GOBIERNO DE ESPAÑA
MINISTERIO DE FOMENTO
SUBSECRETARÍA DE FOMENTO
COMISIÓN PERMANENTE DE INVESTIGACIÓN DE ACCIDENTES E INCIDENTES MARÍTIMOS

CIAIM REPORT 03/2018

Fall of the rapid rescue boat on the vessel AL ANDALUS EXPRESS at the Port of Motril (Granada) on 5 October 2016, injuring two crewmembers

NOTICE

This report was written by the Permanent Maritime Accident and Incident Investigation Commission (CIAIAM), which is regulated by Article 265 of the Revised Text of the Law on State Ports and the Merchant Marine, approved by Royal Legislative Decree 2/2011 of 5 September, and by Royal Decree 800/2011 of 10 June.

The purpose of the CIAIM when investigating maritime accidents and incidents is to obtain conclusions and lessons learned that can reduce the risk of maritime accidents, and thus contribute to improving maritime safety and to preventing contamination from ships. To this end, the CIAIM conducts a technical investigation into each case that aims to determine the causes and circumstances that may have, directly or indirectly, influenced the accident or incident and to make the relevant safety recommendations.

This technical report does not, under any circumstance, prejudge any decision that may stem from legal proceedings, nor does it seek to evaluate responsibilities or assign blame.

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Figure 1. Ship AL ANDALUS EXPRESS.

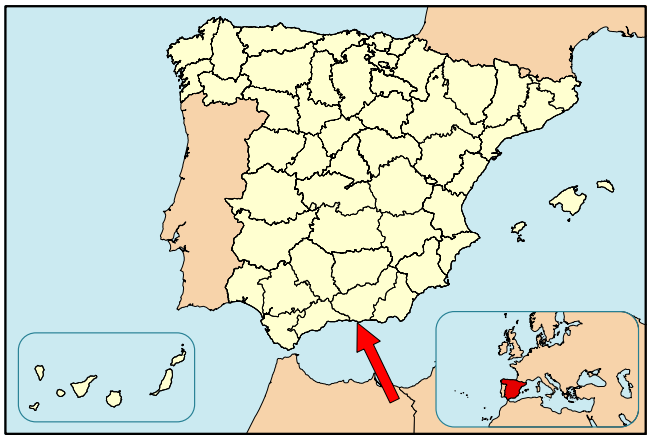

Figure 2. Area of accident.

1 SUMMARY

On 5 October 2016 at about 10:30, the second bridge officer and a seaman on the ship AL ANDALUS EXPRESS were conducting routine checks of the fast rescue boat. As part of these checks, they proceeded to lower it using the emergency procedure. As they operated the lowering mechanism, the boat fell freely from a height of about twenty meters with two persons aboard.

Both crewmembers were injured and were taken to a hospital with back pain.

1.1 Investigation

The CIAIM was notified of the accident on 6 October 2016. That same day the event was classified as a "serious accident", and the Commission agreed to open an investigation. The CIAIM board approved the event's classification and the opening of a safety investigation on 19 October 2016. This report was reviewed by the CIAIM at its meeting of 14 February 2018 and, after its subsequent approval, was published in May 2018.

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2 OBJECTIVE INFORMATION

Table 1. Information on the ship.

Name	
Current:	AL ANDALUS EXPRESS
Previous:	NORD PAS-DE-CALAIS (2012-2016) SEAFRANCE NORD PAS-DE-CALAIS (1996-2012) NORD PAS-DE-CALAIS (1987-1995)
Flag:	
Registry:	Cyprus
Port of registry:	Limassol
IMO Identification	
Call sign:	5BMH4
MMSI:	209011000
Number:	8512152
Type	Ro-ro and passenger ferry.
Main characteristics:	
Overall length:	160.06 m
Length between perpendiculars:	150.93 m
Beam:	22.40 m
Molded depth:	13.80 m (top deck); 8.55 m (main deck).
Gross tonnage:	7263.94 GT (national); 13727 GT (international).
Net tonnage:	2492.52 NT (national); 5545 NT (international).
Hull material:	Steel.
Propulsion:	Two diesel engines with two variable-pitch propellers.
Engine:	2 × Sulzer 16ZAV40/48
Powerplant:	2 × 9011 kW at 500 rpm.
Ownership and management	
Owner:	Förde Reederei Seetouristik Iberia S.L.U. Vana Shipping Co. Ltd
Registration company:	Registro Italiano Navale (RINA)
P&I Club:	Hanseatic P&I
Agent:	Grupo López Guillén S.L.
Construction details	Built in 1987 by the NORMED shipworks (Chantiers du Nord et de la Méditerranée) in Dunkirk (France).

