58:49.618 SHD 01 MAIN L.O. INLET LOW LOW PRESSURE XA SHUTDN SHUTDN ALM
06-08-20 12:58:46.775 3038 ME TIC L.O. INLET PRESS PIAL 0.04 MPa LOW ALM
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06-08-20 19:15:15.625 4109 F.O. VISCOSITY HIGH/LOW VIAHL ALARM ALARM ALM
06-08-20 18:39:04.463 1102 AUX BOILER NON-SHD COMMON ALARM XA ALARM ALARM ALM
06-08-20 18:39:02.660 1205 IGS PLANT FAILURE XA ALARM ALARM ALM
06-08-20 18:37:41.202 4122 AUX AIR RESEVOIR PRESSURE PIAL 1.42 MPa LOW ALM
06-08-20 17:03:21.777 2030 NO.1 DIG F.O. INLET PRESSURE LOW PIAL -0.06 MPa IFL ALM
06-08-20 13:51:46.921 4234 E/R AFT BILGE WELL LEV.H. LAH ALARM ALARM ALM
06-08-20 13:43:03.819 2015 NO.1 DIG PRE LUB OIL LEV.L. LAL ALARM ALARM ALM
06-08-20 13:42:08.865 2005 NO.1 DIG L.O. SUMP TK. LEV.L. LAL ALARM ALARM ALM
06-08-20 13:42:04.572 4128 WORK AIR RESEVOIR PRESSURE LOW PIAL -3.89 MPa IFL ALM
06-08-20 13:41:58.862 2007 NO.1DIG C.F.W. INLET PRESSURE PIAL -0.15 MPa IFL ALM
06-08-20 13:41:23.069 1209 IGS DECK MAIN LINE PRESS LOW-LOW PALL ALARM ALARM ALM
06-08-20 13:41:23.069 1208 IGS DECK MAIN LINE PRESS LOW-LOW PALL ALARM ALARM ALM
06-08-20 13:40:21.246 2003 NO.1 DIG F.O. LEAKAGE TK. LAH ALARM ALARM ALM
06-08-20 13:40:11.528 1307 WATER MIST SYS. FAILURE XC ALARM ALARM ALM
06-08-20 13:40:09.600 2052 NO.2 DIG START. AIR INLET PRESS. PAL ALARM ALARM ALM
Auto Tog
ECR WATCH
NO.1


Alarm History
07.08.20
10:21:49
Date & Time
Tagname
Tag description
Func
Value
Engunit
Alarm
06-08-20 20:45:07.678 1309 CARGO SYS POWER FAILURE XA NORMAL ALARM RET
06-08-20 20:41:32.663 1309 CARGO SYS POWER FAILURE XA ALARM ALARM ALM
06-08-20 16:47:56.608 4107 F.O. BOOSTER UNIT COMM ALARM XA NORMAL ALARM RET
06-08-20 16:57:53.046 COMERR A032 COMM ROS1 RAI_16 DPU32 (1/34) XA NORMAL FAIL RET
06-08-20 16:57:53.046 COMERR A033 COMM ROS1 RDI_32 DPU33 (1/35) XA NORMAL FAIL RET
06-08-20 16:57:53.046 COMERR A034 COMM ROS1 RAI_16 DPU34 (1/36) XA NORMAL FAIL RET
06-08-20 16:57:53.046 COMERR A035 COMM ROS1 RAI_16 DPU35 (1/37) XA NORMAL FAIL RET
06-08-20 16:57:53.046 COMERR A036 COMM ROS1 RDI_32 DPU36 (1/38) XA NORMAL FAIL RET
06-08-20 16:57:52.046 COMERR A013 COMM ROS1 ACP DPU13 (19/72) XA NORMAL FAIL RET
06-08-20 16:57:51.046 COMERR A012 COMM ROS1 ACP DPU12 (19/71) XA NORMAL FAIL RET
06-08-20 16:57:50.046 COMERR A016 COMM ROS1 LTU DPU16 (19/33) XA NORMAL FAIL RET
06-08-20 16:57:50.046 COMERR A017 COMM ROS1 MPP DPU17 (19/34) XA NORMAL FAIL RET
06-08-20 16:57:49.046 COMERR A015 COMM ROS1 MPP DPU15 (19/32) XA NORMAL FAIL RET
06-08-20 16:57:48.046 COMERR A012 COMM ROS1 ACP DPU12 (19/71) XA FAIL FAIL ALM
06-08-20 16:57:48.046 COMERR A013 COMM ROS1 ACP DPU13 (19/72) XA FAIL FAIL ALM
06-08-20 16:57:48.046 COMERR A015 COMM ROS1 MPP DPU15 (19/32) XA FAIL FAIL ALM
06-08-20 16:57:48.046 COMERR A016 COMM ROS1 LTU DPU16 (19/33) XA FAIL FAIL ALM
06-08-20 16:57:48.046 COMERR A017 COMM ROS1 MPP DPU17 (19/34) XA FAIL FAIL ALM
06-08-20 16:57:46.046 COMERR A032 COMM ROS1 RAI_16 DPU32 (1/34) XA FAIL FAIL ALM
06-08-20 16:57:36.046 COMERR A033 COMM ROS1 RDI_32 DPU33 (1/35) XA FAIL FAIL ALM
06-08-20 16:57:36.046 COMERR A034 COMM ROS1 RAI_16 DPU34 (1/36) XA FAIL FAIL ALM
06-08-20 16:57:36.046 COMERR A035 COMM ROS1 RAI_16 DPU35 (1/37) XA FAIL FAIL ALM
06-08-20 16:57:36.046 COMERR A036 COMM ROS1 RDI_32 DPU36 (1/38) XA FAIL FAIL ALM
06-08-20 16:56:56.734 UTC time changed (16 sec) to 06-08-20 07:57:16, New local time: 06-08-20 16:57:16
06-08-20 16:57:15.000 Timezone changed (0 min) to UTC+9 h , New local time: 06-08-20 16:57:15
06-08-20 16:56:57.015 UTC time changed (2 sec) to 06-08-20 07:56:59, New local time: 06-08-20 16:56:59
06-08-20 16:56:55.000 UTC time changed (2 sec) to 06-08-20 07:56:57, New local time: 06-08-20 16:56:57
06-08-20 16:56:53.015 UTC time changed (2 sec) to 06-08-20 07:56:55, New local time: 06-08-20 16:56:55
06-08-20 16:56:51.000 UTC time changed (2 sec) to 06-08-20 07:56:53, New local time: 06-08-20 16:56:53
06-08-20 16:56:49.000 UTC time changed (2 sec) to 06-08-20 07:56:51, New local time: 06-08-20 16:56:51
06-08-20 16:56:47.015 UTC time changed (2 sec) to 06-08-20 07:56:49, New local time: 06-08-20 16:56:49
06-08-20 16:56:45.000 UTC time changed (2 sec) to 06-08-20 07:56:47, New local time: 06-08-20 16:56:47
ECR MATCH
Auto log
NO.1

Date & Time	Tagname	Tag description	Func	Value	Eng.unit	Alarm
06-09-20 20:45:07.678	1209	CARGO SYS POWER FAILURE	XA	NORMAL		ALARM
06-09-20 20:41:32.663	1209	CARGO SYS POWER FAILURE	XA	ALARM		ALARM
06-09-20 18:47:55.608	4107	F.O. BOOSTER UNIT COMM ALARM	XA	NORMAL		ALARM
06-09-20 16:57:53.046	COMERR A032	COMM ROS1 RAI_16 DPU32 (1/34)	XA	NORMAL		FAIL
06-09-20 16:57:53.046	COMERR A033	COMM ROS1 RDI_32 DPU33 (1/35)	XA	NORMAL		FAIL
06-09-20 16:57:53.046	COMERR A034	COMM ROS1 RAI_16 DPU34 (1/36)	XA	NORMAL		FAIL
06-09-20 16:57:53.046	COMERR A035	COMM ROS1 RAI_16 DPU35 (1/37)	XA	NORMAL		FAIL
06-09-20 16:57:53.046	COMERR A036	COMM ROS1 RDI_32 DPU36 (1/38)	XA	NORMAL		FAIL
06-09-20 16:57:52.046	COMERR A013	COMM ROS1 ACP DPU13 (19/72)	XA	NORMAL		FAIL
06-09-20 16:57:51.046	COMERR A012	COMM ROS1 ACP DPU12 (19/71)	XA	NORMAL		FAIL
06-09-20 16:57:50.046	COMERR A016	COMM ROS1 LTU DPU16 (19/33)	XA	NORMAL		FAIL
06-09-20 16:57:50.046	COMERR A017	COMM ROS1 MPP DPU17 (19/34)	XA	NORMAL		FAIL
06-09-20 16:57:49.046	COMERR A015	COMM ROS1 MPP DPU15 (19/32)	XA	NORMAL		FAIL
06-09-20 16:57:48.046	COMERR A012	COMM ROS1 ACP DPU12 (19/71)	XA	FAIL		FAIL
06-09-20 16:57:48.046	COMERR A013	COMM ROS1 ACP DPU13 (19/72)	XA	FAIL		FAIL
06-09-20 16:57:48.046	COMERR A015	COMM ROS1 MPP DPU15 (19/32)	XA	FAIL		FAIL
06-09-20 16:57:48.046	COMERR A016	COMM ROS1 LTU DPU16 (19/33)	XA	FAIL		FAIL
06-09-20 16:57:48.046	COMERR A017	COMM ROS1 MPP DPU17 (19/34)	XA	FAIL		FAIL
06-09-20 16:57:46.046	COMERR A032	COMM ROS1 RAI_16 DPU32 (1/34)	XA	FAIL		FAIL
06-09-20 16:57:36.046	COMERR A033	COMM ROS1 RDI_32 DPU33 (1/35)	XA	FAIL		FAIL
06-09-20 16:57:36.046	COMERR A034	COMM ROS1 RAI_16 DPU34 (1/36)	XA	FAIL		FAIL
06-09-20 16:57:36.046	COMERR A035	COMM ROS1 RAI_16 DPU35 (1/37)	XA	FAIL		FAIL
06-09-20 16:57:36.046	COMERR A036	COMM ROS1 RDI_32 DPU36 (1/38)	XA	FAIL		FAIL
06-09-20 16:56:59.734	UTC time changed	(16 sec) to 06-09-20 07:57:15, New local time:	06-09-20	16:57:15		
06-09-20 16:57:15.000	Timezone changed	(0 min) to UTC+9 h , New local time:	06-09-20	16:57:15		
06-09-20 16:56:57.015	UTC time changed	(2 sec) to 06-09-20 07:56:59, New local time:	06-09-20	16:56:59		
06-09-20 16:56:55.000	UTC time changed	(2 sec) to 06-09-20 07:56:57, New local time:	06-09-20	16:56:57		
06-09-20 16:56:53.015	UTC time changed	(2 sec) to 06-09-20 07:56:55, New local time:	06-09-20	16:56:55		
06-09-20 16:56:51.000	UTC time changed	(2 sec) to 06-09-20 07:56:53, New local time:	06-09-20	16:56:53		
06-09-20 16:56:49.000	UTC time changed	(2 sec) to 06-09-20 07:56:51, New local time:	06-09-20	16:56:51		
06-09-20 16:56:47.015	UTC time changed	(2 sec) to 06-09-20 07:56:49, New local time:	06-09-20	16:56:49		
06-09-20 16:56:45.000	UTC time changed	(2 sec) to 06-09-20 07:56:47, New local time:	06-09-20	16:56:47		

ECR WATCH

Auto log

M/V SLNC GOODWILL: Engine Log

Voyage No. 073 On voyage from GUAM To ONSAN R.O.K. Date 8/5/20 Page 005

(label cut off)		EXH. VALVE		JACKET	SCAV	
	622	CYL #1	369	29	CYL #1	28
	30	CYL #2	332	30	CYL #2	30
		CYL #3	360	31	CYL #3	36
		CYL #4	345	29	CYL #4	39
	7.6	CYL #5	364	30	CYL #5	38
	1.8	CYL #6	326	31	CYL #6	39
	6.3			JACKET CW IN P		3.6
	9.7	AFTER T/C		JACKET CW IN T		73

		PISTON OIL COOLING			
	2.9			LT CW IN P	3.1
	7.5	CYL #1	52	LT CW IN T	31
	42	CYL #2	52	LO IN P	3.4
	30	CYL #3	53	LO IN T	41
SYSTEM		CYL #4	52	TC LO IN P	2.3
	3292	CYL #5	52	TC LO IN T	59
	6.3	CYL #6	57		

		TURBOCHARGER		MAIN BEARINGS	
	70			MC THRUST	37
	12.3	RPM	8465	INT MEARING	37
	3.8	EXH INLET		ST BRG F	38
	4.3	EXH OUTLET		ST BRG AFT	37
LUBE	8.6	SP AIR FILTER			

COOLER TEMPS		AUX CLR #1 - INBD		WATER SYSTEM PRESS	
	50	FW INLET	36	LT FW SYS	3.2
	40	FW OUTLET	35	SEAWATER SYS	2.3
	35	SW OUT	32	HT FW P/P	3.2
	36			FW BOOSTER	2.4

COOLER PRESS		AUX CLR #2 - OUTBD		ENGINE SIDE	
		FW INLET	34	MAIN LO PRESS	1.8
	3.5	FW OUTLET	34	SCAV AIR PRESS	1.3
	3.8	SW OUT	36	HT CLG WTR P	2.0
	2.5	HT FW CONTROL V/V		LT CLG WTR P	2.4
	6.0	PV @ VALVE	74	FO INLET PRESS	9.3
	6.6	SP @ VALVE	72		

		LO FW CONTROL V/V		SW PUMPS Hz & PRESS		
				#1		
	3.6	PV @ VALVE	42	#2	60	3.0
	0.3	SP @ VALVE	42	#3	60	2.8

TEMPS		LT FW CONTROL V/V			
	32	PV @ VALVE	33	PRESS @ VALVE	2.2
	32	SP @ VALVE	30	TEMP @ VALVE	30

PROTECTION	REF CEL	AMPS	VOLTS	1 (MV)	2 (MV)	
	[illegible]	0	1.1	0	0	Shaft 125
		0/0.6		8/0/0.6		

DIESEL GENERATORS	#1	#2	#3
EXH 1			353
EXH 2			380
EXH 3			359
EXH 4			343
EXH 5			353
EXH 6			337
			45
LO P			4.5
LO T/IN			66
HT P			3.7
HT IN			65
LT WTR IN			32
LT WTR OUT			36
CHG AIR °C			49
CHG AIR IN			125
CHG AIR OUT			34
CHG AIR P			70
KW			560
AMPS			754
SUMP			4

Steering gear		
Stbd [illegible]		Cols
Press		3
Temp		77

PUMPS	
S/W	3, 3
HT	1
LT	6, 3
FW BOOST	2
FEED	
SUPPLY	
CIRC	
STEERING	1
T/C	
FIRE/BAL	
IG	

AIR COMPRESSOR	
START AIR #1	
HR. METER	2117.6
HRS RUN	
OIL PRESS	
START AIR #2	
HR. METER	1855
HRS RUN	
OIL PRESS	
EMERG COMP	
HR. METER	1525
HRS RUN	
WORK AIR	
HR. METER	29681
HRS RUN	21349

PURIFIERS	°C	FLOW
HFO#1	98	1.5
HFO#2		
MELO#1		
MELO#2	90	0.3
DG LO		
MGO		

OPERATING HOURS	HRS RAN	TOTAL	LO
MAIN ENGINE		33358.6	
#1 DIESEL GEN		41374.9V	
#2 DIESEL GEN		41637.26	
#3 DIESEL GEN		39415.39	

BOILER SYS	
BOILER ON	Comp 7
% LOAD	8
WTR LEV	23
BOILER P	4.1
FUEL P	6.5

AIR PRESSURE	
START AIR	23
CONT AIR	7
WORK AIR	5.7
WHISTLE	8

REFRIG. COMP.	
SUCT P	16
DISCH P	55
OIL P	0.6
CW IN °F	34
CW OUT °F	34
BOX °F	-1 / 41
ON LINE	2

A/C COMP.		
SUCT P	54	47
DISCH P	15	14
OIL P	33	34
CW IN °F	31	32
CW OUT °F	35	32
CLR IN °F	25	25
CLR OUT °F	18	23
ON LINE	1	4

EVAPORATOR	
FEED TEMP	
VACUUM	
SHELL TEMP	
PPM	
METER	
WTR MADE	
HOURS ON	

COMMENTS

DUTY ENGINEER

Blow air receivers. Added [illegible] to exhaust gases. Added [illegible] 14 L Autotreat to comp boiler. Added 0.6 L to [illegible] tank. Blow down surface composite boiler. Cleaned automatic fuel filter [illegible] H.F.
0000 - 0800
2nd A/E [illegible]

1342. DG #1 SERIOUS FLY-WHEEL CASUALTY AND GENERATOR ROOM DAMAGE LOSS OF POWER AND PROPULSION. 3AE [illegible] CRITICALLY INJURED AND TREATED BY SHIPS CREW AND MEDICAL OFFICER.
[redacted] (b) (6), (b) (7)(C) [redacted] (b) (6), (b) (7)(C) C/E
1343 EDG ONLINE PROVIDING EMERGENCY POWER ENGINE CREW BEGIN EFFORTS TO RESTORE MAIN SHIP'S POWER.
2A TAYLOR [redacted] (b) (6), (b) (7)(C) C/E
1845 #3 DG RESTORED ONLINE FOR MAIN POWER.
2A [redacted] (b) (6), (b) (7)(C) C/E
2154 PROPULSION RESTORED. CONTROL TRANSFERRED TO BRIDGE.
2A TAYLOR [redacted] (b) (6), (b) (7)(C) C/E

CHIEF ENGINEER	DATE
[redacted] (b) (6), (b) (7)(C)	05 Aug 2020

Remarks

M/V SLNC GOODWILL: Engine Log

Voyage No: 023 On voyage from: GUAM To: ONSAN R.O.K. Date: 8/14/20 Page: 004

[illegible]		EXH. VALVE		JACKET	SCAV	
[illegible]	101	CYL #1	302	38	CYL #1	41
[illegible]	20	CYL #2	319	40	CYL #2	41
[illegible]		CYL #3	331	41	CYL #3	42
[illegible]		CYL #4	308	39	CYL #4	41
[illegible]	11.8	CYL #5	309	39	CYL #5	41
[illegible]	1	CYL #6	292	32	CYL #6	42
[illegible]	1		350	JACKET CW IN P		3.6
[illegible]	3.2	AFTER T/C		JACKET CW IN T		33

[illegible]		PISTON OIL COOLING			
[illegible]	0.2			LT CW IN P	3.4
[illegible]	1	CYL #1	50	LT CW IN T	33
[illegible] TEMP	53	CYL #2	50	LO IN P	2.4
[illegible] TEMP	30	CYL #3	50	LO IN T	46
FUEL SYSTEM		CYL #4	50	T/C LO IN P	2.3
[illegible]	1030	CYL #5	49	T/C LO IN T	60
[illegible] FLOW	652	CYL #6	50	MAIN BEARINGS	
[illegible]	125	TURBOCHARGER		ME THRUST	55
[illegible]	11.5	RPM	6538	INT MEARING	53
[illegible]	2.1	EXH INLET	350	ST BRG F	34
[illegible]	4.6	EXH OUTLET	300	ST BRG AFT	34
[illegible]		SP AIR FILTER	3.3	WATER SYSTEM PRESS	
LO COOLER TEMPS		AUX CLR #1 - INBD		LT FW SYS	3.5
[illegible] INLET	31	FW INLET	38	SEAWATER SYS	
[illegible] OUTLET	34	FW OUTLET	32	HT FW P/P	3.2
[illegible] INLET	32	SW OUT	35	FW BOOSTER	3.2
[illegible] OUTLET	32	AUX CLR #2-OUTBD		ENGINE SIDE	
LO COOLER PRESS		FW INLET	38	MAIN LO PRESS	1.8
[illegible] INLET	2.2	FW OUTLET	30	SCAV AIR PRESS	0.8
[illegible] OUTLET	2.3	SW OUT	35	HT CLG WTR P	4
[illegible] INLET	1.5	HT FW CONTROL V/V		LT CLG WTR P	2.2
[illegible] OUTLET	1	PV @ VALVE	92	FO INLET PRESS	0.4
[illegible]	0.2	SP @ VALVE	72	SW PUMPS Hz & PRESS	
[illegible] COOLER		LO FW CONTROL V/V		#1		
[illegible] OUT	32	PV @ VALVE	46	#2	50	2.2
[illegible] OUT	0.4	SP @ VALVE	47	#3	50	2.2
[illegible] COOLER TEMPS		LT FW CONTROL V/V			
[illegible]	42	PV @ VALVE	31	PRESS @ VALVE	2.2
[illegible]	29	SP @ VALVE	30	TEMP @ VALVE	30

CATHODIC PROTECTION					
[illegible]	REF CEL	AMPS	VOLTS	1 (MV)	2 (MV)
[illegible]	240	15	7.1	0	0
[illegible]	FORE	0.006	TOTAL	0.006	

SHAFT CS 50

DIESEL GENERATORS	#1	#2	#3
EXH 1			362
EXH 2			386
EXH 3			370
EXH 4			385
EXH 5			390
EXH 6			406
			42
LO P			4.5
LO T°IN			67
HT P			3.1
HT IN			65
LT WTR IN			34
LT WTR OUT			34
CHG AIR °C			51
°CHG AIR IN			130
°CHG AIR OUT			38
CHG AIR P			1.2
KW			503
AMPS			800
SUMP			4

STEERING GEAR	
SEA ST	CALM
PRESS	6
TEMP	35

PUMPS		
S/W	1	3
HT	2	
LT	2	3
FW BOOST	2	
FEED		
SUPPLY		
CIRC		
STEERING	1	
T/C		
FIRE/BAL		
IG		
AIR COMPRESSOR		
START AIR #1		
HR. METER	2111	
HRS RUN		
OIL PRESS		
START AIR #2		
HR. METER	1847	
HRS RUN		
OIL PRESS		
EMERG COMP		
HR. METER	1624	
HRS RUN		
WORK AIR		
HR. METER	23641	
HRS RUN	21588	

BOILER SYS.	
BOILER ON	COMP
% LOAD	0
WTR LEV	-1.0
BOILER P	6.8
FUEL P	0.5
AIR PRESSURE	
START AIR	30
CONT AIR	7
WORK AIR	5
WHISTLE	10
REFRIG. COMP.	
SUCT P	1.8
DISCH P	15
OIL P	1
CW IN°F	31
CW OUT°F	33
BOX °F	-16/15
ON LINE	2

A/C COMP		
SUCT P	5.2	6.9
DISCH P	16	16.1
OIL P	6.3	3.3
CW IN °F	32	30
CW OUT °F	36	33
CLR IN °F	35	14
CLR OUT °F	13	16
ON LINE	✓	2

PURIFIERS	°C	FLOW
HFO#1	98	1.5
HFO#2		
MELO#1		
MELO#2	90	0.9
DG LO		
MGO		

EVAPORATOR	
FEED TEMP	
VACUUM	
SHELL TEMP	
PPM	
METER	
WTR. MADE	
HOURS ON	

OPERATING HOURS	HRS RAN	TOTAL	L.O.
MAIN ENGINE		53714.6	
#1 DIESEL GEN		41899.94	
#2 DIESEL GEN		41427.91	
#3 DIESEL GEN		41411.31	

COMMENTS
DUTY ENGINEER

0614 - IGG "ON", O2 [illegible] [illegible] - [illegible], [illegible] 2045
0645 Main Engine increasing [illegible] to full.
0720 - Reduced speed T [illegible]
0837 Increased speed full ahead

CHIEF ENGINEER	DATE
[redacted]	14 AUG 2020

[illegible] Remarks:

M/V SLNC GOODWILL: Engine Log

Voyage No. 073 On voyage from GUAM To ONSAN, ROK Date 8/3/20 Page 003

OPERATIONS	
RPM	100
LOAD	50
ME KW	
ME ZONE	
SPEED KTS	11.8
ME CONT AIR	7
ME SCAV AIR	1
ME FO PRESS	8
ME LO PRESS	2.5
HT	1.5
EX TEMP	42
SEA TEMP	31

FUEL SYSTEM	
FO METER	[illegible]
FO FLOW	0.87
TEMP IN	124
VISCO	11.2
SUPPLY P	3.8
CIRC P	8.1
PRES TO ME	9

ME LO COOLER TEMPS	
LO INLET	50
LO OUTLET	38
FW INLET	35
FW OUTLET	34

ME LO COOLER PRESS	
LO INLET	39
LO OUTLET	3.6
FW INLET	2.2
FW OUTLET	1
STRAINER Δ	0.4

AIR COOLER	
TEMP OUT	33
PRESS OUT	0.5

HT COOLER TEMPS	
HT INLET	56
LT OUTLET	42

EXH. VALVE	
CYL #1	366
CYL #2	348
CYL #3	353
CYL #4	342
CYL #5	345
CYL #6	329
AFTER T/C	

PISTON OIL COOLING	
CYL #1	51
CYL #2	51
CYL #3	51
CYL #4	51
CYL #5	51
CYL #6	51

TURBOCHARGER	
RPM	9440
EXH INLET	410
EXH OUTLET	310
SP AIR FILTER	6.0

AUX CLR #1 - INBD	
FW INLET	36
FW OUTLET	31
SW OUT	32

AUX CLR #2-OUTBD	
FW INLET	38
FW OUTLET	34
SW OUT	35

HT FW CONTROL V/V	
PV @ VALVE	77
SP @ VALVE	75

LO FW CONTROL V/V	
PV @ VALVE	46
SP @ VALVE	47

LT FW CONTROL V/V	
PV @ VALVE	32
SP @ VALVE	30
PRESS @ VALVE	2.5
TEMP @ VALVE	30

JACKET	SCAV	
38	CYL #1	37
30	CYL #2	36
32	CYL #3	36
30	CYL #4	37
30	CYL #5	38
30	CYL #6	39
JACKET CW IN P		3.7
JACKET CW IN T		93
LT CW IN P		2.2
LT CW IN T		35
LO IN P		2.4
LO IN T		46.3
TC LO IN P		2.3
TC LO IN T		59

MAIN BEARINGS	
ME THRUST	57
INT MEARING	60
ST BRG F	39
ST BRG AFT	39

WATER SYSTEM PRESS	
LT FW SYS	3.2
SEAWATER SYS	2.3
HT FW P/P	3.5
FW BOOSTER	3.2

ENGINE SIDE	
MAIN LO PRESS	2.8
SCAV AIR PRESS	0.6
HT CLG WTR P	4
LT CLG WTR P	2.2
FO INLET PRESS	0.8

SW PUMPS Hz & PRESS		
#1		
#2	60	2.8
#3	60	1.8

DIESEL GENERATORS	#1	#2	#3
EXH 1			368
EXH 2			384
EXH 3			378
EXH 4			373
EXH 5			410
EXH 6			411
			42
LO P			4.5
LO T IN			62
HT P			3.1
HT IN			67
LT WTR IN			38
LT WTR OUT			40
CHG AIR °C			55
°CHG AIR IN			140
°CHG AIR OUT			38
CHG AIR P			1.3
KW			428
AMPS			930
SUMP			5

STEERING GEAR	
SEA STATE	CALM
PRESS	6
TEMPERATURE	45

PUMPS	
S/W	2, 3
HT	2
LT	2
FW BOOST	2
FEED	2
SUPPLY	2
CIRC	2
STEERING	1
T/C	
FIRE/BAL	
IG	

AIR COMPRESSOR	
START AIR #1	
HR. METER	2111
HRS RUN	
OIL PRESS	
START AIR #2	
HR. METER	1851
HRS RUN	
OIL PRESS	
EMERG COMP	
HR. METER	1474
HRS RUN	
WORK AIR	
HR. METER	29616
HRS RUN	22[illegible]

BOILER SYS.	
BOILER ON	C-4
% LOAD	0
WTR LEV	41
BOILER P	7.4
FUEL P	4.3

AIR PRESSURE	
START AIR	23
CONT. AIR	6
WORK AIR	4.3
WHISTLE	11

REFRIG. COMP.	
SUCT P	14
DISCH P	75
OIL P	45
CW IN °F	32
CW OUT °F	35
BOX °F	-18 / 5
ON LINE	2

A/C COMP.		
SUCT P	45	68
DISCH P	85	15
OIL P	4	3
CW IN °F	31	30
CW OUT °F	36	32
CLR IN °F	21	22
CLR OUT °F	13	18
ON LINE	1	2

PURIFIERS	°C	FLOW
HFO#1	98	7.6
HFO#2		
MELO#1		
MELO#2	50	0.9
DG LO		
MGO		

EVAPORATOR	
FEED TEMP	
VACUUM	
SHELL TEMP	
PPM	
METER	
WTR. MADE	
HOURS ON	

OPERATING HOURS	HRS. RAN	TOTAL	L.O.
MAIN ENGINE		57329.6	
#1 DIESEL GEN.		41834.34	
#2 DIESEL GEN.		[illegible] 36	
#3 DIESEL GEN.		[illegible] 34	

CATHODIC PROTECTION	REF CEL	AMPS	VOLTS	1 (MV)	2 (MV)	
CAPAC	270	0	1.1	0	0	CHART
MGPS	F CU/AL	0.5/0.6	S CU/AL	0.6/0.6		140

COMMENTS
DUTY ENGINEER
Blowdown Compos. the boiler. Trouble shooting and replaced ballast 1X/8W pipe end two ends in E/R 00-08 2A/E [illegible]
1330 - ME speed reduced to half ahead.
(b) (6), (b) (7)(C) [redacted]
0830 - 1600 14
1756 [illegible] (FWE)

CHIEF ENGINEER	DATE
(b) (6), (b) (7)(C) [redacted]	05 AUG [illegible]

Additional Remarks:

M/V SLNC GOODWILL: Engine Log

Voyage #: 073 On voyage from: GUAM To: ONSAN R.O.K. Date: 8/12/20 Page: 002

OPERATIONS		EXH. VALVE		JACKET	SCAV	
[illegible]	420	CYL #1	357	78	CYL #1	47
[illegible]	70	CYL #2	353	80	CYL #2	46
[illegible]		CYL #3	360	82	CYL #3	46
[illegible]		CYL #4	361	80	CYL #4	48
[illegible]	70.3	CYL #5	368	87	CYL #5	48
[illegible]	27	CYL #6	334	78	CYL #6	48
[illegible]	1			JACKET CW IN P		3.7
[illegible]	6	AFTER T/C		JACKET CW IN T		71
[illegible]	2.5	PISTON OIL COOLING		LT CW IN P		2.1
[illegible]	2.7	CYL #1	55	LT CW IN T		35
[illegible] TEMP	41	CYL #2	55	LO IN P		2.4
[illegible] TEMP	30	CYL #3	55.6	LO IN T		48
FUEL SYSTEM		CYL #4	55.4	TC LO IN P		2.3
[illegible]	[illegible]	CYL #5	56	TC LO IN T		65.2
[illegible]	140	CYL #6	54	MAIN BEARINGS		
[illegible]	123	TURBOCHARGER		ME THRUST		55.7
[illegible]	12.4	RPM	11329	INT MEARING		62.4
[illegible]	3.8	EXH INLET	410	ST BRG F		70.4
[illegible]	81	EXH OUTLET	280	ST BRG AFT		40.5
[illegible]	7.1	DP AIR FILTER	35	WATER SYSTEM PRESS		
LO COOLER TEMPS		AUX CLR #1 - INBD		LT FW SYS		3.3
INLET	55	FW INLET	48	SEAWATER SYS		2.2
OUTLET	38	FW OUTLET	46	HT FW P/P		3.3
INLET	44	SW OUT	34	FW BOOSTER		2.3
OUTLET	40	AUX CLR #2-OUTBD		ENGINE SIDE		
LO COOLER PRESS		FW INLET	38	MAIN LO PRESS		1.8
INLET	3.2	FW OUTLET	53	SCAV AIR PRESS		2.3
OUTLET	1.7	SW OUT	34	HT CLG WTR P		4
INLET	1.2	HT FW CONTROL V/V		LT CLG WTR P		2
OUTLET	1	PV @ VALVE	77	FO INLET PRESS		6.8
[illegible]	0.9	SP @ VALVE	77	SW PUMPS Hz & PRESS		
COOLER		LO FW CONTROL V/V		#1		
[illegible]	40	PV @ VALVE	48	#2	60	3.7
[illegible]	63	SP @ VALVE	43	#3	60	2.4
COOLER TEMPS		LT FW CONTROL V/V				
[illegible]	40	PV @ VALVE	34	PRESS @ VALVE		2.3
[illegible]	43	SP @ VALVE	30	TEMP @ VALVE		37

[illegible] PROTECTION	REF CEL	AMPS	VOLTS	1 (MV)	2 (MV)	SHF GN
	220	0	2.1	0	0	125
	[illegible]	01161	SCOAL	08166		

DIESEL GENERATORS	#1	#2	#3
EXH 1	366		299
EXH 2	396		429
EXH 3	379		356
EXH 4	375		394
EXH 5	406		434
EXH 6	386		385
	44		42
LO P	5.0		4.6
LO T°IN	67.2		66.9
HT P	3.2		3.0
HT IN	70.5		66.3
LT WTR IN	37		38
LT WTR OUT	38		40
CHG AIR °C	50		50
CHG AIR IN	110		115
CHG AIR OUT	42		48
CHG AIR P	0.7		0.5
KW	367		369
AMPS	590		640
SUMP	5		5

STEERING GEAR	
SEA STATE	CALM
PRESSURE	5
TEMPERATURE	74

PUMPS	
S/W	
HT	1
LT	4
FW BOOST	2
FEED	
SUPPLY	
CIRC	
STEERING	1
T/C	
FIRE/BAL	
G	
AIR COMPRESSOR	
START AIR #1	
HR. METER	2111
HRS RUN	
OIL PRESS	
START AIR #2	
HR. METER	1836
HRS RUN	
OIL PRESS	
EMERG COMP	
HR. METER	1434
HRS RUN	
WORK AIR	
HR. METER	2959
HRS RUN	2138

PURIFIERS	°C	FLOW
HFO#1	98	75
HFO#2		
MELO#1		
MELO#2	89	0.9
DG LO		
MGO		

OPERATING HOURS	HRS RAN	TOTAL	LO
MAIN ENGINE	[illegible]		
#1 DIESEL GEN.	[illegible]		
#2 DIESEL GEN.	[illegible]		
#3 DIESEL GEN.	[illegible]		

BOILER SYS.	
BOILER ON	COMP
% LOAD	8
WTR LEV	41
BOILER P	3.1
FUEL P	4.2
AIR PRESSURE	
START AIR	29
CONT AIR	7
WORK AIR	5.7
WHISTLE	10
REFRIG. COMP.	
SUCT P	15
DISCH P	61
OIL P	1
CW IN °F	33
CW OUT °F	36
BOX °F	-15
ON LINE	2

A/C COMP.		
SUCT P	67	73
DISCH P	81	8[illegible]
OIL P	4	3.6
CW IN °F	22	30
CW OUT °F	28	32
CLR IN °F	23	21
CLR OUT °F	26	20
ON LINE	1	2

EVAPORATOR	
FEED TEMP	
VACUUM	
SHELL TEMP	
PPM	
METER	
WTR MADE	
HOURS ON	

COMMENTS

DUTY ENGINEER

Blow down composite boiler.
Cleaned and inspected HFO transfer pump strainer.
Added treatment 0.15 to evaporator.
0000-0800
2 A/E CHEC

1300- STOP [illegible]

[redacted]

1600- [illegible]

CHIEF ENGINEER	DATE
[redacted]	[illegible] 2020

M/V SLNC GOODWILL: Engine Log

Voyage No. 073 On voyage from: GUAM To: ONSAN, ROK Date: 8/11/20 Page 001

OPERATIONS	
RPM	120
[illegible]	90
[illegible]	
[illegible]	
[illegible]	
[illegible]	14.2
[illegible]	0.7
ME SCAV AIR P	2
[illegible]	0.8
[illegible]	2.5
LT	75
ER TEMP	27
SEA TEMP	37
FUEL SYSTEM	
FO METER	[illegible]
FO FLOW	74
TEMP IN	125
VISCO	8.8
SUPPLY P	5.6
CIRC P	8.3
[illegible]	8
ME LO COOLER TEMPS	
LO INLET	53
LO OUTLET	42
SW INLET	34
SW OUTLET	40
ME LO COOLER PRESS	
LO INLET	1.5
LO OUTLET	3.6
SW INLET	1.6
SW OUTLET	1.0
[illegible]	6.9
AIR COOLER	
TEMP OUT	40
PRESS OUT	70
HT COOLER TEMPS	
HT INLET	42
LT OUTLET	33

EXH. VALVE		JACKET	SCAV	
CYL #1	356	78	CYL #1	48
CYL #2	353	80	CYL #2	48
CYL #3	362	82	CYL #3	48
CYL #4	366	80	CYL #4	50
CYL #5	352	81	CYL #5	54
CYL #6	336	74	CYL #6	54
AFTER T/C				

JACKET CW IN P	3.7
JACKET CW IN T	71.3
LT CW IN P	3.7
LT CW IN T	71.3
LO IN P	3.3
LO IN T	66
TC LO IN P	2.3
TC LO IN T	66.1
MAIN BEARINGS	
ME THRUST	55.9
INT MEARING	61
ST BRG F	40.7
ST BRG AFT	40.7
WATER SYSTEM PRESS	
LT FW SYS	3.2
SEAWATER SYS	2.8
HT FW P/P	3.6
FW BOOSTER	4.8
ENGINE SIDE	
MAIN LO PRESS	1.8
SCAV AIR PRESS	2.4
HT CLG WTR P	4.0
LT CLG WTR P	3.0
FO INLET PRESS	6

PISTON OIL COOLING	
CYL #1	55
CYL #2	55
CYL #3	55
CYL #4	55
CYL #5	55
CYL #6	55
TURBOCHARGER	
RPM	13345
EXH INLET	410
EXH OUTLET	280
SP AIR FILTER	5
AUX CLR #1 - INBD	
FW INLET	42
FW OUTLET	33
SW OUT	41
AUX CLR #2 OUTBD	
FW INLET	44
FW OUTLET	36
SW OUT	40
HT FW CONTROL V/V	
PV @ VALVE	72
SP @ VALVE	72
LO FW CONTROL V/V	
PV @ VALVE	48
SP @ VALVE	42
LT FW CONTROL V/V	
PV @ VALVE	36
SP @ VALVE	36

SW PUMPS Hz & PRESS		
#1		
#2	60	3.6
#3	60	3.6

PRESS @ VALVE	2.3
TEMP @ VALVE	35

CATHODIC PROTECTION	REF CEL	AMPS	VOLTS	1 (MV)	2 (MV)
MGPS	[illegible]	0	1.6	0	0
	[illegible]	66.6 F	S.CUAL	0.608	

