



SAFETY INVESTIGATION REPORT

202101/005

REPORT NO.: 02/2022

January 2022

The Merchant Shipping (Accident and Incident Safety Investigation) Regulations, 2011 prescribe that the sole objective of marine safety investigations carried out in accordance with the regulations, including analysis, conclusions, and recommendations, which either result from them or are part of the process thereof, shall be the prevention of future marine accidents and incidents through the ascertainment of causes, contributing factors and circumstances.

Moreover, it is not the purpose of marine safety investigations carried out in accordance with these regulations to apportion blame or determine civil and criminal liabilities.

NOTE

This report is not written with litigation in mind and pursuant to Regulation 13(7) of the Merchant Shipping (Accident and Incident Safety Investigation) Regulations, 2011, shall be inadmissible in any judicial proceedings whose purpose or one of whose purposes is to attribute or apportion liability or blame, unless, under prescribed conditions, a Court determines otherwise.

The report may therefore be misleading if used for purposes other than the promulgation of safety lessons.

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MV FABIO DUO' **Serious injury to a crew member,** **during crane operations** **in the port Santa Margherita Ligure, Italy** **11 January 2021**

SUMMARY

Fabio Duo' was engaged in the strengthening and lengthening of the outer breakwater of Santa Margherita Ligure Harbour.

The vessel's crane was being used to transfer boulders from the cargo hold and place them in position at the breakwater. The master, who was on duty at the time, walked forward to check on some maintenance, which the crew had carried out earlier. On his way back to the accommodation, he decided to check on the status of the cargo

hold.

While checking on the cargo, the crane turned towards the breakwater and trapped the master in between the body of the crane and the hatch coaming. Consequently, the master sustained serious injuries to his torso.

The MSIU has issued four recommendations to the Company aimed at addressing the safety on the deck when the crane is in operation.



FACTUAL INFORMATION

The vessel

Fabio Duo' (Figure 1) was a general cargo hopper dredger of 2,080 gross tonnage, owned by Intesa Sanpaolo S.P.A. and operated by Monegle Shipping Ltd. of Malta (Company). The vessel was built by Cantiere Navale Vittoria, Adria, Italy, in 2012 and was classed with Registro Italiano Navale (RINA). The vessel had a length overall of 80.90 m, a moulded breadth of 16.00 m and a moulded depth of 5.50 m.