Table 2. Details of the voyage.

Date	5 October 2016
Ports of arrival / transit / destination	Docked at the Port of Motril (Granada).
Type of voyage	Docked.
Cargo information	In ballast.
Complement	42 crewmen listed as: • 1 captain, from Poland. • 1 first officer, from Macao. • 2 second officers, from Spain. • 1 chief engineer, from Morocco. • 1 first engineer officer, from Poland. • 1 second engineer officer, from Morocco. • 12 deck hands, from Morocco and Spain. • 6 engine room technicians, from Morocco and Romania. • 17 individuals tasked with "other" duties, from Bulgaria, Morocco, Ukraine, Estonia, Malta, Lithuania and Romania.
Documentation	The officers and sailors all had the valid titles and specialty certificates required.

Table 3. Information on the event.

Type of event	Fall of a rapid rescue boat.
Date and time	5 October 2016 at 10:30.
Location	Port of Motril, 36°°43,2' N; 003°31,1' W
Ship operation and segment of voyage	Docked in port doing routine maintenance activities.
Shipboard location	Rapid rescue boat on the port side.
Damage to ship	None.
Injured / missing / fatalities onboard	Two crewmen injured.
Contamination	No.
Other damage external to ships	No.
Other personnel injuries	No.

Table 4. Maritime and meteorological conditions.

Wind	Calm, speed below one knot (0 on Beaufort scale).
Sea state	Calm, no waves.
Visibility	Good (in excess of 10 km).

Table 5. Response by officials on the ground and reaction by emergency services.

Organizations involved	Motril Port Authority.
Resources used	–
Response time	–
Measures taken	–
Results	–

