



HEALTH, SAFETY AND ENVIRONMENT

AT NEW-BUILDING AND REPAIR SHIPYARDS

AND DURING FACTORY ACCEPTANCE TESTING

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1 INTRODUCTION

Whilst at sea or in port, Ship personnel perform their duties in accordance with the Company Operating Procedures and Safety and Environment Protection Management System.

The situation is very different when the ship is under construction, conversion or repair in a shipyard where the work is primarily carried out and managed by shipyard or contracted personnel. Whilst the work may be monitored and checked by Company personnel, the safety of the ship and the personnel aboard it is generally dependent upon the shipyard's safety management system. The situation is exacerbated by the fact that, during a construction, conversion or repair period, the ship may take on an unfamiliar status. The ship and the personnel aboard it may thus be exposed to unexpected and unfamiliar risks and hazards.

The purpose of this publication is to offer guidance on those factors that should be addressed by a Company or a Shipyard and their personnel, during construction, conversion or repair period to help ensure that HSE risks to personnel or assets are minimised.

To make it easier for the publication to be readily used as a working guide the narrative has deliberately been kept to a minimum with more reliance placed on checklists.

These checklists, which can be found in the appendices section, should be considered to provide assurance that the HSE risks associated with working in a shipyard are mitigated to a level commensurate with a low probability of incident or accident. It is recommended that the user critically reviews each checklist and supplements it with any additional work specific issues that the Company considers may improve its overall context and effectiveness.

1.1 DEFINITION OF TERMS

Accident

An unplanned or undesired event that can result in harm to people, property or the environment.

Company

The ship's operating and/or owning company.

Company Personnel

Used throughout this paper as meaning site supervision staff, ships crew, FAT inspectors, etc.

Exposure

The measurement of time during which the subject is at risk from a hazard.

FAT

Factory Acceptance Testing

Fatality

Death due to a work related incident or illness regardless of the time between injury or illness and death.

Harm

Includes death, injury, physical or mental ill health, damage to property, loss of production, or any combination of these.

Hazard

A source or a situation with a potential to cause harm, including human injury or ill health, damage to property, damage to the environment, or a combination of these.

Housekeeping

Maintaining the working environment in a tidy manner.

HSE

Health, Safety and Environment.

Incident

An event that:

- Results in death or injury to person where the injury requires medical attention (including first aid);
- Results in injury/damage to persons, property or process;
- Is not in compliance with statutory requirements, safe work procedures or in-house guidelines.

Interface Document

A document that clearly identifies how the Owner's HSE expectations and the Shipyard's HSE management systems will be interlinked during the work programme.

Lost Time Injury (LTI)

Work related injury or illness that renders the injured person unable to perform any of their duties or return to work on a scheduled work shift, on any day immediately following the day of the accident.

Medical Treatment Case (MTC)

Work related injury or illness requiring more than first aid treatment by a physician, dentist, surgeon or registered medical personnel.

MSDS

Material Safety Data Sheet

Near Miss

A Near Miss is an event where no contact or exchange of energy occurred and thus did not result in personal injury, asset loss or damage to the environment.

Owner

See Company.

Personal Protective Equipment (PPE)

All equipment and clothing intended to be utilised, which affords protection against one or more risks to health and safety. This includes protection against adverse weather conditions.

Restricted Work Case

Work related injury or illness that renders the injured person unable to perform all normally assigned work functions during a scheduled work shift or being assigned to another job on a temporary or permanent basis on the day following the injury.

Risk

A measure of the likelihood that the harm from a particular hazard will occur, taking into account the possible severity of the harm.

Risk Assessment

The process of analysing the level of risk considering those in danger, and evaluating whether hazards are adequately controlled, taking into account any measures already in place.

Risk Management

The process of identifying hazards, assessing risk, taking action to eliminate or reduce risk, and monitoring and reviewing results.

Shipyard

The yard management, construction personnel, subcontractors, etc.

Training

The process of imparting specific skills and understanding to undertake defined tasks.

Unsafe act or condition

Any act or condition that deviates from a generally recognised safe way or specified method of doing a job and increases the potential for an accident.

SWL

Safe Working Load.

Work Programme

The work being undertaken by a shipyard on behalf of the Company.

Worksite

The premises where any building operations or works of engineering construction related to the work program are being carried out.

2 CONTRACTUAL ASPECTS OF HSE

2.1 HSE MANAGEMENT SYSTEM

An HSE management system is an effective means of ensuring that proper attention is paid to the health and safety of individuals working in a shipyard or during factory acceptance testing as well as the protection of the environment from the environmental impacts associated with construction or repair activities.

Because of the potential impact on People, Property and Environment, the manner in which a shipyard manages and controls HSE should be considered of paramount importance during the shipyard selection and subsequent tendering processes.

It is recommended that if a Company intends to assign a contract to carry out work, whether construction or repair, it should be ensured that potential Shipyards have an HSE policy and perform all work under a formal HSE Management system. This system should be adequately documented within a HSE Manual and be shown to be effective in implementing the aims and objectives of the Shipyard HSE Policy.

Such a system should ideally be behavioural based and designed to deliver continual improvement utilizing the following rationale:

- Plan the process,
- Do the work,
- Measure the outcome,
- Review the lessons learned,
- Improve the process

The system should additionally:

- Incorporate measures to demonstrate that all shipyard personnel are medically fit and competent to perform their tasks safely and;
- Ensure that all personnel are conversant with the working conditions at the worksite, the rules and standards related to the working environment and the HSE hazards and risks associated with the work programme.
- Provide means whereby hazards have been identified, assessed and eliminated where possible, or are being controlled / mitigated through formal planning methods and procedures.
- Allow for periodic review triggered by site or system changes that may affect the HSE risk of the work programme.
- Ensure that all sub-contractors understand the principles and requirements of the system.
- Require sub-contractors to have an equivalent HSE standard.
- Contain a written HSE plan-

Company and Shipyard management should make all personnel fully aware that they are empowered, and expected, to bring all health, safety and environmental risks which they believe not to be under adequate control to the immediate notice of their Supervisor so that prompt action may be taken to prevent injuries or other losses and provide a safe and healthy workplace.

2.2 HSE LEADERSHIP AND COMMITMENT

Visible commitment by the shipyard senior management to the reduction or mitigation of HSE risks is critical. It can be demonstrated by:

- The Shipyard having an HSE Management System
- The Shipyard preparing a Project specific HSE plan that is linked to the Owners HSE expectations by means of an interface document.
- The Shipyard appointing a Project specific HSE Manager with sufficient authority and resource.
- The Shipyard making clear the role that all shipyard personnel have to play in reducing or mitigating HSE risks.

The Shipyard Project HSE Manager should have responsibility for the maintenance and upkeep of the Project HSE Plan and Interface document as well as direct liaison with Owner representative.

The Shipyard Project HSE Manager will be responsible for ensuring any HSE incidents are fully investigated in a timely and thorough manner with the findings of the investigation provided to the Owner. Where appropriate, lessons learned from incidents should be incorporated into the HSE Plan in order to prevent recurrence.

Notwithstanding the controls and safeguards identified within the HSE Plan the Shipyard should confirm that the Company personnel are authorised to interrupt or terminate all work in or about the worksite if, in the sole opinion of the Owner's representative, the Shipyard's personnel or sub-contractors fail at any time to comply with the requirements of the agreed HSE Management System and Project specific HSE Plan. Generally, this will be as a result of Company personnel identifying the existence of an unsafe act or condition.