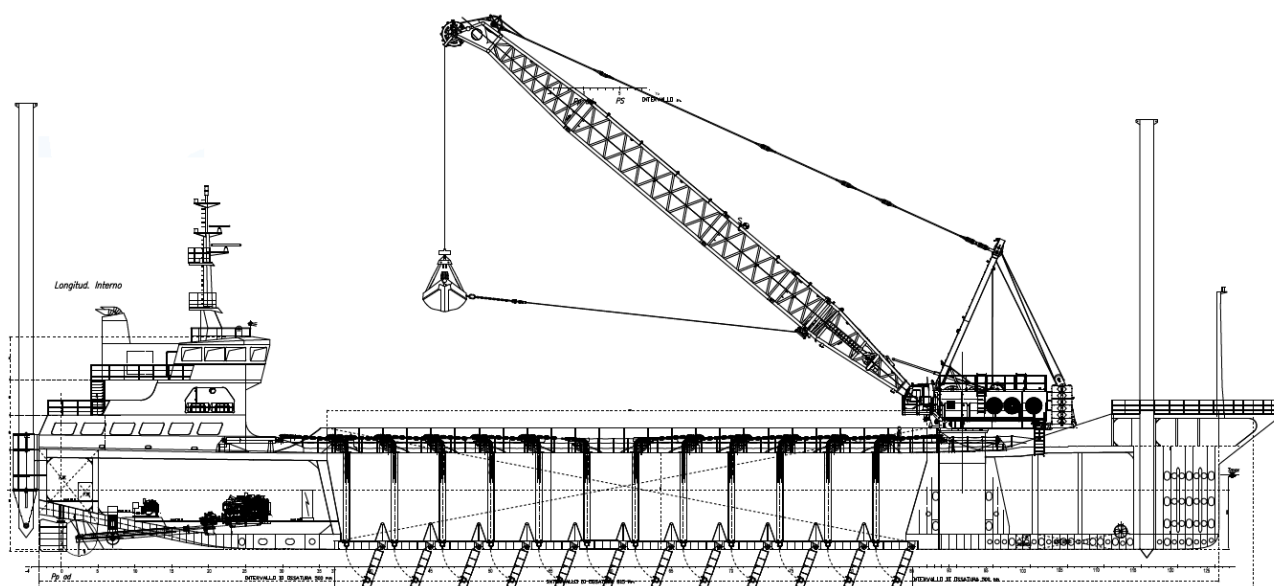


Figure 1: An extract from *Fabio Duo*' GA plan

Fabio Duo' had a crane on her main deck, capable of lifting a maximum load of 250 metric tonnes, and which was installed forward of her single cargo hold. The vessel's cargo hold measured 40.0 m by 11.0 m by 6.5 m and was not provided with a hatch cover. Access to the cargo hold was via a basket, transferred by the vessel's crane.

Propulsive power was provided by two high-speed, 16-cylinder, four-stroke, N.2 CUMMINS KTA50M2 marine diesel engines, which produced a combined power of 2,386 kW at 1,800 rpm. These drove two

fixed-pitch propellers, enabling the vessel to reach a service speed of 10 knots.

The crew

The Minimum Safe Manning Certificate (MSMC) of *Fabio Duo*' stipulated a crew of eight. However, when the vessel was engaged in coastal voyages not exceeding 12-hour duration and within 20 nautical miles (nm) from the coast (restricted area 3), the chief mate and two deck ratings were considered optional.

At the time of the occurrence, the vessel was manned by a crew of five as per the restricted area 3 condition of the MSMC. The crew consisted of Italian, Albanian and Romanian nationals. The working language on board was English.

The master who was a Romanian national, embarked on *Fabio Duo*' at La Spezia, Italy, on 29 December 2020. He had 20 years of experience at sea, two of which were served in the rank of a master. His STCW¹ Certificate of Competence as a master was

¹ IMO. (2001). *International Convention on Standards of Training, Certification and Watchkeeping for Seafarers, 1978, as amended in 1995 and 1997 (STCW Convention)*. London: Author.

issued by the Romanian Government in 2014. This was the master's first contract with the Company, which was for the duration of one month. The master's working hours were during the day, usually starting at around 0700 and finishing at around 1700 with an hour of rest in between.

The chief engineer was an Italian national and had embarked on the vessel from Livorno, Italy, on 14 July 2020. He held an STCW III/2 Certificate of Competence as a chief engineer which was issued in 2010 by the Italian Authorities. The chief engineer had 30 years of seafaring experience and had been employed with the Company for 10 years in his current rank.

The third officer was a Romanian national. He had embarked *Fabio Duo* on 29 December 2020 from La Spezia, Italy. He had started his seafaring career in 2010 and had about nine years of experience as an Officer of the Watch. His STCW II/1 Certificate of Competence was issued in 2011 by the Romanian authorities. The third officer had been working with the Company for only a few months. During his time on board *Fabio Duo*, he also had the role of a safety officer.

The Italian crane operator was not considered part of the crew. He had been working with the Company for the last 10 years. He held a crane driver licence issued by the Italian authorities, which was last renewed on 18 June 2019. The crane operator had embarked in Chioggia, Italy, on 29 December 2020.

Environment

At the time of the accident, the vessel was experiencing calm sea and wind conditions. The sky was clear, and a very good visibility was recorded. The air and sea temperatures were 15 °C and 10 °C, respectively.

Narrative²

The Company had been contracted to repair the breakwater of Santa Margherita Ligure, authorised by the Maritime District Office of the area. The Office also provided *Fabio Duo* with instructions on the positioning of boulders at the breakwater, based on previous bathymetric studies of the seabed and technical guidance from shore civil architects working on site.

On 11 January 2021, at around 0630, *Fabio Duo* departed from Sestri Levante and proceeded to Chiavari to load boulders. The loading was completed at 1142, following which, she proceeded to Santa Margherita Ligure to resume her repair operation of the port's outside breakwater. During the vessel's passages, the master was on the bridge as the officer of the watch. The vessel arrived at 1300 and was placed in position with her port side towards the breakwater and with pylons secured to the fore and aft of the vessel. The operations commenced shortly after.