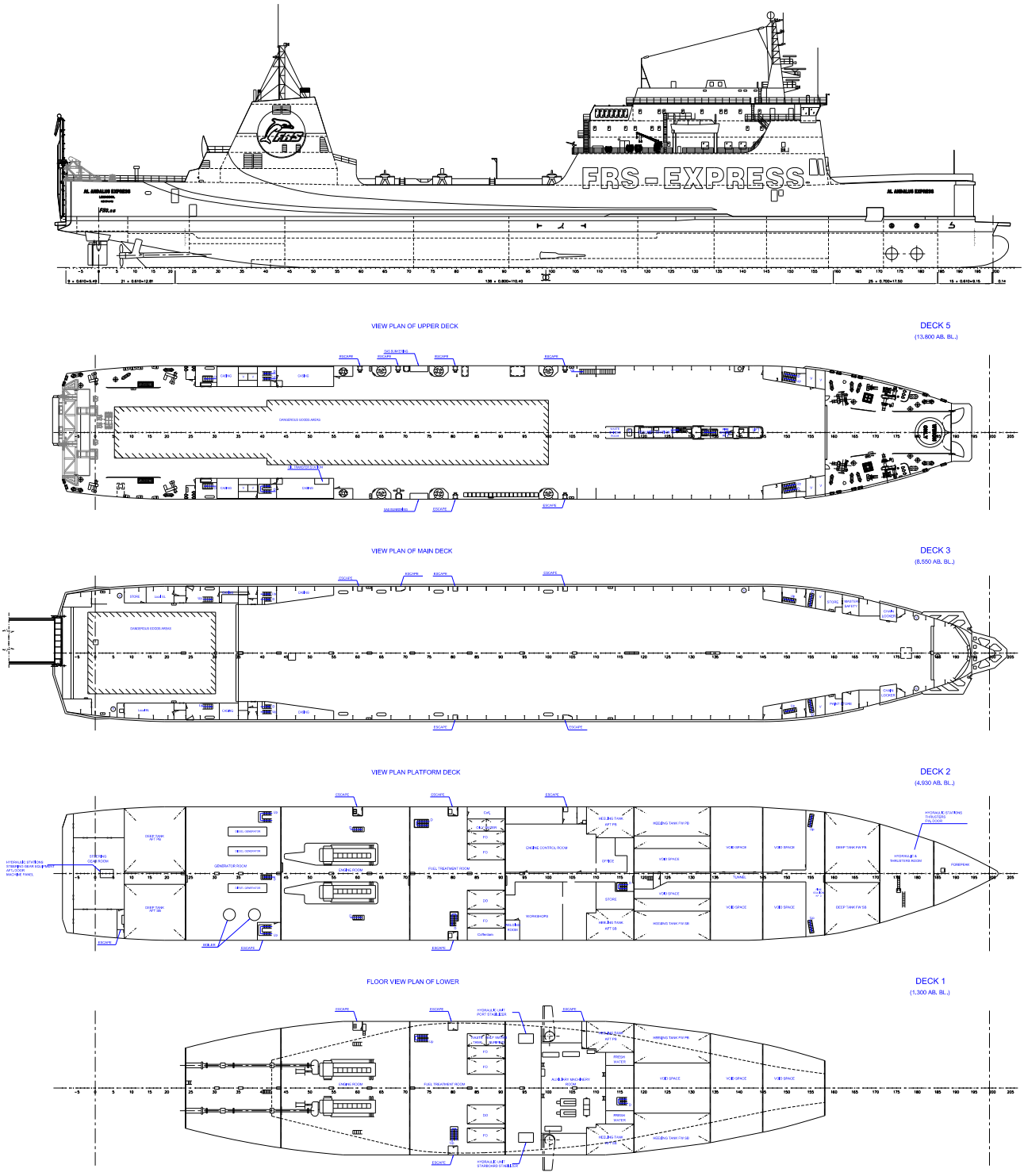

Figure 3. General description of the AL ANDALUS EXPRESS vessel.

3 DETAILED DESCRIPTION

This description of the event is based on available information, statements and reports. All times are local.

The AL ANDALUS EXPRESS vessel was sailing the Motril-Tangiers route daily.

On 5 October 2016, the AL ANDALUS EXPRESS vessel reached the Port of Motril, inbound from Tangiers, at about 09:00. The ship tied up at the Azucenas dock, port side to the dock.

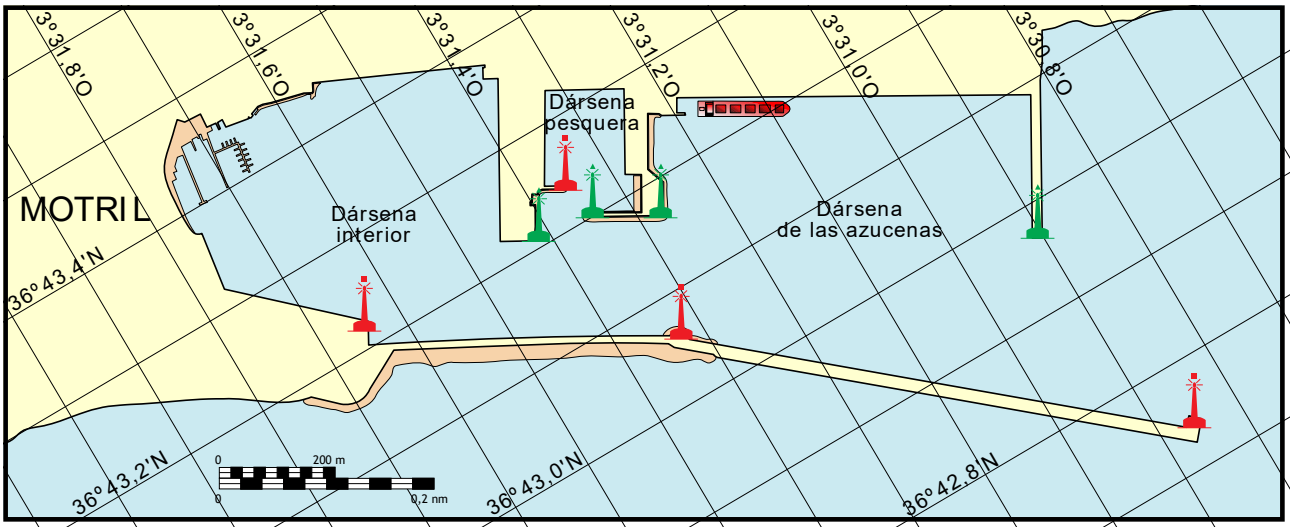

Figure 4. AL ANDALUS EXPRESS vessel docked at the Port of Motril.