There should be a periodic joint inspection tour of the shipyard and external contractors premises and facilities focused on observing and responding to potentially unsafe acts and conditions. The Senior Executive Manager responsible for the work programme, accompanied by the Shipyard and Owners project HSE representative, should lead the tour. Summary details of the inspection and remedial actions should be recorded by the Shipyard's HSE representative and provided to the Owner's representative in a timely manner.

2.3 COMPATIBILITY AND COMMUNICATIONS

Shipyard and Company personnel should be conversant at all levels with each other's HSE systems and requirements.

The Shipyard should develop and implement a written HSE document - 'The Interface Document' or 'Management Plan' - that clearly identifies how the Owner's HSE expectations and the Shipyard's HSE management systems will be interlinked during the work programme.

This document should include:

- Details of key roles and responsibilities
- Communications and key procedures
- Cross references to the Project HSE Plan, Quality Plan and Test and Inspection Plan.

The document should be approved by the Owner and maintained under joint periodic review initiated by changes that have taken place that may affect the compatibility of the Shipyard's HSE Management system and that of the Owner.

2.4 REPORTING REQUIREMENTS

2.4.1 SHIPYARD HSE REPORT

The Shipyard should periodically prepare, and issue to the onsite Owner Representative, a written HSE report that should comprise of, but not necessarily be limited to, the following:

- Progress made against the HSE Plan
- An overview of all accidents, incident and near-miss event
- Details of HSE performance against HSE targets
- Total working hours for all personnel
- Details of the quantity and nature of any emissions and wastes generated
- Details of type and response to any emergency exercises (contingency plans) or real life emergencies
- A summary of the status of any remedial actions.

2.4.2 ACCIDENT/INCIDENT REPORTING

Refer section 1.1 for definition of terms

2.4.2.1 INCIDENT

Incidents should be investigated and reported in a manner that establishes the root cause(s) and makes recommendations for remedial action(s) to prevent repetition.

2.4.2.2 ACCIDENT

Accidents occurring to Shipyard and contractor personnel have valuable learning potential. Every effort should be made by the Company to obtain details of accidents occurring to Shipyard and contractor personnel.

2.4.2.3 NEAR MISS

Analysing Near Misses and Unsafe Acts or Conditions provides a useful indicator of safety performance.

Company, Shipyard and Contractor personnel should be encouraged to notify Near Misses and Unsafe Acts or Conditions and details should be circulated to all concerned for learning purposes.

A sample Near Miss, Unsafe Act or Unsafe Condition report form is included in Appendix Two.

2.5 STATUTORY AND OTHER REQUIREMENTS

The Shipyard should ensure that its personnel and contractors comply with all relevant national statutory requirements, approved codes of practice and other guidance on HSE matters.

The Shipyard should ensure that its personnel and contractors are fully conversant with the working conditions at the work site, the rules and standards related to the working environment and the HSE hazards and risks associated with the work programme.

The Shipyard should ensure that its personnel and contractors are fully aware that they are expected to bring to the immediate notice of their Supervisor all health, safety and environmental risks which they believe not to be under adequate control, so that action may be taken to prevent injuries or other losses and provide a safe and healthy workplace.

The Shipyard should implement a system whereby prior to the attendance of an Owner's representative for inspection, testing and commissioning that the material, equipment and associated work area is verified to be safe for the work planned to be carried out (refer to Section 4).

The Shipyard should make available a Safety Arrangement Plan based on the general arrangement of the vessel under construction or repair showing the positions of fire, hydrants, fire extinguishers, safety equipment, usable toilets, muster points and escape routes. The Safety Arrangement Plan, which should be displayed in prominent areas, is to be updated promptly, should changes occur to the arrangements.

2.6 SUBCONTRACTORS

It is recognised that the use of subcontractors within the shipyard, both by the ship owner and shipyard is a common practice. It is recommended that the shipyard HSE Management System and any project specific HSE Plan and Interface Document or Management Plan should ensure that all subcontractor staff and their activities are addressed.

2.7 PERMIT TO WORK SYSTEMS

A permit to work system is a written statement of the procedures to safeguard personnel working in potentially dangerous areas or with potentially dangerous substances. It should include mechanical, electrical or process isolation procedures and the monitoring of the atmosphere for the presence of dangerous fumes or absence of oxygen, if applicable.

It should set out, in a systematic way, the work to be done, the hazards involved and the precautions to be taken.

The yard's HSE management system should include a permit to work system to control and co-ordinate construction/repair activities. All Company should be advised of the permit systems implemented by the shipyard and the procedures under which such permits are issued.

Copies of all permits issued by the yard should be given to the Company site representative.

Prior to commencing any work that should be covered by a permit to work the applicable items of the 'Checklist – Permit to Work Systems' should be considered by the individual attending or carrying out the work.

2.8 SHIPYARD SELECTION

Due to the potential for adverse impact on People, Property and Environment the manner in which a shipyard manages and controls the HSE aspects of its operations should be considered of paramount importance to ship owners.

It is recommended that during the shipyard selection process, prior to an invitation to tender, ship owners undertake an audit of the shipyards, which includes their HSE management systems and available data on HSE performance.

2.9 EMERGENCY PREPAREDNESS

A detailed Emergency Response Plan should be included in the project HSE Management Plan. This plan should include the procedures for immediate implementation in the event of an emergency.

These procedures must anticipate and cover all types of emergencies that might be encountered at the worksite, such as accidents, fires, explosions, pollution, etc. The plan should include provisions for bad weather, first aid, hospitalisation, evacuation, etc.

The Shipyard should maintain an Emergency Control and Communications Centre that should be manned, ready to respond at any time day or night throughout the year.

An emergency plan, which covers all aspects of the action to be taken in the event of an emergency, should be drawn up in consultation with the port authority, fire brigade, police, medical services etc., and it should be compatible with any port emergency plan.

2.10 ALCOHOL & DRUGS

The consumption of alcohol during working periods should be discouraged.

Company and shipyard personnel taking medicine or drugs prescribed by a qualified medical practitioner should make this fact known to their respective Line Manager and a common sense agreement jointly made as to the individual's daily working programme.

2.11 OCCUPATIONAL HEALTH/INDUSTRIAL HYGIENE

As part of an ongoing health management programme, shipyards should have in place a Health Protection programme comprising the following elements:

- Health/Hygiene Risk Management
- Health/Hygiene Surveillance
- Information, Instruction & Training
- First Aid & Medical Treatment
- Sickness Absenteeism Monitoring.

2.12 ENVIRONMENT

It is strongly recommended that shipyards have a formal environmental management system in place, which identifies the environmental impact of their service and the setting of environmental performance targets and measurement of progress.

3 PRACTICAL ASPECTS OF HSE

3.1 INITIAL HSE INFORMATION

When the Company personnel first arrive in the shipyard, an initial HSE meeting should be held between shipyard and company personnel. Copies of the agreed HSE management plan and full details of the Shipyard's Emergency Response procedures should be prepared in English, and in the language of the Company personnel, and made available to them, as well as being prominently displayed in the Owner site office.

The shipyard should supply the Company site representative with a list of emergency telephone numbers that allow rapid access to local and national emergency services on a 24-hour basis. These details should be clearly posted within the site office as well as being provided to each of the Company personnel in a portable format, a small booklet is generally considered ideal.

