



GOBIERNO  
DE ESPAÑA

MINISTERIO  
DE TRANSPORTES, MOVILIDAD  
Y AGENDA URBANA

SUBSECRETARÍA DE TRANSPORTES,  
MOVILIDAD Y AGENDA URBANA

COMISIÓN PERMANENTE DE  
INVESTIGACIÓN DE ACCIDENTES  
E INCIDENTES MARÍTIMOS

## REPORT CIAIM-17/2020

### Fire aboard the ALGECIRAS JET vessel on the route Ceuta-Algeciras, the 6th of February 2020

#### NOTICE

This report has been elaborated by the Spanish Maritime Accident and Incident Investigation Standing Commission (CIAIM), which is regulated by article 265 of the reformed text of the Law of State Ports and the Merchant Navy, approved by Royal Legislative Decree 2/2011, of the 5th of September, and by Royal Decree 800/2011, of the 10th of June.

The aim of the CIAIM when investigating maritime accidents and incidents is to draw conclusions and extract lessons that allow the risk of future maritime accidents to be reduced, and hence contribute to maritime safety and to preventing contamination from shipping. To this end, the CIAIM carries out a technical investigation in each case in which it attempts to establish the causes and circumstances that, directly or indirectly, may have contributed to the accident or incident and, when necessary, to issue the appropriate safety recommendations.

The elaboration of this technical report is not intended in any way to prejudge any judicial decisions that may be produced, nor does it seek to evaluate responsibilities nor to determine guilt.



Figure 1. ALGECIRAS JET.



Figure 2. Location of accident.

## 1. SUMMARY

On the 6th of February 2020, while the ALGECIRAS JET vessel was on route between Ceuta and Algeciras, smoke began to appear above the main engine in the port engine room.

The engine was immediately stopped, and portable fire extinguishers were discharged over the area where the smoke was originating. The incident was resolved, and the ship continued its journey to Algeciras, where it docked with the help of a tug.

### 1.1. Investigation

The Spanish Maritime Accident and Incident Investigation Standing Commission (CIAIM) was notified of the incident on the 7th of February 2020. On the same day, the case was provisionally classified as a "minor accident", and it was agreed an investigation would be opened. A CIAIM committee meeting ratified the classification of the incident and the initiation of the safety investigation. This report was reviewed by a CIAIM committee meeting on the 12th of November 2020 and published on March 2021, following its approval.

## 2. FACTUAL INFORMATION

PARTICULARS OF THE SHIP/VESSEL	
Name	Current: ALGECIRAS JET Previous: BALTIC JET
Flag / Port of Registry	Cyprus / Limassol
Identification	Call sign: 5BLY2 IMO number: 9198551 MMSI: 209936000
Type	Passenger and wheeled vehicle ferry.
Main Particulars	Length overall: 60.000 m Length between perpendiculars: 55.834 m Width: 16.500 m Gross tonnage: 2273 GT Net tonnage: 681 NT Hull material: Aluminium Propulsion: Two water jet propulsion systems KaMeWa 112 SII. Engine: Two Caterpillar 3618TA 7,200 kW 1,050 rpm diesel engines.
Owner and management	Owner: Epellan Shipping Co Ltd, based in Limassol (Cyprus). Operator and manager: Förde Reederei Seetouristik Iberia S.L.U., based in Cádiz. Both companies are part of the Förde Reederei Seetouristik GmbH & Co KG group, based in Flensburg (Germany).
Classification society	DNV-GL
Shipbuilding details	Built in 1999 by the Kvaerner Fjellstrand AS shipyard in Omastrand (Norway).
Minimum safe manning	12 crew.
VOYAGE PARTICULARS	
Ports of Departure / Arrival	Departure from the port of Ceuta and arrival at the port of Algeciras.
Type of voyage	Commercial, international, scheduled trip.
Cargo information	51 passengers, 17 private cars and 1 trailer.
Crew	13 crew.
Documents	No deficiencies relevant to the accident were found.
INFORMATION ON THE INCIDENT	
Type of incident	Fire.
Date and time	6th of February 2020, 12:44 local time.
Position	35°59, 77'N, 005°19, 77'O.
Vessel's operations	Sailing.
Place on board	Port engine room.
Ship damage	None.
Injured/missing persons overboard	None.
Pollution	None.
Other non-ship damage	None.
Other personal injuries	None.
MARINE AND METEOROLOGICAL CONDITIONS	
Wind	Component east wind between force 5 and 6 on the Beaufort scale.
Sea conditions	Heavy swell from the east with significant wave height less than 0.5 m
Visibility	Regular visibility (between 2 km and 6 km) with fog banks to the east (poor visibility, less than 1 km).
INTERVENTION OF LAND-BASED AUTHORITIES AND REACTION OF EMERGENCY SERVICES	
Organisations involved	None.
Means deployed	Ship's on-board means.
Speed of intervention	Immediate.
Measures adopted	Engines stopped and portable extinguishers deployed.
Results obtained	The fire was prevented from spreading.