The ship was scheduled to depart once more to Tangiers at 15:00.

In the morning, various routine maintenance tasks were completed. One task involved changing the ship's docking position in order to test the life boats.

At approximately 10:30, the second bridge officer and a sailor proceeded to check the operation of the lowering system on the life boats, simulating an emergency abandon ship drill.

The two crewmembers climbed aboard the fast rescue boat on the port side and actuated the davit from the remote station located inside the boat. The maneuver began correctly and the davit swung out without problems. The boat then began to lower, descending the first two meters normally, after which it began to descend uncontrollably at an abnormally high speed, eventually impacting the surface of the water.

The two crewmembers sustained various bruises, and the second bridge officer also suffered a fractured lumbar vertebra.

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4 ANALYSIS

4.1 Davit and fast rescue boat

The accident occurred aboard a "Fassmer FRIR6.1" fast rescue boat installed on a "Ned Deck Marine PRH-20" davit. This davit complies with the requirements of the 1974 SOLAS Convention, as well as with the international code for rescue devices.

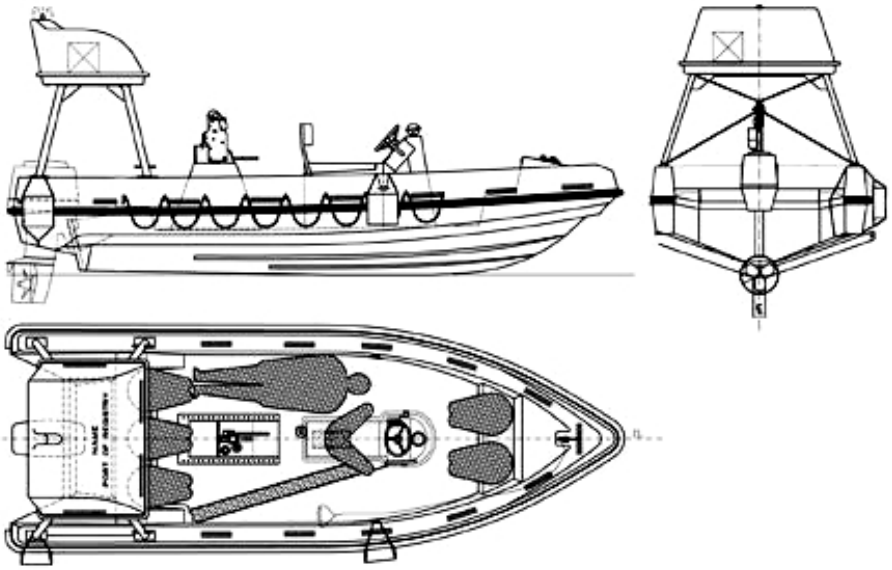

Figure 5. Fassmer FRIR6.1 rapid rescue boat

4.2 Emergency launch procedure

In an emergency situation, the boat is launched from inside the boat itself. The maneuver involves two basic motions: swinging out the davit and lowering the life boat.

The hydraulic system contains a pressure accumulator that, in the absence of electricity, provides sufficient stored hydraulic energy to swing out the davit from its stowed position to an outboard position, from which the boat is lowered by gravity.

The sequence specified by the manufacturer of the equipment for conducting this type of maneuver states that before getting in the boat, the two locking pins on the directional swing valves (Figure 12-Item 3) and launch valves (Figure 12 - Item 4) must be removed and the valves verified to work without blockages.

Once the two crewmembers were aboard the fast rescue boat, outfitted with a life vest, harness and helmet, they have to hook the clip on their harnesses to the safety ring on the boat. The boat's engine is then started.