The shipyard's fire and emergency alarms, location of designated muster points and evacuation procedures should be demonstrated to all Company personnel. Where practical a combined Company personnel and shipyard personnel evacuation muster and drill should be carried out near the commencement of construction, conversion or repair.

The Company should supply the shipyard with a list of all company personnel who will be attending the worksite. This list should be kept up to date during the construction, conversion or repair period.

Whilst in the shipyard premises, all Company personnel should wear identification and carry a card detailing ship, site office and shipyard emergency telephone numbers.

3.2 COMPANY PERSONNEL

From time to time the Company may appoint specialist personnel either from within its own organisation or from sub-contractors, consultants etc., to join the site team. Such personnel should be regarded as if they were full site team inspectors/members and as such should be guided by the agreed HSE requirements.

It is recommended that Company personnel undergo a detailed safety induction course upon assignment to the shipyard arranged by the Company HSE representative. Familiarisation with emergency alarms and required immediate actions to be followed should be an essential part of this induction course.

Particular account should be taken of the age, experience, mobility etc., of visitors, and care taken in ensuring that any required PPE is properly fitted. All visitors should be escorted throughout their period in the shipyard.

Careful preparation will be required in the case of sea staff joining a newly constructed/converted/repared vessel for the first time. Many of the personnel may not have been in a shipbuilding facility previously; they may also arrive in significantly large groups and at a time of peak work activity.

3.3 PERSONAL SAFETY

A ship in a shipyard presents a unique combination of hazards that Company personnel may be unfamiliar with; accordingly, all Company personnel must be particularly diligent about ensuring their own safety and that of colleagues.

The first approach to personal safety should be to identify and report potential hazards wherever possible.

Company personnel, in conjunction with the shipyard, should establish mutually acceptable housekeeping standards as poor housekeeping not only causes injuries but also makes the identification of other hazards much more difficult.

'Checklist – Housekeeping' includes items that should be checked.

3.3.1 PERSONAL PROTECTIVE EQUIPMENT (PPE)

The wearing of the appropriate PPE is a highly visible display of commitment to safety and personal awareness of risk.

Company personnel should always wear appropriate PPE for the work in hand.

When working in a shipyard, minimum PPE should include a long sleeved boiler suit/coveralls, safety footwear, safety helmet, safety spectacles/goggles, torch, gloves and hearing protection.

When working aloft, an appropriate safety harness should be utilised.

If the work being undertaken could create a potential inhalation hazard then respiratory protection should be worn. It is of paramount importance that prior to use respirators are checked to ensure that they have been maintained in accordance with manufacturers recommendations.

3.4 WORK PLANNING & INSPECTIONS

3.4.1 PERIODIC SAFETY AND PROGRESS MEETINGS

Periodic safety and progress meetings should be convened between the Shipyard and Owner representative.

Daily progress meetings should include the highlighting of any HSE issues associated with the day's work and although an HSE agenda for this meeting is not necessary, action points emanating should be recorded for close out at subsequent meetings.

Weekly HSE meetings should be convened for Company personnel, however where the duration of the work dictates otherwise, the interval between these meetings may be reduced.

Monthly formalised and minuted HSE meetings should be convened with the following attendees:

- Senior Company Personnel;
- Shipyard Project HSE Manager;
- Shipyard Project Manager

The contents of the latest HSE report should be discussed at this meeting and any HSE issues arising that cannot be immediately closed out should be recorded, with timescales, for remedial action.

In addition to the HSE Report, this meeting should include:

- Discussion of any safety violations occurring since the previous meeting;
- A review of the previous months incidents and high potential near misses . These reviews should seek to identify both the cause of the incident and the action to be taken to prevent a recurrence;
- Identification of changes in work practices or conditions that could jeopardise the ship or the workers;
- A review of the effectiveness of the permit-to-work systems;
- A review of the material safety data sheets for any chemicals to be first used in the following 30 days to ensure adequate precautions are in place;
- Review deviations from expected safety norms and established procedures, and identify the appropriate corrective action including a timetable for completion.

Should it be deemed necessary by any party, the monthly meetings may take place at a more frequent interval.

3.4.2 SAFETY INSPECTIONS

In addition to the formal inspections previously mentioned it is recommended that company personnel adopt a routine of conducting informal inspections as they go about their daily work routines.

Items to be covered are suggested in 'Checklist - Site Safety'.

3.5 SMOKING REGULATIONS

Smoking on board ship should be controlled

- during construction, when the shipyard should provide specifically designated smoking areas throughout the ship
- during repair, when the owner's regulations regarding smoking onboard must be strictly adhered to.

3.6 EMERGENCY RESPONSE

The Shipyard and the Company should maintain training plans to ensure employees are trained to respond to emergencies. This training should include fire fighting, medical response, first aid, etc.

The Shipyard is responsible for maintaining emergency response equipment (fire engines, ambulances, rescue cars, emergency rescue kits, helicopters, etc.) for speedy rescue of patients and quick extinguishing of fires. This equipment must only be operated by trained shipyard personnel or trained Company personnel.

Random drills and exercises should be conducted to assess and continuously improve emergency response techniques. Company personnel should be included in these drills.

Company personnel should be included into the emergency plan as their specific knowledge of a vessel could enhance any emergency response, including fire fighting in confined locations and/or medical evacuation.

In the event of a medical emergency, external medical facilities should be alerted and appraised of the nature and location of the emergency, the likelihood or number of casualties and whether medical staff are required at the location of the emergency.

3.7 FIRE FIGHTING CAPABILITY

The shipyard must ensure that adequate fire fighting facilities are maintained at the worksite and this equipment should be at clearly marked locations as detailed in the Safety Arrangement Plan (see Section 2.5). Company personnel should be acquainted with the operation of all safety equipment, as it is likely to be of a different type to those with which they are familiar.

Company personnel should regularly check portable fire fighting equipment as they go about their daily routines, as it is not uncommon for a fire extinguisher to have been replaced in its rack after use. Unfortunately, partially filled or empty fire extinguishers are frequently found - usually when they are needed most.

The shipyard's fire fighting capabilities should include at least all of the items contained in 'Checklist - Fire Fighting Capability'.

3.8 ACCESS TO THE SHIP

In order to provide adequate emergency access to and from the ship, there should always be a minimum of two separate points of access. These should be located as far apart as is practicable and where possible, on opposite sides and ends of the ship. Clear passageways and guidance notices to these access points should be maintained at all times. Where open gangways are used, a properly rigged safety net should be utilised.

Where there is a large workforce in a confined space such as an engine room or pump room, consideration should be given to cutting an access point through the hull to the space. In any event, a safe clear way should always be maintained from the lower to the main deck level. Escape routes should be well sign posted; supplementary battery powered "rope" lighting on ladders and platforms leading to escape exits should be provided.

Ship access and escape routes should have their walkways maintained such that they are clear of cables, hoses, scrap steel, dunnage and waste material

3.9 SHIP STATUS BOARD

Prior to the start of work, the shipyard should establish a protected location nearby the ship where an overall picture of work in progress can be easily determined by means of a status board or diagram posted in this area.

This status board should indicate:

- Where work is being carried out
- The nature of the work (hot work, blasting, chemical cleaning, testing etc.)
- Who is doing the work (shipyard or Company personnel) and who is the supervisor in charge
- When the work will start and when it will be completed
- What work permits are in force.