On location, the master recalled that he was engaged in several paperwork jobs on the bridge. Meanwhile on deck, the crane operator was lifting the boulders from the cargo hold and positioning them in their designated position. The chief engineer, who maintained direct contact with the crane operator via a portable radio, was on the bridge overseeing the operation³.

Sometime after 1500, the master decided to go on deck and check on maintenance work, which had been carried out earlier by the crew. The maintenance consisted of a minor paint job on the mooring bitts of the forward

² Unless otherwise stated, all times are local times (UTC + 1).

³ During the consultation process, the Company insisted that as expected from an operational safety management system, the master had always been involved in the cargo operations and these were never coordinated between the chief engineer and the crane operator.

mooring station. The master did not inform other crew members of his intentions.

The master took the access way on starboard side of the cargo hold to reach the forecastle (Figure 2), since the port side access way had been cordoned off. During this time, the crane operator, who was placing one boulder in position at the breakwater, noticed the master in proximity of the paint locker (Figure 2).

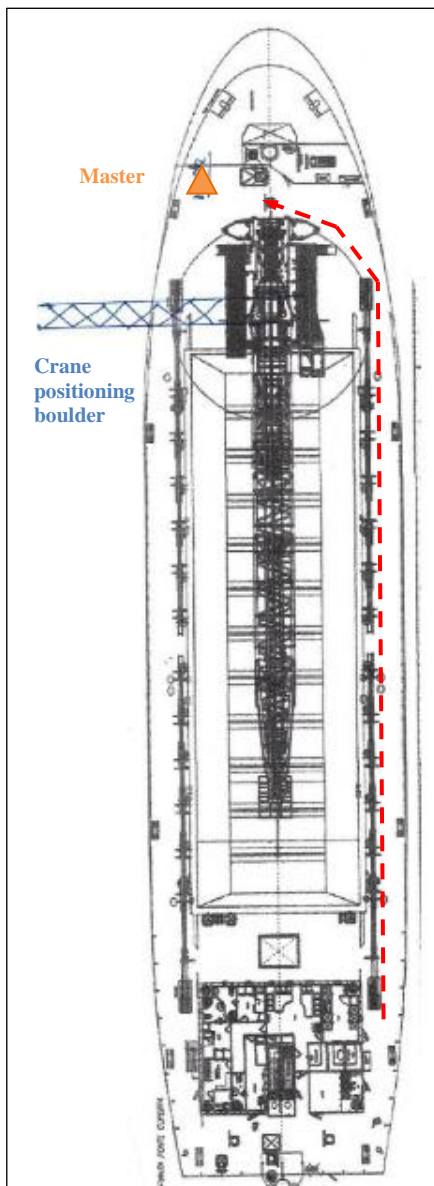


Figure 2: The route taken by the master to access the forecastle is indicated in red. The master's position when the crane operator saw him before the accident is marked in a triangle

After checking on the maintenance, the master made his way to the accommodation block but decided to check the status of the boulders in the cargo hold. The master climbed the starboard stairs to the cargo hold and looked inside the cargo hold (Figure 3).

At this time, the crane operator had the crane's boom in line with the cargo hold and was picking up one of the boulders from the hold. Within a matter of seconds, the crane turned in a clockwise direction, towards the breakwater, entrapping the master between the body of the crane and the cargo hold coaming.



Figure 3: A simulation of the master on the stairs

At this time, while the crane operator was placing one of the boulders in position, he heard a scream and turned the crane back towards the cargo hold. He immediately noticed the master lying on deck from the crane's side mirror. He alerted the bridge and switched off the crane. The cargo operation was suspended at 1514 (Figure 4).