Shaft G. 45

DIESEL GENERATORS	#1	#2	#3
EXH 1			354
EXH 2			376
EXH 3			324
EXH 4			371
EXH 5			402
EXH 6			399
			46
LO P			4.5
LO T°IN			63.6
HT P			3.1
HT IN			67.7
LT WTR IN			40
LT WTR OUT			42
CHG AIR °C			57.5
°CHG AIR IN			140
°CHG AIR OUT			40
CHG AIR P			1.5
KW			525
AMPS			800
SUMP			5

STEERING GEAR	
SEA STATE	CALM
PRESSURE	5
TEMPERATURE	74

PUMPS	
S/W	
HT	1
LT	2 3
FW BOOST	1
FEED	
SUPPLY	
CIRC	
STEERING	
T/C	
FIRE/BAL	
G	
AIR COMPRESSOR	
START AIR #1	
HR. METER	2111.0
HRS RUN	
OIL PRESS	
START AIR #2	
HR. METER	1823
HRS RUN	
OIL PRESS	
EMERG COMP	
HR. METER	1433
HRS RUN	
WORK AIR	
HR. METER	29546
HRS RUN	2539

PURIFIERS	°C	FLOW
HFO#1	98	2.5
HFO#2		
MELO#1		
MELO#2	93	0.3
DG LO		
MGO		

OPERATING HOURS	HRS RAN	TOTAL	LO
MAIN ENGINE		53581.7	
#1 DIESEL GEN		43486.5	
#2 DIESEL GEN		41020.4	
#3 DIESEL GEN		50940.3	

BOILER SYS.	
BOILER ON	Comp
% LOAD	0
WTR LEV	-2.0
BOILER P	7.5
FUEL P	0.5
AIR PRESSURE	
START AIR	30
CONT AIR	7
WORK AIR	5
WHISTLE	3

REFRIG. COMP	
SUCT P	1.5
DISCH P	15.2
OIL P	11.1
CW IN °F	33
CW OUT °F	34
BOX °F	-18 / 45
ON LINE	2

A/C COMP		
SUCT P	6	5.5
DISCH P	18	18.8
OIL P	39	28
CW IN °F	34	32
CW OUT °F	33	36
CLR IN °F	23	23
CLR OUT °F	13	16
ON LINE	1	2

EVAPORATOR	
FEED TEMP	20
VACUUM	-28
SHELL TEMP	47
PPM	1
METER	3661
WTR MADE	
HOURS ON	

COMMENTS

DUTY ENGINEER

08 - 08

Added treatment to M/E turbo and exhaust gases 1 scoop each 2 A/E Misc

0945 - [illegible] (OFF)
1100 - [illegible] (OFF)

(b) (6), (b) (7)(C) [redacted]

[illegible]

CHIEF ENGINEER	DATE
(b) (6), (b) (7)(C) [redacted]	01 AUG 2020

M/V SLNC GOODWILL: Engine Log

Voyage No: ______ On voyage from: @ Sasebo anchorage To: ______ Date: 8/7/20 Page: 007

OPERATIONS	
RPM	
LOAD	
ME KW	
M/E FEMR	
SPEED KTS	
ME CONT AIR	
M/E SCAV AIR	
ME FO PRESS	
ME LO PRESS	
VIT	
E.R. TEMP	40
SEA TEMP	32

FUEL SYSTEM	
FO METER	
FO FLOW	6030
TEMP IN	56
VISCO	5.0
SUPPLY P	3.6
CIRC P	4.2
PRES TO M/E	

ME LO COOLER TEMPS	
LO INLET	
LO OUTLET	
FW INLET	
FW OUTLET	

ME LO COOLER PRESS	
LO INLET	
LO OUTLET	
FW INLET	
FW OUTLET	
STRAINER Δ	

AIR COOLER	
TEMP OUT	
PRESS OUT	

HT COOLER TEMPS	
HT INLET	38
LT OUTLET	42

EXH. VALVE	
CYL #1	
CYL #2	
CYL #3	
CYL #4	
CYL #5	
CYL #6	
AFTER T/C	

PISTON OIL COOLING	
CYL #1	
CYL #2	
CYL #3	
CYL #4	
CYL #5	
CYL #6	

TURBOCHARGER	
RPM	
EXH INLET	
EXH OUTLET	
ΔP AIR FILTER	

AUX CLR #1 - INBD	
FW INLET	
FW OUTLET	
SW OUT	

AUX CLR #2-OUTBD	
FW INLET	31
FW OUTLET	34
SW OUT	30

HT FW CONTROL V/V	
PV @ VALVE	71
SP @ VALVE	71

LO FW CONTROL V/V	
PV @ VALVE	34
SP @ VALVE	35

LT FW CONTROL V/V	
PV @ VALVE	36
SP @ VALVE	36

JACKET		SCAV
	CYL #1	
	CYL #2	
	CYL #3	
	CYL #4	
	CYL #5	
	CYL #6	

JACKET CW IN P	
JACKET CW IN T	
LT CW IN P	
LT CW IN T	
FO IN P	
LO IN T	
TC LO IN P	
TC LO IN T	

MAIN BEARINGS	
ME THRUST	42
INT MEARING	38
ST BRG F	32
ST BRG AFT	36

WATER SYSTEM PRESS	
LT FW SYS	5
SEAWATER SYS	4.5
HT FW P/P	3.4
FW BOOSTER	3.3

ENGINE SIDE	
MAIN LO PRESS	
SCAV AIR PRESS	
HT CLG WTR P	
LT CLG WTR P	
FO INLET PRESS	

SW PUMPS Hz & PRESS		
#1		
#2		
#3	60	2.0

PRESS @ VALVE	3.8
TEMP @ VALVE	27

DIESEL GENERATORS	#1	#2	#3
EXH 1			343
EXH 2			368
EXH 3			342
EXH 4			351
EXH 5			376
EXH 6			383
LO P			
LO T IN			65
HT P			
HT IN			65
LT WTR IN			36
LT WTR OUT			37
CHG AIR °C			34
°CHG AIR IN			40
°CHG AIR OUT			38
CHG AIR P			1
KW			358
AMPS			580
SUMP			5

PUMPS	
S/W	
HT	1
LT	8 3
FW BOOST	2
FEED	
SUPPLY	
CIRC	
STEERING	
T/C	
FIRE/BAL	
IG	

AIR COMPRESSOR	
START AIR #1	
HR. METER	2112
HRS RUN	
OIL PRESS	
START AIR #2	
HR. METER	1867
HRS RUN	
OIL PRESS	
EMERG COMP	
HR. METER	14539
HRS RUN	
WORK AIR	
HR. METER	2331
HRS RUN	[illegible]

PURIFIERS	°C	FLOW
HFO#1		
HFO#2		
MELO#1		
MELO#2		
DG LO		
MGO		

OPERATING HOURS	HRS RAN	TOTAL	L.O.
MAIN ENGINE			
#1 DIESEL GEN			
#2 DIESEL GEN			
#3 DIESEL GEN			

BOILER SYS	
BOILER ON	COMP
% LOAD	45
WTR LEV	5.0
BOILER P	6.1
FUEL P	4.3

AIR PRESSURE	
START AIR	27
CONT AIR	5
WORK AIR	7
WHISTLE	10

REFRIG. COMP.	
SUCT P	18
DISCH P	143
OIL P	64
CW IN °F	32
CW OUT °F	30
BOX °F	-6 43
ON LINE	4

A/C COMP.		
SUCT P	56	37
DISCH P	82	63
OIL P	57	31
CW IN °F	31	30
CW OUT °F	36	31
CLR IN °F	23	25
CLR OUT °F	23	18
ON LINE	1	2

EVAPORATOR	
FEED TEMP	
VACUUM	
SHELL TEMP	
PPM	
METER	
WTR MADE	
HOURS ON	

CATHODIC PROTECTION						
CAPAC	REF CEL	AMPS	VOLTS	1 (MV)	2 (MV)	SHAFT C
	220	0	1.1	0	0	30
MGPS	P.COIL	66 / 66	S.COIL	66 / 66		

COMMENTS

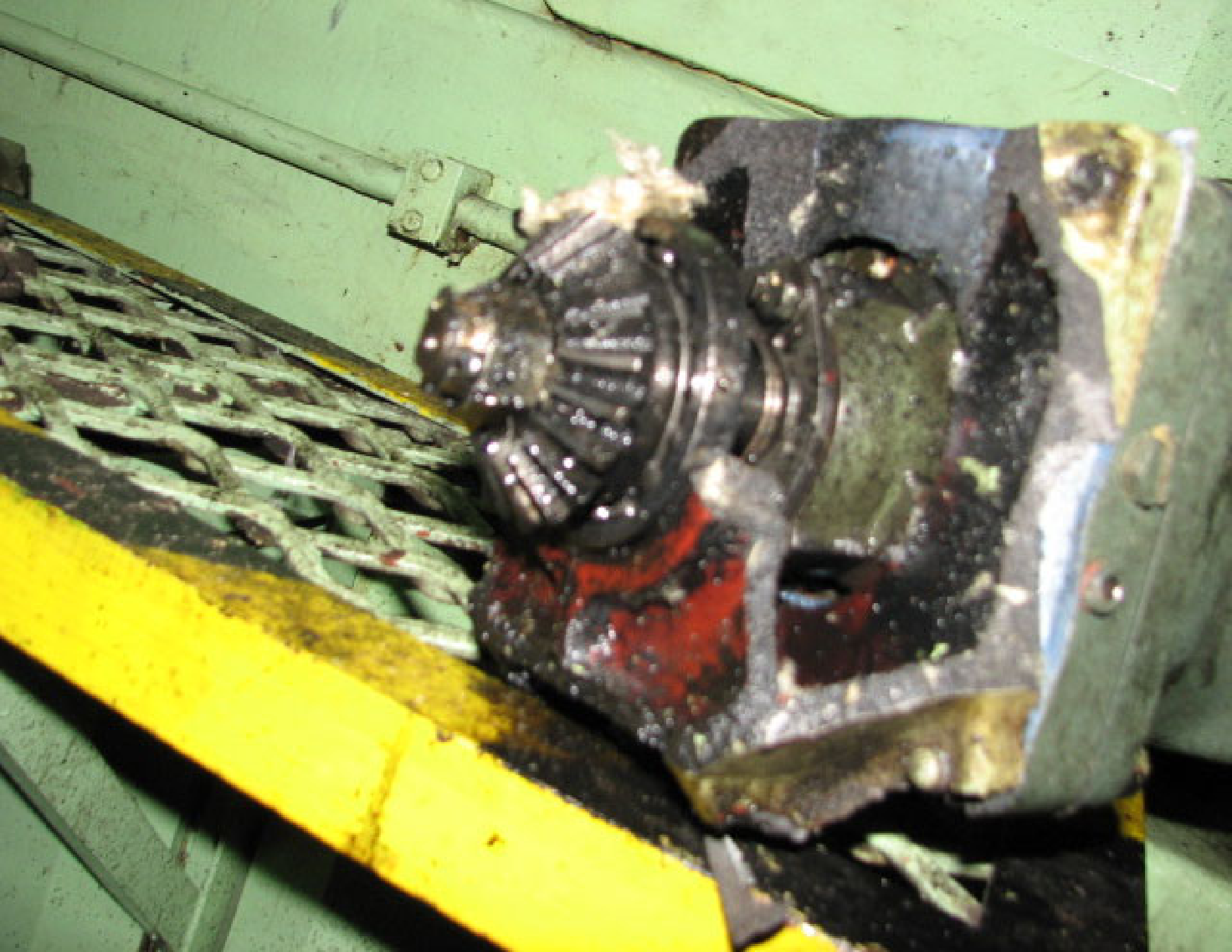
DUTY ENGINEER

Blow air vessel, tested water potable and calibrate e-coli, test tested composite and aux boiler water and cooling water. Clean auto automatic fuel filter.
0000 – 0800
2nd A/E: (b) (6), (b) (7)(C) [redacted]

CHIEF ENGINEER	DATE

Additional Remarks: ______


REMARKS




WOODWARD
TYPE UG-8
PART NO.
GOVERNOR SPEED
CUSTOMER'S NO.
SERIAL NO.
SLOW
FAST


TYPE UG
PART NO
8520-3041
SERIAL NO
LOAD LIMIT
LIMITE DE CHARGE
SPEED SETTING INDICATOR
REMARKS:
WOODWARD
TYPE UG-8


TYPE UG-8
WOODWARD
REMARKS:

U.S. Department of Homeland Security
United States Coast Guard

Activities Far East (FEACT)
United States Coast Guard

Unit #5073
APO, AP 96328-5073
Phone (81) 42-507-6545

16732
26-Jan-22

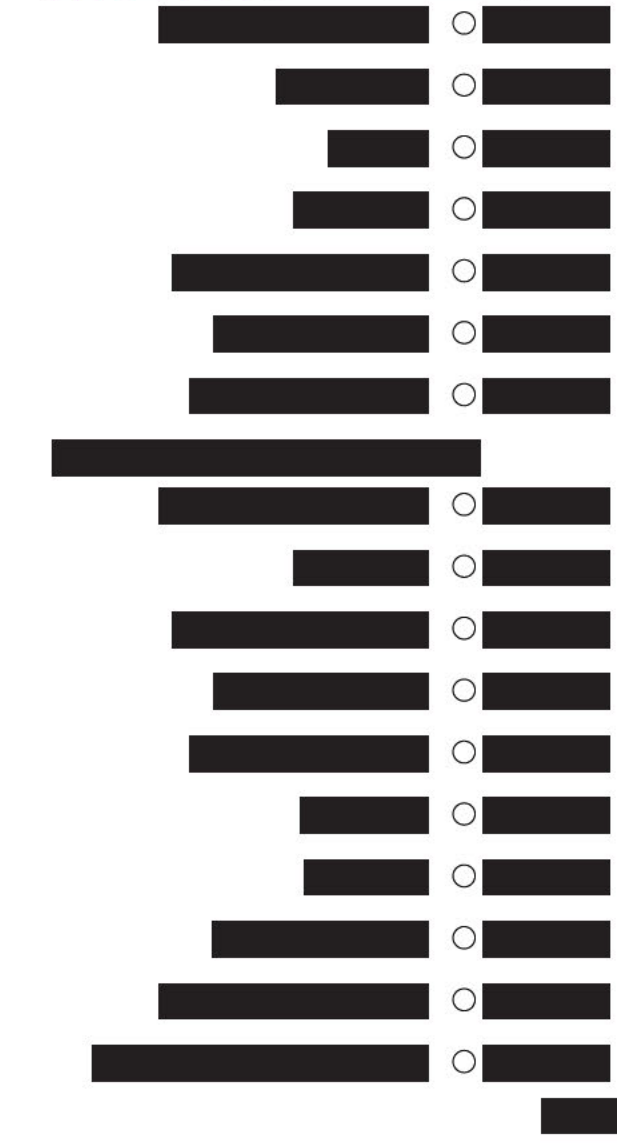
SLNC GOODWILL / LOSS OF LIFE
(MISLE PIA 7025153 AND MISLE IIA 7025155)

OFFICER IN CHARGE, MARINE INSPECTION, MISLE ENDORSEMENT

1. The record and report of the marine investigation conducted for this incident have been reviewed as documented below. The report, including its findings of fact, conclusions, and any recommendations are approved, subject to the comments provided here and documented in the subject MISLE Preliminary Investigations Activity (PIA) and MISLE Incident Investigation Activity (IIA).

(b) (6), (b) (7)(C) [redacted]

(b) (6), (b) (7)(C) [redacted]



(b) (6), (b) (7)(C)

3. Reviewing/Approving Official — Signature

(b) (4) (b) (4) (b) (4)
Executive Officer

(b) (4)

United States Coast Guard Photographic Evidence Index

MISLE Case # 1229748
ECN # 7025155[redacted]016
Photographer: (b) (6), (b) (7)(C)
Photograph Received by: (b) (6), (b) (7)(C)
Type of Camera:
Date: 07Aug20 **Time:** **File Type:** JPG

File Name- Brief Description

IMG_0124 - Engine room alarm history

IMG_0125 - Engine room alarm history

IMG_0126 - Engine room alarm history

IMG_0127 - Engine room alarm history

Alterations: Enlarged

I certify the digital photograph reproduced on this identification sheet is a correct representation of events that I observed or of a scene with which I am familiar Any alterations have been specifically identified above

(b) (6), (b) (7)(C)

Enclosure: CG-16 page 1 of 1
Case# 1229748
ECN 7025155[redacted]016

United States Coast Guard Photographic Evidence Index

MISLE Case # 1229748
ECN # 7025155-[redacted]024
Photographer: [redacted]
Photograph Received by: [redacted]
Type of Camera:
Date: 07Aug20 **Time:** **File Type:** JPG

File Name- Brief Description

IMG_0067 - damage to engine room overhead from flywheel debris

IMG_0068 - damage to engine room overhead from flywheel debris

IMG_0069 - damage to engine room bulkhead from flywheel debris

IMG_0114 - damage to engine room bulkhead from flywheel debris

Alterations: None

I certify the digital photograph reproduced on this identification sheet is a correct representation of events that I observed or of a scene with which I am familiar Any alterations have been specifically identified above

[redacted]

Enclosure: CG-24 page 1 of 1
Case# 1229748
ECN 7025155[redacted]024

United States Coast Guard Photographic Evidence Index

MISLE Case # 1229748
ECN # 7025155-[redacted]018
Photographer: [redacted]
Photograph Received by: [redacted]
Type of Camera:
Date: 07Aug20 **Time:** **File Type:** JPG

File Name- Brief Description

IMG_0042 - Debris on deck of machinery space in between DG#1 (on right) and DG#2 (on left)

IMG_0043 - Debris on deck of machinery space in between DG#1 (on right) and DG#2 (on left)

IMG_0044 - Debris on deck of machinery space in between DG#1 (on right) and DG#2 (on left)

IMG_0047 - Debris on deck of machinery space in between DG#1 (on right) and DG#2 (on left)

Alterations: None

I certify the digital photograph reproduced on this identification sheet is a correct representation of events that I observed or of a scene with which I am familiar Any alterations have been specifically identified above

[redacted]

Enclosure: CG-18 page 1 of 1
Case# 1229748
ECN 7025155[redacted]018

United States Coast Guard Photographic Evidence Index

MISLE Case # 1229748
Photographer: (b) (6), (b) (7)(C)
Type of Camera:

ECN # 7025155-(b) (6), (b) (7)(C)019
Photograph Received by (b) (6), (b) (7)(C)
Date: 07Aug20 **Time:** **File Type:** JPG

File Name- Brief Description

IMG_0045 - Close up on the side of DG#1; governor is hanging off of the engine

IMG_0049 - Close up of DG#1 at empty space where flywheel assembly was attached prior to casualty

IMG_0060 - DG#1, where flywheel assembly was located prior to incident

IMG_0065 - DG#1, where flywheel assembly was located prior to incident

IMG_0066 - Side of DG#1, covered removed and fuel rail shown

IMG_0074 - Other side of DG#1 and associated damage

Alterations: None

I certify the digital photograph reproduced on this identification sheet is a correct representation of events that I observed or of a scene with which I am familiar Any alterations have been specifically identified above

(b) (6), (b) (7)(C)

Enclosure: CG-19 page 1 of 1
Case# 1229748
ECN 7025155(b) (6), (b) (7)(C)019

United States Coast Guard Photographic Evidence Index

MISLE Case # 1229748
ECN # 7025155-[redacted]-020
Photographer: (b) (6), (b) (7)(C)
Photograph Received by (b) (6), (b) (7)(C)
Type of Camera:
Date: 07Aug20 **Time:** **File Type:** JPG

File Name- Brief Description

IMG_0082 - Reference photo, side of DG#2 (undamaged) in left of photo

IMG_0083 - Reference photo, DG#2 (undamaged) flywheel assembly

IMG_0085 - Reference photo, DG#2 (undamaged) flywheel assembly

IMG_0099 - Reference photo, governor on DG#2 (undamaged)

Alterations: None

I certify the digital photograph reproduced on this identification sheet is a correct representation of events that I observed or of a scene with which I am familiar Any alterations have been specifically identified above

(b) (6), (b) (7)(C)

Enclosure: CG-20 page 1 of 1
Case# 1229748
ECN 7025155-[redacted]-020

United States Coast Guard Photographic Evidence Index

MISLE Case # 1229748
ECN # 7025155[redacted]017
Photographer: (b) (6), (b) (7)(C)
Photograph Received by (b) (6), (b) (7)(C)
Type of Camera:
Date: 07Aug20 **Time:** **File Type:** JPG

File Name- Brief Description

IMG_0129 - Engine room logbook entries for 05Aug2020

IMG_0130 - Engine room logbook entries for 04Aug2020

IMG_0131 - Engine room logbook entries for 03Aug2020

IMG_0132 - Engine room logbook entries for 02Aug2020

IMG_0133 - Engine room logbook entries for 01Aug2020

IMG_0135 - Engine room logbook entries for 07Aug2020

Alterations: Enlarged

I certify the digital photograph reproduced on this identification sheet is a correct representation of events that I observed or of a scene with which I am familiar Any alterations have been specifically identified above

(b) (6), (b) (7)(C)

Enclosure: CG-17 page 1 of 1
Case# 1229748
ECN 7025155[redacted]017

United States Coast Guard Photographic Evidence Index

MISLE Case # 1229748
ECN # 7025155[redacted]022
Photographer: (b) (6), (b) (7)(C)
Photograph Received by: (b) (6), (b) (7)(C)
Type of Camera:
Date: 07Aug20 **Time:** **File Type:** JPG

File Name- Brief Description

IMG_0208 - piece of flywheel located on deck between DG#1 and DG #2

IMG_0209 - same piece of flywheel as IMG_0208, different angle

IMG_0211 - same piece of flywheel as IMG_0208, different angle

Alterations: None

I certify the digital photograph reproduced on this identification sheet is a correct representation of events that I observed or of a scene with which I am familiar Any alterations have been specifically identified above

(b) (6), (b) (7)(C)

Enclosure: CG-22 page 1 of 1
Case# 1229748
ECN 7025155[redacted]022

United States Coast Guard Photographic Evidence Index

MISLE Case # 1229748
Photographer: (b) (6), (b) (7)(C)
Type of Camera:

ECN # 7025155(b) (6), (b) (7)(C)021
Photograph Received by: (b) (6), (b) (7)(C)
Date: 07Aug20 **Time:** **File Type:** JPG

File Name- Brief Description

IMG_0161 - governor installed on DG#1 at time of casualty

IMG_0162 - governor installed on DG#1 at time of casualty

IMG_0163 - governor installed on DG#1 at time of casualty

IMG_0165 - data plate of governor installed on DG#1 at time of casualty

IMG_0184 - governor installed on DG#1 previously (left), governor installed at time of casualty (right)

IMG_0193 - governor installed on DG#1 previously (left), governor installed at time of casualty (right)

Alterations: None

I certify the digital photograph reproduced on this identification sheet is a correct representation of events that I observed or of a scene with which I am familiar Any alterations have been specifically identified above

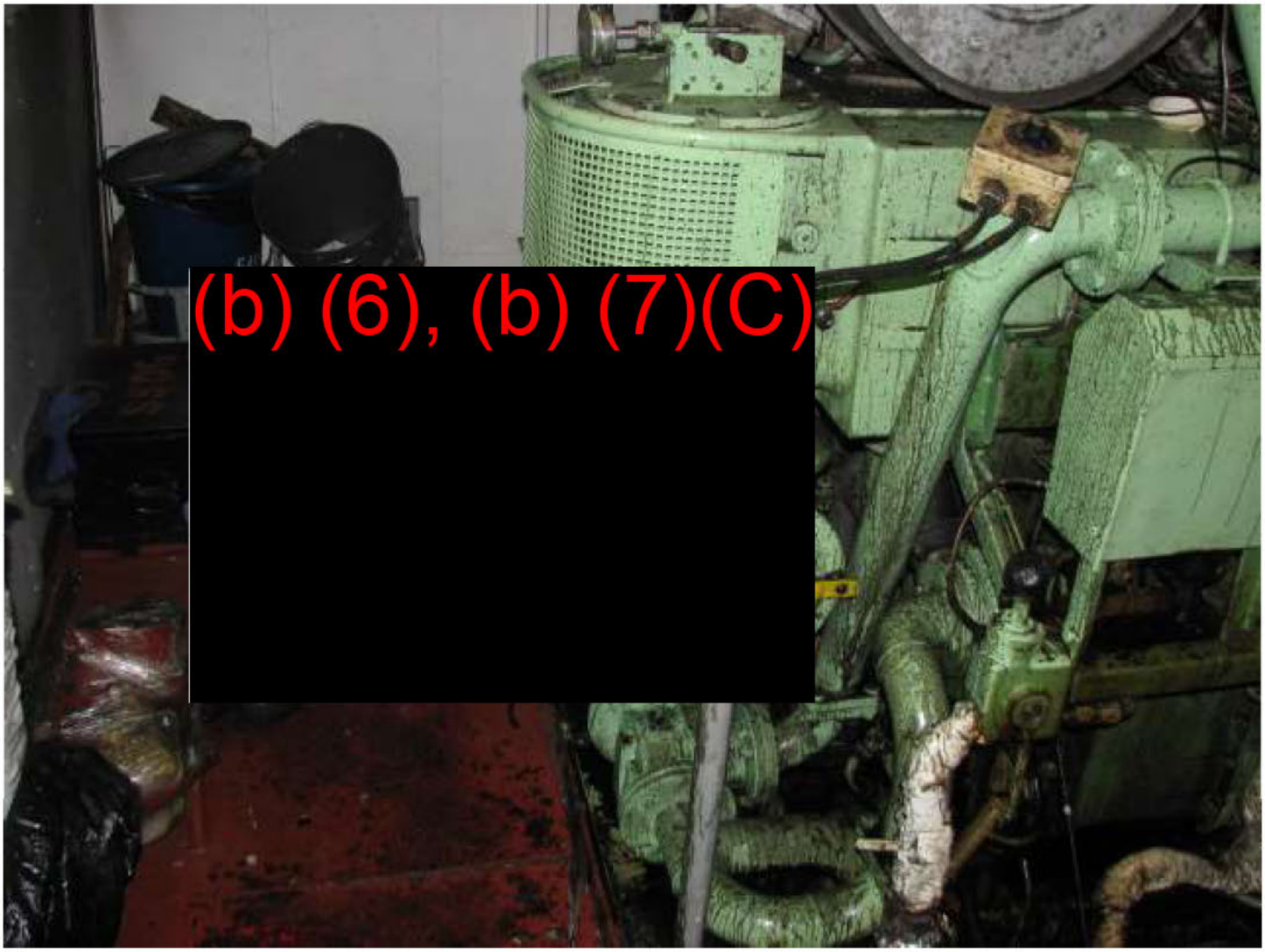
(b) (6), (b) (7)(C)

Enclosure: CG-21 page 1 of 1
Case# 1229748
ECN 7025155(b) (6), (b) (7)(C)-021

United States Coast Guard Photographic Evidence Sheet

MISLE Case # 1229748
Photographer: (b) (6), (b) (7)(C)
Type of Camera: unknown
Name of Electronic File: IMG_0214
Alterations: None

ECN # 7025155(b) (6), (b) (7)(C)023
Photograph Received by: (b) (6), (b) (7)(C)
Date: 07Aug20 **Time:** **Type of File:** JPG



Description of Photograph:

Post-casualty depiction by Chief Engineer showing where he saw the 1AE at the time of the casualty. The position indicated that during the casualty, the 1AE was attempting to shut down the generator using the shut-off lever.

I certify the digital photograph reproduced on this identification sheet is a correct representation of events that I observed or of a scene with which I am familiar Any alterations have been specifically identified above

(b) (6), (b) (7)(C)

Enclosure: CG-23 **Page:** 1 **of:** 1
Case # 1229748
ECN # 7025155(b) (6), (b) (7)(C)023

WORK ORDER/SERVICE REQUISITION FORM

Ship Name : SLNC GOODWILL
WO/SR No : 8053518
Performed By : WO/Crew

Title : 651 MOTOR AGGREGATE 1 QUARTERLY SAFETY

SCHEDULING DATA

Scheduled : 07/07/2020 **Event :**
Completed : 07/13/2020 goodwill, 3ae
Canceled :
Next Due Date : 10/12/2020 **Interval :** 13 W

ADMINISTRATIVE DATA

Created By: goodwill,3ae **On :** 07/13/2020
Auth. By: **On :**
Apprvd. By: **On :**
Account No:
Project No: **Priority :** B
Job Catg: ENGINE REPAIRS **Class Job No :**
Sugg Vend:
Dept.: ENGINE

EQUIPMENT PARTICULARS

Name: 651 MOTOR AGGREGATE 1 **Class Equipment Name :** **Class Eq Code:**
Equip Code : NGOO0651 **Manufacturer :**
Model : **Serial No :**
Size : **Type :**
Equip. Location : **Criticality:** C

SPACE PARTICULARS

RESOURCES & COST DATA

Estimated Cost : 0.00 **Estimated Man-Hrs :** 4
Std. Job Cost : **Actual. Man-Hrs :** 2
Resource : 3RD ASST ENG , OILER

WO DESCRIPTION

DG ENGINE ROUTINE SAFETY CUTOUT CHECK

TASK: TEST ENGINE SAFETY ALARMS AND CUTOUTS

REFER TO ENGINE MANUFACTURE SERVICE MANUAL.

TEST LO LUBE OIL ALARM AND NOTE PRESSURE
TEST LO LUBE OIL TRIP AND NOTE PRESSURE
TEST HIGH JW TEMP ALARM AND NOTE TEMPERATURE
TEST HIGH JW TEMP TRIP AND NOTE TEMPERATURE
TEST OVERSPEED TRIP, NOTE RPM
IF FITTED TEST OIL MIST DETECTOR

RECORD IN LOGBOOK.

ALL REMARKS, DEFICIENCIES OR NOTEWORTHY COMMENTS SHALL BE REPORTED IN THE [FINDINGS] OF WO IN PMS OR FILED AS A DEDICATED ATTACHMENT.

ANY DEFICIENCIES NOTED REQUIRING ADDITIONAL ATTENTION, ARE SAFETY RELATED OR ARE BEYOND THE SCOPE OF NORMAL MAINTENANCE ACTIVITIES SHALL BE ENTERED INTO THE PMS WO/SR SYSTEM FOR PROCESSING.

[redacted]

WO FINDINGS

Engine alarm testing conducted 7/13/2020. Carried out as per PTSP and Manual.

Generator set to 2nd standby. Set to local.

Pressure testing conducted using Omicron OTE-P202 - calibrated 2 NOV 2019 Keppel Shipyard, EXP 2 DEC 2020
Temperature testing conducted using Omicron OTE-T700 - calibrated 13 FEB 2020 A.C.S. EXP 13 FEB 2021

Low LO alarm: 4.3 Bar on tester
Low LO Shutdown: 2.3 Bar on tester

CW H alarm: 91 on tester
CW H shutdown: 95 on tester

Overspeed trip not tested at this time.

Engine set back to normal operation, test run, all sat.

3 A/E T. Lloyd-Rees

Perform By:

Tested By:

Signature:

Designation:

JOB SAFETY ANALYSIS

JSA Required : NO **Use Template :**

From: (b) (6), (b) (7)(C) USCG D14 (USA)
To: (b) (6), (b) (7)(C) USCG ACTIVITIES FAR EAS (USA)
Subject: RE: ROI - SLNC GOODWILL / Loss of Life, 05Aug20
Date: Friday, May 13, 2022 3:57:56 AM

Walt, returned to you….I think. Call if you didn't get it. Since you don't have any Safety Recs or Findings of concern, you can send directly to INV. D14 review complete. [redacted]

From: (b) (6), (b) (7)(C) USCG ACTIVITIES FAR EAS (USA) <(b) (6), (b) (7)(C) uscg.mil>
Sent: Monday, May 9, 2022 6:06 PM
To: (b) (6), (b) (7)(C) CIV USCG D14 (USA) (b) (6), (b) (7)(C) @uscg.mil>
Subject: RE: ROI - SLNC GOODWILL / Loss of Life, 05Aug20

No problem sir. Just return it to me and I'll knock it out quick and resubmit. I forgot to resign the version I sent you, so it's no good anyway.

From: (b) (6), (b) (7)(C) USCG D14 (USA) (b) (6), (b) (7)(C)
Sent: Tuesday, May 10, 2022 11:20 AM
To: (b) (6), (b) (7)(C) USCG ACTIVITIES FAR EAS (USA) <(b) (6), (b) (7)(C) uscg.mil>
Subject: RE: ROI - SLNC GOODWILL / Loss of Life, 05Aug20

Got it. My MISLE skills are poor at best, but I will try to remove and replace. Otherwise I'll return to you.

Great verbiage on post mortem.

From: (b) (6), (b) (7)(C) USCG ACTIVITIES FAR EAS (USA) <(b) (6), (b) (7)(C) uscg.mil>
Sent: Monday, May 9, 2022 3:59 PM
To: (b) (6), (b) (7)(C) USCG D14 (USA) (b) (6), (b) (7)(C) @uscg.mil>
Subject: RE: ROI - SLNC GOODWILL / Loss of Life, 05Aug20

[redacted] (b) (6), (b) (7)(C)

Thank you for the feedback, I have corrected the date and added the following paragraph to address your concern regarding post-mortem drug/alcohol testing:

"4.1.26. No toxicological analysis was conducted on the 3/AE by the Japanese medical facility that generated the "Report of Death of a U.S. Citizen or U.S. Non-Citizen National Abroad" regarding this fatality. As the body was embalmed prior to being transported back to the United States for burial, no further opportunity to conduct postmortem drug or alcohol testing was available."

Because I've transferred the activity, I'm unable to upload the revised ROI. Feel free to either transfer it back to me for correction or replace the old version with the updated (attached).

v/r
(b) (6), (b) (7)(C)

From: (b) (6), (b) (7)(C) (b) (6), (b) USCG D14 (USA) (b) (6), (b) (7)(C) @uscg.mil>
Sent: Tuesday, May 10, 2022 6:25 AM
To: (b) (6), (b) (7)(C) (b) (6), (b) (7)(USCG ACTIVITIES FAR EAS (USA) <(b) (6), (b) (7)(C) uscg.mil>
Subject: RE: ROI - SLNC GOODWILL / Loss of Life, 05Aug20

(b) (6), (b) (7) I hate to bring this up, cause I hate doing yesterday's work again today.

But on the drug testing….all the crew tested (b) (7)(C), (b) (6) but no mention of autopsy toxicology. Are medical examiner's services even available in Japan for foreigners? During covid? Body returned to family and they object or won't cooperate?

Except for Honolulu and main Hawaiian islands which generally have fully staffed offices, America Samoa, CNMI, and Guam ME services are hit and miss; during COVID generally a miss. Not existent in Oceania. Bodies flown home (sometimes to Indonesia or PI) and many families won't cooperate.

If you spend more than 3-5 minutes on a sentence or two, fine. Otherwise leave paragraph as is.

(b) (6), (b) (7)

From: (b) (6), (b) (7)(C) (b) (6), (b) (7) USCG ACTIVITIES FAR EAS (USA) <(b) (6), (b) (7)(C) uscg.mil>
Sent: Friday, May 6, 2022 5:23 PM
To: (b) (6), (b) (7)(C) (b) (6), (b) USCG D14 (USA) (b) (6), (b) (7)(C)
Cc: (b) (6), (b) (7)(C) USCG D14 (USA) (b) (6), (b) (7)(C) >
Subject: RE: ROI - SLNC GOODWILL / Loss of Life, 05Aug20

(b) (6), (b (b) (6), (b) (7)(C)

Thank you sir. Good catch on the date, it should be "2020". I will correct when I'm back in the office on Monday, upload the corrected version in MISLE, and email you when that is done and case is ready to send to INV. Thanks for your time.

v/r
(b) (6), (b) (7)(C)

From: (b) (6), (b) (7)(C) A CIV USCG D14 (USA) (b) (6), (b) (7)(C)
Date: Saturday, May 07, 2022, 9:04 AM
To: (b) (6), (b) (7)(C) (b) (6), (b) (7)(C) USCG ACTIVITIES FAR EAS (USA) <(b) (6), (b) (7)(C) uscg.mil>
Cc: (b) (6), (b) (7)(C) USCG D14 (USA) (b) (6), (b) (7)(C)
Subject: RE: ROI - SLNC GOODWILL / Loss of Life, 05Aug20

(b) (6), (b) (7) case looks great thx.

Over speed on DG1 due to newly installed governor that appears to have been stored incorrectly for 15 months (laid on side vs vertical). Safety system worked and shut down the first over speed event. Short interval and little risk assessment prior to the second restart. Over speed again, but this time safety systems failed. An under strengthened (likely during manufacturing) flywheel came apart as RPMs increased, and one piece struck 3rd Eng, killing him.

Para 4.1.24 – Alcohol Testing: thy missed 2 hr window for alcohol testing due to emergencies. Very good follow on sentence stating 'no evidence was discovered (uncovered) during the investigation'. Nice.

One nit-pick at Para 4.4.12, check date and year in sentence 2….August 4th, 2021? Or should be August 4th 2020??

I'm ready to fwd to INV, let me know.

[redacted]

From: [redacted] USCG ACTIVITIES FAR EAS (USA) <[redacted]uscg.mil>
Sent: Friday, April 29, 2022 1:54 AM
To: [redacted] USCG D14 (USA) <[redacted]@uscg.mil>
Cc: [redacted] USCG D14 (USA) [redacted] USCG ACTIVITIES FAR EAS (USA) [redacted] USCG D14 (USA) [redacted]
Subject: Re: ROI - SLNC GOODWILL / Loss of Life, 05Aug20

[redacted]

No sir, only a District level review and then forward on to HQ for completion.

Thank you.

v/r
[redacted]

From: [redacted] A CIV USCG D14 (USA) [redacted]>
Sent: Friday, April 29, 2022 3:00 AM
To: [redacted] USCG ACTIVITIES FAR EAS (USA) <[redacted]uscg.mil>
Cc: [redacted] USCG D14 (USA) [redacted] USCG ACTIVITIES FAR EAS (USA) [redacted] USCG D14 (USA) [redacted]
Subject: RE: ROI - SLNC GOODWILL / Loss of Life, 05Aug20

[redacted] we're committed to getting the GOODWILL case processed in the next couple of weeks…..printed and on my desk.

I ask that you double check MISLE/case work….do we owe you anything else?