2.1. General layout

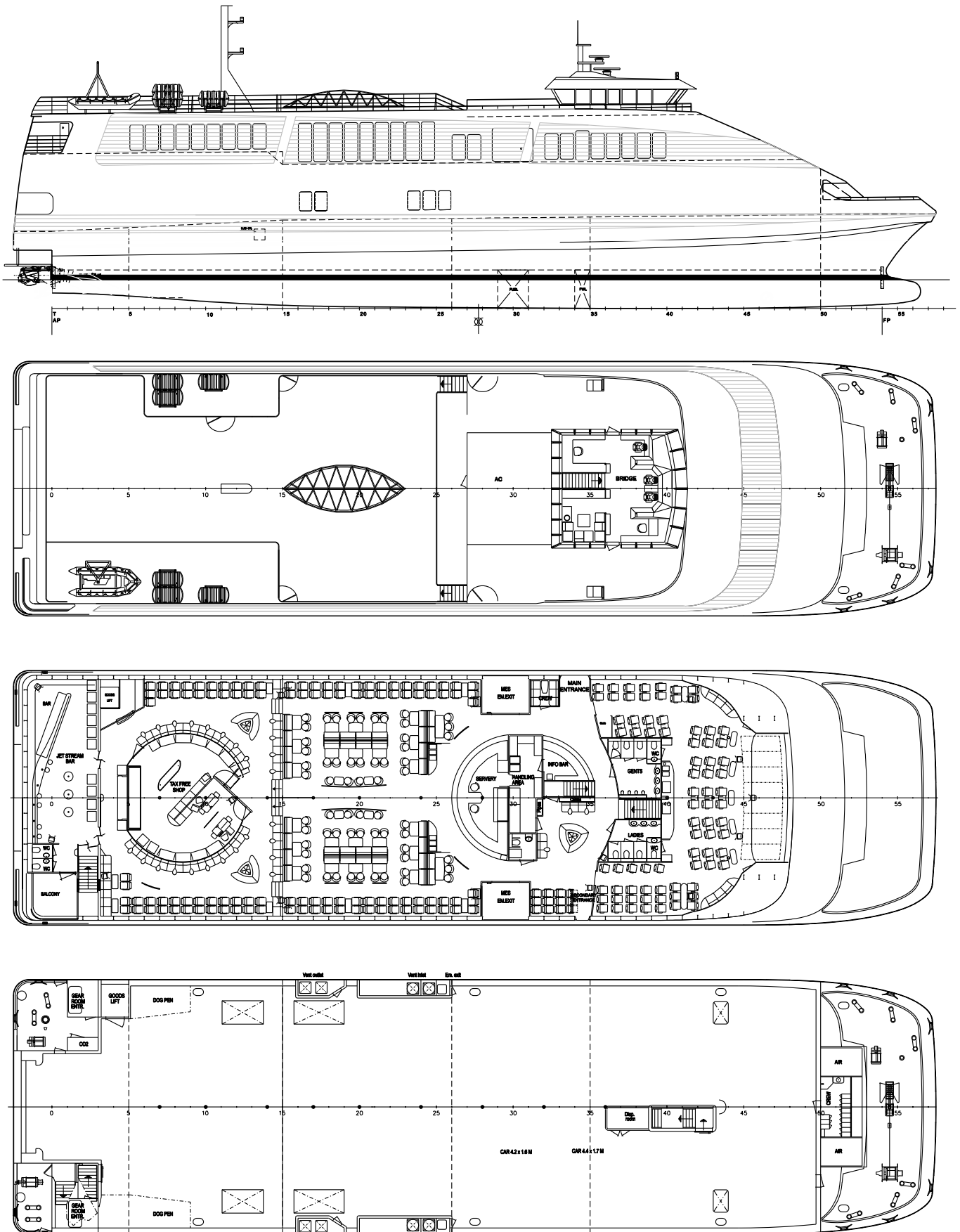


Figure 3. General layout of the ALGECIRAS JET vessel.