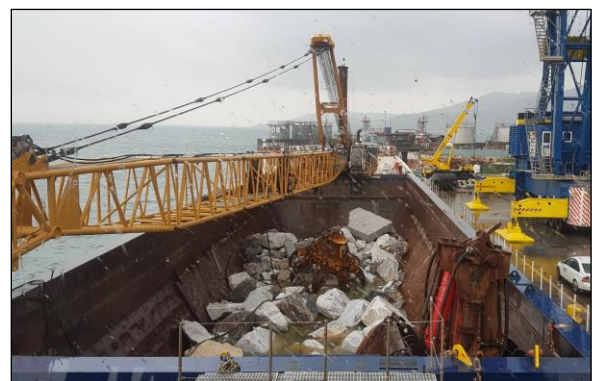


Figure 4: The status of the cargo hold, as viewed from the bridge, after the cargo operation was suspended

The chief engineer, who was on the bridge, called for shore medical assistance, and an ambulance arrived within minutes. However, due to *Fabio Duo*'s location, the ambulance had no access to reach the injured master. A helicopter was therefore dispatched and by 1640, a doctor and a fireman were deployed on board and subsequently prepared the master for evacuation.

Injuries sustained by the master

The master was admitted to the local hospital on the same day where he was diagnosed to have suffered from a massive hematoma, muscle laceration of the right abdominal wall, and a fracture of the vertebrae. The master was discharged from hospital on 12 February 2021. Medical treatment resumed once he arrived at his home country.

Location of the crew

At the time of the accident, the chief engineer was taking a break on the port wing of the bridge, facing aft, while the third officer and the AB were also taking a break on the poop deck. There were no witnesses to this occurrence.

Hours of work/rest

The vessel was operating during daytime, while she was engaged in the works at Santa Margherita Ligure. Once the crew completed their day, the vessel was shifted to a sheltered port for the night. The crew's hours of work/rest were identical. The crew's day usually started around 0700 and finished by 1700 with an hour lunch break in between. The records of hours of work / rest of the crew indicated that they were in line with the requirements of STCW Code and MLC, 2006⁴.

⁴ ILO. (2006). *Maritime Labour Convention*. Genève: Author.

Intoxication

After the accident, the master cooperated fully with the crew and the rescuers. Moreover, the crew neither found alcohol, nor drugs in the master's cabin. Alcohol and drug tests that were carried out at the local hospital returned negative results.

Familiarization & handover

A copy of the elementary safety familiarisation, which was part of the vessel's Safety Management Manual (SMM), and a copy of the SMM familiarisation form were provided to the safety investigation. These indicated that the master was provided with familiarization training in line with the requirements of the STCW Code Part A⁵ and that he had read and understood the contents of the SMM by 30 December 2020.

Furthermore, upon joining the vessel, a handover was provided by the outgoing master.

Vessel's Safety Management System Manual

The vessel's SMM contained a section on cargo handling procedures and instructions. This section was written in the working language of the ship and it contained brief points on the operations of the crane. Amongst these points was a requirement that before the crane is raised or lowered, any personnel near the deck must be warned to leave the area. The same applied when the crew were dealing with a faulty crane.

⁵ STCW Code Part A / Section A-VI/1.

ANALYSIS

Aim

The purpose of a marine safety investigation is to determine the circumstances and safety factors of the accident as a basis for making recommendations, and to prevent further marine casualties or incidents from occurring in the future.

Immediate cause of the accident

At the time of the accident, the master had just climbed the stairs leading to the cargo hold to check its status. The crane operator, having picked up one boulder from the cargo hold, turned the crane towards the breakwater. While doing so, the sudden movements of the crane caught the master off guard and trapped him in between the body of the crane and the cargo hold coaming.

Access to the main deck during cargo operations

It was the master's first experience on *Fabio Duo* and with the Company. Upon embarkation, he was given a handover by the outgoing master, which focused on the paperwork jobs that had to be carried out by him. The master had stated that, although his familiarisation paperwork had been completed, no actual / physical familiarisation had taken place.

Paperwork signed by the master indicated that he had read and fully understood the contents of the SMS Manual and the Company's policy, the day after he embarked.

The SMS Manual was an extensive document, addressing all areas of the vessel's operations, in accordance with the ISM Code. In fact, the master recalled that he did not read through every chapter of the Manual.

The safety investigation did not exclude the possibility that the master may have missed

the instruction that crew members were prohibited free access to the open deck when the crane was in operation.

Accessing the main deck during cargo operations

Information collected by the MSIU suggested that the master's approaching the cargo hold coaming was because he wanted to check the cargo hold and get an idea of the number of boulders remaining inside the cargo hold.