[redacted]

From: (b) (6), (b) (7)(C) USCG D14 (USA) (b) (6), (b) (7)(C)
Sent: Monday, March 21, 2022 2:26 PM
To: (b) (6), (b) (7)(C) [redacted] USCG ACTIVITIES FAR EAS (USA) <(b) (6), (b) (7)(C) uscg.mil>; (b) (6), (b) (7)(C) [redacted] USCG D14 (USA) (b) (6), (b) (7)(C) @uscg.mil>
Cc: (b) (6), (b) (7)(C) USCG ACTIVITIES FAR EAS (USA) (b) (6), (b) (7)(C) [redacted] (b) (6), (b) (7)(C) USCG (USA) (b) (6), (b) (7)(C)
Subject: RE: ROI - SLNC GOODWILL / Loss of Life, 05Aug20

Aloha [redacted]

Thank you for the email, [redacted] (b) (6), (b) (7)(C) will be the one reviewing at the District level. Will let you know if we have any comments, concerns or questions.

V/R,
(b) (6), (b) (7)(C)
D14 Prevention Inspections & Investigations
300 Ala Moana Blvd, 9th Floor
Honolulu, HI 96850-4982
Cell: (b) (6), (b) (7)(C)
Office: 808-535-3421

From: (b) (6), (b) (7)(C) [redacted] USCG ACTIVITIES FAR EAS (USA) <(b) (6), (b) (7)(C) uscg.mil>
Sent: Monday, March 21, 2022 1:54 PM
To: (b) (6), (b) (7)(C) USCG D14 (USA) (b) (6), (b) (7)(C)
Cc: (b) (6), (b) (7)(C) USCG ACTIVITIES FAR EAS (USA) (b) (6), (b) (7)(C) [redacted], [redacted] CAPT USCG (USA) (b) (6), (b) (7)(C)
Subject: ROI - SLNC GOODWILL / Loss of Life, 05Aug20

[redacted]

Good morning sir. For your visibility, the subject investigation has been reviewed and endorsed at the unit level and I have forwarded it on for review at the District level. The IIA# is 7025155 and a copy of the ROI has been saved in "Correspondence". Any questions, please don't hesitate to contact me.

Thank you for your time.

v/r

(b) (6), (b) (7)(C)
Senior Investigating Officer
US Coast Guard Activities Far East
Yokota Air Base
Fussa-shi, Tokyo, Japan 197-0001
(b) (6), (b) (7)(C)
DSN: 225-7833
Mobile/(b) (6), (b) (7)(C)
FEACT Marine Investigations (uscg.mil)

U.S. Department of Homeland Security
United States Coast Guard

Commanding Officer
United States Coast Guard
Activities Far East

Unit# 5073
APO, AP 96326-5073
Phone: 81-42-507-6545
Fax: 81-42-551-5571
Email: (b) (6), (b) (7)(C)

16732/011

LOSS OF LIFE ABOARD THE SLNC GOODWILL (O.N. 1266919) WHILE UNDERWAY IN THE SEA OF JAPAN ON AUGUST 05, 2020

ENDORSEMENT BY THE OFFICER IN CHARGE, MARINE INSPECTION

The record and the report of the investigation convened for the subject casualty have been reviewed. The record and the report, including the findings of fact, analysis, conclusions, and recommendations are approved with no further comments. It is recommended that this marine casualty investigation be closed.

(b) (6), (b) (7)(C)

Officer in Charge, Marine Inspection

Enclosures: (1) Executive Summary
(2) Investigating Officer's Report

UNITED STATES COAST GUARD

REPORT OF THE INVESTIGATION

INTO THE

LOSS OF LIFE ABOARD THE SLNC GOODWILL (ON 1266919) WHILE UNDERWAY IN THE SEA OF JAPAN ON AUGUST 05, 2020

MISLE ACTIVITY NUMBER: 7025155

U.S. Department of Homeland Security

United States Coast Guard

Activities Far East
United States Coast Guard

Unit# 5073
APO, AP 96326-5073
Phone: 81-42-507-6545
Fax: 81-42-551-5571
Email: (b) (6), (b) (7)(C)

16732
March 14, 2022

LOSS OF LIFE ABOARD THE SLNC GOODWILL (ON 1266919) WHILE UNDERWAY IN THE SEA OF JAPAN ON AUGUST 05, 2020

EXECUTIVE SUMMARY

On 05Aug20, the SLNC GOODWILL (ON 1266919) was underway en route to Busan, Republic of Korea. At approx. 1342 Japan Standard Time (Zulu +9), the #1 ship's service diesel generator (SSDG), hereafter referred to as DG#1, was being restarted following a change-out of the generator's governor; this restart was being conducted by the Chief Engineer (CE), 1st Assistant Engineer (1/AE), and 3rd Assistant Engineer (3/AE). The first attempt to restart DG #1 resulted in the rpms increasing to the point that the overspeed protection device tripped. The governor was visually examined for loose connections, leaks, or other signs of malfunction; none were identified. The overspeed protection device was reset and DG #1 was restarted a second time. Again, the rpms steadily increased, but this time the overspeed protection device didn't trip. The 1/AE quickly attempted to manually stop the engine at the governor, but was unsuccessful. While the 1/AE ran to the aft of the generator to manually activate the overspeed protection device, the generator's flywheel broke apart at high speed sending large sections of the component hurtling through the surrounding area. One such section struck the 3/AE, who was still standing in the vicinity of the engine at the time, in the neck and upper torso.

The vessel's Fire Team arrived on scene within minutes and transported the 3/AE to the vessel's hospital space. The Medical Officer supervised the treatment of the 3/AE along with support from other crewmembers as well as a shore-side medical advisory service. The 3/AE was semi-conscious during initial treatment, but later lost consciousness and died as a result of the injuries sustained from being struck by the flywheel section.

As a result of this investigation, the U.S. Coast Guard has determined that the initiating event for this casualty was a mechanical failure of the governor recently installed on DG #1. This failure resulted in an uncontrolled supply of fuel to the engine which in turn resulted in an uncontrolled increase of the engine's rpms. The overspeed protection device failed to trip and the rpms increased to the point that the flywheel fractured, fatally striking the 3/AE and damaging the vessel's electrical and propulsion control systems. The causal factors that contributed to this casualty include: (1) mechanical damage to internal components of the governor installed on DG #1, (2) improper storage of the governor, (3) failure to verify internal condition of the governor, (4) governor storage procedures and recommendations, (5) inability to confirm the governor's maintenance history, (6) improper recordkeeping of governor, (7) failure of the engine's overspeed protection device, (8) inadequate mechanical properties of DG #1 flywheel, (9) inadequate chemical composition of DG#1 flywheel, (10) no reasonable PPE exists to prevent loss of life, (11) inability to conduct visual teleconferencing during medical treatment, (12) significant damage to vessel's electrical generation/distribution system, and (13) significant damage to the vessel's propulsion control systems.

U.S. Department of Homeland Security
United States Coast Guard

Activities Far East
United States Coast Guard

Unit# 5073
APO, AP 96326-5073
Phone: 81-42-507-6545
Fax: 81-42-551-5571
Email (b) (6), (b) (7)(C)

16732
March 14, 2022

LOSS OF LIFE ABOARD THE SLNC GOODWILL (ON 1266919) WHILE UNDERWAY IN THE SEA OF JAPAN ON AUGUST 05, 2020

INVESTIGATING OFFICER'S REPORT

1. Preliminary Statement

1.1. This marine casualty investigation was conducted and this report was submitted in accordance with Title 46, Code of Federal Regulations (CFR), Subpart 4.07, and under the authority of Title 46, United States Code (USC) Chapter 63.

1.2. No parties-in-interest were designated during the investigation.

1.3. No coordination or cooperation with the National Transportation Board, any foreign flag State Administration investigators, or other parties was provided during the investigation.

1.4. All times listed in this Report of Investigation are written in Japan Standard Time (Zulu +9), use a 24-hour format, and are approximate.

2. Vessel Involved in the Incident

Figure 1. Undated Photograph of SLNC GOODWILL

Official Name:	SLNC GOODWILL
Identification Number:	1266919
Flag:	United States
Vessel Class/Type/Sub-Type	Oil & Chemical Tank Ship
Build Year:	2008
Gross Tonnage:	30,241 GT ITC
Length:	580.4 Feet
Beam/Width:	105.6 Feet
Draft/Depth:	59.7 Feet
Main/Primary Propulsion:	Slow speed diesel (<300 rpm)
Owner:	NORD GOODWILL LLC Wilmington, DE
Operator:	Schuyler Line Navigation Co. Annapolis, MD

3. Deceased, Missing, and/or Injured Persons

Relationship to Vessel	Sex	Age	Status
Third Assistant Engineer (3/AE)	Male	23	Deceased

4. Findings of Fact

4.1. The Incident:

4.1.1. On July 31st, 2020, the oil and chemical tankship SLNC GOODWILL completed cargo operations and got underway from Guam bound for Busan, Republic of Korea.

4.1.2. While underway and conducting tank cleaning operations, diesel generator #1 (DG #1) began to "hunt". This meant that the rotational speed (rpms) of the engine were fluctuating and wouldn't remain consistent. When placed in idle, DG #1 shut down.

4.1.3. On August 4th, 2020, work had begun to replace the governor on DG #1. The crewmembers conducting the replacement were the Chief Engineer (C/E), First Assistant Engineer (1/AE), and Third Assistant Engineer (3/AE); the 3/AE was present for training purposes only.

4.1.4. During the replacement of the governor, two (02) pages of the manufacturer's manual were used as a reference, as well as the governor on DG #2 as a visual aid. The 1/AE had replaced governors on other vessels, but not on the SLNC GOODWILL.

4.1.5. On August 5th, 2020 at 1230, the replacement of the governor on DG #1 was resumed by the 1/AE and 3/AE; the C/E arrived later to be present for the final steps and testing the installation. Prior to finishing the installation, the governor was visually inspected for obvious signs of damage, water staining, or debris; no discrepancies were noted.

4.1.6. The governor's overspeed protection device and pneumatic shut off were tested by the C/E and 1/AE with the 3/AE present for training; no discrepancies were noted.

4.1.7. At 1335, DG #1 was started for the first time since replacing the governor. The engine rotations-per-minute (rpms) were unsteady, but continued to increase.

4.1.8. Shortly after starting DG #1, its overspeed protection device, or "overspeed trip", activated and shut down the engine.

4.1.9. The C/E, 1/AE, and 3/AE visually inspected the governor installation to ensure fittings were secure and to check for obvious signs of a reason for the overspeed; none were found and the overspeed protection device was reset.

4.1.10. At 1339, DG #1 was restarted for the second time.

4.1.11. The rpms on DG #1 continued to increase again, but this time accompanied by an unfamiliar noise and vibration.

4.1.12. Neither the electrical nor mechanical overspeed protection device activated once the rpms exceed the set point of approx. 1,020; the rpms continued to increase.

4.1.13. The 1/AE attempted to manually engage the electrical and mechanical overspeed trip at the governor and start box, but neither activated to shut down the engine.

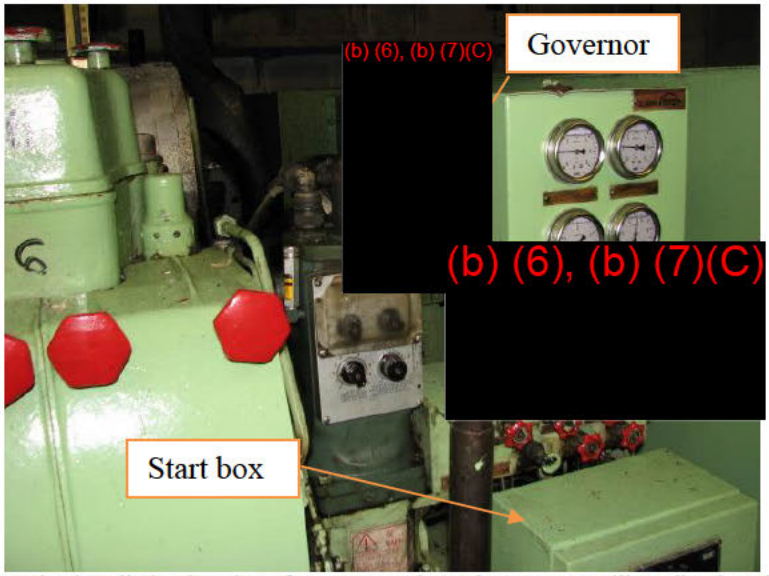


Figure 2. Representative installation location of governor and start box on an auxiliary diesel engine aboard SLNC GOODWILL.

4.1.14. The 1/AE quickly ran to the aft end of DG #1 to secure fuel oil to the engine.

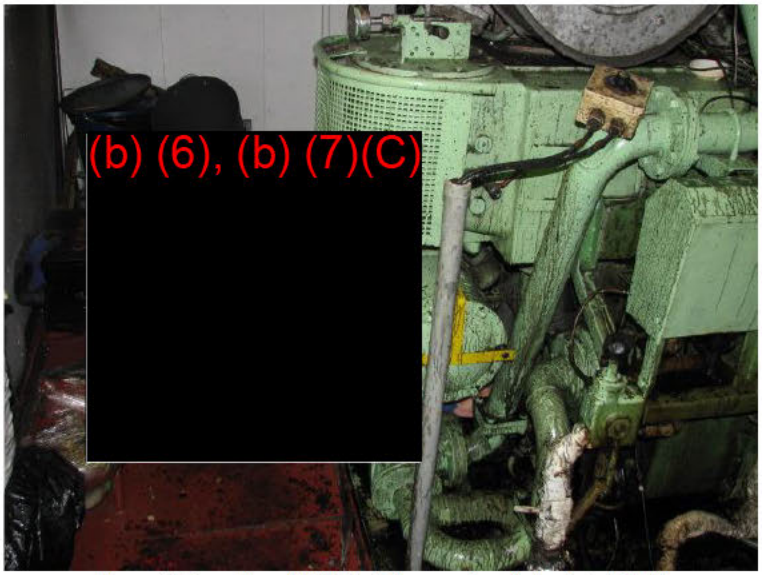


Figure 3. Location of 1/AE while securing fuel oil to DG #1

4.1.15. The C/E yelled for everyone to move clear of DG #1.

4.1.16. At 1342, the flywheel on DG #1 broke apart into several fragments that were hurled throughout the generator space at a high rate of speed.

4.1.17. One large flywheel fragment struck the 3/AE, who was standing near the DG #1 governor, in the upper torso and neck; the impact caused significant blunt-force trauma and bleeding. The 3/AE was evacuated from the engine room and taken to the medical space where he received medical treatment for his injuries, but was unable to recover from the trauma. His death was recorded as having occurred at 1823; cause of death was listed as hemorrhagic shock.

Figure 4. Area where 3 A/E was standing at the time of the casualty

4.1.18. Other fragments of the flywheel struck piping that was vital to the vessel's electrical and propulsion systems to include air and cooling water distribution.

Figure 5. One area of damaged overhead/piping caused by a flywheel fragment

4.1.19. The vessel lost electrical power, main propulsion, and was adrift approx. 12 NM from the coast of Japan.

4.1.20. At 1402, the Master radioed to request a medical evacuation (medevac) of the 3/AE via helicopter (helo) and was given an estimated time of arrival by the Moji Coast Guard of 1730.

4.1.21. The engineering crew worked to restore power and propulsion to the vessel while the deck crew continued to provide medical treatment to the 3/AE.

4.1.22. At 1700, the Moji Coast Guard helo arrived on station and lowered personnel to the vessel. The 3/AE was transported out on deck and raised to the helicopter, then the remaining helo personnel were recovered and the helo returned to shore to continue medical treatment of the 3/AE.

4.1.23. By 1800, power and propulsion were restored to the vessel. It got underway and proceeded to Sasebo, Japan where it anchored.

4.1.24. No alcohol testing was conducted on any of the crew due to the extended medical response and engineering repairs being conducted. No evidence was discovered that suggests any person directly involved were under the influence of alcohol leading up to the casualty.

4.1.25. The entire crew, with the exception of the 3/AE, was subject to post-casualty DOT drug testing in accordance with 46 CFR 4.06; all results were (b) (6), (b) (7)(C)

4.1.26. No toxicological analysis was conducted on the 3/AE by the Japanese medical facility that generated the "Report of Death of a U.S. Citizen or U.S. Non-Citizen National Abroad" regarding this fatality. As the body was embalmed prior to being transported back to the United States for burial, no further opportunity to conduct post-mortem drug or alcohol testing was available.

4.2. Additional/Supporting Information:

4.2.1. The SLNC GOODWILL (ON 1266919) was a 580.4 ft, 30,241 GT chemical/tank ship of steel construction with a keel laid date of 21Nov2008. It had diesel direct propulsion on an oceans/SOLAS route owned by Nord Goodwill LLC and operated by Schuyler Line Navigation Company, LLC (SLNC). The vessel's initial COI was issued IAW MSP on 29Jan2016 (reflagged); most recent COI annual inspection was conducted remotely from 01 to 27Apr20 with 00 deficiencies noted and 00 outstanding.

4.2.2. The Third Assistant Engineer (3/AE), Trenton Lloyd-Rees, started employment with SLNC in October 2019 and had been assigned to the SLNC GOODWILL prior to this casualty.

4.2.3. The Chief Engineer (C/E), (b) (6), (b) (7)(C) (b) (6), (b) (7)(C) had been sailing since 2002. He had been employed by SLNC since November 2019; this was his third assignment aboard the SLNC GOODWILL.

4.2.4. The First Assistant Engineer (1/AE), (b) (6), (b) (7)(C) has been in the maritime industry since 1981. He was hired by SLNC in April 2016 and has only sailed on the SLNC GOODWILL since that time.

4.2.5. The Second Mate (2/M) and Medical Officer, (b) (6), (b) (7)(C) (b) (6), (b) (7)(C) had been sailing since 2004. He had completed two previous trips on another vessel owned by SLNC. This was his first assignment to the SLNC GOODWILL. He had completed Medical Officer training course three (03) times previously and had served in this position on other vessels.

4.2.6. The Master, (b) (6), (b) (7)(C) had been sailing as an officer since 2007. He had worked for SLNC since 2016 and had been the Master of the SLNC GOODWILL since 2018.

4.2.7. Electrical services for the SLNC GOODWILL were provided by three (03) auxiliary generating sets each with a MAN B&W - ZJMD 6L23/30H type prime mover rated to deliver 960 KW at 900 rpm.

4.2.8. Each of the vessel's generators was equipped with a governor. The purpose of the governor was to regulate the flow of fuel to the engine in order to maintain a relatively constant speed, or rotations per minute (rpms), independent of the electrical load placed on the generator*.

*See Zhenjiang Marine Diesel Works Instruction Book L23/30H; Control and Safety systems, Automatics and Instruments.

4.2.9. The governor on DG #1's engine had an electronic and mechanical overspeed protection component set to activate and shut down the engine if the rpms exceeded approx. 1,020. The normal, designed operating speed was 900 rpms.

4.2.10. The manufacturers of the governor installed on DG #1, Woodward Inc., released instructions for the storage of mechanical-hydraulic controls (governors). These instructions included that oil meeting the US MIL-H-17672 should be used to coat the internal surfaces of the device and that they should be stored in an upright position.

4.2.11. On May 22nd, 2019, the governor installed on DG #1 prior to the casualty, Governor B (Part # 8520-0041, Serial # 15592175), was serviced in place by third party contractors licensed by the governor's manufacturing company.

4.2.12. That same day (May 22nd, 2019), another governor arrived onboard the vessel for use as a spare. It was a rebuilt governor, not brand new, and was not installed on any generator onboard the vessel prior to the DG #1 on August 4th, 2020. For the purposes of this investigation, that governor was designated as Governor C.

Figure 6. Governor C (right) was installed at the time of the casualty. Governor B (left) had been removed the day prior.

4.2.13. The data plate affixed to Governor C listed the same serial number and part number as the data plate affixed to Governor B. Despite this, the operating company believed the original serial number for Governor C was 16178255.

4.2.14. At some point, either during or after the overhaul of Governor C, mechanical damage was sustained to the surfaces of its valve bushing and shaft drive. There was no evidence available to determine exactly when/where the damage occurred.

4.2.15. On July 22nd, 2019, the governor installed on DG #2, Governor A (Part # 8521-0047DC, Serial # 14639129), was overhauled.

4.2.16. On December 26th, 2019, an annual test was conducted on the DG #1 governor under normal operating conditions. At the time of the test, the engine had 42,617 run

hours and the rebuild governor had 1,500 run hours. Oil levels, linkages, the fuel rack, and the speed sensor were all checked and a new micro-switch was installed on the electrical overspeed device. The next annual maintenance for the DG #1 generator was scheduled for December 24th, 2020.

4.2.17. On July 13th, 2020, a quarterly safety check was conducted on the DG #1. This check included alarm, pressure, and temperature testing; it did not include a test of the overspeed trip device. The next quarterly safety check was scheduled for October 12th, 2020.

4.2.18. On July 23rd, 2020, the 2,000 hour scheduled, preventative maintenance was conducted on DG #1. Included in the maintenance was a test of the governor's overspeed alarm, engine shut-downs, and replacing the oil in the governor; no deficiencies were noted during the DG #1 test run following preventative maintenance.

4.2.19. During the four (04) days leading up to the casualty, the C/E had worked 9.5 hours each day. The day prior to the casualty, he stopped work at 1830 and resumed at 0600 the day of.

4.2.20. During the four (04) days leading up to the casualty, the 1/AE had worked an average of forty (40) hours. The day prior to the casualty, he stopped work at 1830 and resumed at 0700 the day of.

4.2.21. During the four (04) days leading up to the casualty, the 3/AE worked 10.5 hours each day. The day of the casualty, he stopped work at 0000 and resumed at 1200.

4.2.22. Each generator was equipped with a flywheel that was mounted to the engine's crank shaft and designed to store the mechanical energy of the engine during power stroke and impart that stored energy to the preparatory strokes in an effort to keep shaft rotation uniform*.

4.2.23. The design specification requirement for the DG #21 flywheel was for grey cast iron of Grade C4 with an ultimate tensile strength of between 300-400 megapascals (MPa) and a Brinell hardness of between 200-250 HB.

4.2.24. The flywheel installed on DG #1 did not meet the design requirements of the engine licensor. After eight (08) post-casualty tests, the flywheel measured between 56%-64% of the required minimum strength and the hardness was, on average, 83% of the required minimum hardness.

4.2.25. Post-casualty analysis using a scanning electron microscope revealed the presence of micro-shrinkage voids in the area around the flywheel coupling. The term “micro-shrinkage voids” refers to conditions within a casting where small voids formed.

*See Principles of Naval Engineering: An Introduction to the Theory and Design of Engineering Equipment and Machinery Aboard Ship, ISBN: 9789-0-9825854-2-9

4.2.26. Post-casualty medical treatment received by the 3/AE while awaiting medical evacuation included the following: application of dressings/bandages, morphine injection (01), epinephrine injection (02), needle thoracotomy, nasopharyngeal airway, CPR, and application of an automated external defibrillator (AED; never advised to shock).

4.2.27. The mechanical portion of the DG #1 overspeed protection device was destroyed when the flywheel broke apart; no post-casualty inspection was done on the electrical overspeed protection component.

4.2.28. The vessel's crew administered medical treatment to the 3/AE while receiving consultation from a shore side medical alert service. There was no video-conferencing capability in the hospital space, the consulting was done by the crew describing the injuries, then the medial service advising on the appropriate treatment.

5. Analysis

5.1. *Mechanical Damage to Internal Components of the Governor.* Post-casualty analysis of the governor installed on DG #1 at the time of the casualty (Governor C) identified visible evidence of mechanical damage to the surfaces of the governor pilot valve bushing and shaft drive. The damage was deemed to be inconsistent with what would be expected following the break-up of the flywheel, which indicates that is was present prior to the casualty. Because both those internal components are involved with regulating the oil pressure in the governor, which in turn directly affects the amount of fuel supplied to DG #1, damage to either of them could have prevented an indication or response to an overspeed of DG #1. Had both of those components been operating as designed, the oil pressure and fuel supply should have remained within designed parameters and prevented DG #1 from an overspeed condition.

5.2. *Improper Storage of the Governor.* Governor C had been kept in storage onboard the vessel since May 2019. Either since that time or at some point after, the governor was drained of oil and not refilled. Additionally, despite being installed in a vertical position once placed in service, it was kept horizontally while in storage. Neither of these conditions of storage accurately reflect the conditions of use experienced when the governor is installed and operational, and could well result in some of the internal components not operating as designed either through an increased propensity for damage to or misalignment of internal components. Additionally, the manufacturer had storage instructions that specify the internal surfaces should be coated with oil that meets US MIL-H-17672 specification. Had Governor C been stored in a vertical position with the appropriate amount of oil it would have been in compliance with manufacturer's storage procedures, more accurately reflected the component's actual working conditions, and made them less likely to fail once the governor was installed.

5.3. *Failure to Verify the Internal Condition of the Governor.* After being kept in storage for over a year, being found in a horizontal position, and then realizing no oil was present in Governor C, there were no additional steps taken by the vessel's engineering crew to verify if its internal components were still fully operational. Even if

a year wouldn't be considered an excessively long time for a governor to sit in storage, either the fact that it was stored on its side or that there was no oil in it could have prompted someone to either open the governor and visually inspect the internal components or wait for the vessel to make port in Korea and have a third party technician confirm proper operation of the governor. Because the first option would require specific certifications, the second option would seem more plausible especially since the vessel had already sailed from Guam using Governor B. Had someone waited to verify the internal condition of Governor C, the material defects may have been found prior to it being used.

5.4. *Inadequate Governor Storage Procedures and Recommendations.* The governor manufacturer (Woodward) published Manual 25075 (Revision B, Mar2015) which detailed the storage procedures for mechanical-hydraulic controls. They also recommend their governors be kept in an upright position to keep the internal components in their proper positions and to prevent oil from leaking out of "breather holes" in the top of the assembly. It is unknown if Governor C was initially stored on its side, or if it fell over at some point later on. Also, it's unclear whether Governor C had oil originally that leaked out due to it being on its side, or if it never had oil after being overhauled. Either way, the result was the same: on the day it was retrieved for installation, Governor C was on its side and empty of oil. Had the storage procedures been followed fully and maintained during storage, that may have prevented damage to the internal components of Governor C and allowed it to function as designed.

5.5. *Inability to Confirm the Governor's Maintenance History.* All three (03) governors referenced in this incident were subject to preventative maintenance which included them being sent ashore to qualified technicians for overhaul, inspection, and repair. However, because the same part # and serial # were used for both Governor B and Governor C, this made it difficult to determine which one was being inspected. Had the data plates for Governor B and Governor C been maintained with the correct part # and serial #, it would have been obvious which one was being maintained and which one needed maintenance performed on it. Currently, there is no way to clearly identify whether it was Governor B or Governor C that was overhauled in May 2019, so it is possible that Governor C was well past its inspection interval and should not have been placed in service. Had the data plates been correct, it would have been clear to trace which governor was currently on maintenance schedule and should have been installed for use.

5.6. *Improper Recordkeeping of Governor Information.* Following the casualty, it was found that Governor B and Governor C, both installed on DG #1, had the same serial # and part # stamped on their data plates. Because the work completion report uses these numbers to identify which governor was overhauled, this error made it very difficult to determine whether or not both governors were actually overhauled and, if it was only one that was overhauled, which one it was. Had either someone on the 3rd party repair team or a crewmember/manager of the vessel noticed the mistaken numbers stamped on the data plate, they could have clarified the work done and condition of each governor and have a clear record for each.

5.7. *Failure of the Engine's Overspeed Protection Device.* DG #1 was equipped with an electrical and mechanical overspeed protection device, or "overspeed trip", which is a secondary safety measure designed to prevent an uncontrolled increase in engine rpms should the governor fail to operate as designed. In this specific instance, DG #1 normally operates at 900 rpms and the overspeed device is set to trip at 1,020 rpms. All evidence clearly indicates that the rpms on DG #1 exceeded 1,020 rpms, but the overspeed device failed to trip. Additionally, the overspeed device had operated as designed just prior to this casualty: the first attempt to start DG #1 resulted in increased rpms and the activation of the overspeed protection device. Whether it was reset incorrectly or experienced a mechanical failure that prevented it from activating is unknown and cannot be supported either way using the evidence provided. Either way, had the overspeed trip device worked as designed it would have prevented the uncontrolled increase in rpms.

5.8. *Inadequate Mechanical Properties of DG #1's Flywheel.* The engine licensor, MAN Energy Solutions SE, established design requirements for the flywheel that include an ultimate tensile strength of between 300MPa and 400MPa. Eight post-casualty tensile tests of flywheel fragments showed a range of results between 168 MPa and 194MPa; this is 56% to 64% of the required minimum strength. Additionally, microscopic inspection of the flywheel's bolt holes revealed areas of "micro-shrinkage", which are voids within the casting that can develop during the pour. These would have also reduced the flywheel's tensile strength because they induce planes of weakness and propagate cracking. Had the flywheel's tensile strength met at least the minimum requirements specified by the engine licensor, it is possible that the flywheel could have remained intact until either the 1/AE could have secured the fuel to DG #1 or, failing to secure DG #1, the crew could have had time to evacuate the space before it broke apart.

5.9. *Inadequate Chemical Composition of DG #1's Flywheel.* The engine licensor, MAN Energy Solutions SE, established design requirements for the flywheel that include a Brinell hardness of between 200HB and 250HB. Eight post-casualty tests of flywheel fragments found the hardness to be 167HB on average; this is 83% of the required minimum hardness. Had the flywheel's hardness met at least the minimum requirements specified by the engine licensor, it is possible that the flywheel could have remained intact until either the 1/AE could have secured the fuel to DG #1 or, failing to secure DG #1, the crew could have had time to evacuate the space before it broke apart.

5.10. *No Reasonable Personal Protective Equipment Available.* The 3/AE was standing in a position that should have been reasonably safe under routine operating conditions and was wearing all the applicable personal protective equipment (PPE) for working in the vessel's engine room. Once the flywheel broke apart, there was no time to react, nor any PPE normally worn in that environment that could have reasonably prevented the 3/AE from sustaining the injury that ultimately led to his death.

5.11. *Inability to Conduct Visual Teleconferencing During Medical Treatment.* During interview, the 2/M stated that he had served on at least one other vessel that had the ability to conduct video teleconferencing in its medical space. However, the SLNC

GOODWILL was not equipped with that capability. As a result, a crewmember was required to describe the injury, sometimes while actively applying medical treatment, to a shore side medical support service who was then required to visualize the description and attempt to offer the appropriate treatment option. If the vessel was able to dial up the same medical personnel and have them watching the treatment and see the extent of the injuries, it may have led to more timely recommendations/advice and active feedback during more technical medical treatment that was performed during this casualty such as use of a nasopharyngeal airway, intravenous injection, and needle thoracotomy.

5.12. *Significant Damage to the Vessel's Electrical Generation and Distribution System.* When the flywheel on DG #1 broke apart violently, the fragments caused significant damage to multiple systems within the vessel's engine room to include control, water supply, air supply, and electrical distribution. There was no reasonable defense that could have been used to prevent the fragments from causing this damage which subsequently resulted in a loss of power until repairs could be made.

5.13. *Significant Damage to the Vessel's Propulsion Control Systems.* When the flywheel on DG #1 broke apart violently, the fragments caused significant damage to multiple systems within the vessel's generator room to include control, water supply, air supply, and electrical distribution. All of these systems are necessary in order to maintain operation of the main diesel engine. There was no reasonable defense that could have been used to prevent the fragments from causing this damage which directly resulted in a loss of propulsion until repairs could be made.

6. Conclusions

6.1. Cause of the Casualty:

6.1.1. The initiating event for this casualty occurred when the governor installed on DG #1 at the time of the casualty (Governor C) failed to operate as designed, providing improper fuel regulation to DG #1. Actions and conditions which contributed to this failure were:

6.1.1.1. Mechanical damage found on some internal components of Governor C, specifically the pilot valve bushing and shaft drive, that were inconsistent with damage expected following the fracture of the flywheel. Had those internal components been undamaged and operating as designed, the oil pressure and fuel supply would have remained within designed parameters and prevented DG #1 from an overspeed condition.

6.1.1.2. Governor C being stored without oil and in a horizontal position for approximately 15 months. Had it been stored in a vertical position with the appropriate amount of oil, Governor C would have been in compliance with the manufacturer’s storage procedures, more accurately reflected the component’s actual working conditions, and made internal components less likely to fail once the governor was installed.

6.1.1.3. Duplicated information on the data plates for both Governor B and Governor C following their latest overhaul. Had a technician or crewmember noticed the mistaken numbers stamped on the data plate, they could have clarified the work done and condition of each governor.

6.1.1.4. Failure to follow the governor manufacturer's guidance on storage of Governor C, which stated it was to be stored with oil and in a vertical position. Had the manufacturer's guidance been followed, Governor C would have been less susceptible to damage and any oil wouldn't have been able to drain out of "breather holes" located on the governor housing.

6.1.1.5. Ambiguity between the maintenance history of Governor B and Governor C due to the duplication of their Part Number and Serial Number. Had the data plates contained the correct information, it would have been clear to trace which governor was currently on maintenance schedule and should have been installed for use.

6.1.1.6. A failure of the vessel's crew to recognize Governor C's inadequate storage condition and incorrect data plate information. Had a crewmember identified either of those inconsistencies, they could have either verified the internal condition of Governor C or waited until arriving at their next port of call and had a technician inspect the internal components.

6.1.2. As DG #1 received excessive fuel, the overspeed protection device failed to activate and secure the engine in order to prevent the engine's rpms from increasing beyond normal, and then designed, operating speed. Causal factors contributing to this were:

6.1.2.1. Due to the mechanical component of the overspeed protection being destroyed in the casualty and the lack of post-casualty testing on the electrical component, it is inconclusive as to the exact cause of the overspeed protection device failure.

6.1.3. The failure of Governor C to prevent an overspeed condition resulted in the next event, which was the breaking apart of the flywheel on DG #1 and those fragments hurling through the engine room space at a high rate of speed. Causal factors contributing to this were:

6.1.3.1. The inadequate mechanical properties contained in DG #1's flywheel. Had its tensile strength met at least the minimum requirements specified by the engine licensor and the "micro-shrinkage" voids weren't present, it is possible the flywheel could have remained intact until DG #1 had been secured or until all crewmembers had time to evacuate the space.

6.1.3.2. The inadequate chemical composition of DG #1's flywheel. Had its hardness met at least the minimum requirements specified by the engine licensor, it is possible the flywheel could have remained intact until DG #1 had been secured or until all crewmembers had time to evacuate the space.

6.1.4 The flywheel being broken apart resulted in the next event, which was the 3 A/E being violently struck by one of the flywheel fragments. The trauma sustained by this impact ultimately resulted in the death of the 3 A/E with the cause of death listed as hemorrhagic shock. Causal factors contributing to this were:

6.1.4.1. No reasonable personal protective measures exist for this specific scenario. Once the flywheel broke apart, there was no time to react nor any personal protective equipment normally worn in that environment that could have reasonably prevented the 3 A/E from sustaining the injury that resulted in his death.

6.1.4.2. The inability to conduct visual teleconferencing during medical treatment. Understanding that there are many challenges with enabling this capability, had the professional medical service been able to see the condition of the 3 A/E and the effects of his treatment in real time for themselves it would have facilitated more timely and better-informed recommendations and allowed for active feedback during the more technical medical treatment being administered by the vessel's crew.

6.1.5. The flywheel being broken apart resulted in damage sustained to the vessel's electrical generation and distribution system, which in turn caused the vessel to lose electrical power. Causal factors contributing to this were:

6.1.5.1. There was no design or construction feature in place at the time that could have prevented the damage sustained to the generator's control systems or distribution cabling.

6.1.6. The flywheel being broken apart resulted in additional damage sustained to the vessel's propulsion support systems, which in turn caused the vessel to lose propulsion. Causal factors contributing to this were:

6.1.6.1. There was no design or construction feature in place at the time that could have prevented the damage sustained to the control and support systems that provided the vessel's propulsion.

6.2. Evidence of Act(s) or Violation(s) of Law by Any Coast Guard Credentialed Mariner Subject to Action Under 46 USC Chapter 77: There were no acts of misconduct, incompetence, negligence, unskillfulness, or violation of law by a credentialed mariner identified as part of this investigation.

6.3. Evidence of Act(s) or Violation(s) of Law by U.S. Coast Guard Personnel, or any other person: No evidence of acts or violations of law by U.S. Coast Guard Personnel or any other person was identified.

6.4. Evidence of Act(s) Subject to Civil Penalty: No evidence of acts subject to Civil Penalty were identified.

6.5. Evidence of Criminal Act(s): No evidence of criminal acts were identified.

6.6. Need for New or Amended U.S. Law or Regulation: No need for new or amended U.S. law or regulation was identified.

6.7. Unsafe Actions or Conditions that Were Not Causal Factors:

6.7.1. Although not identified as a causal factor, the decision to restart DG #1 within a relatively brief period of time after the overspeed device activated could be considered an unsafe action. Because of the technical nature of the governor installation, there are multiple conditions that could have contributed to the overspeed device activating and several obvious ones, such as leaks and fittings, were visually checked prior to the restart. However, if there was a more comprehensive checklist of steps to take and items to verify in the event an overspeed device trips during a governor installation, this would then help standardize the process and require additional attention and time to identify potential causes and allow for corrective action prior to restarting.

7. Actions Taken Since the Incident

7.1. There are no actions taken since the incident to include in this report.

8. Recommendations

8.1. Safety Recommendation:

8.1.1. There are no Safety Recommendations submitted with this report.

8.2. Administrative Recommendations:

8.2.1. Recommend the investigation into this casualty be closed.

(b) (6), (b) (7)(C)

(b) (6), (b) (7)(C) U.S. Coast Guard
Senior Investigating Officer

UNITED STATES COAST GUARD

REPORT OF THE INVESTIGATION

INTO THE

LOSS OF LIFE ABOARD THE SLNC GOODWILL (ON 1266919) WHILE UNDERWAY IN THE SEA OF JAPAN ON AUGUST 05, 2020

MISLE ACTIVITY NUMBER: 7025155

U.S. Department of Homeland Security
United States Coast Guard

Commanding Officer
United States Coast Guard
Activities Far East

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16732/011

LOSS OF LIFE ABOARD THE SLNC GOODWILL (O.N. 1266919) WHILE UNDERWAY IN THE SEA OF JAPAN ON AUGUST 05, 2020

ENDORSEMENT BY THE OFFICER IN CHARGE, MARINE INSPECTION

The record and the report of the investigation convened for the subject casualty have been reviewed. The record and the report, including the findings of fact, analysis, conclusions, and recommendations are approved with no further comments. It is recommended that this marine casualty investigation be closed.