It is recommended that a system be established within the Company site office indicating the location of Company personnel. This system should be kept accurately updated by each individual as they enter and leave the site office. Should the individual be required to relocate to a different work area, whilst on site, then the site office must be advised and the system updated accordingly.

3.10 COMMUNICATIONS

The company representative must ensure that clear lines of communication/authority between the Shipyard and Company personnel are established and maintained throughout the period. There are invariably many simultaneous activities going on that unless all parties are aware of what others are doing may give rise to a high probability of conflict between jobs which could compromise the safety of the ship and those on board.

Battery operated communication equipment such as mobile phones and pagers represent a potential ignition source and their use on the worksite should be regulated.

3.11 SLIP, TRIP AND FALLS

Decks, gratings, ladders and walkways are likely to become slippery or hazardous due to cargo residues, welding rod ends, spilt liquids, dunnage, scrap metal, etc., Whilst good housekeeping practices will minimise these risks, ship staff should always be alert to the potential hazards. In this respect, it is important to ensure that lighting is adequate. Many slips, trips and falls are the result of the person involved being unaware of the risk because they could not see the hazard.

3.12 LADDERS AND WALKWAYS

Works often require people to move around using ladders and walkways that are not routinely used. Before use, such ladders, walkways and their associated handrails should be checked to confirm they are properly secured, safe to use, and that footing is secure.

Note: ladders may be found tack welded prior to final securing. Ladders in this condition should not be used.

3.13 OPENINGS

Shipbuilding or repair activity invariably results in the ship's structure being incomplete, thus there are likely to be a large number of openings through which a person might fall. This includes shipside rails or rails in the engine room, missing blocks, access holes cut to facilitate work, removal of gratings and ladders, lightening holes in the structure and corroded areas. Company personnel should be particularly alert to the fact that, despite precautions being taken, unexpected hazards may still arise.

3.14 SCAFFOLDING AND STAGING

It is not uncommon for shipyards to utilise scaffolding subcontractors for all of their scaffolding needs. It is imperative that these subcontractors are aware of and operate under the shipyard formal operating and monitoring procedures that establish

acceptable scaffolding and staging standards. These procedures should be operated under a national industry standard and should enable all personnel to easily identify whether the staging and or scaffold has been inspected and passed by competent inspectors. It is recommended that a label (such as scaff-tag) be fixed to all scaffolding to indicate that it is either safe to use or not safe to use.

Company personnel should inspect all scaffolding for conformance with agreed standards and should strictly refuse to climb aboard inadequate or defective scaffold erections.

Note: All inadequate or defective scaffolding should be reported immediately.

To assess the suitability of the scaffolding and/or staging at least all of the items contained in 'Checklist – Scaffolding/Staging' should be positively identified.

3.15 FALLING OBJECTS

Ship and shipyard personnel should be alert to the threat of falling objects. Apart from the obvious hazards from the hoisting of material on and off the ship, there are also numerous movements of equipment and material within tanks, engine rooms and pumprooms and the constant possibility of equipment or materials falling.

Safety helmets should be worn by all personnel at all times they are out and about in the shipyard.

3.16 ATMOSPHERIC MONITORING

The atmosphere of all spaces which are opened for entry, regardless of whether or not work is being carried out in them, should be monitored by a competent and qualified person at least once a day for:

- oxygen level
- hydrocarbon gas
- toxic gases

The results of these inspections, together with the date/time at which they were carried out, should be clearly marked at each entrance to the space concerned and on the central status board referred to in 3.8.

Shipyard and Company personnel should be continually alert for the impact of changes such as opening of pipelines or valves, introduction of chemicals or paints, leaking fuel/gas or oxygen hoses, etc., which could make the atmosphere of a tank or confined space hazardous.

3.17 VENTILATION AND LIGHTING

It is essential that adequate ventilation and safe lighting be provided and maintained in all work sites. Company personnel should always check that sufficient lighting and ventilation is in evidence before entering enclosed spaces. In addition, where appropriate, gas free certificates should be confirmed to be in place and valid at the time of proposed entry.

3.18 CONFINED SPACE ENTRY

Entry into tanks and confined spaces should be strictly controlled, firstly to ensure that the atmosphere in the space is safe and secondly to ensure that in an emergency, rescue teams are able to quickly ascertain the whereabouts of individuals.

Any enclosed space should only be closed after it has undergone a final inspection by a responsible person.

Consideration should be given to a system that includes providing each person who might enter a tank or confined space with a unique Tank Entry Name Badge. When a person enters a tank or confined space this badge should either be attached to a board or placed in a box, at the point of entry. In this way, if there is an emergency in a particular tank, the Emergency Response Team will be able to determine the number of persons in the tank or confined space and take appropriate action.

Reference should be made to IMO Resolution A.684(20) "Recommendations for entering enclosed spaces aboard ships".

3.19 BLASTING

If blasting with a friable material then special precautions should be implemented to protect personnel and to contain any escaping dust, etc.

Exposure to other toxic substances released from the material being blasted may occur. For example, lead arsenic, chromium, magnesium, manganese, nickel and iron oxide.

In order to prevent exposure to respiratory hazards during blasting operations the following effective controls must be in place:

- Zoning/cordoning off work areas
- Respiratory protection
- Atmospheric Monitoring
- Good housekeeping
- Training

Note: Silica (sand) can be an extremely hazardous substance to work with. Not only does it have the potential to cause an incurable respiratory disease, silicosis, it also produces its effects insidiously, sometimes taking years for symptoms to appear.

In view of the high risk of silicosis and the difficulty in controlling exposures, the use of crystalline silica for blast cleaning operations has been prohibited in many countries.

There is no first aid for the inhalation of silica dust. Prevention of silicosis depends entirely on the prevention of inhalation.

It is strongly recommended that blasting with silica is not permitted.

3.20 EXPOSURES TO TOXIC FUMES AND PARTICLES DURING PAINTING

Painting of ship structures is frequently performed in confined spaces and tanks thereby potentially concentrating fumes and particulates. In addition to health hazards, the opportunity for fires and explosion increases. Poisoning can occur from ingestion and inhalation of paint particles. The extent of exposure/risk depends on the method of

application of the paint; for example, rolling versus spraying. Exposure to other hazardous chemical constituents of paints can occur in the same way.

To mitigate respiratory hazard, appropriate respiratory protection should be provided to the worker, for example, cartridge-type facemasks or air-purifying respirators.

To reduce fume and particulate concentrations to acceptable levels, mechanical air supply and exhaust arrangements should be used to ventilate confined spaces and hence mitigate/control exposure during painting operations.

3.21 MANUAL HANDLING

Manual handling of heavy loads combined with poor posture can cause back strain, therefore good lifting techniques should be learned and used. The weight to be lifted should be carefully assessed and if considered to be too heavy assistance should be sought or mechanical lifting aids should be employed.

3.22 LIFTING EQUIPMENT

3.22.1 PERSONNEL LIFTING EQUIPMENT

Many fatalities in shipyards involve the misuse or mal-operation of personnel lifting equipment such as scissor lifts, elevating platforms, cherry pickers, etc. Company representative should keep this fact uppermost in their minds and ensure that, as well as being alert to danger at all times, all of the requirements shown in the 'Checklist – Lifting Equipment' are complied with.

Note; lifting equipment not certified for personnel lifting must not be used for this purpose under any circumstances.

3.22.2 OTHER LIFTING EQUIPMENT

All shipyards should have formal procedures that address the regular inspection, testing and maintenance of all lifting equipment including installed items such as "I" beams, pad eyes etc.