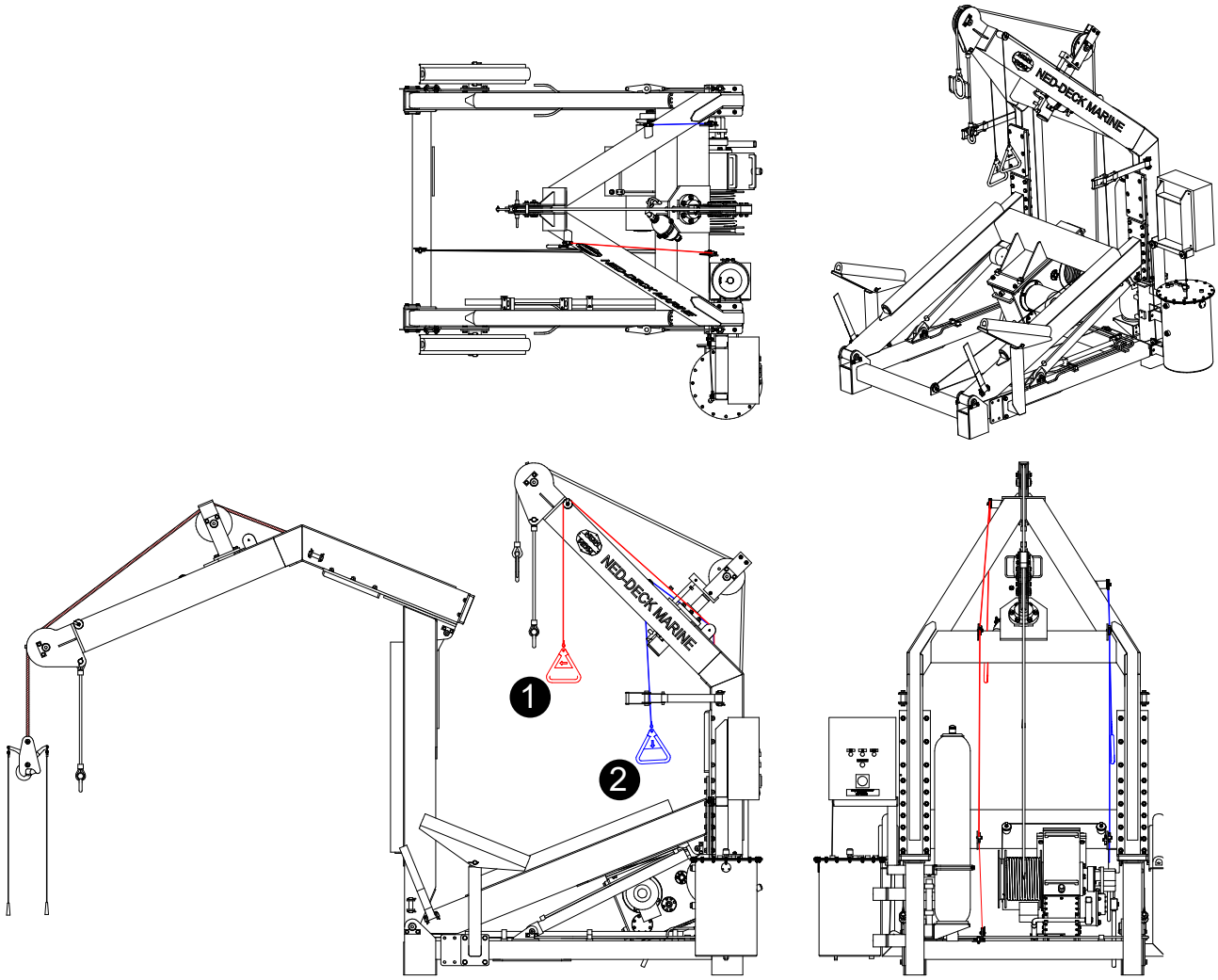

Figure 6. Ned Deck Marine PRH-20 davit.

The davit is then swung from its stowed position to the launch position. This maneuver is done from inside the boat using the swing handle indicated with a horizontal arrow (Figure 6 - Item 1 and Figure 12 - Item 1).

The handle indicated with a vertical arrow (Figure 6 - Item 2 and Figure 12 - Item 2) is then pulled to start lowering the boat toward the water's surface. The boat only descends while the handle is pulled back, and it stops when it is released.

Finally, when the boat reaches the water, the cable is released from the capstan on the lashing eyebolt and the boat is moved away from the ship.

The user's manual and the sticker with the summarized instructions are consistent, and neither instructs to start the hydraulic pump when carrying out this maneuver.

4.3 Hydraulic system

When the swing handle is pulled, a steel cable and a rod (Figure 12 - Item 1) actuate directional valve K3-2 H1 (Figure 12 - Item 3), which allows oil to flow from the pressure accumulator (Figure 12 - Item 5).