(b) (6), (b) (7)(C)

(b) (6), (b) (7)(C)
Officer in Charge, Marine Inspection

Enclosures: (1) Executive Summary
(2) Investigating Officer's Report

U.S. Department of Homeland Security

United States Coast Guard

Activities Far East
United States Coast Guard

Unit# 5073
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16732
March 14, 2022

LOSS OF LIFE ABOARD THE SLNC GOODWILL (ON 1266919) WHILE UNDERWAY IN THE SEA OF JAPAN ON AUGUST 05, 2020

EXECUTIVE SUMMARY

On 05Aug20, the SLNC GOODWILL (ON 1266919) was underway en route to Busan, Republic of Korea. At approx. 1342 Japan Standard Time (Zulu +9), the #1 ship's service diesel generator (SSDG), hereafter referred to as DG#1, was being restarted following a change-out of the generator's governor; this restart was being conducted by the Chief Engineer (CE), 1st Assistant Engineer (1/AE), and 3rd Assistant Engineer (3/AE). The first attempt to restart DG #1 resulted in the rpms increasing to the point that the overspeed protection device tripped. The governor was visually examined for loose connections, leaks, or other signs of malfunction; none were identified. The overspeed protection device was reset and DG #1 was restarted a second time. Again, the rpms steadily increased, but this time the overspeed protection device didn't trip. The 1/AE quickly attempted to manually stop the engine at the governor, but was unsuccessful. While the 1/AE ran to the aft of the generator to manually activate the overspeed protection device, the generator's flywheel broke apart at high speed sending large sections of the component hurtling through the surrounding area. One such section struck the 3/AE, who was still standing in the vicinity of the engine at the time, in the neck and upper torso.

The vessel's Fire Team arrived on scene within minutes and transported the 3/AE to the vessel's hospital space. The Medical Officer supervised the treatment of the 3/AE along with support from other crewmembers as well as a shore-side medical advisory service. The 3/AE was semi-conscious during initial treatment, but later lost consciousness and died as a result of the injuries sustained from being struck by the flywheel section.

As a result of this investigation, the U.S. Coast Guard has determined that the initiating event for this casualty was a mechanical failure of the governor recently installed on DG #1. This failure resulted in an uncontrolled supply of fuel to the engine which in turn resulted in an uncontrolled increase of the engine's rpms. The overspeed protection device failed to trip and the rpms increased to the point that the flywheel fractured, fatally striking the 3/AE and damaging the vessel's electrical and propulsion control systems. The causal factors that contributed to this casualty include: (1) mechanical damage to internal components of the governor installed on DG #1, (2) improper storage of the governor, (3) failure to verify internal condition of the governor, (4) governor storage procedures and recommendations, (5) inability to confirm the governor's maintenance history, (6) improper recordkeeping of governor, (7) failure of the engine's overspeed protection device, (8) inadequate mechanical properties of DG #1 flywheel, (9) inadequate chemical composition of DG#1 flywheel, (10) no reasonable PPE exists to prevent loss of life, (11) inability to conduct visual teleconferencing during medical treatment, (12) significant damage to vessel's electrical generation/distribution system, and (13) significant damage to the vessel's propulsion control systems.

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INVESTIGATING OFFICER'S REPORT

1. Preliminary Statement

1.1. This marine casualty investigation was conducted and this report was submitted in accordance with Title 46, Code of Federal Regulations (CFR), Subpart 4.07, and under the authority of Title 46, United States Code (USC) Chapter 63.

1.2. No parties-in-interest were designated during the investigation.

1.3. No coordination or cooperation with the National Transportation Board, any foreign flag State Administration investigators, or other parties was provided during the investigation.

1.4. All times listed in this Report of Investigation are written in Japan Standard Time (Zulu +9), use a 24-hour format, and are approximate.

2. Vessel Involved in the Incident

Figure 1. Undated Photograph of SLNC GOODWILL

Official Name:	SLNC GOODWILL
Identification Number:	1266919
Flag:	United States
Vessel Class/Type/Sub-Type	Oil & Chemical Tank Ship
Build Year:	2008
Gross Tonnage:	30,241 GT ITC
Length:	580.4 Feet
Beam/Width:	105.6 Feet
Draft/Depth:	59.7 Feet
Main/Primary Propulsion:	Slow speed diesel (<300 rpm)
Owner:	NORD GOODWILL LLC Wilmington, DE
Operator:	Schuyler Line Navigation Co. Annapolis, MD

3. Deceased, Missing, and/or Injured Persons

Relationship to Vessel	Sex	Age	Status
Third Assistant Engineer (3/AE)	Male	23	Deceased

4. Findings of Fact

4.1. The Incident:

4.1.1. On July 31st, 2020, the oil and chemical tankship SLNC GOODWILL completed cargo operations and got underway from Guam bound for Busan, Republic of Korea.

4.1.2. While underway and conducting tank cleaning operations, diesel generator #1 (DG #1) began to "hunt". This meant that the rotational speed (rpms) of the engine were fluctuating and wouldn't remain consistent. When placed in idle, DG #1 shut down.

4.1.3. On August 4th, 2020, work had begun to replace the governor on DG #1. The crewmembers conducting the replacement were the Chief Engineer (C/E), First Assistant Engineer (1/AE), and Third Assistant Engineer (3/AE); the 3/AE was present for training purposes only.

4.1.4. During the replacement of the governor, two (02) pages of the manufacturer's manual were used as a reference, as well as the governor on DG #2 as a visual aid. The 1/AE had replaced governors on other vessels, but not on the SLNC GOODWILL.

4.1.5. On August 5th, 2020 at 1230, the replacement of the governor on DG #1 was resumed by the 1/AE and 3/AE; the C/E arrived later to be present for the final steps and testing the installation. Prior to finishing the installation, the governor was visually inspected for obvious signs of damage, water staining, or debris; no discrepancies were noted.

4.1.6. The governor's overspeed protection device and pneumatic shut off were tested by the C/E and 1/AE with the 3/AE present for training; no discrepancies were noted.

4.1.7. At 1335, DG #1 was started for the first time since replacing the governor. The engine rotations-per-minute (rpms) were unsteady, but continued to increase.

4.1.8. Shortly after starting DG #1, its overspeed protection device, or "overspeed trip", activated and shut down the engine.

4.1.9. The C/E, 1/AE, and 3/AE visually inspected the governor installation to ensure fittings were secure and to check for obvious signs of a reason for the overspeed; none were found and the overspeed protection device was reset.

4.1.10. At 1339, DG #1 was restarted for the second time.

4.1.11. The rpms on DG #1 continued to increase again, but this time accompanied by an unfamiliar noise and vibration.

4.1.12. Neither the electrical nor mechanical overspeed protection device activated once the rpms exceed the set point of approx. 1,020; the rpms continued to increase.

4.1.13. The 1/AE attempted to manually engage the electrical and mechanical overspeed trip at the governor and start box, but neither activated to shut down the engine.

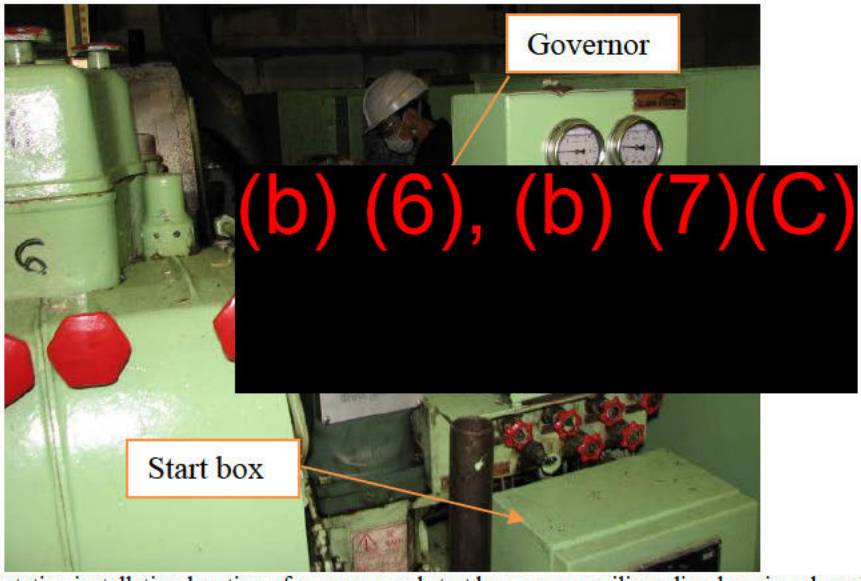


Figure 2. Representative installation location of governor and start box on an auxiliary diesel engine aboard SLNC GOODWILL.

4.1.14. The 1/AE quickly ran to the aft end of DG #1 to secure fuel oil to the engine.

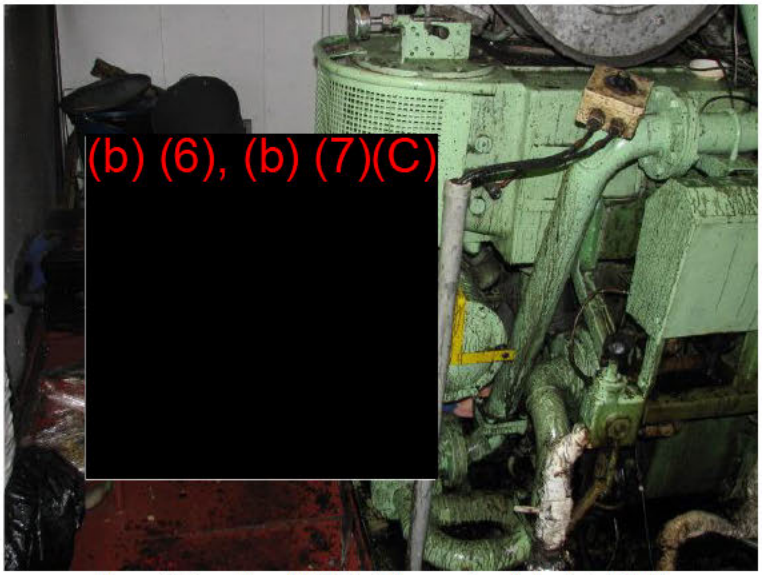


Figure 3. Location of 1/AE while securing fuel oil to DG #1

4.1.15. The C/E yelled for everyone to move clear of DG #1.

4.1.16. At 1342, the flywheel on DG #1 broke apart into several fragments that were hurled throughout the generator space at a high rate of speed.

4.1.17. One large flywheel fragment struck the 3/AE, who was standing near the DG #1 governor, in the upper torso and neck; the impact caused significant blunt-force trauma and bleeding. The 3/AE was evacuated from the engine room and taken to the medical space where he received medical treatment for his injuries, but was unable to recover from the trauma. His death was recorded as having occurred at 1823; cause of death was listed as hemorrhagic shock.

Figure 4. Area where 3 A/E was standing at the time of the casualty

4.1.18. Other fragments of the flywheel struck piping that was vital to the vessel's electrical and propulsion systems to include air and cooling water distribution.

Figure 5. One area of damaged overhead/piping caused by a flywheel fragment

4.1.19. The vessel lost electrical power, main propulsion, and was adrift approx. 12 NM from the coast of Japan.

4.1.20. At 1402, the Master radioed to request a medical evacuation (medevac) of the 3/AE via helicopter (helo) and was given an estimated time of arrival by the Moji Coast Guard of 1730.

4.1.21. The engineering crew worked to restore power and propulsion to the vessel while the deck crew continued to provide medical treatment to the 3/AE.

4.1.22. At 1700, the Moji Coast Guard helo arrived on station and lowered personnel to the vessel. The 3/AE was transported out on deck and raised to the helicopter, then the remaining helo personnel were recovered and the helo returned to shore to continue medical treatment of the 3/AE.

4.1.23. By 1800, power and propulsion were restored to the vessel. It got underway and proceeded to Sasebo, Japan where it anchored.

4.1.24. No alcohol testing was conducted on any of the crew due to the extended medical response and engineering repairs being conducted. No evidence was discovered that suggests any person directly involved were under the influence of alcohol leading up to the casualty.

4.1.25. The entire crew, with the exception of the 3/AE, was subject to post-casualty DOT drug testing in accordance with 46 CFR 4.06; all results were [redacted].

4.1.26. No toxicological analysis was conducted on the 3/AE by the Japanese medical facility that generated the "Report of Death of a U.S. Citizen or U.S. Non-Citizen National Abroad" regarding this fatality. As the body was embalmed prior to being transported back to the United States for burial, no further opportunity to conduct post-mortem drug or alcohol testing was available.

4.2. Additional/Supporting Information:

4.2.1. The SLNC GOODWILL (ON 1266919) was a 580.4 ft, 30,241 GT chemical/tank ship of steel construction with a keel laid date of 21Nov2008. It had diesel direct propulsion on an oceans/SOLAS route owned by Nord Goodwill LLC and operated by Schuyler Line Navigation Company, LLC (SLNC). The vessel's initial COI was issued IAW MSP on 29Jan2016 (reflagged); most recent COI annual inspection was conducted remotely from 01 to 27Apr20 with 00 deficiencies noted and 00 outstanding.

4.2.2. The Third Assistant Engineer (3/AE), Trenton Lloyd-Rees, started employment with SLNC in October 2019 and had been assigned to the SLNC GOODWILL prior to this casualty.

4.2.3. The Chief Engineer (C/E), [redacted], had been sailing since 2002. He had been employed by SLNC since November 2019; this was his third assignment aboard the SLNC GOODWILL.

4.2.4. The First Assistant Engineer (1/AE), [redacted], has been in the maritime industry since 1981. He was hired by SLNC in April 2016 and has only sailed on the SLNC GOODWILL since that time.

4.2.5. The Second Mate (2/M) and Medical Officer, [redacted], had been sailing since 2004. He had completed two previous trips on another vessel owned by SLNC. This was his first assignment to the SLNC GOODWILL. He had completed Medical Officer training course three (03) times previously and had served in this position on other vessels.

4.2.6. The Master, [redacted], had been sailing as an officer since 2007. He had worked for SLNC since 2016 and had been the Master of the SLNC GOODWILL since 2018.

4.2.7. Electrical services for the SLNC GOODWILL were provided by three (03) auxiliary generating sets each with a MAN B&W - ZJMD 6L23/30H type prime mover rated to deliver 960 KW at 900 rpm.

4.2.8. Each of the vessel's generators was equipped with a governor. The purpose of the governor was to regulate the flow of fuel to the engine in order to maintain a relatively constant speed, or rotations per minute (rpms), independent of the electrical load placed on the generator*.

*See Zhenjiang Marine Diesel Works Instruction Book L23/30H; Control and Safety systems, Automatics and Instruments.

4.2.9. The governor on DG #1's engine had an electronic and mechanical overspeed protection component set to activate and shut down the engine if the rpms exceeded approx. 1,020. The normal, designed operating speed was 900 rpms.

4.2.10. The manufacturers of the governor installed on DG #1, Woodward Inc., released instructions for the storage of mechanical-hydraulic controls (governors). These instructions included that oil meeting the US MIL-H-17672 should be used to coat the internal surfaces of the device and that they should be stored in an upright position.

4.2.11. On May 22nd, 2019, the governor installed on DG #1 prior to the casualty, Governor B (Part # 8520-0041, Serial # 15592175), was serviced in place by third party contractors licensed by the governor's manufacturing company.

4.2.12. That same day (May 22nd, 2019), another governor arrived onboard the vessel for use as a spare. It was a rebuilt governor, not brand new, and was not installed on any generator onboard the vessel prior to the DG #1 on August 4th, 2020. For the purposes of this investigation, that governor was designated as Governor C.

Figure 6. Governor C (right) was installed at the time of the casualty. Governor B (left) had been removed the day prior.

4.2.13. The data plate affixed to Governor C listed the same serial number and part number as the data plate affixed to Governor B. Despite this, the operating company believed the original serial number for Governor C was 16178255.

4.2.14. At some point, either during or after the overhaul of Governor C, mechanical damage was sustained to the surfaces of its valve bushing and shaft drive. There was no evidence available to determine exactly when/where the damage occurred.

4.2.15. On July 22nd, 2019, the governor installed on DG #2, Governor A (Part # 8521-0047DC, Serial # 14639129), was overhauled.

4.2.16. On December 26th, 2019, an annual test was conducted on the DG #1 governor under normal operating conditions. At the time of the test, the engine had 42,617 run

hours and the rebuild governor had 1,500 run hours. Oil levels, linkages, the fuel rack, and the speed sensor were all checked and a new micro-switch was installed on the electrical overspeed device. The next annual maintenance for the DG #1 generator was scheduled for December 24th, 2020.

4.2.17. On July 13th, 2020, a quarterly safety check was conducted on the DG #1. This check included alarm, pressure, and temperature testing; it did not include a test of the overspeed trip device. The next quarterly safety check was scheduled for October 12th, 2020.

4.2.18. On July 23rd, 2020, the 2,000 hour scheduled, preventative maintenance was conducted on DG #1. Included in the maintenance was a test of the governor's overspeed alarm, engine shut-downs, and replacing the oil in the governor; no deficiencies were noted during the DG #1 test run following preventative maintenance.

4.2.19. During the four (04) days leading up to the casualty, the C/E had worked 9.5 hours each day. The day prior to the casualty, he stopped work at 1830 and resumed at 0600 the day of.

4.2.20. During the four (04) days leading up to the casualty, the 1/AE had worked an average of forty (40) hours. The day prior to the casualty, he stopped work at 1830 and resumed at 0700 the day of.

4.2.21. During the four (04) days leading up to the casualty, the 3/AE worked 10.5 hours each day. The day of the casualty, he stopped work at 0000 and resumed at 1200.

4.2.22. Each generator was equipped with a flywheel that was mounted to the engine's crank shaft and designed to store the mechanical energy of the engine during power stroke and impart that stored energy to the preparatory strokes in an effort to keep shaft rotation uniform*.

4.2.23. The design specification requirement for the DG #21 flywheel was for grey cast iron of Grade C4 with an ultimate tensile strength of between 300-400 megapascals (MPa) and a Brinell hardness of between 200-250 HB.

4.2.24. The flywheel installed on DG #1 did not meet the design requirements of the engine licensor. After eight (08) post-casualty tests, the flywheel measured between 56%-64% of the required minimum strength and the hardness was, on average, 83% of the required minimum hardness.

4.2.25. Post-casualty analysis using a scanning electron microscope revealed the presence of micro-shrinkage voids in the area around the flywheel coupling. The term “micro-shrinkage voids” refers to conditions within a casting where small voids formed.

*See Principles of Naval Engineering: An Introduction to the Theory and Design of Engineering Equipment and Machinery Aboard Ship, ISBN: 9789-0-9825854-2-9

4.2.26. Post-casualty medical treatment received by the 3/AE while awaiting medical evacuation included the following: application of dressings/bandages, morphine injection (01), epinephrine injection (02), needle thoracotomy, nasopharyngeal airway, CPR, and application of an automated external defibrillator (AED; never advised to shock).

4.2.27. The mechanical portion of the DG #1 overspeed protection device was destroyed when the flywheel broke apart; no post-casualty inspection was done on the electrical overspeed protection component.

4.2.28. The vessel's crew administered medical treatment to the 3/AE while receiving consultation from a shore side medical alert service. There was no video-conferencing capability in the hospital space, the consulting was done by the crew describing the injuries, then the medial service advising on the appropriate treatment.

5. Analysis

5.1. *Mechanical Damage to Internal Components of the Governor.* Post-casualty analysis of the governor installed on DG #1 at the time of the casualty (Governor C) identified visible evidence of mechanical damage to the surfaces of the governor pilot valve bushing and shaft drive. The damage was deemed to be inconsistent with what would be expected following the break-up of the flywheel, which indicates that is was present prior to the casualty. Because both those internal components are involved with regulating the oil pressure in the governor, which in turn directly affects the amount of fuel supplied to DG #1, damage to either of them could have prevented an indication or response to an overspeed of DG #1. Had both of those components been operating as designed, the oil pressure and fuel supply should have remained within designed parameters and prevented DG #1 from an overspeed condition.

5.2. *Improper Storage of the Governor.* Governor C had been kept in storage onboard the vessel since May 2019. Either since that time or at some point after, the governor was drained of oil and not refilled. Additionally, despite being installed in a vertical position once placed in service, it was kept horizontally while in storage. Neither of these conditions of storage accurately reflect the conditions of use experienced when the governor is installed and operational, and could well result in some of the internal components not operating as designed either through an increased propensity for damage to or misalignment of internal components. Additionally, the manufacturer had storage instructions that specify the internal surfaces should be coated with oil that meets US MIL-H-17672 specification. Had Governor C been stored in a vertical position with the appropriate amount of oil it would have been in compliance with manufacturer's storage procedures, more accurately reflected the component's actual working conditions, and made them less likely to fail once the governor was installed.

5.3. *Failure to Verify the Internal Condition of the Governor.* After being kept in storage for over a year, being found in a horizontal position, and then realizing no oil was present in Governor C, there were no additional steps taken by the vessel's engineering crew to verify if its internal components were still fully operational. Even if

a year wouldn't be considered an excessively long time for a governor to sit in storage, either the fact that it was stored on its side or that there was no oil in it could have prompted someone to either open the governor and visually inspect the internal components or wait for the vessel to make port in Korea and have a third party technician confirm proper operation of the governor. Because the first option would require specific certifications, the second option would seem more plausible especially since the vessel had already sailed from Guam using Governor B. Had someone waited to verify the internal condition of Governor C, the material defects may have been found prior to it being used.

5.4. *Inadequate Governor Storage Procedures and Recommendations.* The governor manufacturer (Woodward) published Manual 25075 (Revision B, Mar2015) which detailed the storage procedures for mechanical-hydraulic controls. They also recommend their governors be kept in an upright position to keep the internal components in their proper positions and to prevent oil from leaking out of "breather holes" in the top of the assembly. It is unknown if Governor C was initially stored on its side, or if it fell over at some point later on. Also, it's unclear whether Governor C had oil originally that leaked out due to it being on its side, or if it never had oil after being overhauled. Either way, the result was the same: on the day it was retrieved for installation, Governor C was on its side and empty of oil. Had the storage procedures been followed fully and maintained during storage, that may have prevented damage to the internal components of Governor C and allowed it to function as designed.

5.5. *Inability to Confirm the Governor's Maintenance History.* All three (03) governors referenced in this incident were subject to preventative maintenance which included them being sent ashore to qualified technicians for overhaul, inspection, and repair. However, because the same part # and serial # were used for both Governor B and Governor C, this made it difficult to determine which one was being inspected. Had the data plates for Governor B and Governor C been maintained with the correct part # and serial #, it would have been obvious which one was being maintained and which one needed maintenance performed on it. Currently, there is no way to clearly identify whether it was Governor B or Governor C that was overhauled in May 2019, so it is possible that Governor C was well past its inspection interval and should not have been placed in service. Had the data plates been correct, it would have been clear to trace which governor was currently on maintenance schedule and should have been installed for use.

5.6. *Improper Recordkeeping of Governor Information.* Following the casualty, it was found that Governor B and Governor C, both installed on DG #1, had the same serial # and part # stamped on their data plates. Because the work completion report uses these numbers to identify which governor was overhauled, this error made it very difficult to determine whether or not both governors were actually overhauled and, if it was only one that was overhauled, which one it was. Had either someone on the 3rd party repair team or a crewmember/manager of the vessel noticed the mistaken numbers stamped on the data plate, they could have clarified the work done and condition of each governor and have a clear record for each.

5.7. *Failure of the Engine's Overspeed Protection Device.* DG #1 was equipped with an electrical and mechanical overspeed protection device, or "overspeed trip", which is a secondary safety measure designed to prevent an uncontrolled increase in engine rpms should the governor fail to operate as designed. In this specific instance, DG #1 normally operates at 900 rpms and the overspeed device is set to trip at 1,020 rpms. All evidence clearly indicates that the rpms on DG #1 exceeded 1,020 rpms, but the overspeed device failed to trip. Additionally, the overspeed device had operated as designed just prior to this casualty: the first attempt to start DG #1 resulted in increased rpms and the activation of the overspeed protection device. Whether it was reset incorrectly or experienced a mechanical failure that prevented it from activating is unknown and cannot be supported either way using the evidence provided. Either way, had the overspeed trip device worked as designed it would have prevented the uncontrolled increase in rpms.

5.8. *Inadequate Mechanical Properties of DG #1's Flywheel.* The engine licensor, MAN Energy Solutions SE, established design requirements for the flywheel that include an ultimate tensile strength of between 300MPa and 400MPa. Eight post-casualty tensile tests of flywheel fragments showed a range of results between 168 MPa and 194MPa; this is 56% to 64% of the required minimum strength. Additionally, microscopic inspection of the flywheel's bolt holes revealed areas of "micro-shrinkage", which are voids within the casting that can develop during the pour. These would have also reduced the flywheel's tensile strength because they induce planes of weakness and propagate cracking. Had the flywheel's tensile strength met at least the minimum requirements specified by the engine licensor, it is possible that the flywheel could have remained intact until either the 1/AE could have secured the fuel to DG #1 or, failing to secure DG #1, the crew could have had time to evacuate the space before it broke apart.

5.9. *Inadequate Chemical Composition of DG #1's Flywheel.* The engine licensor, MAN Energy Solutions SE, established design requirements for the flywheel that include a Brinell hardness of between 200HB and 250HB. Eight post-casualty tests of flywheel fragments found the hardness to be 167HB on average; this is 83% of the required minimum hardness. Had the flywheel's hardness met at least the minimum requirements specified by the engine licensor, it is possible that the flywheel could have remained intact until either the 1/AE could have secured the fuel to DG #1 or, failing to secure DG #1, the crew could have had time to evacuate the space before it broke apart.

5.10. *No Reasonable Personal Protective Equipment Available.* The 3/AE was standing in a position that should have been reasonably safe under routine operating conditions and was wearing all the applicable personal protective equipment (PPE) for working in the vessel's engine room. Once the flywheel broke apart, there was no time to react, nor any PPE normally worn in that environment that could have reasonably prevented the 3/AE from sustaining the injury that ultimately led to his death.

5.11. *Inability to Conduct Visual Teleconferencing During Medical Treatment.* During interview, the 2/M stated that he had served on at least one other vessel that had the ability to conduct video teleconferencing in its medical space. However, the SLNC

GOODWILL was not equipped with that capability. As a result, a crewmember was required to describe the injury, sometimes while actively applying medical treatment, to a shore side medical support service who was then required to visualize the description and attempt to offer the appropriate treatment option. If the vessel was able to dial up the same medical personnel and have them watching the treatment and see the extent of the injuries, it may have led to more timely recommendations/advice and active feedback during more technical medical treatment that was performed during this casualty such as use of a nasopharyngeal airway, intravenous injection, and needle thoracotomy.

5.12. *Significant Damage to the Vessel's Electrical Generation and Distribution System.* When the flywheel on DG #1 broke apart violently, the fragments caused significant damage to multiple systems within the vessel's engine room to include control, water supply, air supply, and electrical distribution. There was no reasonable defense that could have been used to prevent the fragments from causing this damage which subsequently resulted in a loss of power until repairs could be made.

5.13. *Significant Damage to the Vessel's Propulsion Control Systems.* When the flywheel on DG #1 broke apart violently, the fragments caused significant damage to multiple systems within the vessel's generator room to include control, water supply, air supply, and electrical distribution. All of these systems are necessary in order to maintain operation of the main diesel engine. There was no reasonable defense that could have been used to prevent the fragments from causing this damage which directly resulted in a loss of propulsion until repairs could be made.

6. Conclusions

6.1. Cause of the Casualty:

6.1.1. The initiating event for this casualty occurred when the governor installed on DG #1 at the time of the casualty (Governor C) failed to operate as designed, providing improper fuel regulation to DG #1. Actions and conditions which contributed to this failure were:

6.1.1.1. Mechanical damage found on some internal components of Governor C, specifically the pilot valve bushing and shaft drive, that were inconsistent with damage expected following the fracture of the flywheel. Had those internal components been undamaged and operating as designed, the oil pressure and fuel supply would have remained within designed parameters and prevented DG #1 from an overspeed condition.

6.1.1.2. Governor C being stored without oil and in a horizontal position for approximately 15 months. Had it been stored in a vertical position with the appropriate amount of oil, Governor C would have been in compliance with the manufacturer’s storage procedures, more accurately reflected the component’s actual working conditions, and made internal components less likely to fail once the governor was installed.

6.1.1.3. Duplicated information on the data plates for both Governor B and Governor C following their latest overhaul. Had a technician or crewmember noticed the mistaken numbers stamped on the data plate, they could have clarified the work done and condition of each governor.

6.1.1.4. Failure to follow the governor manufacturer's guidance on storage of Governor C, which stated it was to be stored with oil and in a vertical position. Had the manufacturer's guidance been followed, Governor C would have been less susceptible to damage and any oil wouldn't have been able to drain out of "breather holes" located on the governor housing.

6.1.1.5. Ambiguity between the maintenance history of Governor B and Governor C due to the duplication of their Part Number and Serial Number. Had the data plates contained the correct information, it would have been clear to trace which governor was currently on maintenance schedule and should have been installed for use.

6.1.1.6. A failure of the vessel's crew to recognize Governor C's inadequate storage condition and incorrect data plate information. Had a crewmember identified either of those inconsistencies, they could have either verified the internal condition of Governor C or waited until arriving at their next port of call and had a technician inspect the internal components.

6.1.2. As DG #1 received excessive fuel, the overspeed protection device failed to activate and secure the engine in order to prevent the engine's rpms from increasing beyond normal, and then designed, operating speed. Causal factors contributing to this were:

6.1.2.1. Due to the mechanical component of the overspeed protection being destroyed in the casualty and the lack of post-casualty testing on the electrical component, it is inconclusive as to the exact cause of the overspeed protection device failure.

6.1.3. The failure of Governor C to prevent an overspeed condition resulted in the next event, which was the breaking apart of the flywheel on DG #1 and those fragments hurling through the engine room space at a high rate of speed. Causal factors contributing to this were:

6.1.3.1. The inadequate mechanical properties contained in DG #1's flywheel. Had its tensile strength met at least the minimum requirements specified by the engine licensor and the "micro-shrinkage" voids weren't present, it is possible the flywheel could have remained intact until DG #1 had been secured or until all crewmembers had time to evacuate the space.

6.1.3.2. The inadequate chemical composition of DG #1's flywheel. Had its hardness met at least the minimum requirements specified by the engine licensor, it is possible the flywheel could have remained intact until DG #1 had been secured or until all crewmembers had time to evacuate the space.

6.1.4 The flywheel being broken apart resulted in the next event, which was the 3 A/E being violently struck by one of the flywheel fragments. The trauma sustained by this impact ultimately resulted in the death of the 3 A/E with the cause of death listed as hemorrhagic shock. Causal factors contributing to this were:

6.1.4.1. No reasonable personal protective measures exist for this specific scenario. Once the flywheel broke apart, there was no time to react nor any personal protective equipment normally worn in that environment that could have reasonably prevented the 3 A/E from sustaining the injury that resulted in his death.

6.1.4.2. The inability to conduct visual teleconferencing during medical treatment. Understanding that there are many challenges with enabling this capability, had the professional medical service been able to see the condition of the 3 A/E and the effects of his treatment in real time for themselves it would have facilitated more timely and better-informed recommendations and allowed for active feedback during the more technical medical treatment being administered by the vessel's crew.

6.1.5. The flywheel being broken apart resulted in damage sustained to the vessel's electrical generation and distribution system, which in turn caused the vessel to lose electrical power. Causal factors contributing to this were:

6.1.5.1. There was no design or construction feature in place at the time that could have prevented the damage sustained to the generator's control systems or distribution cabling.

6.1.6. The flywheel being broken apart resulted in additional damage sustained to the vessel's propulsion support systems, which in turn caused the vessel to lose propulsion. Causal factors contributing to this were:

6.1.6.1. There was no design or construction feature in place at the time that could have prevented the damage sustained to the control and support systems that provided the vessel's propulsion.

6.2. Evidence of Act(s) or Violation(s) of Law by Any Coast Guard Credentialed Mariner Subject to Action Under 46 USC Chapter 77: There were no acts of misconduct, incompetence, negligence, unskillfulness, or violation of law by a credentialed mariner identified as part of this investigation.

6.3. Evidence of Act(s) or Violation(s) of Law by U.S. Coast Guard Personnel, or any other person: No evidence of acts or violations of law by U.S. Coast Guard Personnel or any other person was identified.

6.4. Evidence of Act(s) Subject to Civil Penalty: No evidence of acts subject to Civil Penalty were identified.

6.5. Evidence of Criminal Act(s): No evidence of criminal acts were identified.

6.6. Need for New or Amended U.S. Law or Regulation: No need for new or amended U.S. law or regulation was identified.

6.7. Unsafe Actions or Conditions that Were Not Causal Factors:

6.7.1. Although not identified as a causal factor, the decision to restart DG #1 within a relatively brief period of time after the overspeed device activated could be considered an unsafe action. Because of the technical nature of the governor installation, there are multiple conditions that could have contributed to the overspeed device activating and several obvious ones, such as leaks and fittings, were visually checked prior to the restart. However, if there was a more comprehensive checklist of steps to take and items to verify in the event an overspeed device trips during a governor installation, this would then help standardize the process and require additional attention and time to identify potential causes and allow for corrective action prior to restarting.

7. Actions Taken Since the Incident

7.1. There are no actions taken since the incident to include in this report.

8. Recommendations

8.1. Safety Recommendation:

8.1.1. There are no Safety Recommendations submitted with this report.

8.2. Administrative Recommendations:

8.2.1. Recommend the investigation into this casualty be closed.

[redacted]
Lieutenant Commander, U.S. Coast Guard
Senior Investigating Officer

Generator Maintenance Rough Log

May 25th 2016 to current date

Gen 1

5/30 - Spinner filter cleaned

6/8- spinner filter done at 32158 hours, 1-2cm sludge built up on spinner

6/8 – on the 5th we had a high differential pressure alarm across the fuel strainers.

They were with clean filter found on the shelves in the purifier room. There are still two on standby along with two orings for the seal. The left filter had to bad studs, new ones were made out of 8mm bolts in the shop. All work done at 32158 hours.

6/9 – left lube oil cartridge filter done at 32158

6/9 – turbo wrap done at 32158

6/9 – water wash at 32158, 4-5 buckets of water were taken out and water was gray

6/14 – right side lube oil cartridge filter done at 32169

6/21 – left side lube oil cartridge filter done at 32211 (53 hours since last done)

6/21 – spinner done at 32212 54 hours since done last ½ cm of sludge built up

6/22 – performance test was taken at 32212 see folder for details. All pressures were very close

6/28 – shore crew came aboard and changed out the turbo charger at 32220

6/30- BOTH cartridge lube oil filters done at 32224

7/14 – spinner done at 32462, 3-4 cm of sludge built up (250 hours since last)

7/22/16- both cartridge filters done at 32539

7/25/16- lube oil temp. Thermostats were changed due to high lube oil temp. (around 73 degrees) after the new ones were put in the temp dropped to about 55-60 degrees depending on the generator load. The lube oil pressure was also bumped up to roughly 5.2 bar at 500ish kw. The two new tstats were taken from the store room. New ones are on order. Work done at 32550 hours

8/3 left side lube oil cartridge filter was done at 32718 hours

8/4 – turbo wrap done and turbo water wash done went through about 4 buckets of water, water was a little clearer than previous time , work done at 32719

8/5 spinner done at 32723, 261 hours since last done, 4 cm of sludge built up

8/15 spinner done at 32839, 116 hours since last done about 1cm of sludge built up

8/19 RIGHT side cartridge filter done at 32873, 334 hours since last done

8/29/16 spinner done at32995, 156 since last done about 2 cm sludge built up

8/30 WATER WASH DONE ON TURBO, WENT THROUGH ABOUT 1.5 5 GAL BUCKETS OF WATER. WATER WAS VERY BLACK

9/2 left side cartridge filter done at 33041, 330 since last done

9/6 green oil filter was changed out at 33098, 3 new filter in steering gear store room

9/13 right side cartridge filter done at 33187 hrs.

9/21 turbo water wash done at 33317 hrs. Water was very black

9/27 cleaned spinner filter. 220 hours since last time. 3-4 cm of buildup, will reduce interval to 150 hours.

10/1 turbo wrap was replaced at 33489 hrs, 172 hrs since last. has to be done more frequently than the others due to exhaust leak.

10/8 water was done at 33495 hrs, 170 hrs since last. water was pretty black

10/25 replaced rectangular gasket on turbo the exhaust side of the turbo. No longer leaks exhaust gas.

11/2 right cartridge filter changed at 33756 hrs, 228 hrs since last time.

11/5 all injectors were replaced at 33738.

11/5 number 5 fuel pump was replaced

11/14 turbo water wash at 33800 hrs, 146 since last. water was black

11/14 cleaned spinner filter at 33800 hrs, 146 since last. 3 cm of buildup

11/23 left cartridge filter changed at 33941 hrs. left in standby

11/23 cleaned spinner filter at 33941 hrs, 141 since last. 3 cm of buildup

11/23 water wash at 33941 hrs, 141 since last. water was black

12/3 cleaned spinner filter at 34086 hrs, 145 since last. 3 cm of buildup

12/6 valve lash done at 34102 hrs.

12/13 spinner cleaned at 34216 hrs, 130 since last. 3 cm of buildup

12/13 water wash done at 34216 hrs, 126 since last.

12/24 left cartridge filter changed at 34437 hrs, 496 since last.

12/20 spinner cleaned at 34535 hrs, 134 since last. 3 cm of buildup

1/6 spinner cleaned at 34651 hrs, 116 since last. 3 cm of buildup

1/12 left cartridge filter done at 34708, last 245 hrs ago

1/18/17 spinner done at 34783

1/19 water wash done at 34785, 127 since last done 3 buckets of black water

1/30 spinner was done at 34920, was packed full of sludge, 137 hrs since

1/30 both cartridge filters were done at 34920

1/31 at 34920 lo sump was changed out with approx. 750L of new oil, the sump low level alarm was tested while draining and filling

2/3 water wash done at 34944

2/17 all done at 35073, right side cartridge filter

Spinner filter done 153 hour since last, about 2-3 cm of sludge built up, New Turbo wrap done

2/23 turbo wash done at 35123, about three buckets of dirty water ran through

3/1 work done at 35185, spinner done 3ish cm of sludge built up after 110 hours

Right side cartridge filter done

3/4 the rectangular exhaust gasket was replaced because the old one, we used two that were made on board and it seems to have fixed the leak, work done at 35187

3/6 work done at 35200, number 2 fuel pump (used blunger and bar) and 4 fuel pump (new plunger and bar) were changed in an attempt to rectify the high exhaust temps at 350-450 kw load. Number 2 cylinder came down but number 4 cylinder still goes high at full load. After Guam I will be checking the internals on number 5 fuel pump suspected of being the wrong gear tooth setting inside the pump

3/7 as a quick fix the number 4 fuel rack was adjusted roughly -1mm to deal with the high exhaust gas temp on the cylinder, I want to check the injector on this cylinder at the next available time and see if the popping pressure is off

3/18 – turbo wash done at 35262

3/21 – spinner done at 35294, about 3cm sludge was hard to get apart, done at 109 hours

3/25 – right side cartridge filter done at 35350

3/25 – spinner filter done at 35350 after 56 hours, about 1 cm sludge built up

4/1 – work done 39350 water wash done on turbo, 3 buckets of water ran through water start getting a little clearer on the last bucket

5/11/2017 - all fuel pumps and injectors were replaced at 35601

6/26- Generator 1 exhaust pipe to turbo charger gasket was replaced at 36047 hours.