It is recommended that all equipment is colour coded and a flag system is in place indicating which colour code equipment is valid at that time.

Any temporary pad eyes put in place to facilitate the building, repair or conversion should either be removed or properly tested and permanently marked with their SWL prior to the vessel entering/re-entering service.

The shipyard should present evidence to the Company representative that any equipment utilised by company personnel or contractors has been approved for the purpose intended and has been recently tested as part of an on-going process.

A typical listing of adequate evidence is shown in 'Checklist - Lifting Equipment'. These checks should be supplemented by a visual inspection of the appropriate approvals/certificates.

3.23 EARTHING OF WELDING EQUIPMENT

When using arc-welding equipment, the shipyard must ensure that transformers are adequately earthed, especially when the ship is on the blocks in dry-dock. In addition, transformer enclosures must be in good condition and closed at all times.

Welding machines and consumables should be kept dry at all times.

3.24 COMBUSTIBLE MATERIALS AND SOLVENTS

Strict control and monitoring should be maintained over the introduction of combustible materials and cleaning solvents into work sites.

Where substantial combustible or hazardous material is to be used or brought on board, the Company representative should review its Material Safety Data Sheet (MSDS) or equivalent to confirm that the hazards associated with handling the material from both a fire and health point of view, are fully understood and that proper precautions are implemented.

Hot work must not be carried out in any space where combustible liquids/vapours (e.g., painting or chemical cleaning) are being used and entry into such spaces should be strictly controlled. In the case of tank painting or cleaning, interconnecting pipelines or ducts between tanks should be blanked off. Where access holes have been cut, particularly in way of bottom areas, sufficient precautions must be taken for the dispersion of solvent vapours which could otherwise leak into adjacent spaces, or come into contact with potential heat sources.

3.25 CONTROL OF INDUSTRIAL GASES

A procedure should exist to assure the safety of main supply and/or bottled gas. It may assist in this control process to use 'Checklist - Control of Industrial Gases'.

3.26 TRANSFER OF LIQUIDS

The loading of fuel, lubricating and hydraulic oils represents a significant change in the ship status and should not be allowed to take place until a full review of completeness of all relevant systems is made by the responsible parties. Proper notification of status change should be given to any areas/workers potentially affected and the status change should be posted throughout the ship in prominent places.

'Checklist - Loading/Transfer of Liquids', or similar, should be utilised to assist the management of this important operation.

3.27 MOORINGS

The ship should be securely moored throughout the repair period. The ship will usually be unable to provide power during the repair period and the shipyard should thus have a system that allows for mooring lines to be tightened as required. Both ship and shipyard personnel should monitor the moorings on a regular basis.

The prevailing weather should be monitored and early action should be taken to increase the moorings in order to meet any adverse weather conditions.

3.28 DOUBLE BANKING

Although the double banking of ships is undesirable, it may occasionally occur. In such a situation, the shipyard should ensure that the Company personnel are advised of any activities on the other ship that may affect the safety of their own ship and/or personnel.

Should crossing from one vessel to gain access to another be necessary, a clear way should be marked across the deck of the vessel being crossed.

3.29 VEHICLES ON THE WORKSITE

Vehicular traffic is an integral part of shipyard operation and frequent vehicle movements take place where the driver's vision is restricted. Company and shipyard personnel should be particularly alert to this hazard at all times.

Company personnel should be aware of the local driving regulations and the practices of local drivers.

4 COMMISSIONING FROM NEW OR AFTER REPAIRS AND FACTORY ACCEPTANCE TESTING

This section provides guidance on procedures necessary for the identification of hazards, carrying out risk assessments and defining risk mitigation controls during shipboard or factory acceptance testing (FAT) of equipment destined for new building ships or those under repair/modification.

Introducing a ship or new equipment into service after a construction or repair period is a time of high stress and intense activity. As such, the potential for a serious incident can be higher than would normally be expected.

All Company personnel must be extremely vigilant during such periods whilst ship systems are individually and collectively being tested and commissioned.

Test and commissioning activities should be reviewed in a timely manner by competent personnel who should identify hazards, assess their risk and decide on necessary mitigatory controls and procedures.

All of the identified hazards and possible effects associated with a particular activity whether it is factory acceptance testing or on-board commissioning should be noted in a Hazard Analysis Form (refer Appendix THREE).

In completing such a form, particular consideration should be given to non-participants who may be unfamiliar with the test procedures.

A risk rating of less than four (4), i.e., within the shaded area, may be considered acceptable and should require no further action.

However, if the risk rating is four (4) or higher a corrective action will be necessary to:

- Eliminate the hazard or;
- Reduce the risk of the hazard at the source or;
- Control exposure to the hazard by means of physical measures that preferably protect everyone rather than individuals.

The corrective actions proposed for each hazard should then be formulated and recorded and a Risk Assessment report detailing all of the above should be prepared. This report should be disseminated in a timely manner to all participants in the test.

The person or persons in charge of risk assessment should sign and date the Risk Assessment report

4.1.1 FACTORY ACCEPTANCE TESTING

Shipyard and Company personnel should be particularly vigilant during factory acceptance testing, as this is an area where many incidents, accidents and near misses occur.

'Checklist – Pre-Test' should be completed prior to attendance with the 'Checklist – FAT and Off-site Inspections' carried out on arrival at the site of the testing or inspections.

4.1.2 SEA TRIALS

When the vessel is first removed from the relative safety of the quayside to undergo sea trials, additional care will be required to ensure that the necessary HSE standards are maintained, with particular emphasis on:

- Potential overcrowding.
- Long working hours.
- Possible presence of inexperienced non-seagoing personnel on board.

While the shipyard is responsible for the supply of all regulatory life-saving and fire-fighting equipment for the sea trials, any deficiencies noted by company personnel should be brought to the attention of the Shipyard and the deficiency rectified before sea trials commence.

All personnel attending the sea trials should be made conversant with the emergency facilities available on board and additionally the Shipyard should be required to carry out a fire and boat drill shortly after leaving the quay.

A Risk Assessment should be carried out in line with the guidelines above.

5 BIBLIOGRAPHY

ISGOTT

ILO conventions

Issued by the

Oil Companies International Marine Forum

APPENDIX A - EXTRA REQUIREMENTS SPECIFIC TO REPAIR YARDS

1 Contractual Aspects of Safety

The repair contract/agreement should clearly define certain key responsibilities in respect of safety. Along with items listed in the main document, other items should include:

- the arrival condition of the ship with respect to condition of tanks, etc.
- how fuel and lubricating oil tanks are to be identified
- the level of safety awareness and particular safety requirements that the ship owner expects from the shipyard.

It should be made clear to the shipyard that ship's personnel have been instructed to closely monitor all repair activity undertaken by the shipyard and that any infringements of safety requirements will be immediately brought to the attention of the repair manager. Ship's personnel should not hesitate to intervene and even stop the work if they see something that, in their opinion, poses an immediate threat to the safety of life or the ship.

Conversely the shipyard should be invited to monitor all work being carried out by ship's personnel and to advise the Master or Company representative, should any safety concerns be noted.