When the operator in the rescue boat pulls on the launch handle, a steel cable and a rod (Figure 12 - Item 2) actuate directional valve K3-2 H-2 (Figure 12 - Item 4), which routes hydraulic fluid at accumulator pressure (Figure 12 - Item 5) through the selector valve (Figure 12 - Item 6) to the multi-disc brake (Figure 12 - Item 7), releasing the drum from the capstan and allowing the boat to drop by gravity. In the absence of hydraulic pressure, a system of springs locks the brake.

At the same time, to keep the "Linde Hydraulics HMF 28-02" hydraulic motor from impeding the rotation of the capstan, a bypass valve, EL85, on the line that releases the brake opens the check valve (Figure 12 - Item 8), which allows the fluid from the hydraulic motor to flow via burst valve "LB4F-1-135" (Figure 12 - Item 9), to then continue to the variable flow regulator, SQ2 (Figure 12 - Item 10) and the check valve (Figure 12 - Item 12), finally flowing to the directional control valve (Figure 12 - Item 12) and from there to the tank (Figure 12 - Item 13).

To ensure the rescue boat descends uniformly, there is a dual safety system in place:

First is the burst valve (Figure 12 - Item 9), which is designed to allow a maximum flow rate through it of 135 liters/minute. If this rate is exceeded, the pressure will tend to overcome the opposing spring pressure, which will reduce the flow rate and prevent the boat from descending faster. This automatic change in the flow rate will lead to a smooth and uniform motion of the boat in the event of a hypothetical pipe break downstream.

The variable flow rate regulating valve (Figure 12 - Item 10) is the second safety feature in the system, and also limits the descent speed of the rescue boat. In parallel with this line is a bypass, "EL20S", toward an overflow valve (Figure 12 - Item 14), which also leads to the directional control valve (Figure 12 - Item 12).