8/3 – spinner filter done at 36472 about 150 hours on 2cm sludge built up

8/3 – left cartridge filter done at 36472

8/9 – turbo wash complete at 36472, after 400 ish hours, water was really bad

8/27/2017 – heads and connecting rods on number 5 and 6 cylinder were taken off. The connecting rods ovality were found to be out of spec. The piston rings were replaced along with all new orings and gaskets on the heads. 2 new injectors were also used

from the injector room. Refurbished heads were placed back on the generator and test ran. All work was done at 36500 hours

9/7 spinner done after 103 hours about 1.5 cm of sludge built up, work done at 36575

9/9 water wash done on turbo after about 110hrs, about 2 buckets of water ran through, work done at 36586

9/16 right side cartridge filter done after roughly 320 hours work done at 36644

9/22/17 spinner done after 104 hours, about 1 cm sludge built up, work done 36679

9/27 – spinner done after 100 hours 1.5cm of sludge built up, right side cartridge filter done after 138 hours, turbo water wash done on after 196 hours, 2 buckets of water ran through and was very dirty, turbo wrap also done after 270 hours, all work done at 36782

9/27/17 – start air pressure reducer was leaking air pretty badly, after generator was turned on. The reducer was taken out and a few of the orings were worn and replaced. It was tested after and no more air leaks. Work done 36782 hours, we have a new oring kit and a new diaphragm, along with an old bottom piston in a newly marked back in the generator cabinet, new rebuild kits are on order

10/9 turbo wash done after 50 hours, 3 buckets of water ran through still very dirty, spinner done after 50 hours, about .5 cm sludge build up, work done at 36832

10/24 alarm for jet assist is going off intermittently, can clear alarm and will go away. Usually comes back at change of load

11/2/17 spinner done at 36950

11/7 banjo fitting on fuel branch pipe cleaned and new copper gaskets. Rebuilt #4 injector with new nozzle and spring

11/8 cylinder head swap on cylinder 4. Reason for doing: with new injector the exh temp was still at alarm point. Used head rebuilt by 1A/E. Piston was not removed per order of the C/E because we do not have a new conrod to replace if bad. Top of piston cleaned as best as possible with piston in place. The inboard forward cylinder head stud required extra attention when removing, but was due to dirty threads on stud. After soaking penetrant on nut/threads the bolt became free. All studs were cleaned and looked satisfactory. New flame ring and head gasket used. New o-rings on jumpers, push rod protecting tube and coolant. New exhaust manifold gasket.

11/14/17 water wash turbo 2 gal until clean. Work done at 36978

11/15/17 Left side cartridge filter done at 37000

11/16/17 right side cartridge filter done at 37010 running on right side now

11/25/17 water wash turbo 3 gal until clean. Work done at 37100

11/26/17 replace o-ring on after part of knife edge filter. The previous person to do this job had used 2 o-rings.

11/30/17 Spinner done at 37145.

12/2/17 right side cartridge filter done at37148

1/5/18 LEFT SIDE FILTER DONE 37289

1/6/18 SPINNER DONE AT 37289

1/6/18 WATER WASH 37289

1/25/18 spinner done at 37370

1/31/18 right cartridge filter done

2/2/18 spinner done at 37480, about 2 cm sludge built up after 110 hours

2/4 right filter done at 37507

2/8 water wash on exhaust side of the turbo 6 dirty buckets of water ran through work done at 37508 after 219 hours

2/14 spinner done after 76 hours about 1 cm sludge built up work done 37556 hours

Turbo wrap changed

3/2 work done at 37660

Quick turbo wash 2 buckets of water ran through after 150 hours

Spinner done 2 cm of sludge built up after 106 hours

Right side cartridge filter changes after 153 hours

3/11/2018 – WORK DONE AT 37682, injectors 1,2,3 were changed with new ones from the injector room, the old ones pop tested very low

3/19/2018 – Start motor failed this morning, new one was installed no more spares on board, old one will be check and possibly rebuilt, work done 37727

3/20/2018 – work done at 37728, injectors 4,5,6 were changes with new ones from the injector room, the old ones pop tested very low

3/25 turbo wrap changed 37754

3/26 work done at 43325 , left side cartridge filter after 94 hours and turbo water wash 3 buckets ran through after 94 hours

3/27 spinner done at 37772, about .5 cm sludge built up after 112 hours

4/11 work done at 37945, spinner done about 2 cm sludge built up after 160 hours

Right side cartridge filter done

4/29/18 spinner done at 38094

5/14/18 spinner done at 38223

5/23/18 Left side done at 38307.

5/28/18 spinner done at 38408

6/5/18 water wash 38461

6/5/18 right side cartridge done at 38462

6/9/18 spinner 38559

6/11/18 right side cartridge filter done at 38573

6/12/18 injector on cylinder #2 replaced at 38573

6/17/18 right side cartridge filter done at 38657

6/17/18 spinner done at 38657

6/21/18 spinner 38747

6/26/18 spinner 38871

7/2/18 left side cartridge done at 38875

7/7/18 water wash and left side filter done at 38972

7/14/18 – Spinner Filter Cleaned 39115

7/14/18 – Turbo Wrap Replaced 39115

9/22/18 – SPINNER FILTER DONE AT 39957

10/4/18- SPINNER AND RIGHT SIDE CARTRIDGE FILTER DONE AT 40087

10/12/18 water wash turbo at 40197

10/13/18 – spinner filter done at 40215

11/2/18 right side done at 40304

11/8/18 WATER WASH AT 40323

11/10/18 spinner done at 40323

11/19/18 40384 left side cartridge filter changed

12/12/18 SPINNER FILTER DONE AT 40414

1/5/19 spinner done at 40485

-dumped diesel down fuel leak off gallery drain

-note governor-fuel rack linkage shock absorber stuck.

1/21/19- left side cartridge filter changed @ 40515

1/23/19 water wash turbine and compressor @ 40566

1/29/19- new turbo wrap @40644

1/31/19-Both Cartridge Filters Changed@40672

02/03/19 WATER WASH TURBINE SIDE 45 MINS 4 BUCKETS @ 40673

02/08/19- **40709 hours** change out injectors 1, 2, and 5. all leaked and did not pop, full release around 270bar, new injectors have the orange packaged nozzles

02/21/19 40838 hours Injectors 3, 4 and 6 changed out, full release around 250bar, leaked from tip at 100 bar. New injectors all pop at 320 bar and the yellow packaged nozzles were used.

02/21/19- 40838 Turbo wrap changed

02/23/19-40849 hours- water wash performed for 30 mins, running on diesel. Water came out clear. Collected 1 bucket full

2/28/19-40859hrs- spinner done

4/30/19 – 12,000 overhaul done at 41076 including turbo. All new fuel pumps. All new injectors. Replaced bearings and con rods on out of spec units. Refer to Junma's report from shipyard.

5/24/19 – rebuilt turbo governor installed and topped off with 827. New micro switch installed on over speed device. Work done at 41114

6/7/19 – new overspeed device and micro switch installed. Spinner filter cleaned at 41251

6/10/19 – water wash at 41279

6/15/19 – spinner done at 41368

08/02/19- left side cartridge filter changed-41982

9/27/19- LO Pressure alarm/trip, JW Temp alarm/trip, Overspeed Trip tested

10/9/2019 - Replaced Right side blade filter assembly.

11/19/2019 - Knife edge filter drain line removed, cleared, deck line cleared with tubing.

Update: Draining Issue persists. Clog suspected to be after 90 in deck line. In need of small diameter drain snake.

11/20/2019 - Leak off alarm float switch serviced, working. Two spares in storeroom.

11/20/2019 – 11/22/2019 Sump on purifier

12/23/2019 – Valve lash completed 42620

1/7/2020 – Tested LO Low pressure and trip / CW High temp and trip. WO: 8052150

1/25/2020 – ETO replaces FO pressure transmitter. Tightened multitude of connections

2/11/2020- 42781hrs-Left side lo cartridge replaced.

2/23/2020-42910hrs- water wash

4/15/2020- 43424hrs- spinner done

4/15/2020- 43424hrs -Gauges replaced on gauge panel

5/23/2020- 43562hrs- Complete water wash and turbo wrap replaced

6/5/2020- 43567 hrs Green Oil filter changed and pre filter cleaned

6/25/2020 – Spinner done

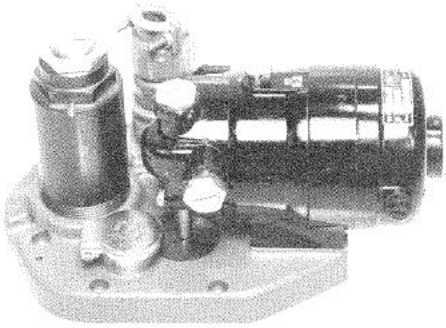
7/13/2020- Quarterly alarm testing conducted WO 8053518

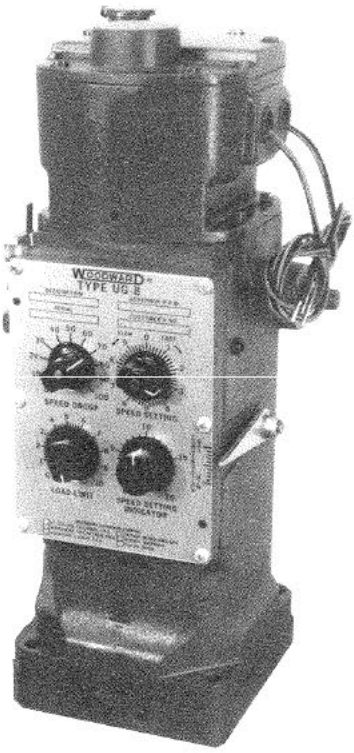
7/17/2020 – 43794 Purified sump 30 hours

7/20/2020 – Replaced #3 injector with rebuilt, new nozzle.

WOODWARD

Product Manual 03013
(Revision T)
Original Instructions





Shutdown Solenoid for UG Governor

Installation and Operation Manual

General Precautions

Read this entire manual and all other publications pertaining to the work to be performed before installing, operating, or servicing this equipment.

Practice all plant and safety instructions and precautions.

Failure to follow instructions can cause personal injury and/or property damage.

Revisions

This publication may have been revised or updated since this copy was produced. To verify that you have the latest revision, check manual *26311* , *Revision Status & Distribution Restrictions of Woodward Technical Publications*, on the *publications page* of the Woodward website:

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Proper Use

Any unauthorized modifications to or use of this equipment outside its specified mechanical, electrical, or other operating limits may cause personal injury and/or property damage, including damage to the equipment. Any such unauthorized modifications: (i) constitute "misuse" and/or "negligence" within the meaning of the product warranty thereby excluding warranty coverage for any resulting damage, and (ii) invalidate product certifications or listings.

Translated Publications

If the cover of this publication states "Translation of the Original Instructions" please note:

The original source of this publication may have been updated since this translation was made. Be sure to check manual *26311* , *Revision Status & Distribution Restrictions of Woodward Technical Publications*, to verify whether this translation is up to date. Out-of-date translations are marked with ⚠. Always compare with the original for technical specifications and for proper and safe installation and operation procedures.

Revisions—Changes in this publication since the last revision are indicated by a black line alongside the text.

Contents

Illustrations and Tables

Warnings and Notices

Important Definitions

This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.

- **DANGER**—Indicates a hazardous situation which, if not avoided, will result in death or serious injury.
- **WARNING**—Indicates a hazardous situation which, if not avoided, could result in death or serious injury.
- **CAUTION**—Indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.
- **NOTICE**—Indicates a hazard that could result in property damage only (including damage to the control).
- **IMPORTANT**—Designates an operating tip or maintenance suggestion.

⚠WARNING

Overspeed / Overtemperature / Overpressure

The engine, turbine, or other type of prime mover should be equipped with an overspeed shutdown device to protect against runaway or damage to the prime mover with possible personal injury, loss of life, or property damage.

The overspeed shutdown device must be totally independent of the prime mover control system. An overtemperature or overpressure shutdown device may also be needed for safety, as appropriate.

⚠WARNING

Personal Protective Equipment

The products described in this publication may present risks that could lead to personal injury, loss of life, or property damage. Always wear the appropriate personal protective equipment (PPE) for the job at hand. Equipment that should be considered includes but is not limited to:

- **Eye Protection**
- **Hearing Protection**
- **Hard Hat**
- **Gloves**
- **Safety Boots**
- **Respirator**

Always read the proper Material Safety Data Sheet (MSDS) for any working fluid(s) and comply with recommended safety equipment.

⚠WARNING

Start-up

Be prepared to make an emergency shutdown when starting the engine, turbine, or other type of prime mover, to protect against runaway or overspeed with possible personal injury, loss of life, or property damage.

⚠WARNING

Automotive Applications

On- and off-highway Mobile Applications: Unless Woodward's control functions as the supervisory control, customer should install a system totally independent of the prime mover control system that monitors for supervisory control of engine (and takes appropriate action if supervisory control is lost) to protect against loss of engine control with possible personal injury, loss of life, or property damage.

NOTICE

Battery Charging Device

To prevent damage to a control system that uses an alternator or battery-charging device, make sure the charging device is turned off before disconnecting the battery from the system.

Electrostatic Discharge Awareness

NOTICE

Electrostatic Precautions

Electronic controls contain static-sensitive parts. Observe the following precautions to prevent damage to these parts:

- **Discharge body static before handling the control (with power to the control turned off, contact a grounded surface and maintain contact while handling the control).**
- **Avoid all plastic, vinyl, and Styrofoam (except antistatic versions) around printed circuit boards.**
- **Do not touch the components or conductors on a printed circuit board with your hands or with conductive devices.**

To prevent damage to electronic components caused by improper handling, read and observe the precautions in Woodward manual *82715*, *Guide for Handling and Protection of Electronic Controls, Printed Circuit Boards, and Modules*.

Follow these precautions when working with or near the control.

1. Avoid the build-up of static electricity on your body by not wearing clothing made of synthetic materials. Wear cotton or cotton-blend materials as much as possible because these do not store static electric charges as much as synthetics.
2. Do not remove the printed circuit board (PCB) from the control cabinet unless absolutely necessary. If you must remove the PCB from the control cabinet, follow these precautions:
   - Do not touch any part of the PCB except the edges.
   - Do not touch the electrical conductors, the connectors, or the components with conductive devices or with your hands.
   - When replacing a PCB, keep the new PCB in the plastic antistatic protective bag it comes in until you are ready to install it. Immediately after removing the old PCB from the control cabinet, place it in the antistatic protective bag.

Chapter 1.
Operation and Adjustment

Description

A shutdown solenoid is available for use on dial type UG8, UG32, and UG40 governors. Two basic models are available. One will cause shutdown when energized, and the other will cause shutdown when de-energized.

Vibration-resistant models are available for both styles.

The energize and de-energize models are available with a latch that requires manual resetting for restarting the engine. Vibration-resistant models are not built with the latching feature.

⚠WARNING

The shutdown solenoid must not be used as an overspeed protection device. Overspeed protection must come from a unit entirely separate from the UG governor. Failure of a governor or governor-related part of the system control can cause a life- or engine-threatening overspeed condition. In these cases, it is possible that the shutdown solenoid could not stop the runaway condition.

If voltage is available, the engine may be started without manual reset of the solenoid if the solenoid with latch is of the energize-to-run type.

All shutdown solenoids move the load-limit strap down to effect shutdown.

The solenoid can be supplied with various coils to accommodate the more common dc voltages. If operation on ac is desired, rectifiers can be incorporated in the cover assembly to rectify either 110 or 220 volts to dc. In addition, other ac voltages can be adapted on special order.

The special governor cover, required for mounting the unit, is available with or without accommodations for a speed-adjusting motor.

Operation

De-energize to Shut Down Model

The de-energize to shut down models shown in Figures 1 and 2 will shut the engine down on loss of current to the solenoid. The solenoid plunger moves up to allow the engine to run. To start an engine when no current is available, lift the solenoid plunger manually by means of the shutdown-latch knob (see Figure 1). As it approaches the top of its stroke, the lock pin may be pressed in to latch the shutdown-latch knob just below its upper position. This permits starting and running the engine. ***Operating with the latch pin holding the solenoid at the top of its stroke eliminates the possibility of using the solenoid to shut down the engine.***

When current is applied to the solenoid, it will move to its full upward position, unloading the lock pin, which is moved outward by the circular latch spring. With loss of current, the load spring will cause the solenoid plunger to move down, lifting the governor pilot valve and closing off fuel.

WARNING

During start-up, if for any reason the solenoid has no current and the lock-in is latched, the solenoid will be inoperative. This will eliminate any safety systems which may use the solenoid to shut down the engine.

A de-energize to shut down model can be supplied without the latching feature, generally for operation in automatic plants. The vibration-resistant de-energize to shut down model is available only in non-latching design. The non-latching solenoids present an “energize to run” limitation on the engine, a condition which is required in many plants.

Energize to Shut Down Model

The energize to shut down model shown in Figures 3 and 4 will shut the engine down as current is applied (even momentarily in the case of the latching model).

The solenoid plunger moves downward through a tapered plunger stop, which contains seven spring-loaded steel balls. The binding action of the steel balls against the shutdown rod prevents the solenoid from returning. To restart the engine, return the plunger to its original position by pressing the reset button, which forces the steel balls away from the plunger and allows the spring force to push the load-limit strap and the solenoid plunger to the uppermost positions.

The energize to shut down system is available in non-latching designs for both the regular and the vibration-resistant models. The vibration-resistant model is not available in the latching mode.

The non-latching model requires a “shutdown current” to the solenoid until shutdown is complete.

Adjustments—Installation

Solenoid shutdown devices supplied on governors as original equipment are adjusted at the factory. It will be necessary to make the following adjustments on units which are to be installed on governors already in service.

NOTICE

When assembling or adjusting a shutdown solenoid, ALWAYS remove the cover and do the work away from the governor. IF ANY PART OF THE SOLENOID DEVICE SHOULD DROP INTO THE GOVERNOR, IT WILL REQUIRE EXTENSIVE DISASSEMBLY OF THE GOVERNOR.

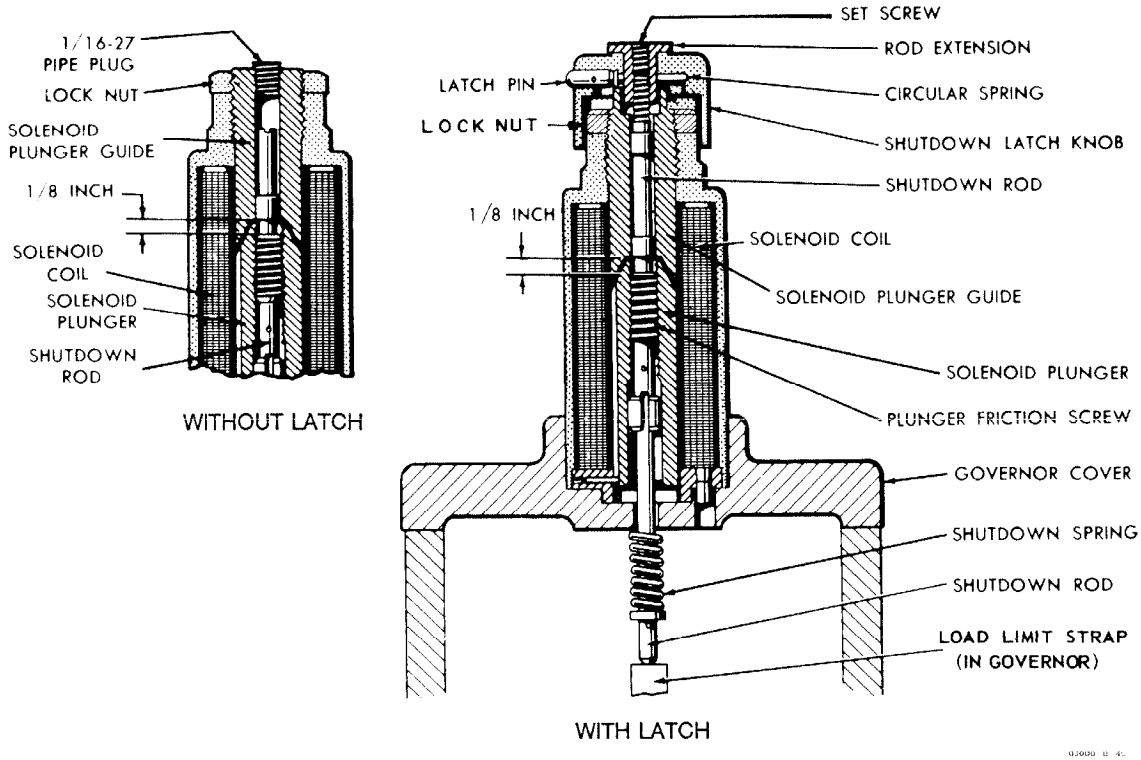


Figure 1. De-Energize to Shut Down Models

De-Energize to Shut Down Model

1. Position the shutdown rod assembly in the solenoid plunger with the end of the plunger friction screw 3 mm (1/8 inch) inside the solenoid plunger nose as shown in Figure 1. This adjustment is necessary only when the shutdown device has been disassembled for cleaning or replacing parts. New assemblies sent from the factory will have this adjustment completed.

2. Loosen the lock nut and, with the solenoid de-energized, turn the solenoid plunger guide clockwise until it is tight against the plunger. The plunger should now be seated against the governor cover. Back off the solenoid plunger guide 3 to 4 turns and tighten the lock nut.

3. Attach the cover assembly (including the shutdown device) to the governor case.

4. Remove the set screw from the hole in the rod extension. With the engine running and the governor in operation and controlling the speed, de-energize the solenoid and use a screwdriver to turn the shutdown rod assembly clockwise until the governor just starts to shut down, then screw the shutdown rod down one additional turn.

Steps 5, 6, and 7 pertain to the latching model. Skip to step 8 if adjusting a non-latching model.

5. De-energize the solenoid. Lift the shutdown latch knob and press in the latch pin so the pin remains engaged when the knob is released.

6. With a screwdriver in the slot of the shutdown rod to prevent it from turning, screw the rod extension clockwise until the solenoid plunger is pulled up against the solenoid plunger guide.

7. Energize the solenoid. Back off the rod extension until the latch pin releases. Then back off 1/4 turn more. Lock in place with the 10-32 set screw.

8. Check for normal operation with the solenoid energized and for shutdown when the solenoid is de-energized. Check the latching device to verify that it will latch up to allow starting and unlatch when the solenoid is energized.

Vibration-Resistant De-Energize to Shut Down Model

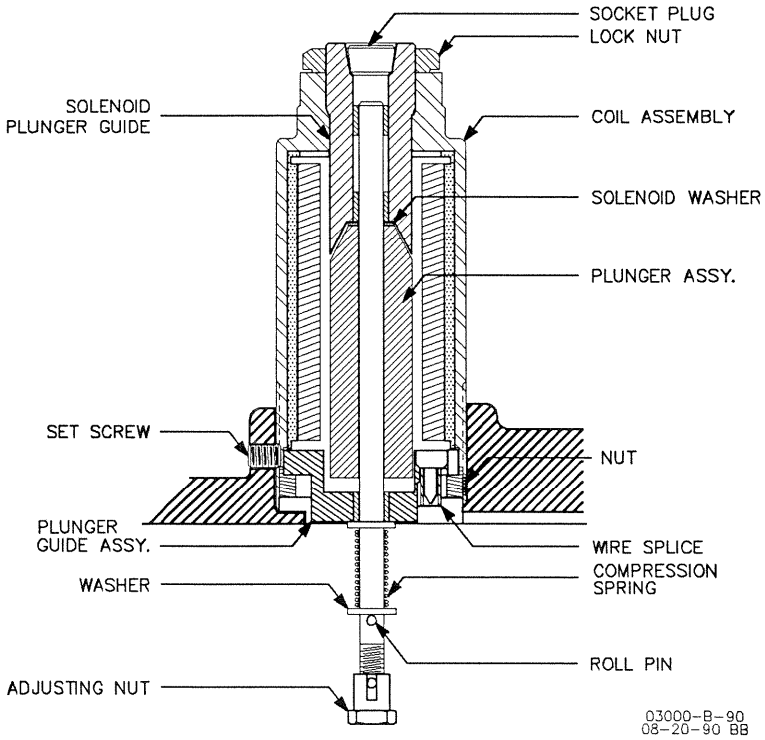


Figure 2. Vibration-Resistant De-energize to Shut Down

1. Install the shutdown solenoid in the cover with the Plunger Guide Assembly slightly below the surface of the inside of the cover. Thread the adjusting nut onto the solenoid plunger rod as far as it will go. DO NOT LOCK WITH THE ROLL PIN AT THIS TIME.

2. Turn the solenoid plunger guide down until the rod just moves a little farther out of the bottom of the solenoid assembly. Then back off the plunger guide four full turns and lock with the lock nut.

3. With the engine running and the governor controlling engine speed, place the cover and gasket on the governor. If the engine does not shut down, remove the cover, screw the adjusting nut out one full turn, and replace the cover assembly on the governor.

4. Continue this procedure until the engine shuts down when then the cover is placed on the governor.

NOTICE

Completely remove the cover from the governor and make the adjustments in the adjusting nut away from the governor to prevent accidentally dropping the adjusting nut into the operating governor. Extensive damage to the governor can occur should the nut drop off the end of the shaft. Should the adjusting nut thread out more than 5 turns before causing shutdown, loosen the set screw and thread the entire shutdown solenoid farther into the governor cover, then start the adjusting nut setting again.

5. When the governor shuts the engine down when the cover is placed on the governor, remove the cover a final time and thread the adjusting nut until the roll pin can be pressed into the shaft, locking the adjusting nut into place. Do not risk dropping the roll pin into the governor while making this final installation.

6. Complete the wiring to the plug on the cover and check that the application of the required voltage causes the plunger to retract.

7. Install the cover-solenoid assembly onto the governor and check that the engine shuts down when the solenoid is de-energized, and that the engine can start and run with the solenoid energized. Check for normal operation with the solenoid de-energized, making sure that the governor is not sluggish in adding fuel to pick up load.

   If the governor is sluggish in adding fuel to pick up load, check for excessive drag in the movement of the solenoid plunger, a misaligned shutdown rod, a bent plunger guide, or solidified preservative lubricant on any of the moving parts.

Energize to Shut Down Model

1. Position the shutdown rod assembly in the solenoid plunger with the end of the plunger friction screw 3 mm (1/8 inch) inside the plunger nose as shown in Figure 2. This adjustment is necessary only when the shutdown device has been disassembled for cleaning or replacing parts. New assemblies from the factory will have this adjustment completed.

2. Attach the cover assembly (including the shutdown device) to the governor case.

3. Unscrew the knurled reset button retainer and remove the reset button and spring. Loosen the lock nut. Turn the plunger stop down until the solenoid plunger is tight against the solenoid plunger guide. Back off 3 to 4 turns. Tighten the lock nut.

4. With the governor in operation and controlling engine speed, energize the solenoid and turn the slotted shutdown rod clockwise until shutdown occurs. Turn clockwise one more turn past the point of shutdown, and install the spring, reset button, and reset button retainer.

5. Check for normal operation with the solenoid de-energized, making sure that the governor is not sluggish in adding fuel to pick up load.

6. Energize the solenoid. After shutdown, check to see that the governor remains inoperative until the latch is released by pressing the reset button. Recheck for normal operation.

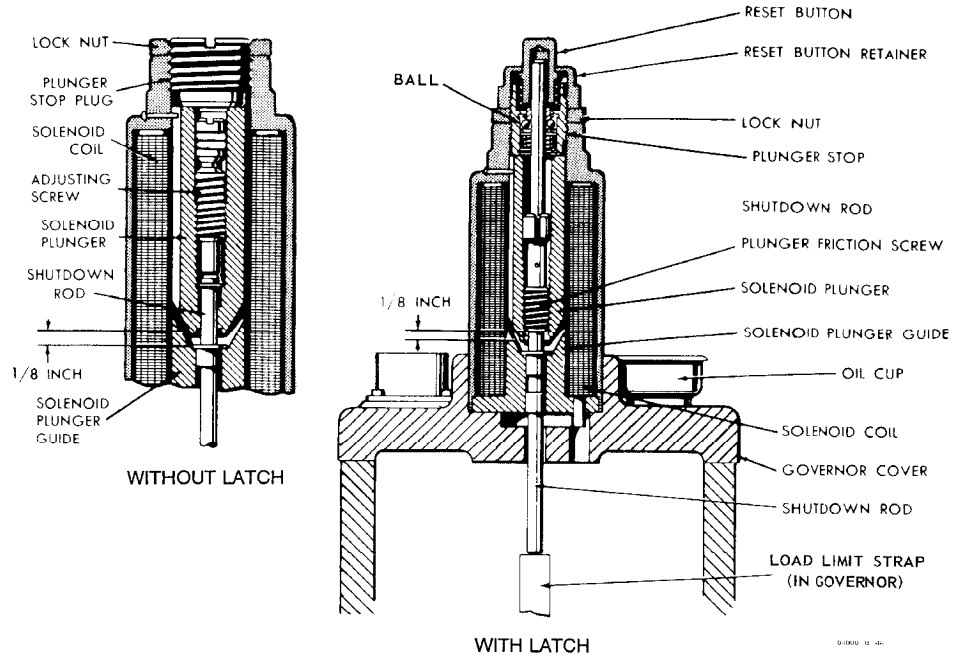


Figure 3. Energize to Shut Down Models

The energize to shut down model without the latching feature is adjusted in the following manner: Remove the plunger stop plug and, with the unit running, energize the solenoid. With the governor in operation and controlling speed, turn the slotted shutdown rod clockwise until shutdown occurs. Turn clockwise one more turn past the point of shutdown. Replace the plunger stop plug and screw it down until the solenoid plunger is tight against the solenoid plunger guide. Back off 3 to 4 turns on UG5.7, UG8, and UG12.8 governors or 4 turns on UG32 or UG40 governors. Lock in place with the lock nut. Make the final check as described in steps 5 and 6 above.

Vibration-Resistant Energize to Shut Down Model, without Latch

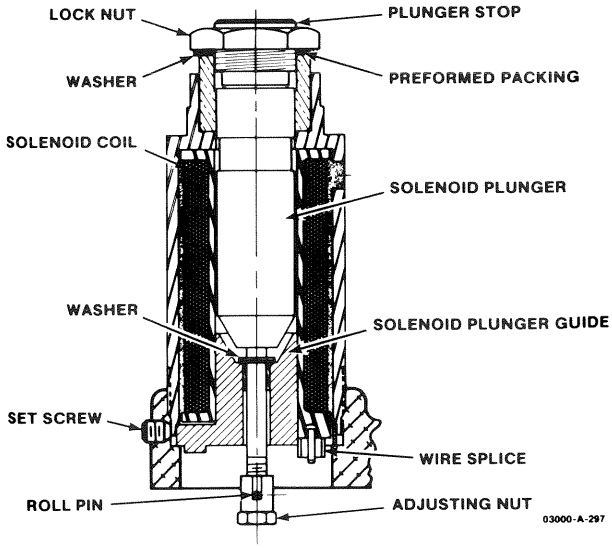


Figure 4. Vibration-Resistant Energize to Shut Down, without Latch

1. With the governor controlling and the governor cover removed: Loosen the locknut. Turn the plunger stop all the way in to immobilize the plunger, and run the adjusting nut all the way in to secure a starting position.

2. Install the cover and gasket on the governor.

NOTICE

Completely remove the cover from the governor and make the adjustments in the adjusting nut away from the governor to prevent accidentally dropping the adjusting nut into the operating governor. Extensive damage to the governor can occur should the nut drop off the end of the shaft. Should the adjusting nut thread out more than 5 turns before causing shutdown, loosen the set screw and thread the entire shutdown solenoid farther into the governor cover, then start the adjusting nut setting again.

3. With the engine running and the governor controlling engine speed, place the cover and gasket on the governor. If the engine does not shut down, remove the cover, screw the adjusting nut out one full turn, and replace the cover assembly on the governor.

4. Continue this procedure until the engine shuts down when then the cover is placed on the governor.

5. When the governor shuts the engine down when the cover is placed on the governor, remove the cover a final time and thread the adjusting nut until the roll pin can be pressed into the shaft, locking the adjusting nut into place. Do not risk dropping the roll pin into the governor while making this final installation.

6. Back out the plunger stop four turns and lock in place with the lock nut.

7. Complete the wiring to the plug on the cover and check that the application of the required voltage causes the plunger to extend from the solenoid.

8. Install the cover-solenoid assembly onto the governor and check that the engine shuts down when the solenoid is energized, and that the engine can start and run with the solenoid de-energized. Check for normal operation with the solenoid energized, making sure that the governor is not sluggish in adding fuel to pick up load. If the governor is sluggish in adding fuel to pick up load, check for excessive drag in the movement of the solenoid plunger, a misaligned shutdown rod, a bent plunger guide, or solidified preservative lubricant on any of the moving parts.

Solenoid Suppression Diodes

Solenoid coils used by Woodward, whether operated on ac or dc, have two diodes wired in the circuit as shown in Figure 5.

Diodes rectify ac to supply dc to the solenoid coils and also to provide shock hazard protection when used on ac when the ac is disconnected at the peak of a cycle (counter EMF is generated when the power is removed from the coil).

The diodes should be used on dc power solenoid coils because of the counter EMF.

IMPORTANT **Open or shorted diodes impair operation of the shutdown solenoid.**

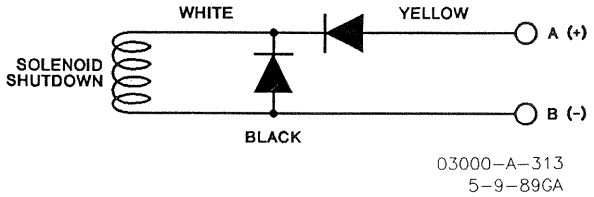


Figure 5. Solenoid Suppression Diode

Chapter 2.
Parts Lists

Parts Information

When ordering replacement parts, include the following information:
1. Governor serial number and part number shown on the nameplate.
2. Manual number (this is manual 03013).
3. Part reference number and part name from parts list.

NOTICE

Damage may result if any parts are allowed to drop into the governor. Use extreme caution when working on the shutdown solenoid. Any part that should drop into the governor must be retrieved before attempting to operate the governor.