2 Arrival Condition

The company should arrange for the ship to arrive in the shipyard with all cargo tanks, ballast tanks, void spaces, pipe tunnels, cofferdams, pump-rooms and empty fuel tanks in a clean and gas free "safe for entry", condition. Where hot work is to be carried out, a "safe for hot work" condition is to be achieved in accordance with local regulations. All cargo, vent, inert gas and cow lines together with cargo heating coils and lines should have been flushed and/or ventilated. Fuel lines and associated systems should be similarly cleaned in so far as this is practicable. Any exceptions to these requirements should be clearly identified.

Note: "Safe for entry" criteria are those defined in ISGOTT:

- Oxygen content of 21% by volume;
- Hydrocarbon vapours not more than 1% of the Lower Flammable Limit (LFL); and,
- Toxic gases (e.g., hydrogen sulphide, benzene etc.) below the relevant permissible exposure limit (PEL).

It is imperative that an independent qualified chemist inspects and certifies the vessel to be gas free at a cleaning station or anchorage prior to the ship's entry into the shipyard. On completion of the tests, appropriate certificates should be issued to the Company representative and ship's Master.

It is important to note that this initial test may only be to verify that the status of the ship is suitable for it to enter the shipyard. It should not be assumed that any tank or space is safe for entry or safe for hot work until that tank or space has been properly tested and certified.

It is particularly important that any tank, which is not certified as being safe for entry or safe for hot work, is clearly identified as such. Under normal circumstances, the only tanks that would not be certified as such will be the in use Fuel oil tanks and lubricating oil tanks.

The continuing maintenance and verification of the status of any tank or space throughout the repair period is the responsibility of the shipyard.

A typical pre-docking checklist is shown in 'Checklist – Ship Repair Pre-Docking'.

3 Removal of Oily Residues

In tanks where significant hot work is to be carried out, the tank bottom and horizontal stringers and other major surfaces of tank structures should be cleaned of any significant oily residues. Further local cleaning may be required once access is obtained to the work site and the cleanliness of the structure in the vicinity can be assessed.

As an additional precaution, it may be possible to cover the tank bottom with water, it should be noted that most chemists do not accept this as an option to local cleaning. If this is done the water surface should be clear of any oil sheen. In such cases, it will be necessary to remove residue from structure in the vicinity of the work site.

Even if there is no hot work being carried out in the tank, there may be hot work in adjacent or surrounding tanks. In such cases, it will be necessary to remove residue from the structure on the "other side" of the bulkhead, and it may also be necessary to remove residues or put a water bottom in the non-working tank.

When removing residues from cargo tanks after the ship has entered the shipyard, hot work should be prohibited outside the engine room or superstructure until all the requirements for the issue of a hot-work certificate are met.

The disposal of both liquid and solid hydrocarbon residues generated by such cleaning operations must be handled in compliance with MARPOL and any local regulations.

4 Non Gas-Free Repairs

If in exceptional circumstances, and where no viable alternative exists it is necessary to carry out repairs with the ship in a non gas-free condition the company should arrange for all appropriate cargo and slop tanks to be inerted and bottom residues in these tanks to be submerged under water.

Repairs involving hot work should not be carried out:

- within 60 metres of a non gas-free space
- on decks above such spaces
- on any pipeline system connected to these spaces
- in the vicinity of any such pipeline system connecting these spaces, unless such pipelines have been cleaned and properly certified "gas-free" and suitable for hot work in full compliance with the detailed requirements of the appropriate sections of ISGOTT.

Any tanks or compartments where work is to be carried out should be blanked off from

- Common vent lines
- Inert gas lines
- Crude Oil Wash lines

Additionally:

- there should be at least two valve segregation from the cargo systems
- Valves should be secured and marked accordingly.

For reference see 'Checklist - Non-Gas Free' and 'Checklist - Hot Work'.

5 Fuel and Lubricating Oil Tanks

All tanks, which contain fuel or lubricating oils, should be clearly identified. Their boundaries should be clearly and adequately marked. It is recommended that a line be painted across appropriate decks and bulkheads and, stencilled with the words, "DANGER, NO WELDING, BURNING OR CUTTING". No hot work should be carried out on bulkheads of bunker or lubricating oil tanks containing bunkers or lubricating oils or within 0.5 metres from such bulkheads.

All valves on lines to and from such tanks should similarly be clearly marked and should be secured against inadvertent operation. This includes both local (manual, electric, hydraulic or pneumatic) and remote controls in the control room or elsewhere. All vents from such tanks should be clearly identified. These should be covered and clearly marked if they terminate in an area where hot work is likely to be carried out.

APPENDIX B - NEAR MISS HSE OPPORTUNITY FORM

Select the probable immediate cause

- | | |
|---|--|
| <input type="checkbox"/> Use of tools & equipment | <input type="checkbox"/> Protective Systems |
| <input type="checkbox"/> Work exposures to | <input type="checkbox"/> Use of Protective methods |
| <input type="checkbox"/> Workplace layout | <input type="checkbox"/> Tools, equipment & vehicles |
| <input type="checkbox"/> Lack of awareness | <input type="checkbox"/> Other |

Select the type of contact which nearly occurred

- | | |
|---|---|
| <input type="checkbox"/> Struck by | <input type="checkbox"/> Contact with cold |
| <input type="checkbox"/> Struck against | <input type="checkbox"/> Spill to / from |
| <input type="checkbox"/> Caught between | <input type="checkbox"/> Emission to / from |
| <input type="checkbox"/> Trip & fall | <input type="checkbox"/> Contact with heat |

Which of the following would have been potentially impacted had an actual event occurred

- | | |
|---|--|
| <input type="checkbox"/> Health | <input type="checkbox"/> Safety |
| <input type="checkbox"/> Environment | <input type="checkbox"/> Property Damage |
| <input type="checkbox"/> Media Coverage | <input type="checkbox"/> Business |
| <input type="checkbox"/> Security | |

Any immediate preventative action should be taken

Date:

Office/Team

Enter the location to where the near miss/HSE Opportunity relates:

Select the Category

- | | | |
|--|----------------------------------|---------------------------------|
| <input type="checkbox"/> Environmental | <input type="checkbox"/> Quality | <input type="checkbox"/> Safety |
| <input type="checkbox"/> Security | <input type="checkbox"/> Health | |

Describe what happened and / or what the opportunity for improvement is:

APPENDIX C - HAZARD ANALYSIS PROCESS

To obtain the appropriate risk for each activity:

1. Rate the Potential Severity of the identified hazard as 1, 2 or 3
2. Rate the Likelihood of the hazard happening as 1, 2 or 3

$$\text{(Risk Rating (RR))} = \text{(Potential Severity Rating)} \times \text{(Likelihood Rating)}$$

RISK MATRIX

		SEVERITY		
		3	2	1
		<ul style="list-style-type: none"> - Fatality - 30 days + lost production - property damage or environmental remedial cost >\$100,000 	<ul style="list-style-type: none"> - Lost Time Injury - 7 days + lost production - property damage or environmental remedial cost <\$100,000 	<ul style="list-style-type: none"> - Minor injury - Negligible lost time - Property damage or environmental remedial cost < \$5,000
LIKELIHOOD	3 Likely to occur in next 12 months	RR = 9	RR = 6	RR = 3
	2 Likely to occur in next 2-3 years	RR = 6	RR = 4	RR = 2
	1 Unlikely to occur	RR = 3	RR = 2	RR = 1

Shaded areas indicate that risks are adequately controlled and therefore tolerable when stipulated safeguards/precautionary measures are effectively implemented.