Figure 7. Directional control valve K3-2

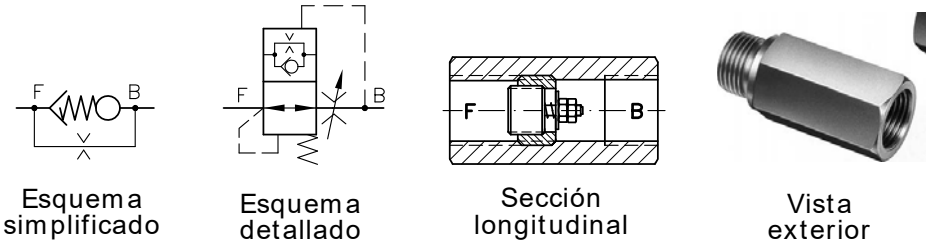

Figure 8. Burst valve LB4F-1-135

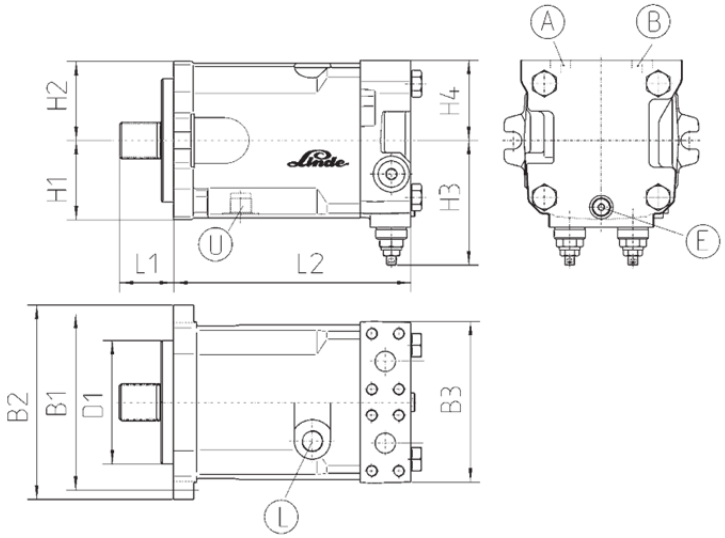

Figure 9. Linde Hydraulics HMF 28-02 hydraulic motor

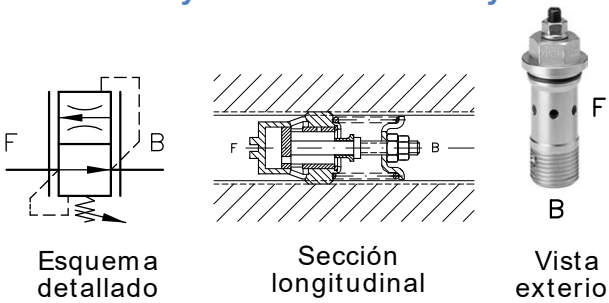

Figure 10. Variable flow rate control valve SQ2

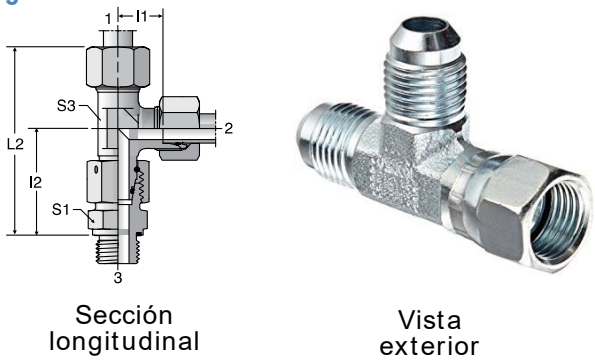

Figure 11. EL8S and EL20S bypass valves

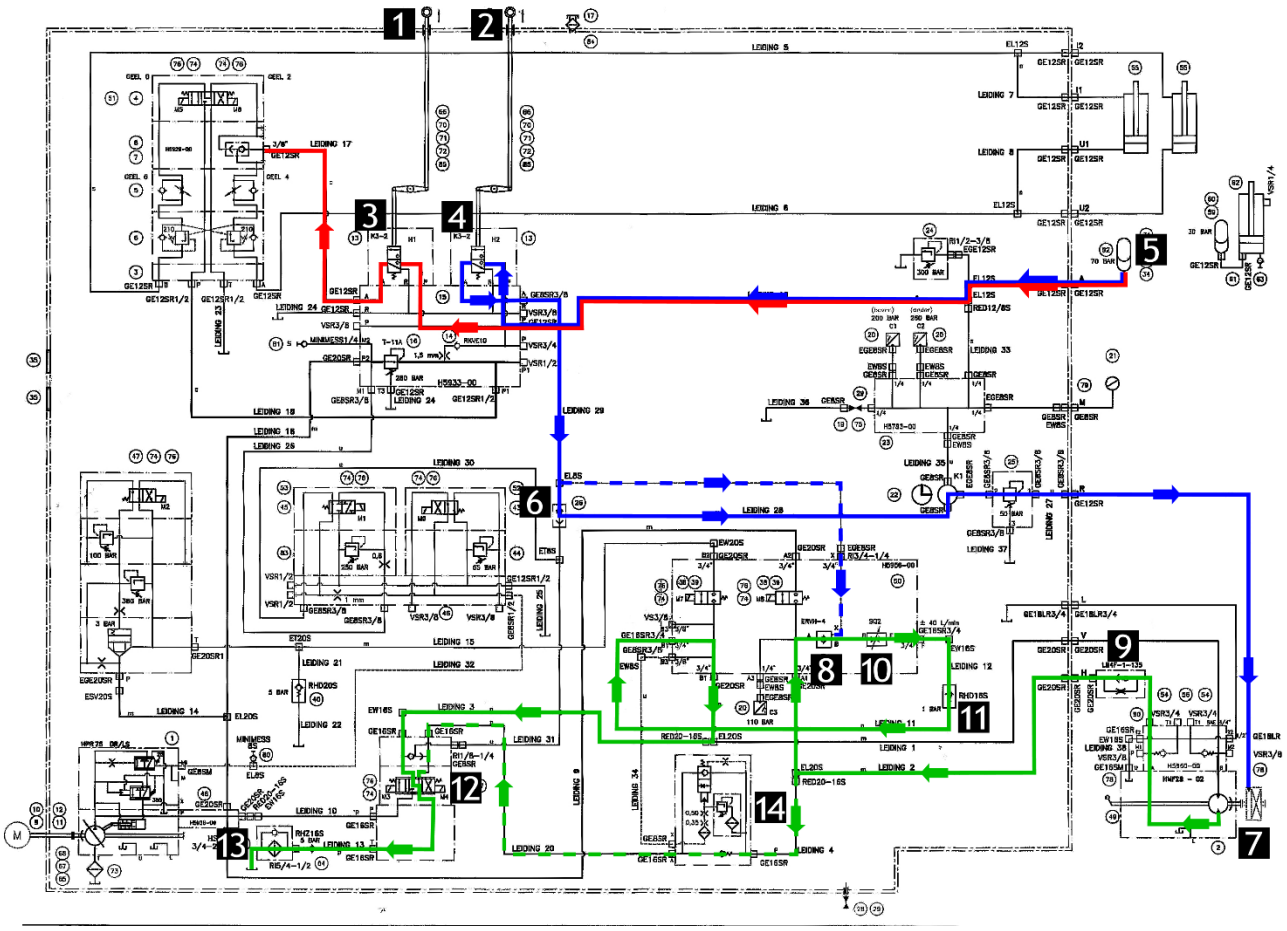

Figure 12. Hydraulic system for the davit.

4.4 Checks conducted before the accident

The fast rescue boat and its davit underwent a five-year inspection in January 2016, and a further annual inspection in June 2016. Both inspections were done by the same certified external company. The ship changed owners on 5 May 2016.

Over the course of the inspections, the remote control, braking and launch with overload systems were tested satisfactorily.

The crew also performed the weekly inspections of the rescue boat, with no problems being found with the davit.

4.5 Tests performed after the accident

After the accident, the davit underwent several tests.

5 October 2016:

- Emergency launch. Identical situation to the accident's, with the pumps stopped and the energy supplied by the hydraulic accumulator.
- Normal launch. With the pumps running and controlled from the control station on deck.

6 October 2016:

- Start and operation of pumps for ten minutes to purge the line.
- Normal launch.
- Emergency launch.
- Normal launch with 110% overload.

All of the tests were satisfactory. No abnormal movements, noises or vibrations were detected in the system. These tests were performed in the presence of specialized inspectors from the company VIKING LIFE-SAVING EQUIPMENT IBERICA, S.A., which investigated the failure of the davit.

4.6 Causes of the accident

In the opinion of the specialists from this company, the equipment failure indicates the presence of air in the hydraulic system. The fluids (water or oil) in hydraulic systems are essentially incompressible. These fluids make the system respond quickly and precisely. The presence of air in a hydraulic system leads to instability in the compression of the hydraulic fluid, preventing it from operating correctly and causing the unstable operation of the elements actuated by the system.