Ref.	Part Description	Quantity
03013-1	Cable Clamp	1
03013-2	Plug	1
03013-3	Screw, 4-40 x 5/16" Fil Hd	4
03013-4	Receptacle	1
03013-5	Cover	1
03013-6	Set Screw, 10-32 x 1/4"	1
03013-7	Screw, 10-32 x 3/4" Fil Hd	4
03013-8	Split Lock Washer, No. 10	4
03013-9	Grommet	1
03013-10	Motor Seal Spring	1
03013-11	Oil Cup	1
03013-12	Bodine Motor	1
03013-13	Solenoid Case	1
03013-14	Load Spring	1
03013-15	Insulating Paper	1
03013-16	Solenoid Coil	1
03013-17	Parallel Connector	2
03013-18	Wire, White Flamenol O.D.	AR
03013-19	Wire Strap, 2 Wires	2
03013-20	Screw, Fil Hd 8-32 x 1/4"	2
03013-21	Clear Tubing 3/4" Long	2
03013-22	Air Gap Washer	1
03013-23	Solenoid Plunger	1
03013-24	Solenoid Plunger Locking Pin	1
03013-25	Not Used	
03013-26	Solenoid Plunger Guide	1
03013-27	Shutdown Spring	1
03013-28	Washer, Shutdown Spring Ret.	1
03013-29	Roll Pin, 1/16" x 1/4"	1
03013-30	Plunger Friction Screw	1
03013-31	Shutdown Rod	1
03013-32	Roll Pin	1
03013-33	Plunger Guide Bushing	2
03013-34	Solenoid Plunger Guide	1
03013-35	Latch Spring	1
03013-36	Snap Ring	1
03013-37	Shutdown Latch Knob	1
03013-38	Lock Pin	1
03013-39	Rod Extension	1
03013-40	Lock Wire	AR
03013-41	1/16 Pipe Plug	1
03013-42	Jam Nut	1
03013-43	Solenoid Plunger Guide	1
03013-44	Shutdown Rod	1
03013-45	Solenoid Case	1
03013-46	Solenoid Plunger Guide	1
03013-50	Ball Loading Spring	1
03013-51	Washer	1
03013-52	Latch Spring	1
03013-53	Shutdown Push Button	1
03013-54	Push button Retainer	1
03013-55	Plunger Stop Plug	1
03013-56	O Ring	2
03013-57	Adjusting Screw	1
03013-58	Snap Ring	1
03013-59	Shutdown Rod	1
03013-60	Solenoid Plunger	1
03013-61	Soldering Shield Washer	2
03013-62	Varnished Tubing 3/16" long	2
03013-63	Shutdown Rod	1
03013-64	Latch Rod	1
03013-65	Snap Ring	1
03013-66	Washer Assembly	1
03013-67	Ball	7
03013-68	Bushing, Ball Release	1
03013-69	Plunger Stop	1
03013-70	Diodes (Figure 4) (not shown in parts breakdown)	2
03013-71	Plunger Stop Assembly	1
03013-72	O-Ring, .739" ID x .070"	1
03013-73	Washer, .875" x 1.125" x .047"	1
03013-74	Plunger Assembly	1
03013-75	Roll Pin, .062" Dia. x .312", S.S.	1
03013-76	Solenoid Coil Assembly	1
03013-77	Solenoid Plunger Guide Assm.	1
03013-78	Adjusting Nut	1
03013-79	Not Used	
03013-80	Not Used	

Ref.	Part Description	Quantity	Ref.	Part Description	Quantity
03013-81	Socket Plug	1	03013-128	Cable Assembly	1
03013-82	Lock Nut	1	03013-129	Motor Gasket	1
03013-83	Solenoid Plunger Guide	1	03013-130	Motor	1
03013-87	Coil Assembly	1	03013-131	Lock Washer, No. 6	4
03013-85	Plunger Guide Assembly	1	03013-132	Cap Screw, 0.312-18 x 0.875	4
03013-86	Wire Splice	2	03013-133	Resistor Assembly	2
03013-87	Solenoid Nut	1	03013-134	Shakeproof Washer #4	2
03013-88	Solenoid Washer	1	03013-135	Soc. Hd. Screw, 4-40 x 0.750	2
03013-89	Plunger Assembly	1	03013-136	Gasket	1
03013-90	Roll Pin	2	03013-137	Cover	1
03013-91	Spring	1	03013-138	Oil Cup	1
03013-92	Spring Seat Washer	2	03013-139	Screw	4
03013-93	Adjusting Nut	1	03013-140	Screw, 10	4
03013-121	Motor Housing	1	03013-141	Pressure Pad	1
03013-122	Soc. Hd. Cap Screw, 10-32	8	03013-142	Printed Circuit Board	1
03013-123	Lock Washer, #10	8	03013-143	Housing Gasket	1
03013-124	Cable Assembly	1	03013-144	Cable Assembly	1
03013-125	Potting Stop	1	03013-145	Grommet	2
03013-126	Wire Protector Bushing	2	03013-146	Plug	1
03013-127	Potting Stop	1	03013-147	Wiring Harness	1

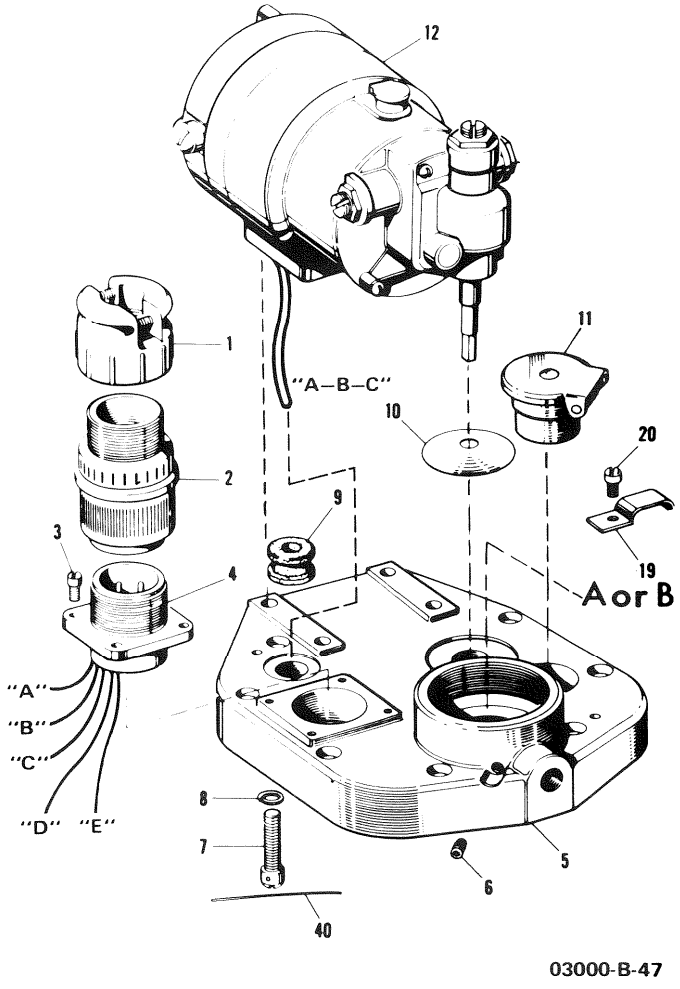


Figure 6. Cover Assembly (with speed setting motor)

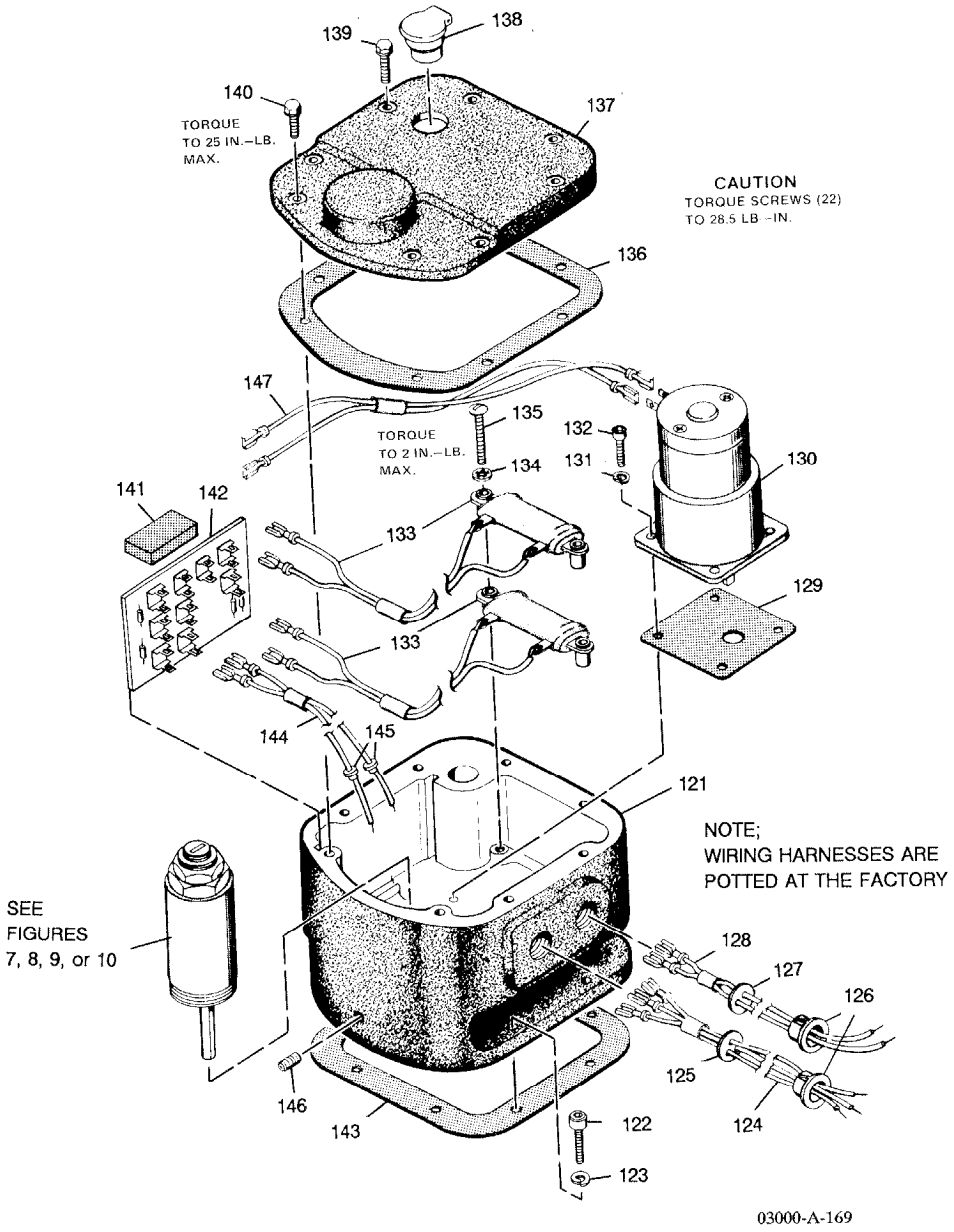


Figure 6a. PM Motor Assembly (see manual 03035)

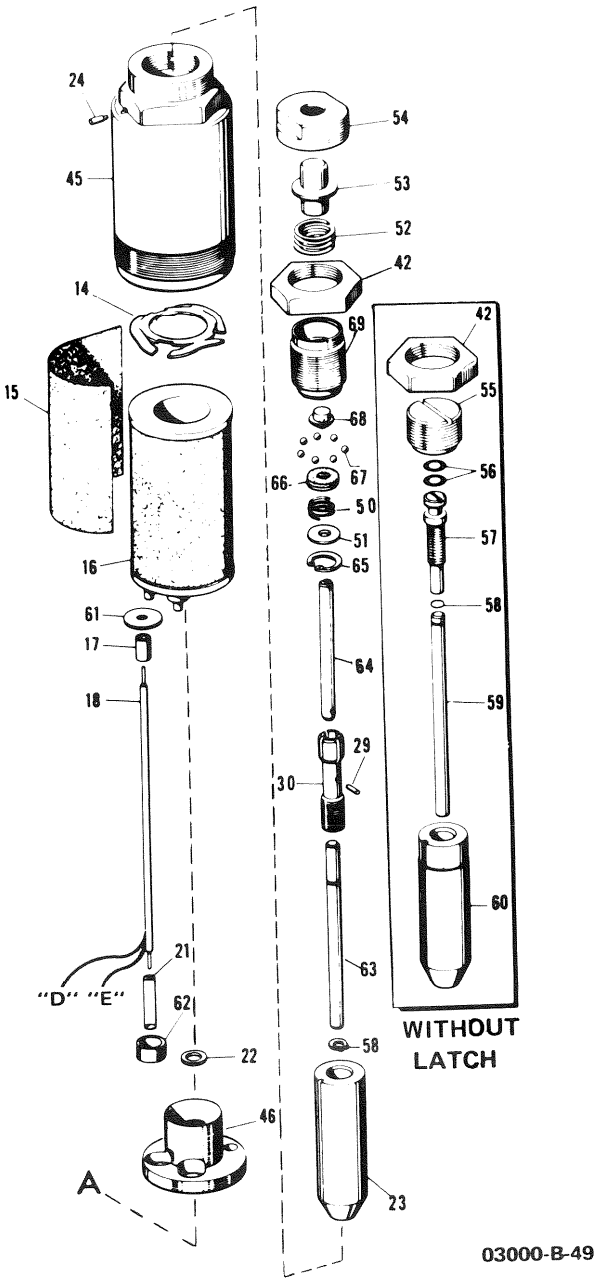


Figure 7. Energize to Shut Down with Latch

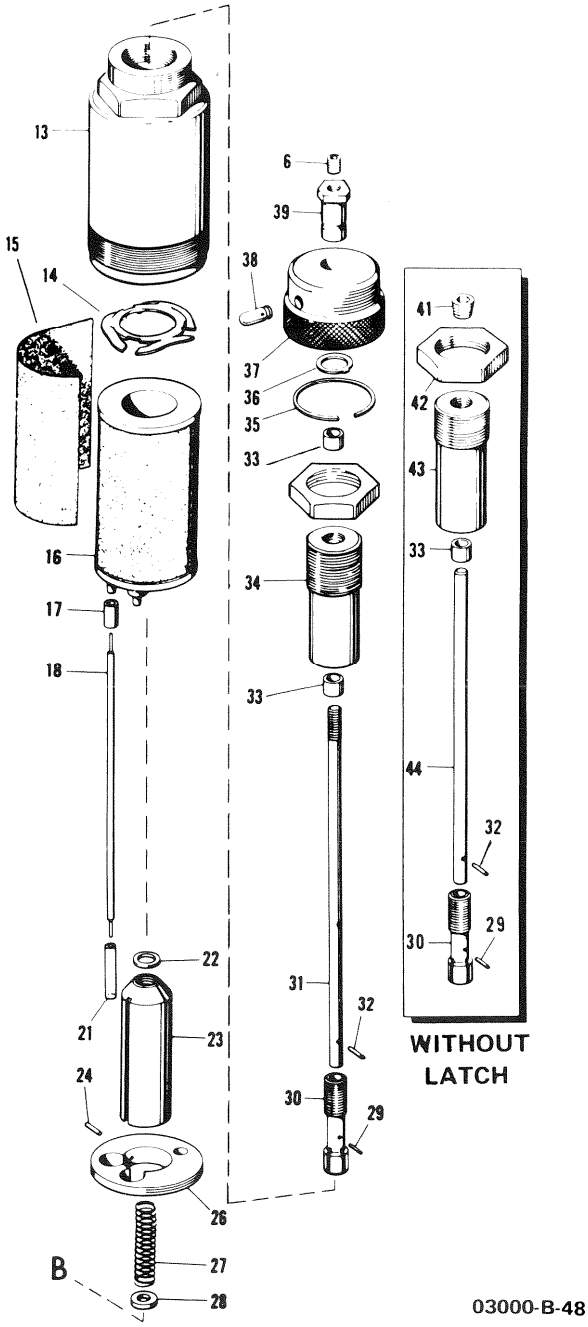


Figure 8. De-Energize to Shut Down with Latch

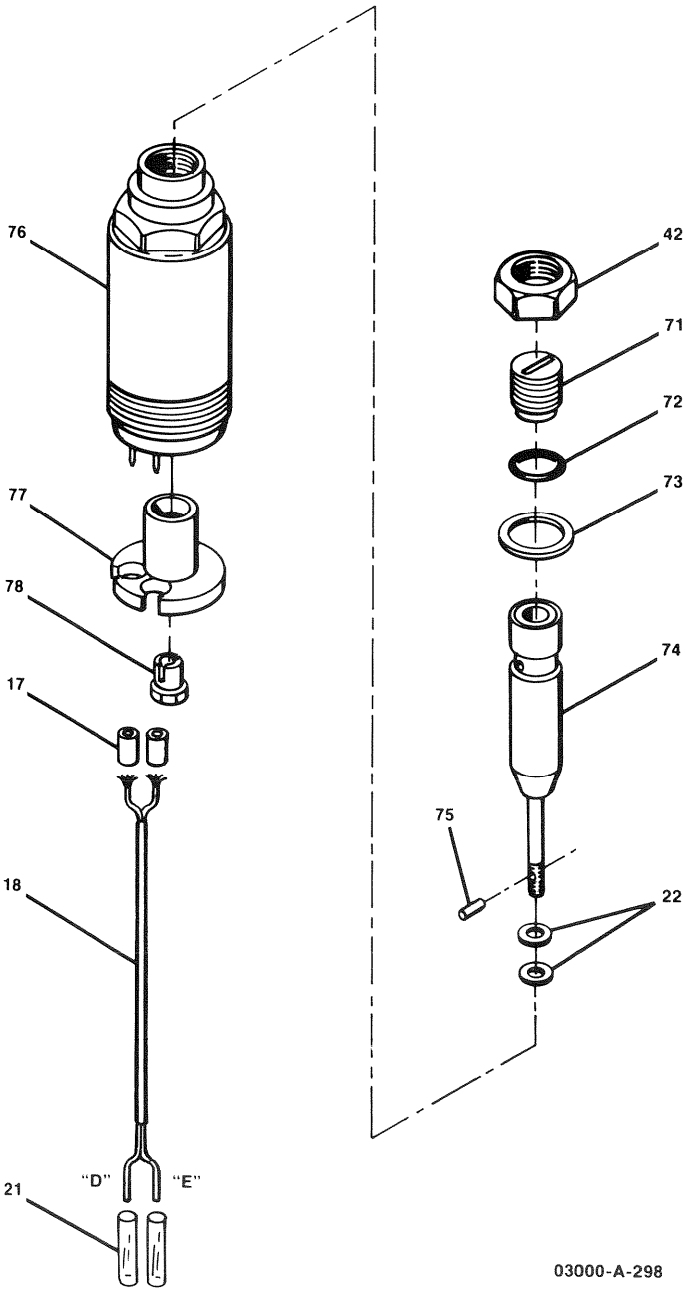


Figure 9. Vibration Resistant Energize to Shut Down, without Latch

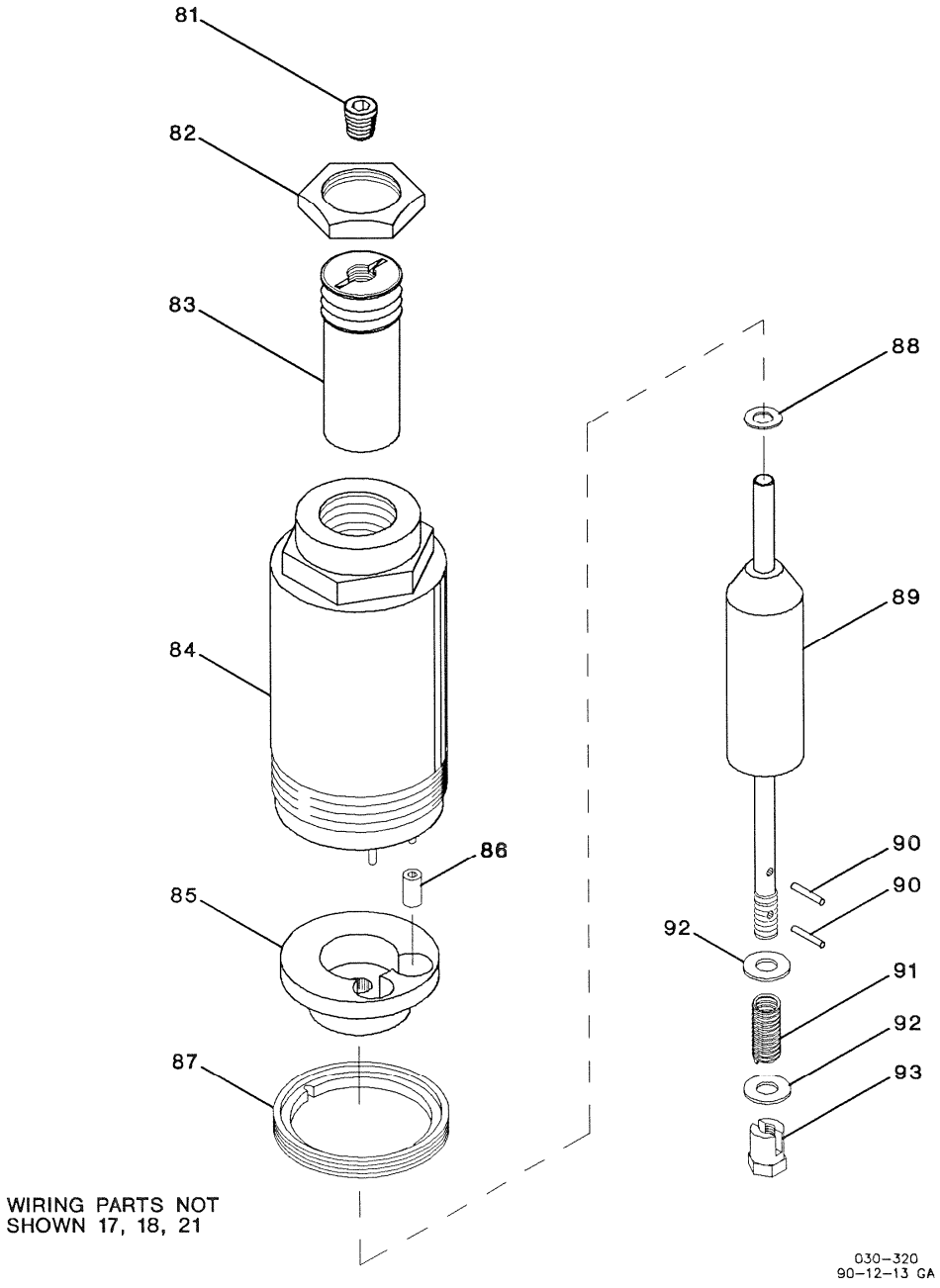


Figure 10. Vibration Resistant De-energize to Shut Down, with Latch

Chapter 3.
Product Support and Service Options

Product Support Options

If you are experiencing problems with the installation, or unsatisfactory performance of a Woodward product, the following options are available:

1. Consult the troubleshooting guide in the manual.
2. Contact the **OE Manufacturer or Packager** of your system.
3. Contact the **Woodward Business Partner** serving your area.
4. Contact Woodward technical assistance via email (**EngineHelpDesk@Woodward.com**) with detailed information on the product, application, and symptoms. Your email will be forwarded to an appropriate expert on the product and application to respond by telephone or return email.
5. If the issue cannot be resolved, you can select a further course of action to pursue based on the available services listed in this chapter.

OEM or Packager Support: Many Woodward controls and control devices are installed into the equipment system and programmed by an Original Equipment Manufacturer (OEM) or Equipment Packager at their factory. In some cases, the programming is password-protected by the OEM or packager, and they are the best source for product service and support. Warranty service for Woodward products shipped with an equipment system should also be handled through the OEM or Packager. Please review your equipment system documentation for details.

Woodward Business Partner Support: Woodward works with and supports a global network of independent business partners whose mission is to serve the users of Woodward controls, as described here:

- A **Full-Service Distributor** has the primary responsibility for sales, service, system integration solutions, technical desk support, and aftermarket marketing of standard Woodward products within a specific geographic area and market segment.
- An **Authorized Independent Service Facility (AISF)** provides authorized service that includes repairs, repair parts, and warranty service on Woodward's behalf. Service (not new unit sales) is an AISF's primary mission.
- A **Recognized Engine Retrofitter (RER)** is an independent company that does retrofits and upgrades on reciprocating gas engines and dual-fuel conversions, and can provide the full line of Woodward systems and components for the retrofits and overhauls, emission compliance upgrades, long term service contracts, emergency repairs, etc.

A current list of Woodward Business Partners is available at **www.woodward.com/directory**.

Product Service Options

Depending on the type of product, the following options for servicing Woodward products may be available through your local Full-Service Distributor or the OEM or Packager of the equipment system.

- Replacement/Exchange (24-hour service)
- Flat Rate Repair
- Flat Rate Remanufacture

Replacement/Exchange: Replacement/Exchange is a premium program designed for the user who is in need of immediate service. It allows you to request and receive a like-new replacement unit in minimum time (usually within 24 hours of the request), providing a suitable unit is available at the time of the request, thereby minimizing costly downtime.

This option allows you to call your Full-Service Distributor in the event of an unexpected outage, or in advance of a scheduled outage, to request a replacement control unit. If the unit is available at the time of the call, it can usually be shipped out within 24 hours. You replace your field control unit with the like-new replacement and return the field unit to the Full-Service Distributor.

Flat Rate Repair: Flat Rate Repair is available for many of the standard mechanical products and some of the electronic products in the field. This program offers you repair service for your products with the advantage of knowing in advance what the cost will be.

Flat Rate Remanufacture: Flat Rate Remanufacture is very similar to the Flat Rate Repair option, with the exception that the unit will be returned to you in "like-new" condition. This option is applicable to mechanical products only.

Returning Equipment for Repair

If a control (or any part of an electronic control) is to be returned for repair, please contact your Full-Service Distributor in advance to obtain Return Authorization and shipping instructions.

When shipping the item(s), attach a tag with the following information:
- return number;
- name and location where the control is installed;
- name and phone number of contact person;
- complete Woodward part number(s) and serial number(s);
- description of the problem;
- instructions describing the desired type of repair.

Packing a Control

Use the following materials when returning a complete control:
- protective caps on any connectors;
- antistatic protective bags on all electronic modules;
- packing materials that will not damage the surface of the unit;
- at least 100 mm (4 inches) of tightly packed, industry-approved packing material;
- a packing carton with double walls;
- a strong tape around the outside of the carton for increased strength.

NOTICE

To prevent damage to electronic components caused by improper handling, read and observe the precautions in Woodward manual 82715, *Guide for Handling and Protection of Electronic Controls, Printed Circuit Boards, and Modules*.

Replacement Parts

When ordering replacement parts for controls, include the following information:
- the part number(s) (XXXX-XXXX) that is on the enclosure nameplate;
- the unit serial number, which is also on the nameplate.

Engineering Services

Woodward's Full-Service Distributors offer various Engineering Services for our products. For these services, you can contact the Distributor by telephone or by email.

- Technical Support
- Product Training
- Field Service

Technical Support is available from your equipment system supplier, your local Full-Service Distributor, or from many of Woodward's worldwide locations, depending upon the product and application. This service can assist you with technical questions or problem solving during the normal business hours of the Woodward location you contact.

Product Training is available as standard classes at many Distributor locations. Customized classes are also available, which can be tailored to your needs and held at one of our Distributor locations or at your site. This training, conducted by experienced personnel, will assure that you will be able to maintain system reliability and availability.

Field Service engineering on-site support is available, depending on the product and location, from one of our Full-Service Distributors. The field engineers are experienced both on Woodward products as well as on much of the non-Woodward equipment with which our products interface.

For information on these services, please contact one of the Full-Service Distributors listed at **www.woodward.com/directory**.

Contacting Woodward's Support Organization

For the name of your nearest Woodward Full-Service Distributor or service facility, please consult our worldwide directory published at **www.woodward.com/directory**.

You can also contact the Woodward Customer Service Department at one of the following Woodward facilities to obtain the address and phone number of the nearest facility at which you can obtain information and service.

Products Used In Electrical Power Systems

Facility	Phone Number
Brazil	+55 (19) 3708 4800
China	+86 (512) 6762 6727
Germany:	
Kempen	+49 (0) 21 52 14 51
Stuttgart	+49 (711) 78954-510
India	+91 (129) 4097100
Japan	+81 (43) 213-2191
Korea	+82 (51) 636-7080
Poland	+48 12 295 13 00
United States	+1 (970) 482-5811

Products Used In Engine Systems

Facility	Phone Number
Brazil	+55 (19) 3708 4800
China	+86 (512) 6762 6727
Germany	+49 (711) 78954-510
India	+91 (129) 4097100
Japan	+81 (43) 213-2191
Korea	+82 (51) 636-7080
The Netherlands	+31 (23) 5661111
United States	+1 (970) 482-5811

Products Used In Industrial Turbomachinery Systems

Facility	Phone Number
Brazil	+55 (19) 3708 4800
China	+86 (512) 6762 6727
India	+91 (129) 4097100
Japan	+81 (43) 213-2191
Korea	+82 (51) 636-7080
The Netherlands	+31 (23) 5661111
Poland	+48 12 295 13 00
United States	+1 (970) 482-5811

For the most current product support and contact information, please visit our website directory at **www.woodward.com/directory**.

Personnel	Doc:	SMM-PER-05-F1
	Page:	1
Familiarization Checklist	Date:	29 Dec 16
	Rev:	3

LLOYD-REES, TRENTON — Name: Last, First
SLNC GOODWILL — Vessel
OCT 4, 2019 — Date

In accordance with SMS procedure SMM-PER-05, ISM Code Section 6.3 and STCW Code Section A VI/1, the following training for new employees was completed prior to being assigned shipboard duties or vessel sailing whichever takes place first, included but not limited to the following:

Section 1- GENERAL

✓	Item Reviewed
✓	Common language; communicate fluently in the English language.
✓	Certificates and inoculations; current and appropriate for rating employed.
✓	Anti-Harassment Policy, explain to employee.
✓	Drug and Alcohol Policy, explain to employee.
✓	Personal comportment; employee has read and understands firing offense list.
✓	Bulletin/Notices - Location of posted policies; company and vessel specific.
✓	Performance evaluation; employee understands policies.
✓	Medical Sign-On Form completed.
✓	Safety issues reporting; knows to report possible unsafe conditions or situations in order to prevent accidents or injuries.
✓	Waste management procedures, including segregation, stowage locations and proper disposal of waste.
✓	Basic CBRD Introduction and Notice to All U.S. Government Contractor Employees on Accessing and Protecting Classified Information **(MSC Only)**
✓	Sight Conservation Indoctrination – Review use of eye protection.
✓	Respiratory Protection Indoctrination – Review use of PPE
✓	Hearing conservation – Review of hearing protection devices
✓	Heat stress review

Section 2 - SAFETY

✓	Item Reviewed
✓	Communicate with other persons on board on elementary safety matters and understand safety information symbols, signs and alarms.
✓	Emergency duties, know what to do if: • A person falls overboard • Fire or smoke is detected • Fire or abandon ship alarm is sounded
✓	Identify muster and embarkation stations and emergency escape routes.
✓	Locate and don lifejackets.
✓	Location of immersion suits.
✓	Emergency signals, activating alarms and have basic knowledge on the location and use of fixed and portable fire extinguishers.
✓	Take immediate action upon encountering an accident or other medical emergency before seeking further medical assistance on board
✓	Close and open the fire, weathertight, and watertight doors fitted, other than for hull openings.
✓	SOPEP Locker location and contents
✓	Importance of alarms, determining root cause of alarms, and importance of promptly notifying senior shipboard personnel of alarms and/or equipment casualties.
✓	Safety Management System indoctrination including reporting of non-conformities
✓	Basic walkaround tour of vessel and relevant work areas
✓	Work area review of exit and escape areas

(b) (6), (b) (7)(C)

Section 3 - LICENSED OFFICER (To be completed within one week of joining)

✓	DECK DEPARTMENT
	Ballast control operations
	Bridge area and configuration
	Cargo Control Room (CCR)
	Cargo operations, stability
	Contingency plans
	Emergency equipment
	GMDSS
	Log books and records
	Maintenance plans and schedules
	Navigation aids
	Route planning
	Standing Orders
	Mooring equipment and ground tackle operation and maintenance
	Hazardous materials handling training
	Cargo gear maintenance
	Spare parts and ordering

✓	ENGINE DEPARTMENT
✓	HVAC system
✓	Auxiliary engines
✓	Bilge and ballast systems
✓	Boilers
✓	Contingency plans
✓	Emergency equipment
✓	Engine Control Room (ECR)
✓	Freshwater system
✓	Fuel and lube systems
✓	Log books
✓	Main Engine
✓	Maintenance plan and schedule
✓	Pollution control equipment
✓	Sanitary system
✓	Steering gear
✓	Workshop and tools
✓	Cargo gear maintenance
✓	Spare parts and ordering

[redacted]

10/7/19

[redacted]

Personnel	Doc:	SMM-PER-05-F1
	Page:	3
Familiarization Checklist	Date:	29 Dec 16
	Rev:	3

I, the undersigned person joining this vessel, have had the items listed on this page explained to me, have had a chance to question these requirements, understand what they mean with respect to my position aboard this ship, and agree to abide by them.

LLOYD-REES, TRENTON [redacted]

Print (person joining) **Signature**

[redacted]

Print (person conducting familiarization) **Signature**

10/7/19

Date

[redacted]

04 Oct 2019 | (b) (6), (b) (7)(C) | Trenton Lloyd-Rees

Sign-on Date | Position | Crewmember Name

SLNC Goodwill Sign-on Paperwork

A. Vessel Familiarization

- ✓ 1. SLNC SMM PER-05-F1 Vessel Familiarization
- ✓ 2. Security Briefing
- ✓ 3. Signed Job Description
- ✓ 4. Door Nametag
- ✓ 5. Goodwill Welcome Aboard Packet
- ✓ 6. Termination Offenses

B. Credentials

- ✓ 7. MMC
  - ✓ 1. Expiration date valid through end of discharge date? Y or N
  - ✓ 2. Certified rating for position? Y or N
  - N 3. Tankerman PIC or PIC Assist.? Y or N (N/A for Jr. 3/M Position)
  - Y 4. STCW Compliant? Y or N
  - Y 5. VSO or VPDSD? Y or N
  - N/A 6. Radar Valid Through Discharge Date? Y or N (Deck Officer Only)
  - N/A 7. TRANSAS Navi-Sailor Cert? Y or N (Deck Officers Only)
- ✓ 8. Passport
  - Y 1. Valid Through Discharge Date? Y or N
- N/A 9. GMDSS (Deck Officers Only)
- ✓ 10. TWIC Card
  - Y 1. Valid Through Discharge Date? Y or N
- ✓ 11. Shot Card
- N/A 12. Drug Free
  - N 1. Current and Valid? Y or N
- ✓ 13. USCG Medical Certificate
  - Y 1. Exp. Date Valid on STCW Time? Y or N

C. Employment Documents

Y 14. Employee Information Form

Y 1. Contact Number Y or N

Y 2. Email Y or N

Y 3. Next of kin/Emergency contact Y or N

Y 4. Signature Y or N

Y 15. I-9 Form, Page 1

Y 1. Signature Y or N

Y 2. US Citizen? Y or N If no, Proper Paperwork? Y or N

Y 16. W-4

Y 1. Box checked for single or married? Y or N

Y 2. Line 5 Filled out? Y or N

Y 17. Chesapeake Crewing Direct Deposit Form

Y 1. Routing Number Y or N

Y 2. Account Number Y or N

✓ 3. Signature Y or N

N/A 18. MMP 401K Enrollment (Deck Officers Only)

____ 19. MEBA 401K Enrollment (Engine Officers Only)

✓ 20. Chesapeake Crewing Health Statement Sign On

N 1. Allergies? Y or N (If yes make sure filled out on form)

N 2. Medical Conditions? Y or N (If yes make sure filled out on form)

N 3. Medicine required on board? Y or N (If yes make sure filled out on form)

D. Other Documents

✓ 21. Union Dispatch (c/o *Captain*)

✓ 22. Fit Test

✓ 1. Test conducted

✓ 2. Test filed in training binder

✓ 23. Internal Threat Program

✓ 1. Course taken

✓ 2. Certificate attached

✓ 3. Quiz filed in training binder

N/A 24. Extreme Weather Gear Receipt

N/A 25. SEEMP Training

N/A 1. SEEMP Polices And PP reviewed and understood.

✓ 26. MSC Credentials

N/A 1. Small Arms

✓ 2. Anti-Terrorism Level 1

N/A 3. Ship's Reaction Force

✓ 4. CBR-D

✓ 5. Cyber Security

✓ 6. Active Shooter

Person Conducting Familiarization:

(b) (6), (b) (7)(C)

New Crew Member:

TRENTON, LLOYD-2693 3/4E

SCHUYLER LINE
Navigation Company
A BOLDOCEAN COMPANY

Schuyler Line Navigation Company, LLC
M.T. SLNC GOODWILL
Ship Specific Security Brief

WELCOME ABOARD

Welcome aboard our Vessel, the MT SLNC Goodwill. This Vessel is a Commercial Oil/Chemical Tanker on long term charter to Military Sealift Command. Due to our unique status as an asset of the US Department of Defense, it makes us a unique target for those who do not appreciate our values or way of life. Through vigilance and effective security measures, we can effectively protect ourselves and our shipmates against those who wish us harm. To do this, the Vessel and all of her crewmembers are must uphold the highest security standards to protect the Ship and the facilities we visit. All crew members play a role in our security.

VISITORS

When coming aboard the Vessel, all visitors must identify themselves and state their business. If they are unwilling to comply, the Officer of the Watch must be notified immediately. The gangway watch assigns wristbands or badges to visitors depending on their business aboard:

[redacted]

- Not allowed inside Restricted Areas. Business is strictly on deck or CCR. Wrist band is assigned to people who are:
  - Longshoremen (Cargo samplers, cargo arm connectors).
  - If a group of contractors come aboard, the foreman will receive a badge, the rest will receive wrist bands.

White Badge

- Allowed inside Restricted Areas relating to their business without being escorted. This badge is assigned to people who:
  - Have a TWIC card.
  - Known by the Vessel's Crew (Example: Company Personnel, Agents).

Yellow Badge

- Allowed inside Common Areas relating to their business without being escorted. This badge is assigned to people who:
  - Hold a TWIC or CAC card.
  - Unknown to the Vessel (Example: Vendors, Military Personnel).

[redacted]

- The visitor must be escorted at all times. This badge is assigned to people who:
  - Do not hold a TWIC/CAC Card.
  - Have Government Issued Photo-ID.

If you find visitors in a Restricted Area:

- Ask what their business is.
- If they do not have a badge, escort them to the gangway and notify the Officer of the Watch.
- If they have a red badge, but are not where their work is, escort them back to their authorized workspace. Then notify the Officer of the Watch.
- If you find them suspicious, notify the Officer of the Watch.

When the Officer of the Watch is notified of suspicious or unauthorized activity, he or she shall notify the Vessel Security Officer (VSO) immediately.

An Inventory of all badges and visitor locations aboard the vessel shall be done and reported at the beginning of each watch as part of a proper turnover.

RESTRICTED AREAS

In port, access points to Restricted Areas must be locked when not in use. If open, it must be manned or monitored. Restricted Spaces include the following:

- Bridge

[redacted]

- Store rooms
- Lockers
- Engine Room
- Steering Gear Room
- Forecastle
- Hospital
- Emergency generator
- I.G. room
- Cargo Control Room.

All exterior doors must be kept locked in port to ensure that access is secured to restricted spaces. The only entry shall be through the A Deck Portside door. All personnel must pass through the Cargo Control Room. The A Deck Port Side Passageway Door (adjacent to the Smoking Room) is to remain locked at all times.

DURESS WORD
In the event of a Security Threat. muster as per the Station Bill for a security briefing and further direction.

In event of a Security Breach, the duress word shall be spoken over the Public Address System or passed by word of mouth. This is the signal to retreat to the Citadel. Lock down until the all clear is given. If attack is imminent or underway, non-essential personal will proceed to the Citadel. Engineering Officers will man the Engine Room and the Security Reaction Force (SRF) will be activated.

Security Duties
The Officer of the Watch:

- The Officer of the Watch is reports to the Vessel's Master and is responsible for:
  - Supervising the Gangway Watch and Security Rover.
  - Assisting Gangway Watch as required
  - Processing Visitors.

Gangway Watch and Security Rover:

- The Gangway Watch and Security rover report to the Officer of the Watch and are responsible for:
  - Ensuring only authorized personnel are allowed aboard.
  - Visually checking over the side and surrounding areas of the ship in port.
  - Escorting Visitors.
  - Ensuring Integrity of locks where applicable.
  - Checking the identity of embarking crewmembers and visitors.
  - Maintenance of Visitors Log.
  - Screening all persons boarding the vessel and their hand-carried articles, at rates specified by the Vessel Security Plan, Officer of the Watch, or Master.
  - Maintain security vigilance during their tour of duty
  - Challenge Unescorted Persons on board who are not properly credentialed.
  - Assist in the performance of vessel searches.
  - Report deficiencies e.g. broken or missing locks.

All crewmembers are expected to uphold the security of the Vessel by complying with these policies. By signing below, you acknowledge that you have been trained, read, understand this security briefing.

Trevor Lloyd Rees	(b) (6), (b) (7)(C)	1/7/19
Name	Signature	Date

(b) (6), (b) (7)(C)

International Organization of

Masters, Mates & Pilots

Port: Houston
13850 Gulf Freeway, Suite 250
Houston, TX 77034-0000
Phone: (281)464-9650
Online: www.bridgedeck.org Email: (b) (6), (b) (7)(C)

Master SLNC GOODWILL
This will introduce TRENTON D LLOYD-REES
Dispatched to your vessel as 3AE

Company: CHESAPEAKE CREWING, LLC
SSN: (b) (6), (b) (7)(C)
Mariner Reg#: 3757105

Assignment Information:

Date Dispatched:	9/20/2019	Report In:	9/30/2019
Date Registered:	09/20/2019	Port to:	NY/NJ
Registered List:	APP	Dues Paid to:	9/30/2019
Pay Starts:	10/02/2019	Relieving:	(b) (6), (b) (7)(C)
Return to Work Date:		For Reason of:	Assignment Complete
Length:	120 90	Assignment Type:	ROTARY
		Assignment End Date:	1/30/2020 4:00:00 AM

Remarks: Dispatch Period: 120 days
Anticipated Fly Date: o/a 31-SEP-201
Anticipated First Day Aboard: o/a 26-AUG-2016
Location where Joining Vessel: ROK

Professional Information

Passport Expiration: 7/27/2025
TWIC Expiration: 6/12/2020

License

Rank:	Serial:	Expiration:	Details:
(b) (6), (b) (7)(C)		/2024	

Endorsements	Expiration	Endorsements	Expiration	Endorsements	Expiration
DRUG-FREE	10/26/2019	VSO	5/4/2024		
OS	5/4/2024				
STCW	5/4/2024				
STCWMC	10/25/2020				
PDSD	5/4/2024				

I certify that the above Officer/Seaman has been dispatched in accordance with MM&P rules and that I have verified the above information against original documents presented to me by the Officer/Seaman named above.