Company:	
Equipment to be Tested:	
Hazard Assessment Date:	

ACTIVITY	HAZARD	EFFECT	SEVERITY	LIKELIHOOD	RISK	RECOMMENDED ACTION

Prepared by:

Date:

Title:

Approved by

Date:

Title:

APPENDIX D - CHECKLISTS

CONTROL OF INDUSTRIAL GASES

	Comment
Are gas cylinders secured against accidental falling?	
Are protective caps fitted on gas cylinders not in use?	
Are the hoses colour coded to avoid mistakes in identification?	
Have all hoses been pressure tested within the last three months and checked on a periodic basis?	
Are all gas cylinders inspected and tested on a periodic basis.	
Are all hoses used for acetylene, liquefied flammable gas and oxygen fitted with flashback arrestors?	
Are hoses deployed in a manner such that they are not liable to physical damage and not obstructing walkways, tank hatches or other means of escape	
During work break, shift change or securing for the day are all shut off valves closed? Are torches physically disconnected from hoses and are all hoses leading down into a tank or other confined space disconnected from the gas supply system by some positive means - such as short jumper hoses.	

FIRE FIGHTING CAPABILITY

	Comment
Is all fire fighting equipment stored at clearly marked locations around the worksite?	
Is there a dedicated fire patrol for the worksite?	
Are the personnel involved in the fire patrol readily identifiable?	
Is the worksite fire main pressurised on a 24 hour a day basis? The vessel's fire main should be utilised where possible.	
Is the vessels normal fixed fire-fighting system (e.g. CO2, etc.) operational?	
If fixed fire-fighting system is disabled, can it be reinstated at short notice and is the period of disablement defined and posted?	
Are fire watchers stationed in the vicinity of all hot work locations, including other spaces or compartments directly adjacent to the work site and where sparks or molten metal may fall?	
Is firewatcher equipped with a charged hose and/or a portable fire extinguisher?	
Are hot work areas free of all combustible material?	
Is equipment in way of hot work protected?	
Are additional portable fire extinguishers provided in adjacent spaces to where the hot work is taking place?	

HOUSEKEEPING

	Comment
Walkways maintained clear without obstructions. Routing of cables, hoses, etc, should not obstruct passage.	
Emergency exit/access from/to ship in place and maintained (two routes at opposite ends of worksite are recommended).	
Are all ladders and walkways within the tanks safe to use, properly secured and is secure footing provided? Beware of newly installed ladders that are only tack welded.	
Openings in decks, platforms and other structures are to be properly and adequately indicated and fenced (including corroded areas that will no longer support any weight).	
Adequate guarding must be in place at sides and ends of raised platforms. Particular attention should be paid to the removal of ship side rails and rails in the engine room.	
Lighting in all areas should be adequate. Note: Slips, trips and falls mainly occur due to bad lighting.	
Is all waste including scrap steel, welding rod ends, rags and other waste, etc., being removed from the worksite?	
Are all chemical and paint containers closed when not in use?	
Is spilt oil, chemical and/or water mopped up?	
Hazardous materials, e.g., asbestos, chemicals, radio active materials, etc., Should be handled in a safe and controlled manner.	

LIFTING EQUIPMENT

	Comment
Is equipment for lifting personnel certified as such?	
Are all cranes used to hoist personnel carriers certified for man riding?	
Are such cranes fitted with brakes or equivalent devices to arrest or prevent movement of the hoist or slewing mechanism when the drive motor is disengaged or in case of a power failure?	
Is equipment, including rigging, marked with its maximum safe working load (SWL)?	
Is the equipment regularly inspected and tested?	
Is all equipment including lifting wires, slings, chain blocks, shackles and associated equipment regularly inspected and proof tested?	
Are crane fail-safe devices and limit switches regularly tested?	
Are the operators properly trained and certified in its use?	
Are safe lifting practices in use?	

LOADING/TRANSFER OF LIQUIDS

	Comment
Are all repairs completed?	
Has tank been inspected and integrity of tank, pipes and valves been confirmed?	
Has the operation of all associated valves been confirmed?	
Has the operation of the tank gauging system been confirmed?	
Is the tank venting system operational?	
Has yard consent for change of status been given?	
Have all affected personnel/groups been given notification of change of status?	
Have notices been posted on "Ship's Status Board" and in other prominent places?	

PERMIT TO WORK SYSTEM

	Comment
Does the permit clearly state who raised the permit?	
Does the permit clearly state who authorised the permit?	
Does the permit clearly state the period of validity?	
Is the period of validity within the timescale for work to be carried out?	
Does permit clearly identify the nature and extent of the work to be carried out?	
Does permit clearly state the location of the work?	
Does permit state the criteria to be met for adequacy and periodicity of the control of safety equipment?	
Has a copy of all permits associated with the work been given to the Company representative?	
Has a copy of all permits associated with the work been given to any sub-contractor involved in such work?	
Are copies of all permits available in a central location?	

SCAFFOLDING/STAGING

Are all scaffolds/stages suitably tagged to indicate that they are safe for use and for recording the regular inspections?	
Has scaffolding been inspected and passed by competent inspectors from a recognised body?	
Are safety nets rigged where required?	
Are the staging boards in good condition, i.e. not burnt or split?	
Are scaffolding platforms free from scrap and replacement steel?	
Is securing of the access ladders and maximum heights of straight run ladders without safety rails or rest platforms within the standards required?	
Steel tube scaffolding not used for earthing welding equipment?	
Is there a system to prevent overloading of the scaffold/staging?	
Are there two course rails capable of supporting 100kg?	
Are toe boards installed?	
Is diagonal bracing utilised?	
Swinging and hanging scaffolding from wires or chains to be avoided.	
Are safety harnesses used during erection and dismantling?	
Wooden and bamboo scaffolding to be avoided.	

SITE SAFETY

	Comment
Is access to/from ship properly controlled/monitored by a tag system?	
Are enclosed spaces maintained in a safe condition for entry, and entry is controlled/monitored by a tag system.	
Does a work plan exist with a process whereby changes can be approved by all parties concerned to ensure that the implications for safety are properly addressed?	
Are procedures relating to gas free certificates and hot work permits in place and strictly enforced?	
Are significant changes of plan approved by all parties concerned, (yard, ship, contractors etc.), to ensure that the implications for safety are properly addressed?	
Are shipyard and their sub-contractors complying with the designated safety procedures?	
Is there evidence of proper coordination and control of all work with appropriate risk mitigation measures in place and is it enforced?	
Is a Permit to Work System in force that includes control of hot work, working aloft and access into confined spaces?	
Is adequate lighting and ventilation in place? Is the integrity of the supply systems (e.g., electrical) maintained?	
Is adequate fire-fighting capability maintained throughout the construction/repair period, both in general and specifically in the vicinity of any hot work?	
Is a scaffolding and staging monitoring/tagging system in place to ensure scaffolding and staging is safe to use?	
Is all lifting equipment properly certified and checked before lifting operations commence? Are all lifting operations undertaken in a controlled manner so they may be carried out safely?	
Are electrical circuits supplying equipment under maintenance or equipment that should not be started for any reason properly de-energised and locked or tagged out?	
Does a process exist whereby testing/commissioning of machinery and systems should be properly coordinated with other construction/repair activities?	
Does a process exist whereby transfers of liquids including ballast, fuel, and lubricating/hydraulic oils may be properly coordinated with other construction/repair activities?	
Does a process exist to ensure all hazardous materials, such as asbestos, are handled and disposed off by an approved contractor in a safe, controlled and environmentally responsible manner?	
Where vessels are moored, are the moorings safe and tended?	