Apparently, the master was not aware of the access restrictions on deck when the crane was in operation. However, the safety investigation focussed more specifically on this matter given the exposure to the hazard, which the master has found himself in with his getting in proximity of the operating crane.

Academic literature suggests that successful accomplishment of work in a socio-organisation means that actors within that system must have a "common ground"⁶ *i.e.*, collaboration amongst themselves (and coordination of work). *Per se*, this suggested that the master required guidance, considering also that he was new to the ship and that the other key crew member was much more familiar with the ship and the operational structure of the Company.

The master explained to the safety investigation that he had not been involved in the cargo operations. He also explained that the operation was being coordinated between the chief engineer and the crane operator, in their native language, and over portable radios.

The chief engineer had a long-standing relationship with the Company and the vessel's owners. He had been employed to

⁶ Clark H. H., & Brennan S. E. (1991). Grounding in communication. In Resnick L. B. & Levine J. M. (Eds.), *Perspectives on socially shared cognition* (pp. 222–233). Washington, DC: American Psychological Association.

work on *Fabio Duo* on multiple contracts of varying durations. This aspect gave the MSIU reason to believe that the working relationship between the chief engineer and his employers was much stronger than that of the master and the Company.

In fact, albeit aware of his responsibility in terms of the Company's SMS implemented on board, the master accepted the situation, explaining that whilst the chief engineer had long been employed with the Company, he had only been on board for 13 days and his contract would, after all, expire after 30 days.

The safety investigation was of the view that the leadership style adopted on board the ship by the crew members was a factor, which contributed to an eroded communication structure, motivated a silo approach and (consequently) encouraged unilateral decisions.

The weak communication structure may have also contributed to a lack of trust between the key crew members, making communication more difficult. It also appeared that the issue with communication on board was not only limited to the ship but extended to the higher level of the socio-organisational system, *i.e.*, the management ashore.

Safety barriers

As indicated elsewhere, the free access to the main deck was restricted. In fact, due to the ongoing operations, access to the forecastle from the port side of the cargo hold had been cordoned off by means of a chain (*i.e.*, a physical barrier system). However, access to the forecastle (from the accommodation block) was possible from the starboard side of the cargo hold. Black and yellow markings were painted in a semi-circle on the deck around the crane, extending from port to starboard (Figure 5). The paint marked the hazardous area for the crane operations.

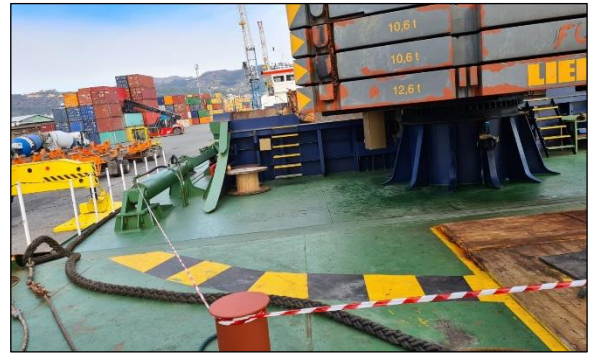


Figure 5: Black/yellow markings on the deck (starboard side only)

Paint markings are classified as a symbolic barrier system and therefore require one's interpretation to be effective (as opposed to a physical barrier system). After the accident, the master could not recall these markings on deck and his impression was that the deck was easily accessible.

The vessel was also fitted with one CCTV camera on either side of the bridge wing to assist in the monitoring of the cargo operation area. The fact that the master did not notify any of the crew members of his intention to access the main deck during the cargo operation, meant that:

1. no crew member could draw his attention that access to the deck area was prohibited during crane operations; and
2. this access by the master could not (at least) be monitored by other crew members and perhaps warn the master of any hazards captured on the CCTV.

The safety investigation concluded that the (symbolic) barriers in place at the time of the accident did not serve their intent and purpose.

Other findings

It was possible for the crane driver to step inside the crane cabin either from port or starboard side. However, if access was made from the starboard side through the stairs on the deck (Figure 5), it necessitated the crane

driver to step onto the coaming, leap into the cabin, and in so doing, exposing himself to the hazard of a fall from a height⁷ (Figure 6).



Figure 6: Access to the crane from starboard side

Besides the potential issue with the access to the crane, the safety investigation identified two other factors, *i.e.*, access to PPE and working language.