9/20/2019
Date

(b) (6), (b) (7)(C)
(b) (6), (b) (7)(C)
Dispatcher

Personal Information

W-4/Mail Address

(b) (6), (b) (7)(C)

Next of Kin Information:
(b) (6), (b) (7)(C)

Cell: (b) (6), (b) (7)(C)
Email: (b) (6), (b) (7)(C)

I certify that the above Officer/Seaman has been dispatched in accordance with MM&P rules and that I have verified the above information against original documents presented to me by the Officer/Seaman named above.

9/20/2019
Date

(b) (6), (b) (7)(C)
TRENTON D LLOYD-REES (b) (6), (b) (7)(C)

(b) (6), (b) (7)(C)

Chesapeake Crewing LLC.
Employee Information Form

- - - please print clearly - - -

Name Trenton Lloyd-Rees SSN (b) (6), (b) (7)(C)

Address (b) (6), (b) (7)(C)

City (b) (6), (b) (7)(C) State (b) (6), (b) (7)(C)

Email Address (b) (6), (b) (7)(C)

Phone: Home ( ) - Cell (b) (6), (b) (7)(C)

Date of Birth (b) (6), (b) (7)(C) Birth Place (b) (6), (b) (7)(C)

Drivers License (b) (6), (b) (7)(C) Issuing State (b) (6), (b) (7)(C)

MMC # (b) (6), (b) (7)(C) Date of Issue (b) (6), (b) (7)(C)

Nearest Major Commercial Airport IAH

EMERGENCY CONTACT INFO:

Contact Name (b) (6), (b) (7)(C) Relationship Parents

Address (b) (6), (b) (7)(C)

City (b) (6), (b) (7)(C) State (b) (6), (b) (7)(C)

Phone #1 (b) (6), (b) (7)(C) #2 (b) (6), (b) (7)(C)

I understand that the above information will be entered into my permanent file. The above address provided by me will be used for tax forms and other company correspondence.

I further understand that I must notify the company as soon as there are any changes to the above information as a condition of continued employment.

Signed (Employee (b) (6), (b) (7)(C) Date 10, 6, 19

(b) (6), (b) (7)(C)

Employment Eligibility Verification

Department of Homeland Security
U.S. Citizenship and Immigration Services

USCIS
Form I-9
OMB No. 1615-0047
Expires 08/31/2019

▶**START HERE:** Read instructions carefully before completing this form. The instructions must be available, either in paper or electronically, during completion of this form. Employers are liable for errors in the completion of this form.

ANTI-DISCRIMINATION NOTICE: It is illegal to discriminate against work-authorized individuals. Employers **CANNOT** specify which document(s) an employee may present to establish employment authorization and identity. The refusal to hire or continue to employ an individual because the documentation presented has a future expiration date may also constitute illegal discrimination.

Section 1. Employee Information and Attestation *(Employees must complete and sign Section 1 of Form I-9 no later than the first day of employment, but not before accepting a job offer.)*

Last Name *(Family Name)*	First Name *(Given Name)*	Middle Initial	Other Last Names Used *(if any)*
Lloyd-Rees	Trenton	D	

(b) (6), (b) (7)(C)

I am aware that federal law provides for imprisonment and/or fines for false statements or use of false documents in connection with the completion of this form.

I attest, under penalty of perjury, that I am (check one of the following boxes):

- ☒ 1. A citizen of the United States
- ☐ 2. A noncitizen national of the United States *(See instructions)*
- ☐ 3. A lawful permanent resident (Alien Registration Number/USCIS Number): _____
- ☐ 4. An alien authorized to work until (expiration date, if applicable, mm/dd/yyyy): _____
  Some aliens may write "N/A" in the expiration date field. *(See instructions)*

Aliens authorized to work must provide only one of the following document numbers to complete Form I-9: An Alien Registration Number/USCIS Number OR Form I-94 Admission Number OR Foreign Passport Number.

1. Alien Registration Number/USCIS Number: _____
   OR
2. Form I-94 Admission Number: _____
   OR
3. Foreign Passport Number: _____
   Country of Issuance: _____

QR Code - Section 1
Do Not Write In This Space

Signature of Emplo (b) (6), (b) (7)(C) | Today's Date *(mm/dd/yyyy)* 10/6/2019

Preparer and/or Translator Certification (check one):

☐ I did not use a preparer or translator. ☐ A preparer(s) and/or translator(s) assisted the employee in completing Section 1.
(Fields below must be completed and signed when preparers and/or translators assist an employee in completing Section 1.)

I attest, under penalty of perjury, that I have assisted in the completion of Section 1 of this form and that to the best of my knowledge the information is true and correct.

Signature of Preparer or Translator		Today's Date *(mm/dd/yyyy)*	
Last Name *(Family Name)*	First Name *(Given Name)*		
Address *(Street Number and Name)*	City or Town	State	ZIP Code

STOP *Employer Completes Next Page* STOP

(b) (6), (b) (7)(C)

Form W-4 (2019)

Future developments. For the latest information about any future developments related to Form W-4, such as legislation enacted after it was published, go to *www.irs.gov/FormW4*.

Purpose. Complete Form W-4 so that your employer can withhold the correct federal income tax from your pay. Consider completing a new Form W-4 each year and when your personal or financial situation changes.

Exemption from withholding. You may claim exemption from withholding for 2019 if **both** of the following apply.

- For 2018 you had a right to a refund of **all** federal income tax withheld because you had **no** tax liability, **and**
- For 2019 you expect a refund of **all** federal income tax withheld because you expect to have **no** tax liability.

If you're exempt, complete **only** lines 1, 2, 3, 4, and 7 and sign the form to validate it. Your exemption for 2019 expires February 17, 2020. See Pub. 505, Tax Withholding and Estimated Tax, to learn more about whether you qualify for exemption from withholding.

General Instructions

If you aren't exempt, follow the rest of these instructions to determine the number of withholding allowances you should claim for withholding for 2019 and any additional amount of tax to have withheld. For regular wages, withholding must be based on allowances you claimed and may not be a flat amount or percentage of wages.

You can also use the calculator at ***www.irs.gov/W4App*** to determine your tax withholding more accurately. Consider using this calculator if you have a more complicated tax situation, such as if you have a working spouse, more than one job, or a large amount of nonwage income not subject to withholding outside of your job. After your Form W-4 takes effect, you can also use this calculator to see how the amount of tax you're having withheld compares to your projected total tax for 2019. If you use the calculator, you don't need to complete any of the worksheets for Form W-4.

Note that if you have too much tax withheld, you will receive a refund when you file your tax return. If you have too little tax withheld, you will owe tax when you file your tax return, and you might owe a penalty.

Filers with multiple jobs or working spouses. If you have more than one job at a time, or if you're married filing jointly and your spouse is also working, read all of the instructions including the instructions for the Two-Earners/Multiple Jobs Worksheet before beginning.

Nonwage income. If you have a large amount of nonwage income not subject to withholding, such as interest or dividends, consider making estimated tax payments using Form 1040-ES, Estimated Tax for Individuals. Otherwise, you might owe additional tax. Or, you can use the Deductions, Adjustments, and Additional Income Worksheet on page 3 or the calculator at *www.irs.gov/W4App* to make sure you have enough tax withheld from your paycheck. If you have pension or annuity income, see Pub. 505 or use the calculator at *www.irs.gov/W4App* to find out if you should adjust your withholding on Form W-4 or W-4P.

Nonresident alien. If you're a nonresident alien, see Notice 1392, Supplemental Form W-4 Instructions for Nonresident Aliens, before completing this form.

Specific Instructions

Personal Allowances Worksheet

Complete this worksheet on page 3 first to determine the number of withholding allowances to claim.

Line C. *Head of household please note:* Generally, you may claim head of household filing status on your tax return only if you're unmarried and pay more than 50% of the costs of keeping up a home for yourself and a qualifying individual. See Pub. 501 for more information about filing status.

Line E. Child tax credit. When you file your tax return, you may be eligible to claim a child tax credit for each of your eligible children. To qualify, the child must be under age 17 as of December 31, must be your dependent who lives with you for more than half the year, and must have a valid social security number. To learn more about this credit, see Pub. 972, Child Tax Credit. To reduce the tax withheld from your pay by taking this credit into account, follow the instructions on line E of the worksheet. On the worksheet you will be asked about your total income. For this purpose, total income includes all of your wages and other income, including income earned by a spouse if you are filing a joint return.

Line F. Credit for other dependents. When you file your tax return, you may be eligible to claim a credit for other dependents for whom a child tax credit can't be claimed, such as a qualifying child who doesn't meet the age or social security number requirement for the child tax credit, or a qualifying relative. To learn more about this credit, see Pub. 972. To reduce the tax withheld from your pay by taking this credit into account, follow the instructions on line F of the worksheet. On the worksheet, you will be asked about your total income. For this purpose, total

---

Separate here and give Form W-4 to your employer. Keep the worksheet(s) for your records.

Form **W-4** — Department of the Treasury, Internal Revenue Service

Employee's Withholding Allowance Certificate

▶ **Whether you're entitled to claim a certain number of allowances or exemption from withholding is subject to review by the IRS. Your employer may be required to send a copy of this form to the IRS.**

OMB No. 1545-0074

2019

1 Your first name and middle initial	Last name	2 Your social security number
Trenton D	Lloyd-Rees	(b) (6), (b) (7)(C)

Home address (number and street or rural route)

(b) (6), (b) (7)(C)

3 ☒ Single ☐ Married ☐ Married, but withhold at higher Single rate.

Note: If married filing separately, check "Married, but withhold at higher Single rate."

4 **If your last name differs from that shown on your social security card, check here. You must call 800-772-1213 for a replacement card.** ▶ ☐

5	Total number of allowances you're claiming (from the applicable worksheet on the following pages)	5
6	Additional amount, if any, you want withheld from each paycheck	6 $
7	I claim exemption from withholding for 2019, and I certify that I meet **both** of the following conditions for exemption. • Last year I had a right to a refund of **all** federal income tax withheld because I had **no** tax liability, **and** • This year I expect a refund of **all** federal income tax withheld because I expect to have **no** tax liability. If you meet both conditions, write "Exempt" here ▶	7

Under penalties of perjury, I declare th[illegible] belief, it is true, correct, and complete.

Employee's signature
(This form is not valid unless you sign)

(b) (6), (b) (7)(C)

Date ▶ 10/6/2019

8 Employer's name and address (**Employer:** Complete boxes 8 and 10 if sending to IRS and complete boxes 8, 9, and 10 if sending to State Directory of New Hires.)

9 First date of employment

10 Employer identification number (EIN)

(b) (6), (b) (7)(C)

income includes all of your wages and other income, including income earned by a spouse if you are filing a joint return.

Line G. Other credits. You may be able to reduce the tax withheld from your paycheck if you expect to claim other tax credits, such as tax credits for education (see Pub. 970). If you do so, your paycheck will be larger, but the amount of any refund that you receive when you file your tax return will be smaller. Follow the instructions for Worksheet 1-6 in Pub. 505 if you want to reduce your withholding to take these credits into account. Enter "-0-" on lines E and F if you use Worksheet 1-6.

Deductions, Adjustments, and Additional Income Worksheet

Complete this worksheet to determine if you're able to reduce the tax withheld from your paycheck to account for your itemized deductions and other adjustments to income, such as IRA contributions. If you do so, your refund at the end of the year will be smaller, but your paycheck will be larger. You're not required to complete this worksheet or reduce your withholding if you don't wish to do so.

You can also use this worksheet to figure out how much to increase the tax withheld from your paycheck if you have a large amount of nonwage income not subject to withholding, such as interest or dividends.

Another option is to take these items into account and make your withholding more accurate by using the calculator at *www.irs.gov/W4App*. If you use the calculator, you don't need to complete any of the worksheets for Form W-4.

Two-Earners/Multiple Jobs Worksheet

Complete this worksheet if you have more than one job at a time or are married filing jointly and have a working spouse. If you don't complete this worksheet, you might have too little tax withheld. If so, you will owe tax when you file your tax return and might be subject to a penalty.

Figure the total number of allowances you're entitled to claim and any additional amount of tax to withhold on all jobs using worksheets from only one Form W-4. Claim all allowances on the W-4 that you or your spouse file for the highest paying job in your family and claim zero allowances on Forms W-4 filed for all other jobs. For example, if you earn $60,000 per year and your spouse earns $20,000, you should complete the worksheets to determine what to enter on lines 5 and 6 of your Form W-4, and your spouse should enter zero ("-0-") on lines 5 and 6 of his or her Form W-4. See Pub. 505 for details.

Another option is to use the calculator at *www.irs.gov/W4App* to make your withholding more accurate.

Tip: If you have a working spouse and your incomes are similar, you can check the "Married, but withhold at higher Single rate" box instead of using this worksheet. If you choose this option, then each spouse should fill out the Personal Allowances Worksheet and check the "Married, but withhold at higher Single rate" box on Form W-4, but only one spouse should claim any allowances for credits or fill out the Deductions, Adjustments, and Additional Income Worksheet.

Instructions for Employer

Employees, do not complete box 8, 9, or 10. Your employer will complete these boxes if necessary.

New hire reporting. Employers are required by law to report new employees to a designated State Directory of New Hires. Employers may use Form W-4, boxes 8, 9, and 10 to comply with the new hire reporting requirement for a newly hired employee. A newly hired employee is an employee who hasn't previously been employed by the employer, or who was previously employed by the employer but has been separated from such prior employment for at least 60 consecutive days. Employers should contact the appropriate State Directory of New Hires to find out how to submit a copy of the completed Form W-4. For information and links to each designated State Directory of New Hires (including for U.S. territories), go to ***www.acf.hhs.gov/css/employers.***

If an employer is sending a copy of Form W-4 to a designated State Directory of New Hires to comply with the new hire reporting requirement for a newly hired employee, complete boxes 8, 9, and 10 as follows.

Box 8. Enter the employer's name and address. If the employer is sending a copy of this form to a State Directory of New Hires, enter the address where child support agencies should send income withholding orders.

Box 9. If the employer is sending a copy of this form to a State Directory of New Hires, enter the employee's first date of employment, which is the date services for payment were first performed by the employee. If the employer rehired the employee after the employee had been separated from the employer's service for at least 60 days, enter the rehire date.

Box 10. Enter the employer's employer identification number (EIN).

Personal Allowances Worksheet (Keep for your records.)

A	Enter "1" for yourself	A	
B	Enter "1" if you will file as married filing jointly	B	
C	Enter "1" if you will file as head of household	C	
D	Enter "1" if: • You're single, or married filing separately, and have only one job; or • You're married filing jointly, have only one job, and your spouse doesn't work; or • Your wages from a second job or your spouse's wages (or the total of both) are $1,500 or less.	D	
E	**Child tax credit.** See Pub. 972, Child Tax Credit, for more information. • If your total income will be less than $71,201 ($103,351 if married filing jointly), enter "4" for each eligible child. • If your total income will be from $71,201 to $179,050 ($103,351 to $345,850 if married filing jointly), enter "2" for each eligible child. • If your total income will be from $179,051 to $200,000 ($345,851 to $400,000 if married filing jointly), enter "1" for each eligible child. • If your total income will be higher than $200,000 ($400,000 if married filing jointly), enter "-0-"	E	
F	**Credit for other dependents.** See Pub. 972, Child Tax Credit, for more information. • If your total income will be less than $71,201 ($103,351 if married filing jointly), enter "1" for each eligible dependent. • If your total income will be from $71,201 to $179,050 ($103,351 to $345,850 if married filing jointly), enter "1" for every two dependents (for example, "-0-" for one dependent, "1" if you have two or three dependents, and "2" if you have four dependents). • If your total income will be higher than $179,050 ($345,850 if married filing jointly), enter "-0-"	F	
G	**Other credits.** If you have other credits, see Worksheet 1-6 of Pub. 505 and enter the amount from that worksheet here. If you use Worksheet 1-6, enter "-0-" on lines E and F	G	
H	Add lines A through G and enter the total here ▶	H	

For accuracy, **complete all worksheets that apply.**

- If you plan to **itemize** or **claim adjustments to income** and want to reduce your withholding, or if you have a large amount of nonwage income not subject to withholding and want to increase your withholding, see the **Deductions, Adjustments, and Additional Income Worksheet** below.
- If you **have more than one job at a time** or are **married filing jointly and you and your spouse both work,** and the combined earnings from all jobs exceed $53,000 ($24,450 if married filing jointly), see the Two-Earners/Multiple Jobs Worksheet on page 4 to avoid having too little tax withheld.
- If neither of the above situations applies, **stop here** and enter the number from line H on line 5 of Form W-4 above.

Deductions, Adjustments, and Additional Income Worksheet

Note: Use this worksheet *only* if you plan to itemize deductions, claim certain adjustments to income, or have a large amount of nonwage income not subject to withholding.

1	Enter an estimate of your 2019 itemized deductions. These include qualifying home mortgage interest, charitable contributions, state and local taxes (up to $10,000), and medical expenses in excess of 10% of your income. See Pub. 505 for details	1	$
2	Enter: $24,400 if you're married filing jointly or qualifying widow(er); $18,350 if you're head of household; $12,200 if you're single or married filing separately	2	$
3	**Subtract** line 2 from line 1. If zero or less, enter "-0-"	3	$
4	Enter an estimate of your 2019 adjustments to income, qualified business income deduction, and any additional standard deduction for age or blindness (see Pub. 505 for information about these items)	4	$
5	**Add** lines 3 and 4 and enter the total	5	$
6	Enter an estimate of your 2019 nonwage income not subject to withholding (such as dividends or interest)	6	$
7	**Subtract** line 6 from line 5. If zero, enter "-0-". If less than zero, enter the amount in parentheses	7	$
8	**Divide** the amount on line 7 by $4,200 and enter the result here. If a negative amount, enter in parentheses. Drop any fraction	8	
9	Enter the number from the **Personal Allowances Worksheet,** line H, above	9	
10	**Add** lines 8 and 9 and enter the total here. If zero or less, enter "-0-". If you plan to use the **Two-Earners/ Multiple Jobs Worksheet,** also enter this total on line 1 of that worksheet on page 4. Otherwise, **stop here** and enter this total on Form W-4, line 5, page 1	10	

Two-Earners/Multiple Jobs Worksheet

Note: Use this worksheet *only* if the instructions under line H from the **Personal Allowances Worksheet** direct you here.

1 Enter the number from the **Personal Allowances Worksheet**, line H, page 3 (or, if you used the **Deductions, Adjustments, and Additional Income Worksheet** on page 3, the number from line 10 of that worksheet) . . . . . 1 _____

2 Find the number in **Table 1** below that applies to the **LOWEST** paying job and enter it here. **However,** if you're married filing jointly and wages from the highest paying job are $75,000 or less and the combined wages for you and your spouse are $107,000 or less, don't enter more than "3" . . . . . 2 _____

3 If line 1 is **more than or equal to** line 2, subtract line 2 from line 1. Enter the result here (if zero, enter "-0-") and on Form W-4, line 5, page 1. **Do not** use the rest of this worksheet . . . . . 3 _____

Note: If line 1 is **less than** line 2, enter "-0-" on Form W-4, line 5, page 1. Complete lines 4 through 9 below to figure the additional withholding amount necessary to avoid a year-end tax bill.

4 Enter the number from line 2 of this worksheet . . . . . 4 _____

5 Enter the number from line 1 of this worksheet . . . . . 5 _____

6 **Subtract** line 5 from line 4 . . . . . 6 _____

7 Find the amount in **Table 2** below that applies to the **HIGHEST** paying job and enter it here . . . . . 7 $ _____

8 **Multiply** line 7 by line 6 and enter the result here. This is the additional annual withholding needed . . . 8 $ _____

9 **Divide** line 8 by the number of pay periods remaining in 2019. For example, divide by 18 if you're paid every 2 weeks and you complete this form on a date in late April when there are 18 pay periods remaining in 2019. Enter the result here and on Form W-4, line 6, page 1. This is the additional amount to be withheld from each paycheck . . . . . 9 $ _____

Table 1

Married Filing Jointly		All Others	
If wages from **LOWEST** paying job are—	Enter on line 2 above	If wages from **LOWEST** paying job are—	Enter on line 2 above
$0 - $5,000	0	$0 - $7,000	0
5,001 - 9,500	1	7,001 - 13,000	1
9,501 - 19,500	2	13,001 - 27,500	2
19,501 - 35,000	3	27,501 - 32,000	3
35,001 - 40,000	4	32,001 - 40,000	4
40,001 - 46,000	5	40,001 - 60,000	5
46,001 - 55,000	6	60,001 - 75,000	6
55,001 - 60,000	7	75,001 - 85,000	7
60,001 - 70,000	8	85,001 - 95,000	8
70,001 - 75,000	9	95,001 - 100,000	9
75,001 - 85,000	10	100,001 - 110,000	10
85,001 - 95,000	11	110,001 - 115,000	11
95,001 - 125,000	12	115,001 - 125,000	12
125,001 - 155,000	13	125,001 - 135,000	13
155,001 - 165,000	14	135,001 - 145,000	14
165,001 - 175,000	15	145,001 - 160,000	15
175,001 - 180,000	16	160,001 - 180,000	16
180,001 - 195,000	17	180,001 and over	17
195,001 - 205,000	18		
205,001 and over	19		

Table 2

Married Filing Jointly		All Others	
If wages from **HIGHEST** paying job are—	Enter on line 7 above	If wages from **HIGHEST** paying job are—	Enter on line 7 above
$0 - $24,900	$420	$0 - $7,200	$420
24,901 - 84,450	500	7,201 - 36,975	500
84,451 - 173,900	910	36,976 - 81,700	910
173,901 - 326,950	1,000	81,701 - 158,225	1,000
326,951 - 413,700	1,000	158,226 - 201,600	1,000
413,701 - 617,850	1,450	201,601 - 507,800	1,450
617,851 and over	1,540	507,801 and over	1,540

Privacy Act and Paperwork Reduction Act Notice. We ask for the information on this form to carry out the Internal Revenue laws of the United States. Internal Revenue Code sections 3402(f)(2) and 6109 and their regulations require you to provide this information; your employer uses it to determine your federal income tax withholding. Failure to provide a properly completed form will result in your being treated as a single person who claims no withholding allowances; providing fraudulent information may subject you to penalties. Routine uses of this information include giving it to the Department of Justice for civil and criminal litigation; to cities, states, the District of Columbia, and U.S. commonwealths and possessions for use in administering their tax laws; and to the Department of Health and Human Services for use in the National Directory of New Hires. We may also disclose this information to other countries under a tax treaty, to federal and state agencies to enforce federal nontax criminal laws, or to federal law enforcement and intelligence agencies to combat terrorism.

You aren't required to provide the information requested on a form that's subject to the Paperwork Reduction Act unless the form displays a valid OMB control number. Books or records relating to a form or its instructions must be retained as long as their contents may become material in the administration of any Internal Revenue law. Generally, tax returns and return information are confidential, as required by Code section 6103.

The average time and expenses required to complete and file this form will vary depending on individual circumstances. For estimated averages, see the instructions for your income tax return.

If you have suggestions for making this form simpler, we would be happy to hear from you. See the instructions for your income tax return.

[redacted]

Employee Direct Deposit Enrollment Form

Payroll Manager—Please complete this section.

Company Code: _____ Company Name: _____ Date: _____

Payroll Mgr. Name: _____ Payroll Mgr. Signature: _____

To enroll in Full Service Direct Deposit, simply fill out this form and give it to your payroll manager. Attach a voided check for each checking account – not a deposit slip. If depositing to a savings account, ask your bank to give you the Routing/Transit Number for your account. It isn't always the same as the number on a savings deposit slip. This will help ensure that you are paid correctly.

[redacted]

(A 9-digit number always between these two marks)	Checking Account #	Check # (this number matches the number in the upper right corner of the check—not needed for sign-up)

Important! Please read and sign before completing and submitting.

I hereby authorize my employer (hereinafter "Company") to deposit any amounts owed me by initiating credit entries to my accounts at the financial institutions (hereinafter "Bank") indicated on this form. Further, I authorize Bank to accept and to credit any credit entries indicated by Company to my accounts. Unless prohibited by applicable law, in the event that Employer deposits funds erroneously into my account, I authorize Employer, either directly or through its payroll service provider, to debit my account for an amount not to exceed the original amount of the erroneous credit.

This authorization is to remain in full force and effect until Company and Bank have received written notice from me of its termination in such time and in such manner as to afford Company and Bank reasonable opportunity to act on it.

Employee Name: [redacted]

Employee Signature: [redacted] Date: 10/6/19

Account Information

The last item must be for the remaining amount owed to you. To distribute to more accounts, please complete another form. **Make sure to indicate what kind of account, along with amount to be deposited, if less than your total net paycheck.**

1. Bank Name/City/State: [redacted]

Routing/Transit #: [redacted]

☐Checking ☐ Savings ☐ Other I wish to deposit: $ _____ . ____ or ☒ Entire Net Amount

2. Bank Name/City/State: _____

Routing/Transit #: _____ Account Number: _____

☐Checking ☐ Savings ☐ Other I wish to deposit: $ _____ . ____ or ☐ Entire Net Amount

3. Bank Name/City/State: _____

Routing/Transit #: _____ Account Number: _____

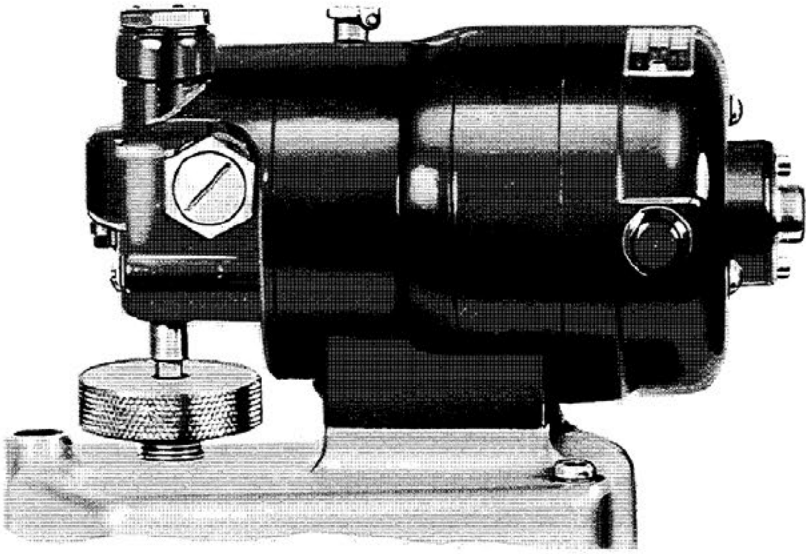
☐Checking ☐ Savings ☐ Other I wish to deposit: $ _____ . ____ or ☐ Entire Net Amount

ATTENTION PAYROLL MANAGER:
Employers must keep each original employee enrollment form on file as long as the employee is using FSDD, and for two years thereafter.

[redacted]

WOODWARD

Product Manual 03505
(Revision D)
Original Instructions



Speed Adjusting (Synchronizing) Motor

Parts Catalog and Lubrication Guide

Operation Manual

IMPORTANT

This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.

DEFINITIONS

- **DANGER**—Indicates a hazardous situation which, if not avoided, will result in death or serious injury.
- **WARNING**—Indicates a hazardous situation which, if not avoided, could result in death or serious injury.
- **CAUTION**—Indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.
- **NOTICE**—Indicates a hazard that could result in property damage only (including damage to the control).
- **IMPORTANT**—Designates an operating tip or maintenance suggestion.

WARNING

The engine, turbine, or other type of prime mover should be equipped with an overspeed shutdown device to protect against runaway or damage to the prime mover with possible personal injury, loss of life, or property damage.

The overspeed shutdown device must be totally independent of the prime mover control system. An overtemperature or overpressure shutdown device may also be needed for safety, as appropriate.

Read this entire manual and all other publications pertaining to the work to be performed before installing, operating, or servicing this equipment. Practice all plant and safety instructions and precautions. Failure to follow instructions can cause personal injury and/or property damage.

This publication may have been revised or updated since this copy was produced. To verify that you have the latest revision, be sure to check the *publications page* on the Woodward website:

www.woodward.com/publications

The current revision and distribution restriction of all publications are shown in manual *26311*.

The latest version of most publications is available on the *publications page*. If your publication is not there, please contact your customer service representative to get the latest copy.

Any unauthorized modifications to or use of this equipment outside its specified mechanical, electrical, or other operating limits may cause personal injury and/or property damage, including damage to the equipment. Any such unauthorized modifications: (i) constitute "misuse" and/or "negligence" within the meaning of the product warranty thereby excluding warranty coverage for any resulting damage, and (ii) invalidate product certifications or listings.

NOTICE

To prevent damage to a control system that uses an alternator or battery-charging device, make sure the charging device is turned off before disconnecting the battery from the system.

NOTICE

To prevent damage to electronic components caused by improper handling, read and observe the precautions in Woodward manual *82715*, *Guide for Handling and Protection of Electronic Controls, Printed Circuit Boards, and Modules*.

Speed Adjusting (Synchronizing) Motor

General Information

The motor most often used for speed adjusting or synchronizing purposes on Woodward engine and turbine controls is the Bodine type V10R motor with integral worm gear speed reducer. This manual describes the maintenance of these motors.

Lubricating Instructions

The following instructions apply to this motor model regardless of voltage input or output shaft speed.

Bearings

Use Royal A oil or a good 10 weight oil for bearing lubrication. Under normal, intermittent operation, apply 5 drops of oil to the oil hole and oil cup every year. If the motor is run for long periods of time, apply 5 drops of oil to the oil hole and oil cup every six months.

Speed Reduction Gearbox

The speed reduction gear housing of a new motor is filled with sufficient lubricant to last for two years under normal, intermittent operation. Under extensive use, when the motor is run for long periods of time, the lubricant will last about one year.

To replace grease, remove screws a, b, and c (see Figure 2) and slip off the gear housing, (see Figure 3). Clean out the old grease from the housing, and refill the gear housing 3/4 full with one of the following greases:

- Bodine Grease
- Supermil Grease No. A 72832, by Standard Oil Company
- Dow Corning Grease No. 44, when specified (temperature range is –40 to +400 °F/–40 to +204 °C)

Make sure the ball thrust bearing is reinstalled with the gear box.

Adjustments

Adjustments are unnecessary unless one of the locknuts securing the adjusting screws should loosen, changing the adjustment. In this case there are three adjustments possible with the gear housing removed.

1st Adjustment—At d of Figure 2, turn the screw in until it is hand tight, then back it off one quarter turn and tighten the locknut while holding the adjusting screw stationary. Rotate the bakelite gear (5 in Figure 2) to make sure it turns freely. Check the output shaft for endplay by pulling it in the lengthwise direction while holding the gear housing firmly. When adjusted properly, the output shaft should show no visible movement.

2nd Adjustment—At e of Figure 2 (both sides of the worm shaft), turn the worm adjusting screws to center the worm shaft with the output shaft. Check visually to determine proper alignment of the two gears. The worm adjusting screws should be positioned so each protrudes equally from its locknut when hand-tight. After hand tightening, the worm adjusting screws should be loosened just enough so that the bakelite gear (5 in Figure 2) turns freely and there is no side play in the worm shaft.

3rd Adjustment—With the gear housing reassembled on the motor, hold the motor firmly and shake it in a lengthwise direction. If a faint clicking sound is heard inside the motor, then an adjustment should be made. At f of Figure 3, with the locknut loosened, turn the screw in just enough to take the play out of the armature shaft. Adjust the screw so that the clicking sound is absent, then back the screw up a few degrees. Check by shaking the motor again. If the clicking sound is there again, adjust the screw forward approximately one-half the number of degrees it was reversed and tighten the locknut while holding the adjusting screw stationary. Check again, and with the absence of the clicking sound, this should be the approximate adjustment.

IMPORTANT

Do not bind the armature.

3rd Adjustment on Optional Bodine Motor Friction Loading Kit—This adjustment can be made only on V10R motors equipped with Bodine Motor Friction Loading Kits. This is shown in Figure 4. To take play out of the armature shaft, start with the adjustment screw loose and tighten until the motor slows. Then back up the screw until normal speed is just regained. Tighten the locknut while holding adjusting screw stationary.

⚠WARNING

This adjustment is not to be used to slow the speed of the motor. It is only used to take end play out of the armature shaft and to stop possible armature rotation caused by vibration from the engine when the motor is not powered.

Principal Replacement Parts

When requesting information concerning V10R Bodine Motors, or when ordering repair parts, it is essential that the following information accompany the request:

- Serial number of governor and motor type
- Voltage of motor
- Part number, name of part, or description of part
- Manual number (this is manual 03505)

Ref. No.	Part Name	Quantity	Ref. No.	Part Name	Quantity
03505-1	Motor Brush	2	03505-9	End Shield, Front	1
03505-2	Brush Spring	2	03505-10	Gear Housing Assy.	1
03505-3	Brush and Spring Assy.	2	03505-11	Field Frame Assy. Complete	1
03505-4	Worm Shaft	1	03505-12	Armature Wound Complete	1
03505-5	Bakelite Gear	1	03505-13	Output Shaft	1
03505-6	Brushholder Cap Screw	2	03505-14	Ball Thrust Washer	1
03505-7	Brushholder	2	03505-15	Spring	1
03505-8	Bronze Gear	1	03505-16	Screw	1

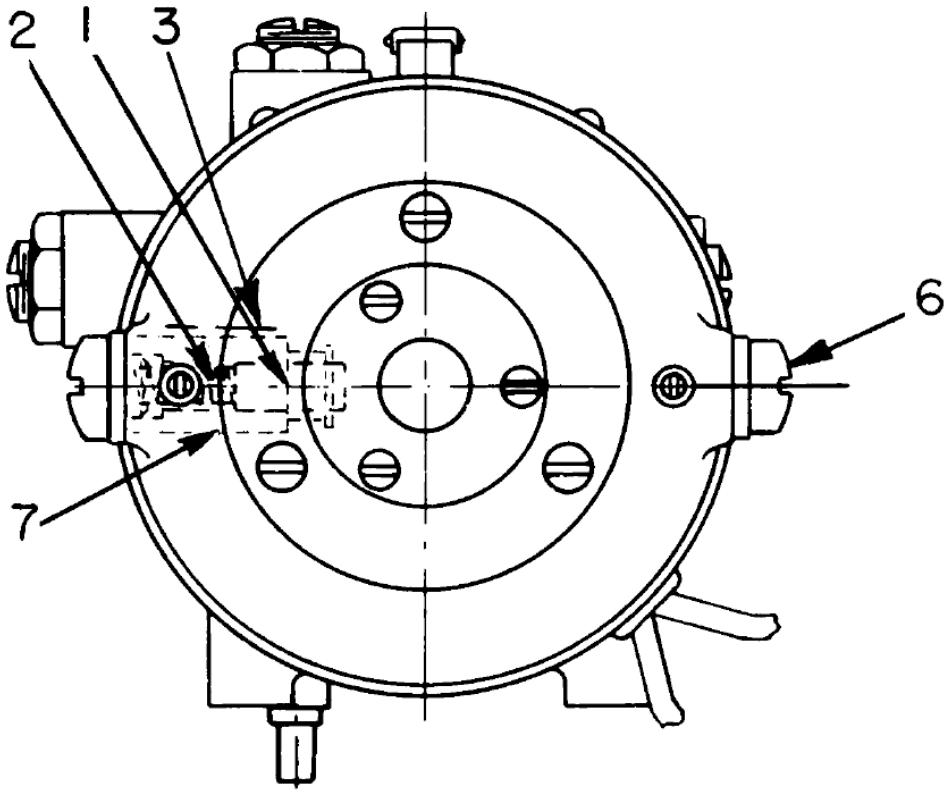


Figure 1

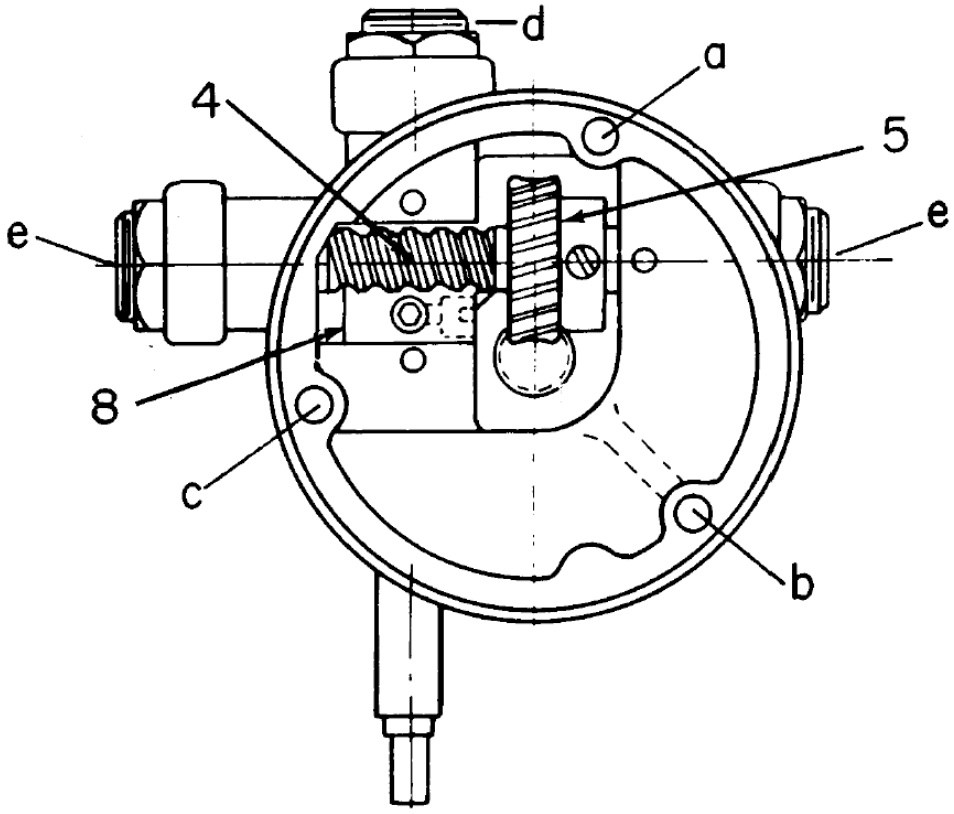


Figure 2

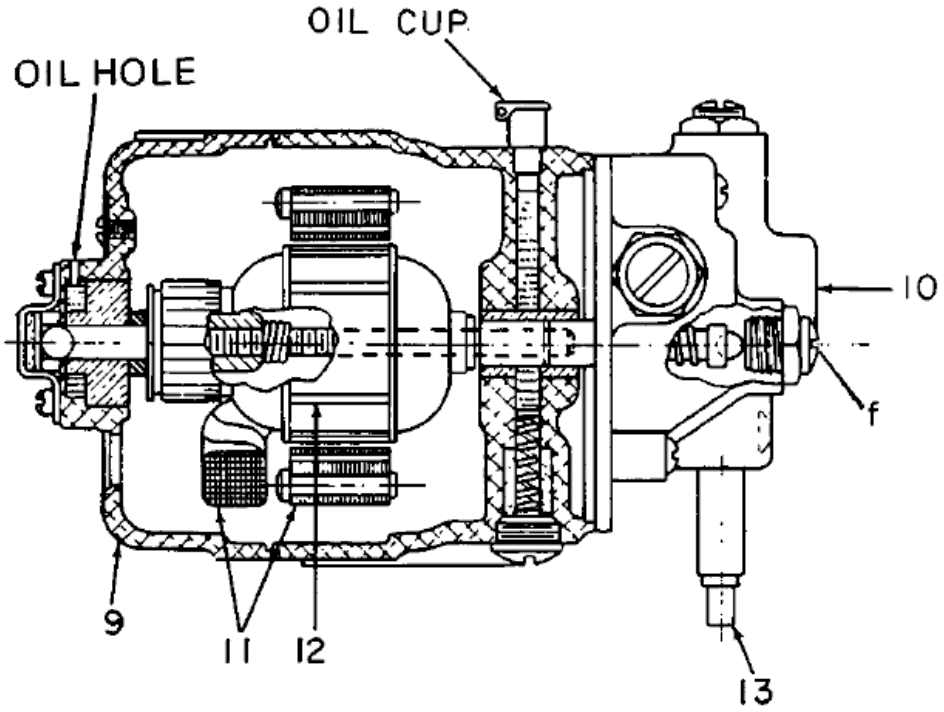


Figure 3

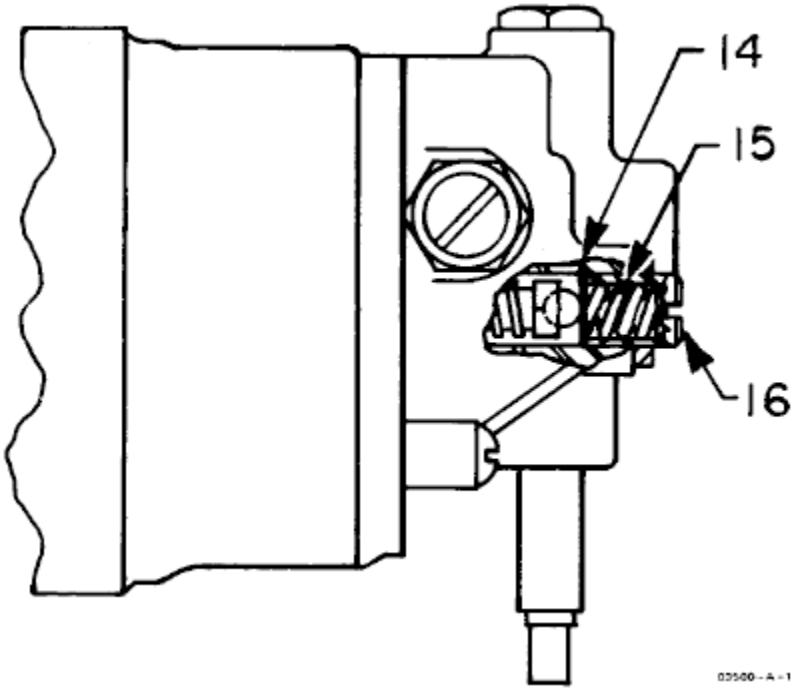


Figure 4

S/NC Goodwill - Engine Room Casualty w/ FA [redacted] HAG

me: MED-PIC / 2ND MATE

~1330 awoke to a large thud. audible from D deck, and the whole ship jerked.