SHIP REPAIR PRE-DOCKING

Tanks/spaces to be designated "Safe for Entry"							
Cargo tanks:							
Water ballast tanks:							
Fuel tanks:							
Void spaces:							
Other tanks/spaces:							
Tank/space status check						Yes	No
Tanks/spaces cleaned/washed Notes:							
Tanks/spaces drained Notes:							
Tanks/spaces continually ventilated Notes:							
Oxygen content not less than 21%					Reading		
Hydrocarbon level not greater than 1%							
Toxic gas below Permissible Exposure Limit					1) H ₂ S		
					2) Benzene		
					3) Carbon Monoxide		
					4) Mercaptans		
					5)		
					6)		
					7)		
Service Status: (For each applicable line type, a minimum of 1 category should be checked "Y")							
	Cleaned	Flushed	Drained	Ventilated	Isolated	N/A	
Cargo lines							
Vent lines							
Inert gas lines							
Crude oil wash lines							
Heating coils							
Fuel lines							
Verification Procedures Yes No							
Shipboard permit to work procedures in force							
Independent chemist verified "Safe for Entry" status							

HOT WORK

Tanks/Spaces/Areas to be designated "Safe For Hot Work"		
Cargo tanks:		
Water ballast tanks:		
Fuel tanks:		
Void spaces:		
Other Tanks/Spaces/Areas:		
Worksite status check	Yes	No
Note: Worksite refers to all areas including adjacent spaces that are affected by the proposed work schedule		
Worksite confirmed "Safe For Entry"		
Workscope identified & agreed		
Worksite conflicts with other jobs/trades, identified, assessed and removed		
Safe access to worksite provided		
Worksite inspection completed and satisfactory		
Hazard Risk Analysis completed		
Worksite local cleaning agreed. May include some or all of the following:	<ol style="list-style-type: none"> 1) Hand scraping 2) Picking 3) Ragging 4) Spot Washing 5) Mopping 	
Controlled residue disposal to safe area outside of worksite tank/space		
Worksite local cleaning completed and checked for quality		
Worksite fire protection procedures agreed		
Worksite fire protection procedures agreed. Recommended to include as minimum:	<ol style="list-style-type: none"> 1) Fire proof screening 2) Fire blankets 3) Water bottom in tank if required 4) Adequate worksite fire watch 5) Charged hoses 6) Charged fire extinguishers 7) Radio communications 	
Worksite supervision/verification procedures	Yes	No
Chemist worksite verification of "Safe For Hot Work"		
Yard and vessel Safety officers to verify Safe For Hot Work status		
Yard and vessel's Safety Officers to verify adequacy of Hazard Risk Analysis preventive and mitigation measures		
Have all Yes/No checks above been checked Yes		
Safe For Hot Work permit issued		
Yard and vessel's Safety Officers to monitor worksite during hot work to ensure:	<ol style="list-style-type: none"> 1) Adequacy of Fire Watch 2) Safe procedures of working 3) Trades keep within agreed workscope 	

NON-GAS FREE

Tanks/Spaces/Areas to be specified as Hot Work Worksite							
Cargo tanks:							
Water ballast tanks:							
Fuel tanks:							
Void spaces:							
Other Tanks/Spaces/Areas:							
Tank/Spaces within [60]metres of worksite						Yes	No
All tanks/spaces/areas identified.							
All gas free tanks/spaces certified "Safe for Entry"							
Tank/Spaces more than [60]metres from worksite						Yes	No
All tanks/spaces/areas identified.							
All gas free tanks/spaces certified "Safe for Entry"							
All non-gas free tanks/spaces identified							
Non-Gas Free Tanks/Spaces check						Yes	No
Fully inerted							
Pressure monitoring established							
Precautions against pressure venting established							
Facility for IG top up established and confirmed							
Water bottom established where applicable							
Boundaries marked and highly visible							
Services to/from non-gas free tanks/spaces							
(For each applicable line type, a minimum of 1 category should be checked "Y")							
	Cleaned	Flushed	Drained	Ventilated	Isolated	N/A	
Cargo lines							
Vent lines							
Inert gas lines							
Crude oil wash lines							
Heating coils							
Fuel lines							
Supervision/verification procedures						Yes	No
Have all services to/from non-gas free tanks/spaces been correctly checked							
Have all other Y/N checks been checked "Y"							
Yard and vessel safety officials agree to proceed to "Repair Yard Hot WorkChecklist"							

PRE-TEST

	Comment
Design approved by customer?	
Has there been customer inspection during manufacture?	
Are there any outstanding non conformances? If so, will they effect the acceptance testing?	
Has the testing procedure been reviewed by customer prior to acceptance testing?	
Are the acceptance testing check sheets available for review and acceptance?	
Are the testing equipment calibration certificates available for inspection?	
Are package instruments/gauges, etc., calibrations valid with certificates?	
Are there any outstanding punch lists that will affect the acceptance test?	
Is a certified Quality Management System in place?	
Does a HSE management system exist?	
Is a Permit to Work procedure used during the acceptance test?	
Are safety procedures in place to cover the acceptance test scope?	
Are safety signs, barriers displayed?	
Is there a HSE focal point and is he available to ensure all safety precautions are in place and all applicable personnel are briefed?	
Is appropriate PPE available and worn by all attendees?	
Are emergency procedures in place and explained prior to the acceptance test starting?	
Is the original copy of the test procedure being used for signatures at the different stages of the test and observations recorded?	
Is the acceptance test schedule and sequence of testing followed?	
Are all applicable personnel available and in attendance?	
Have all modifications to the acceptance test agreed and noted in the procedure?	
Have all punch items noted and agreed?	
Is the Classification Society surveyor in attendance and did he/she sign the applicable sections of the procedure and issue an inspection release note on completion?	
Testing of machinery and systems is properly co-ordinated with other repair activities?	

FAT AND OFFSITE INSPECTION

General Information	
Attendees	
Company	
Address	
Contact Person	
Contact Tel, Fax, Email	
Equipment	
Test/Inspection Date	
Pre-Test/Inspection Date	
Pre-Test Result	
Safety at the Work Site	
Confirm HSE Management System in use	
Confirm medical first aid facilities are available	
Confirm knowledge of electric shock at site	
Confirm fire fighting facilities are available	
Confirm PPE is freely available for use	
Confirm hotwork will be stopped during inspection	
Confirm no NDT during inspection	
Confirm no paint spraying during inspection	
Confirm scaffolding erected by competent persons	
Confirm scaffolding inspection system in use	
Confirm scaffolding of metal construction	
Confirm ladders are in good condition & secured	
Confirm openings are protected to prevent falling	
Confirm lifting devices have been load tested	
Confirm suitable lighting has been arranged	
Confirm water or oil is used for strength tests	
Confirm equipment is properly secured	
Confirm safety guards are fitted	

Confirm safety devices are tested and operational as applicable for e.g., monitoring, alarm and shutdown devices for:

Other equipment, duty and function to be informed

Overspeed	
Lubricating	
Fuel oil pressure and temperature	
Cooling water pressure and temperature	
Crankcase oil mist density	
Vibration	
Hydraulic oil pressure and temperature	
Compressed air pressure	
Overcurrent	
Over/under voltage	
Over/under frequency	
Valve and other equipment limit switches	