On the day of occurrence, the master was wearing casual clothes. The master informed the safety investigation that only the chief engineer could provide access to PPE; however, the latter was not on board when the master signed on. When the chief engineer returned to the ship several days later, the master did not make any requests to this effect.

Documents indicated that the working language on board was English. However, the vessel's operations were conducted in Italian, the mother tongue of most of the

crew members and that of the crane operator. To some extent, the master was able to communicate with the crew in Italian due to his previous experience in working with Italian crew.

The safety investigation's concern, as much as this was not an influencing factor in this accident, was that under such circumstances, a situation may arise whereby crew members would be unable to communicate among themselves and see them unable to execute their respective responsibilities.

Fatigue, drugs, and alcohol

The work/rest hours of the master indicated that his rest periods complied with the relevant requirements.

However, it was noticed that the records of hours of work / rest for the crew members made available to the safety investigation indicated that all crew members worked the same hours. This meant that the log entries were inaccurate, and / or the vessel was kept without a watchkeeper during night hours.

Taking into consideration the alcohol and drug test results, and the behaviour of the master after the accident, the safety investigation concluded that intoxication was not a contributing factor to this accident.

⁷ As indicated in the 'Factual' section of this safety investigation report, the vessel was not fitted with a cargo hold hatch cover.

CONCLUSIONS

1. The master was trapped between the coaming and the body of the crane while he was looking inside the cargo hold.
2. The master may have missed the instruction in the SMS Manual that crew members were prohibited free access to the open deck when the crane was in operation.
3. The leadership style adopted on board the ship by the crew members was a factor, which contributed to an eroded communication structure, motivated a silo approach and (consequently) encouraged unilateral decisions.
4. The weak communication structure may have also contributed to a lack of trust between the key crew members, making communication more difficult across all levels of the organisation.
5. The black and yellow markings, which indicated the crane's swinging area, were missed by the master.

SAFETY ACTIONS TAKEN DURING THE COURSE OF THE SAFETY INVESTIGATION⁸

Following the accident, the Company revised the HAZID document which identified potential major hazards associated with the operation of the vessel.

RECOMMENDATIONS

Monegle Shipping Ltd is recommended to:

- 02/2022_R1** Install physical barriers systems to all deck accesses and around the crane prior to the commencement of crane operations.
- 02/2022_R2** Ensure that joining officers do not find themselves in a situation where they are expected to assume responsibility without getting a detailed handover and prior knowledge of critical aspects of the ship's operations.
- 02/2022_R3** Assess the risks related to access to the crane's cabin from starboard side, taking into consideration the open cargo hold.
- 02/2022_R4** Ensure that crew employed on board, with special reference to officers, can communicate in English, and that all crew members can communicate in the determined working language.

⁸ Safety actions and recommendations shall not create a presumption of blame and / or liability.

SHIP PARTICULARS

Vessel Name:	MV <i>Fabio Duo</i> '
Flag:	Malta
Classification Society:	RINA
IMO Number:	9627174
Type:	General Cargo Hopper Dredger
Registered Owner:	Intesa Sanpaolo S. P. A.
Managers:	Monegle Shipping Ltd.
Construction:	Steel
Length Overall:	80.90 m
Registered Length:	78.40 m
Gross Tonnage:	2,080
Minimum Safe Manning:	5 (Restricted area: 3)
Authorised Cargo:	General cargo

VOYAGE PARTICULARS

Port of Departure:	Santa Margherita Ligure, Italy
Port of Arrival:	La Spezia, Italy
Type of Voyage:	Coastal voyage
Cargo Information:	Boulders
Manning:	5

MARINE OCCURRENCE INFORMATION

Date and Time:	11 January 2021 at 15:14 (LT)
Classification of Occurrence:	Serious Marine Casualty
Location of Occurrence:	Santa Margherita Ligure, Italy
Place on Board	Main deck
Injuries / Fatalities:	One seriously injured crew member
Damage / Environmental Impact:	None
Ship Operation:	Unloading – ship to shore
Voyage Segment:	Anchored
External & Internal Environment:	The wind and sea state were calm. The sky was clear, and the visibility was very good.
Persons on board:	6