I started getting dressed. The general alarm was sounding before my boots were on...

Radio on: heard of a crew member "down" injured in the E/R. I headed to the hospital.

When I got to the hospital, the emergency squad was on their way to the scene with Trauma & Resuscitation go-bags.

I reported in by radio and was told to make the hospital ready to receive a patient.

I cleared off the bed, unlocked the cabinets and waited while wondering what else I could get ready.

3AE was carried in on a backboard but not fully strapped down. unconscious, pale, covered in soot/oil, abrasions possible burns, with a serious neck wound pulsing arterial.

We treated for shock - elevated legs. - O2 started.
We cut off his shirt and belt and right upper thigh.
Initial Assessment found: abrasions to his arm, right torso, neck wound on right side of his neck (arterial pulsing flow), and he responded to anywhere we touched as being painful.

Everything hurt him. He was incoherent in pain. When he wasn't delirious with pain, he was complaining that he couldn't breathe. Asking to sit up to cough.

[redacted]

We had trouble keeping his O_2 mask on him, and had the 2AE holding it on him, even as he complained he couldn't breathe

The arterial neck wound - one of the AB's was holding constant pressure on it. gauze was added every few minutes.

I bandaged his arms where they were scrapped and bleeding.

The Captain was there with MAS on the sat phone, we tried to start an IV.

I failed 2 IV's, 3rd one went in, was good.
barely had a tape on it when he jerked his arm out of grasp. It knocked out the IV.

3M was assigned to talking to MAS. AED applied. NO SHOCK

I tried another IV. no good.

We got approval from MAS for 1mL morphine. @1427
without the IV, we opted for intermuscular
Morphine was given.
it didn't seem to ease any pain initially

Another IV attempted in left hand, succeeded. Drip started.

3AE in and out of consciousness. AED - NO SHOCK

MAS authorizes epi-pen from trauma bag w/ 3AE
unconscious. @ 1533

Listing meds onboard to MAS - they want more epi-pen.
OS gets his personal epi-pen. administered. ~1540?

3AE unconscious. Blood pressures steady at first, 135/99

We lose pulse. CPR started. @ 1528. AED - no shock

IV drip not going in. embolise? local puffing and drip not going in affectively. removed.

MAS asks to ventilate right lung with IV needle.

CPR continues. AED - no shock

Nasal airway inserted. CPR continues.

MAS asks again to ventilate lung with IV needle. First one has fallen out. New one inserted.

CPR continues AED - no shock

Captain consults MAS, returns and makes the decision to stop CPR. All agree that we've done all we can, helo estimates more than 30 minutes out.

Crew preparing for helo-ops. Crew told to rest and be ready for emergency tow-ops. AED disconnected. O_2 stopped.

I start cleaning up hospital. Radio UHF - Japan doctor says to resume CPR until helo arrives.

CPR resumes. With helo in sight? we prepare basket for 3AE transport. Carry him on deck outside hospital. Japanese doctor has us continue CPR on deck with their AED. Still no shock advised. 3AE transported to stern to be med-evac'd.

I continued to clean up the hospital until I was told to stop and rest until I'm needed for emergency tow. Hospital locked up. emergency tow estimated arrival 20:00.

No AC - I go up to the bridge for some air.

I offer to take the watch (my normal watch hours). CAPT checks that I've eaten and had water. I confirm that I can stand watch until 20:00 at least and let the 3M step below for food.

I create a voyage plan to Sasebo for anchoring. CAPTAIN reviews it and approves it.

20:00 I'm relieved of watch for rest. Vessel drifting NUC with 1 generator online - no propulsion. There was communication with JAPAN COAST GUARD that if we get w/in 6 NM of shore we will accept e-tow from on station cutter, but we are awaiting salvage tug arrival.

//

0400-0800 watch 06AUG20.

We are underway w/ our own propulsion, following voyage plan track to SASEBO for safe harbor anchorage for repairs.

0800-1200. Continue cleaning hospital - inventory to be done and re-order supplies after.

1600-2000 AT ANCHOR SASEBO, JP.

(b) (6), (b) (7)(C)

(b) (6), (b) (7)(C)

Chief Engineer's Statement 08 AUGUST 2020

On 03 August 2020 DG#1 when started was observed to hunt excessively. Upon troubleshooting it was determined to change the governor and install overhauled spare in stock. This overhauled spare was taken from storage location and inspected for use.

04 August 2020 First Assistant Engineer and Third Assistant Engineer removed old governor and installed new one. I came down to see how progress was made and gave a hand with installing the new one. This was not completed due being at the end of the work day. It was decided to continue the following day.

05 August 2020 after lunch time the First Assistant Engineer and Third Assistant Engineer completed final assembly items of the governor. I came down to the engine room to see their progress. Everything was ready and the engine was inspected to ensure all items in correct status prior to starting the engine. I was located at the after end of the generator room between #1 and #2 generators. First Assistant Engineer and Third Assistant Engineer were facing the starting box and governor assembly. Engine was started, came up to speed, hunted for a few seconds and then shut off on overspeed as indicated on the starting box. Parameters were double checked, governor parameters checked and overspeed device reset. It was decided to try this again in order to determine what the cause of the engine hunting was. Engine was started, sped up fast and seemed like it went past overspeed rpm. First Assistant engineer tried shut the engine down at the starting box without any success. Then he ran over to the mechanical overspeed device to attempt to shut down the engine. I yelled over for them to get out of the way and at that point something seemed to break on the engine with smoke coming from it, explosion happened and then the lights went out. All of this happened very quickly. I got my flashlight out and turned it on, then proceeded through the #3DG room and coming out of the forward exit. As I went through the #3 generator room I observed it was still running but no power being supplied. As I exited the #3 generator room the emergency lights came on. I then proceed to call for the First Assistant and Third Assistant Engineer. I went into the #1 and #2 generator room, all lights were out, smoke in the air, water spraying in different directions. I found the Third Assistant Engineer laying on the deck with a piece of the flywheel leaned up against his torso. I ran over calling his name with no response and pulled the piece of flywheel away from him. I saw a cut by the lower part of his throat and I put a rag I found on it, applied pressure and held his head stable calling for help. Then proceeded to check for breathing and he was breathing but unconscious. By then the Chief Mate and emergency team arrived to help me move the Third Assistant Engineer out of the #1 and #2 Generator Room. The emergency team began to administer first aid and stabilize the Third Assistant Engineer in order to move him to the ship's hospital.

I was then called by the Captain to provide an assessment of the main power and propulsion. I gave him a status report and then I was ordered to get the engine crew and begin restoring power and propulsion.

DG3 oil temperature was hot by this time and no 24VDC supply to tachometer start box and control relays. We had to secure DG3 until these issues were corrected. Went to establish condition of start air pressure and found one bottle had air supply and the other depleted. 1AE began working on start air supply, securing the isolation valves for DG1 and DG2 and ensured start air supply for DG3 was healthy. Also he started the emergency air compressor.

(b) (6), (b) (7)(C)

At this point the K-Chief system was supposed to still be operating due to UPS battery supplies, however these units were offline. I then ran extension cords to the K-Chief computers and restarted them.

Then I fabricated a 220VAC to 24VDC power supply to get ready to install on #3 just in case this unit could not be started. We then established that there was sufficient air to start DG3 with the emergency air start device.

DG3 was started and put online but cooling water supply was not cooling the generator lube oil. We then checked the regulating valve and tried to open this manually. After it was opened manually it would close again due to not having the 24VDC signal to stay open. We shut the power back off and secured the generator until we could get the regulating valve open. Opened the valve manually and removed the terminal cables from the unit and then decided to start again.

DG3 was started, put online and sea water and LT cooling pumps energized. DG3 began to cool off and operate successfully. We then proceeded to line up fuel supply for diesel fuel operation. After lining up diesel fuel operation we bled the oil from the exhaust valves on the main engine and then prepared main engine for operation. Rolled over on gear and tested on starting air. Test successful. Gave control to Bridge and Propulsion restored.

(b) (6), (b) (7)(C)

Chief Engineer SLNC GOODWILL

(b) (4)

August 6, 2020

Statement to the Events of 05 August 2020

- Working in the focsle when the ship went quiet and dark.
- Called by Capt. multiple alarms on the fire and water mist detector panel in the ER
- Ran back to the house and proceeded into the ER
- Immediately upon opening of the engine room space there was smoke, steam and it was hot.
- Proceeded to the Generator Flat and looked for fire, no fire noted, reported no fire to the bridge.
- Saw the CE in between the No1 and No2 Generator calling for help. He was holding the 3AE
- Reported medical emergency to bridge
- Proceeded to assist CE in moving the 3AE from the scene of the accident into the main engine room.
- Transferred 3AE to stretcher with neck collar in place
- Moved 3AE up to hospital
- Once on Upper deck, broke off from transporting to check IGG space for fire, due to alarm reported from the bridge.
- On arrival to hospital MAS phone handed to me by Capt.
- Started conversation with MAS and reported what was asked described injuries, bruising and assigned people to do jobs, get vitals, try to stick an IV, provide oxygen, connected the AED, etc.
- Noted complications with breathing, short rapid breaths
- Multiple attempts with MAS to understand procedure to release fluid or air trapped in lung. After failure to understand handed phone off to 4M to see if he could understand procedure. Continued to stick 3 times to relieve pressure, never noted any air or liquid coming out.
- Weakening breath, until finally ceased to breath
- Immediately started CPR, tried to establish radial pulse
- Continued CPR 30 compressions and 2 breaths as instructed by MAS
- 1620 At instruction of Capt and MAS checked pupils twice with flashlight, no response. Ordered to stop providing CPR.
- 1626 on order of Japanese Coast Guard resumed CPR
- Approximately 5 mins before arrival of helicopter proceeded on deck to ensure no loose items and everything was secured.
- Met helicopter crew at the Hospital, JP Coast Guard placed AED on 3AE, ordered to continue CPR
- Transported 3AE to stbd stern
- Transferred to JP Coast Guard stokes litter
- JP Coast Guard winched off ship.

(b) (6), (b) (7)(C)

(b) (6), (b) (7)(C)

JWE 제원엔지니어링
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Home page : http://www.jewonepg.co.kr
E-mail (b) (6), (b) (7)(C)

Registered ISO 9001:2008

WOODWARD Business Partner

WORK COMPLETION REPORT

JEWON ENGINEERING
Technical Repairing Team

- CUSTOMER/END USER : SCHUYLERLINE
- Location : BUSAN / Rep of KOREA
- Site / Ship(Hull)'s Name : M/V SLNC GOODWILL
- Reason : UG-8D GOVERNOR 1 SET OVERHAUL
- Charged Person : (b) (6), (b) (7)(C)
- GOVERNOR INFORMATION
  1. Governor Manufacturer : WOODWARD
  2. Governor Vendor/Type : UG-8D
  3. Governor P/N & S/N : Part No. : 8521-0047DC, Serial No. : 14639129

- TIME TABLE for TRAVEL/WORK SERVICE

DATE	TIME for WORK				TIME for TRAVEL		REMARKS
	Start Time	End Time	Reg. Times	Over Times	Reg. Times	Over Times	
2019.07.08							Received
-							Overhauled
2019.07.22							Exchange

MT SLNC GOODWILL CHIEF ENGINEER DATE: #9448

JEWON ENGINEERING CO., JWE 제원엔지니어링

I certify and confirm that the works contained in this report has been completed to my satisfaction and list of replacement is correct.

CUSTOMER Signature
(b) (6), (b) (7)(C)

SERVICE ENGINEER Signature
(b) (6), (b) (7)(C)
(b) (6), (b) (7)(C)
(b) (6), (b) (7)(C)

JWE 제원엔지니어링

#472-30 Gupyoung-dong Saha-gu Busan Korea Home page : http://www.jewoneng.com
Tel.(051)264-1375~7 Fax.(051)264-1374 E-mail (b) (6), (b) (7)(C)

Registered ISO 9001:2008

WOODWARD Business Partner

DEFECTIVE & USED SPARE PARTS

	Part. Name.	Reference No.	Part. No.	Number	Unit	Remark
1	DIAL PLATE		3099-935	1	EA	
2	BALLHEAD ASSEMBLY		31507	1	SET	MODIFYING
3	DIAL PANEL ASSEMBLY		34535	1	SET	
4	NEEDLE VALVE		30009	1	EA	DEFECTIVE
5	-Blank-					
6						
7						
8						
9						
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						
21						
22						
23						
24						
25						
26						
27						

JE WON ENGINEERING CO. JWE 제원엔지니어링

I certify and confirm that the works contained in this report has been completed to my satisfaction and list of replacement is correct.

CUSTOMER Signature

(b) (6), (b) (7)(C)

(b) (6), (b) (7)(C)

(b) (6), (b) (7)(C)

제원엔지니어링
#472-30 Gupyoung-dong Saha-gu Busan Korea Home page : http://www.jewoneng.com
Tel.(051)264-1375~7 Fax.(051)264-1374 E-mai(b) (6), (b) (7)(C)

WOODWARD Business Partner

PURPOSE OF WORK

A. It is Highly recommended that Hydraulic-Mechanical Governor/Actuator should be done periodical maintenance in order to extend its service life, Hydraulic-Mechanical Governor/Actuator consist of mechanically moving parts and life limited parts in it that requires periodical maintenance or overhaul
B. Carrying out work for modification and maintenance of the Governor.
C. Modifying from 8521-0047DC to 8520-0041

WORK

1. Jul.08th.2019. Visit agent office at Po-hang, Rep. of Korea, and received the UG-8D governor for M/V SLNC GOODWILL (1 set)
2. Disassembled governor

2-1 Disassembled governor



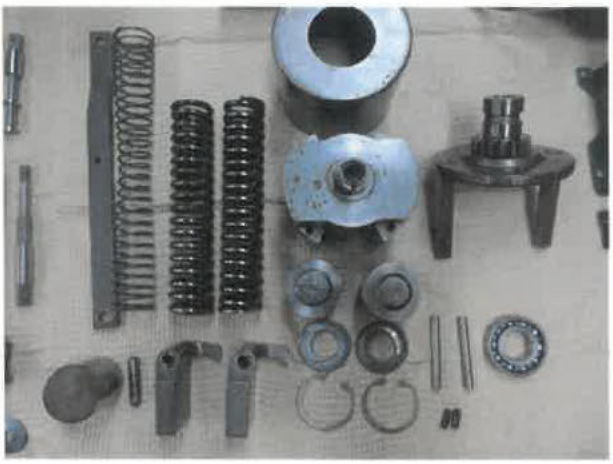
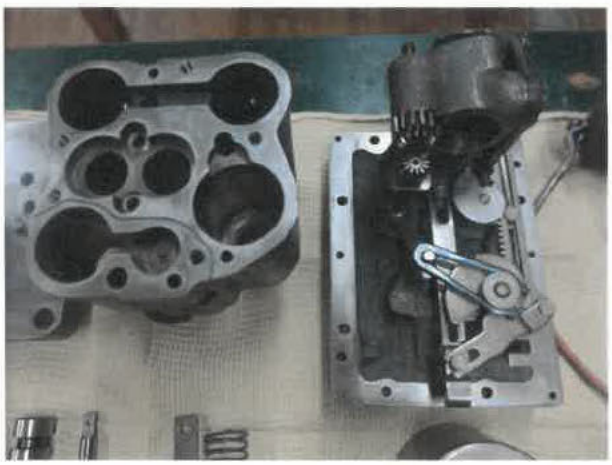

JE WON ENGINEERING CO. JWE 제원엔지니어링

(b) (6), (b) (7)(C)

JWE 제원엔지니어링
#472-30 Gupyoung-dong Saha-gu Busan Korea Home page : http://www.jewoneng.com
Tel.(051)264-1375~7 Fax.(051)264-1374 E-mail: (b) (6), (b) (7)(C)

3. Clean each parts and carry out parts inspection for modifying.



4. Defective & Need spare parts.

Part name	Part No.	Number	unit	Remark
DIAL PLATE	3099-935	1	EA	Spare parts needed for modifying.
BALLHEAD ASSEMBLY	31507	1	SET	
DIAL PANEL ASSEMBLY	34535	1	SET	
NEEDLE VALVE	30009	1	EA	Defective part.

4.1. Ballhead A'ssy

JE WON ENGINEERING CO.,
JWE
제원엔지니어링

(b) (6), (b) (7)(C)

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Tel.(051)264-1375~7 Fax.(051)264-1374 E-mail (b) (6), (b) (7)(C)

Registered ISO 9001:2008

WOODWARD Business Partner

4.2. Dial panel A'ssy.

4.3. Dial plate

4.4. Needle valve : Mark point was were down.

JEWON ENGINEERING CO., JWE 제원엔지니어링

(b) (6), (b) (7)(C)

JWE 제원엔지니어링
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Tel.(051)264-1375~7 Fax.(051)264-1374 E-mail:(b) (6), (b) (7)(C)

WOODWARD Business Partner

5. Tested governor on test stand

6. 2019.07.22 onboard to M/V SLNC GOODWILL at Busan, Rep. of Korea for exchange the governor.
7. Exchange the governor of No.2 generator engine after conference with the ship's crew.
8. Test governor with ship's crew. And found good condition.

- Remark
  1. The spare parts for modifying of governor were used.
  2. Because no have new spare parts in my company and the delivery date takes a long time.

- END -

JE WON ENGINEERING CO., JWE 제원엔지니어링

(b) (6), (b) (7)(C)

RECORD OF HOURS OF REST

Aug 2020

IMO STCW 2010(+Manila)

Vessel: SLNC Goodwill

IMO No: 9448334

Flag: United States

Seafarer (Full Name): (b) (6), (b) (7)(C)

Position (Rank): [redacted]

Watchkeeper: NO

Date	Periods of work are shaded (00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24)	Hours of work in 24h period	Hours of rest in 24h period	Comments	NOT TO BE COMPLETED BY THE SEAFARER: Hours of rest in any 24h period	NOT TO BE COMPLETED BY THE SEAFARER: Hours of rest in any 7 day period
8/1/2020		11.0	13.0		13.0	94.5
8/2/2020		11.0	13.0		13.0	91.0
8/3/2020		11.0	13.0		13.0	91.0
8/4/2020		11.0	13.0		13.0	91.0
8/5/2020		11.0	13.0		13.0	91.0
8/6/2020		11.0	13.0		13.0	91.0
8/7/2020		6.5	17.5		13.0	95.5
8/8/2020		11.0	13.0		11.5	95.5
8/9/2020		11.0	13.0		12.0	95.5
8/10/2020		11.0	13.0		12.0	95.5
8/11/2020		11.0	13.0		12.0	95.5
8/12/2020		11.0	13.0		12.0	95.5
8/13/2020		11.0	13.0		12.0	95.5
8/14/2020		11.0	13.0		12.0	91.0
8/15/2020		11.0	13.0		12.0	91.0
8/16/2020		11.0	13.0		12.0	91.0
8/17/2020		11.0	13.0		12.0	91.0
8/18/2020		11.0	13.0		12.0	91.0
8/19/2020		11.0	13.0		12.0	91.0
8/20/2020		11.0	13.0		12.0	91.0
8/21/2020		11.0	13.0		12.0	91.0
8/22/2020		11.0	13.0		12.0	91.0
8/23/2020		11.0	13.0		12.0	91.0
8/24/2020		11.0	13.0		12.0	91.0
8/25/2020		11.0	13.0		12.0	91.0
8/26/2020		11.0	13.0		12.0	91.0
8/27/2020		11.0	13.0		12.0	91.0
8/28/2020		11.0	13.0		12.0	91.0
8/29/2020		11.0	13.0		12.0	91.0
8/30/2020		11.0	13.0		12.0	91.0
8/31/2020		11.0	13.0		12.0	91.0
	00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24	336.5	407.5			

The following national laws, regulations and/or collective agreements governing limitations on working hours or minimum rest periods apply to this ship:

USCG, IMO STCW 2010, OPA 90, MM&P, SIU

I AGREE THAT THIS RECORD IS AN ACCURATE REFLECTION OF THE HOURS OF WORK OR REST OF THE SEAFARER CONCERNED.

Name of master or person authorized by master to sign this record: (b) (6), (b) (7)(C) (b) (6), (b) (7)(C)

Signature of master or authorized person: _____

Signature of seafarer: _____

A copy of this record is to be given to the seafarer. This form is subject to examination and endorsement under procedures established by: United States

(name of competent authority)

RECORD OF HOURS OF REST

Aug 2020

IMO STCW 2010(+Manila)

Vessel: SLNC Goodwill

IMO No: 9448334

Flag: United States

Seafarer (Full Name): [redacted]

Position (Rank): [redacted]

Watchkeeper: YES

Date	Periods of work are shaded (00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24)	Hours of work in 24h period	Hours of rest in 24h period	Comments	NOT TO BE COMPLETED BY THE SEAFARER: Hours of rest in any 24h period	NOT TO BE COMPLETED BY THE SEAFARER: Hours of rest in any 7 day period
8/1/2020		10.5	13.5		13.0	94.5
8/2/2020		10.5	13.5		13.0	94.5
8/3/2020		10.5	13.5		13.0	94.5
8/4/2020		10.5	13.5		13.0	94.5
8/5/2020		10.5	13.5		13.0	94.5
8/6/2020		10.5	13.5		13.0	94.5
8/7/2020		10.5	13.5		13.0	94.5
8/8/2020		10.5	13.5		13.0	94.5
8/9/2020		10.5	13.5		13.0	94.5
8/10/2020		10.5	13.5		13.0	94.5
8/11/2020		10.5	13.5		13.0	94.5
8/12/2020		10.5	13.5		13.0	94.5
8/13/2020		10.5	13.5		13.0	94.5
8/14/2020		10.5	13.5		13.0	94.5
8/15/2020		10.5	13.5		13.0	94.5
8/16/2020		10.5	13.5		13.0	94.5
8/17/2020		10.5	13.5		13.0	94.5
8/18/2020		10.5	13.5		13.0	94.5
8/19/2020		10.5	13.5		13.0	94.5
8/20/2020		10.5	13.5		13.0	94.5
8/21/2020		10.5	13.5		13.0	94.5
8/22/2020		10.5	13.5		13.0	94.5
8/23/2020		10.5	13.5		13.0	94.5
8/24/2020		10.5	13.5		13.0	94.5
8/25/2020		10.5	13.5		13.0	94.5
8/26/2020		10.5	13.5		13.0	94.5
8/27/2020		10.5	13.5		13.0	94.5
8/28/2020		10.5	13.5		13.0	94.5
8/29/2020		10.5	13.5		13.0	94.5
8/30/2020		10.5	13.5		13.0	94.5
8/31/2020		10.5	13.5		13.0	94.5
	00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24	325.5	418.5			

The following national laws, regulations and/or collective agreements governing limitations on working hours or minimum rest periods apply to this ship:

USCG, IMO STCW 2010, OPA 90, MM&P, SIU

I AGREE THAT THIS RECORD IS AN ACCURATE REFLECTION OF THE HOURS OF WORK OR REST OF THE SEAFARER CONCERNED.

Name of master or person authorized by master to sign this record: [redacted]

Signature of master or authorized person: _____

Signature of seafarer: _____

A copy of this record is to be given to the seafarer. This form is subject to examination and endorsement under procedures established by: United States

(name of competent authority)

RECORD OF HOURS OF REST

Aug 2020

IMO STCW 2010(+Manila)

Vessel: SLNC Goodwill

IMO No: 9448334

Flag: United States

Seafarer (Full Name): (b) (6), (b) (7)(C)

Position (Rank): [redacted]

Watchkeeper: NO

Date	Periods of work are shaded (00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24)	Hours of work in 24h period	Hours of rest in 24h period	Comments	NOT TO BE COMPLETED BY THE SEAFARER: Hours of rest in any 24h period	NOT TO BE COMPLETED BY THE SEAFARER: Hours of rest in any 7 day period
8/1/2020		10.5	13.5		12.0	94.5
8/2/2020		10.5	13.5		12.0	94.5
8/3/2020		10.5	13.5		12.0	94.5
8/4/2020		10.5	13.5		12.0	94.5
8/5/2020		10.5	13.5		12.0	94.5
8/6/2020		10.5	13.5		12.0	94.5
8/7/2020		10.5	13.5		12.0	94.5
8/8/2020		10.5	13.5		12.0	94.5
8/9/2020		10.5	13.5		12.0	94.5
8/10/2020		10.5	13.5		12.0	94.5
8/11/2020		10.5	13.5		12.0	94.5
8/12/2020		10.5	13.5		12.0	94.5
8/13/2020		10.5	13.5		12.0	94.5
8/14/2020		10.5	13.5		12.0	94.5
8/15/2020		10.5	13.5		12.0	94.5
8/16/2020		10.5	13.5		12.0	94.5
8/17/2020		10.5	13.5		12.0	94.5
8/18/2020		10.5	13.5		12.0	94.5
8/19/2020		10.5	13.5		12.0	94.5
8/20/2020		10.5	13.5		12.0	94.5
8/21/2020		10.5	13.5		12.0	94.5
8/22/2020		10.5	13.5		12.0	94.5
8/23/2020		10.5	13.5		12.0	94.5
8/24/2020		10.5	13.5		12.0	94.5
8/25/2020		10.5	13.5		12.0	94.5
8/26/2020		10.5	13.5		12.0	94.5
8/27/2020		10.5	13.5		12.0	94.5
8/28/2020		10.5	13.5		12.0	94.5
8/29/2020		10.5	13.5		12.0	94.5
8/30/2020		10.5	13.5		12.0	94.5
8/31/2020		10.5	13.5		12.0	94.5
	00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24	325.5	418.5			

The following national laws, regulations and/or collective agreements governing limitations on working hours or minimum rest periods apply to this ship:

USCG, IMO STCW 2010, OPA 90, MM&P, SIU

I AGREE THAT THIS RECORD IS AN ACCURATE REFLECTION OF THE HOURS OF WORK OR REST OF THE SEAFARER CONCERNED.

Name of master or person authorized by master to sign this record: [redacted]

Signature of master or authorized person: _____

Signature of seafarer: _____

A copy of this record is to be given to the seafarer. This form is subject to examination and endorsement under procedures established by: United States

(name of competent authority)

RECORD OF HOURS OF REST

Aug 2020

IMO STCW 2010(+Manila)

Vessel: SLNC Goodwill

IMO No: 9448334

Flag: United States

Seafarer (Full Name): [redacted]

Position (Rank): [redacted]

Watchkeeper: YES

Date	Periods of work are shaded (00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24)	Hours of work in 24h period	Hours of rest in 24h period	Comments	NOT TO BE COMPLETED BY THE SEAFARER: Hours of rest in any 24h period	NOT TO BE COMPLETED BY THE SEAFARER: Hours of rest in any 7 day period
8/1/2020		10.0	14.0		12.5	101.0
8/2/2020		10.5	13.5		12.0	100.0
8/3/2020		8.5	15.5		12.0	101.0
8/4/2020		11.0	13.0		11.5	99.5
8/5/2020		13.0	11.0		9.5	96.0
8/6/2020		9.5	14.5		9.5	96.0
8/7/2020		8.5	15.5		13.0	97.0
8/8/2020		9.5	14.5		13.0	97.5
8/9/2020		9.5	14.5		13.0	98.5
8/10/2020		9.5	14.5		13.0	97.5
8/11/2020		9.5	14.5		13.0	99.0
8/12/2020		9.5	14.5		13.0	102.5
8/13/2020		9.5	14.5		13.0	102.5
8/14/2020		9.5	14.5		13.0	101.5
8/15/2020		9.5	14.5		13.0	101.5
8/16/2020		9.5	14.5		13.0	101.5
8/17/2020		9.5	14.5		13.0	101.5
8/18/2020		9.5	14.5		13.0	101.5
8/19/2020		9.5	14.5		13.0	101.5
8/20/2020		9.5	14.5		13.0	101.5
8/21/2020		9.5	14.5		13.0	101.5
8/22/2020		9.5	14.5		13.0	101.5
8/23/2020		9.5	14.5		13.0	101.5
8/24/2020		9.5	14.5		13.0	101.5
8/25/2020		9.5	14.5		13.0	101.5
8/26/2020		9.5	14.5		13.0	101.5
8/27/2020		9.5	14.5		13.0	101.5
8/28/2020		9.5	14.5		13.0	101.5
8/29/2020		9.5	14.5		13.0	101.5
8/30/2020		9.5	14.5		13.0	101.5
8/31/2020		9.5	14.5		13.0	101.5
	00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24	299.0	445.0			

The following national laws, regulations and/or collective agreements governing limitations on working hours or minimum rest periods apply to this ship:

USCG, IMO STCW 2010, OPA 90, MM&P, SIU

I AGREE THAT THIS RECORD IS AN ACCURATE REFLECTION OF THE HOURS OF WORK OR REST OF THE SEAFARER CONCERNED.

Name of master or person authorized by master to sign this record: [redacted]

Signature of master or authorized person: _____

Signature of seafarer: _____

A copy of this record is to be given to the seafarer. This form is subject to examination and endorsement under procedures established by: United States

(name of competent authority)

RECORD OF HOURS OF REST

Aug 2020

IMO STCW 2010(+Manila)

Vessel: SLNC Goodwill

IMO No: 9448334

Flag: United States

Seafarer (Full Name): [redacted]

Position (Rank): [redacted]

Watchkeeper: NO

Date	Periods of work are shaded (00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24)	Hours of work in 24h period	Hours of rest in 24h period	Comments	NOT TO BE COMPLETED BY THE SEAFARER: Hours of rest in any 24h period	NOT TO BE COMPLETED BY THE SEAFARER: Hours of rest in any 7 day period
8/1/2020		11.0	13.0		13.0	91.0
8/2/2020		11.0	13.0		13.0	91.0
8/3/2020		11.0	13.0		13.0	91.0
8/4/2020		11.0	13.0		13.0	91.0
8/5/2020		11.0	13.0		13.0	91.0
8/6/2020		11.0	13.0		13.0	91.0
8/7/2020		11.0	13.0		13.0	91.0
8/8/2020		11.0	13.0		13.0	91.0
8/9/2020		11.0	13.0		13.0	91.0
8/10/2020		11.0	13.0		13.0	91.0
8/11/2020		11.0	13.0		13.0	91.0
8/12/2020		11.0	13.0		13.0	91.0
8/13/2020		11.0	13.0		13.0	91.0
8/14/2020		11.0	13.0		13.0	91.0
8/15/2020		11.0	13.0		13.0	91.0
8/16/2020		11.0	13.0		13.0	91.0
8/17/2020		11.0	13.0		13.0	91.0
8/18/2020		11.0	13.0		13.0	91.0
8/19/2020		11.0	13.0		13.0	91.0
8/20/2020		11.0	13.0		13.0	91.0
8/21/2020		11.0	13.0		13.0	91.0
8/22/2020		11.0	13.0		13.0	91.0
8/23/2020		11.0	13.0		13.0	91.0
8/24/2020		11.0	13.0		13.0	91.0
8/25/2020		11.0	13.0		13.0	91.0
8/26/2020		11.0	13.0		13.0	91.0
8/27/2020		11.0	13.0		13.0	91.0
8/28/2020		11.0	13.0		13.0	91.0
8/29/2020		11.0	13.0		13.0	91.0
8/30/2020		11.0	13.0		13.0	91.0
8/31/2020		11.0	13.0		13.0	91.0
	00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24	341.0	403.0			

The following national laws, regulations and/or collective agreements governing limitations on working hours or minimum rest periods apply to this ship:

USCG, IMO STCW 2010, OPA 90, MM&P, SIU

I AGREE THAT THIS RECORD IS AN ACCURATE REFLECTION OF THE HOURS OF WORK OR REST OF THE SEAFARER CONCERNED.

Name of master or person authorized by master to sign this record: [redacted]

Signature of master or authorized person: _____

Signature of seafarer: _____

A copy of this record is to be given to the seafarer. This form is subject to examination and endorsement under procedures established by: United States

(name of competent authority)

RECORD OF HOURS OF REST

Aug 2020

IMO STCW 2010(+Manila)

Vessel: SLNC Goodwill

IMO No: 9448334

Flag: United States

Seafarer (Full Name): 09 Trenton Lloyd-Rees

Position (Rank): (b) (6), (b) (7)(C)

Watchkeeper: YES

Date	Periods of work are shaded (00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24)	Hours of work in 24h period	Hours of rest in 24h period	Comments	NOT TO BE COMPLETED BY THE SEAFARER: Hours of rest in any 24h period	NOT TO BE COMPLETED BY THE SEAFARER: Hours of rest in any 7 day period
8/1/2020		10.5	13.5		13.0	92.0
8/2/2020		10.5	13.5		13.0	92.0
8/3/2020		10.5	13.5		13.0	95.0
8/4/2020		10.5	13.5		13.0	94.5
8/5/2020		10.5	13.5		13.0	94.5
8/6/2020		10.5	13.5		13.0	94.5
8/7/2020		10.5	13.5		13.0	94.5
8/8/2020		10.5	13.5		13.0	94.5
8/9/2020		10.5	13.5		13.0	94.5
8/10/2020		10.5	13.5		13.0	94.5
8/11/2020		10.5	13.5		13.0	94.5
8/12/2020		10.5	13.5		13.0	94.5
8/13/2020		10.5	13.5		13.0	94.5
8/14/2020		10.5	13.5		13.0	94.5
8/15/2020		10.5	13.5		13.0	94.5
8/16/2020		10.5	13.5		13.0	94.5
8/17/2020		10.5	13.5		13.0	94.5
8/18/2020		10.5	13.5		13.0	94.5
8/19/2020		10.5	13.5		13.0	94.5
8/20/2020		10.5	13.5		13.0	94.5
8/21/2020		10.5	13.5		13.0	94.5
8/22/2020		10.5	13.5		13.0	94.5
8/23/2020		10.5	13.5		13.0	94.5
8/24/2020		10.5	13.5		13.0	94.5
8/25/2020		10.5	13.5		13.0	94.5
8/26/2020		10.5	13.5		13.0	94.5
8/27/2020		10.5	13.5		13.0	94.5
8/28/2020		10.5	13.5		13.0	94.5
8/29/2020		10.5	13.5		13.0	94.5
8/30/2020		10.5	13.5		13.0	94.5
8/31/2020		10.5	13.5		13.0	94.5
	00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24	325.5	418.5			

The following national laws, regulations and/or collective agreements governing limitations on working hours or minimum rest periods apply to this ship:

USCG, IMO STCW 2010, OPA 90, MM&P, SIU

I AGREE THAT THIS RECORD IS AN ACCURATE REFLECTION OF THE HOURS OF WORK OR REST OF THE SEAFARER CONCERNED.

Name of master or person authorized by master to sign this record: (b) (6), (b) (7)(C)

Signature of master or authorized person: _____

Signature of seafarer: _____

A copy of this record is to be given to the seafarer. This form is subject to examination and endorsement under procedures established by: United States

(name of competent authority)