Following the analysis of the incident, it was concluded that the accident could have been caused by the presence of air in the hydraulic system. According to VIKING S.A., the air could have penetrated due to wear on some hydraulic component and remained in the system due to how little the emergency launch system had been used in previous months. This air presence in the motor line (Figure 12 - Green line) could lead to faulty operation and to an inability to control the speed when lowering the boat.

According to VIKING S.A., previous tests had shown that running the hydraulic pump for a few minutes guarantees that no air will be present in the system. Therefore, this company recommended that the hydraulic pump be started and run for a few minutes before every drill, and that launch drills be conducted every month.

In the opinion of the CIAIM, the best way to avoid these accidents is to equip the davits with a centrifugal brake that acts on the winch to limit the speed at which the boat falls in the event of a fault in the hydraulic system.

4.7 Actions taken by the company

After the accident, the company took the following actions:

- All manned lowerings of FRBs/RBs/LBs were forbidden for all of their fleet's vessels.
- Installation of an upgrade kit to the hydraulic system of the davit, to avoid air inside the system, as per the manufacturer recommendation.
- Implementation of an easy to follow, pictured, launching procedure. This instruction includes the unmanned lowering and lifting before final launching as another safeguard.

5 CONCLUSIONS

An analysis of the accident indicates that it was most likely caused by the presence of air in the hydraulic system for the davit, and by the absence of a procedure to regularly purge the hydraulic system.

An underlying cause is the design of the davit, which did not anticipate the improper operation of the hydraulic system due to the presence of air in the system.

6 SAFETY RECOMMENDATIONS

For the manufacturer of the davit, NED-DECK (now PALFINGER MARINE):

1. Include in its davits a centrifugal brake in the winch that limits the speed at which the boat is lowered if the hydraulic system malfunctions, as well as an automatic purge system to prevent the presence of air in the hydraulic system.

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