### 3. DETAILED DESCRIPTION

This relation of events is based on the available data, declarations and reports. The times given refer to local time.

On the 8th of January 2020, the ALGECIRAS JET passenger and wheeled vehicle ferry ended its regular route between Tarifa and Tangier (Morocco). The ship travelled to the port of Algeciras, and on the 9th of January 2020, it entered repair dock no. 3 at Gibdock Ltd in Gibraltar (United Kingdom).

On the 20th of January 2020, the ship began operating a scheduled service between Ceuta and Algeciras, with six daily rotations.

On the 6th of February 2020 at 12:14 hours, the ALGECIRAS JET vessel left the port of Ceuta with 13 crew members, 51 passengers, 17 cars and a trailer on board, bound for the port of Algeciras. The ship was scheduled to depart at 12:00 hours.

At 12:44 hours, the ship's position was 35°59.77' N, 005°19.77' W, and sailing at 17 knots. At that moment, a fire alarm was activated in the port engine room.

Immediately and in accordance with the fire response plan, the captain ordered the second engineer to go and see what was happening in the engine room, and the chief engineer to monitor the situation via closed-circuit television.

When the second engineer reached the port engine-room, he picked up a portable fire extinguisher to extinguish any potential fires while the chief engineer shut down the equipment in that engine-room: the main engine, auxiliary engine and the engine room ventilation system.

Additionally, two firefighting units mustered at the assembly point, and one of them was sent to assist the second engineer.

The second engineer discharged the contents of the extinguisher in the vicinity of main-engine cylinder no.17, which appeared to be the source of the smoke.

Moments later, the smoke stopped, and the incident was resolved satisfactorily.

After informing the authorities on land and the passengers, the ship continued its journey using the starboard engine only. The bow thrusters were used to assist with manoeuvrability.

At 13:48 hours, the ship arrived at the port of Algeciras. It docked with a pilot on board and the help of a tugboat. The ship was scheduled to arrive at 13:00 hours.

At 16:35 hours the vessel departed again, bound for the port of Ceuta.

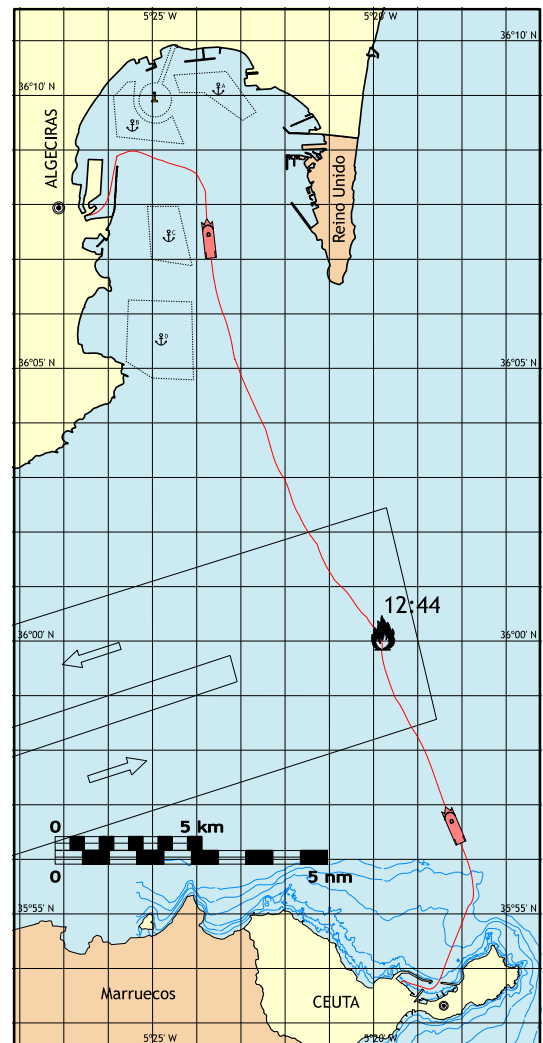


Figure 4. Ship's route.

#### 4. ANALYSIS

##### 4.1. Location of the fire

THE ALGECIRAS JET vessel has a catamaran-type design with two engine rooms, one in each hull of the vessel, as can be seen in Figure 5.

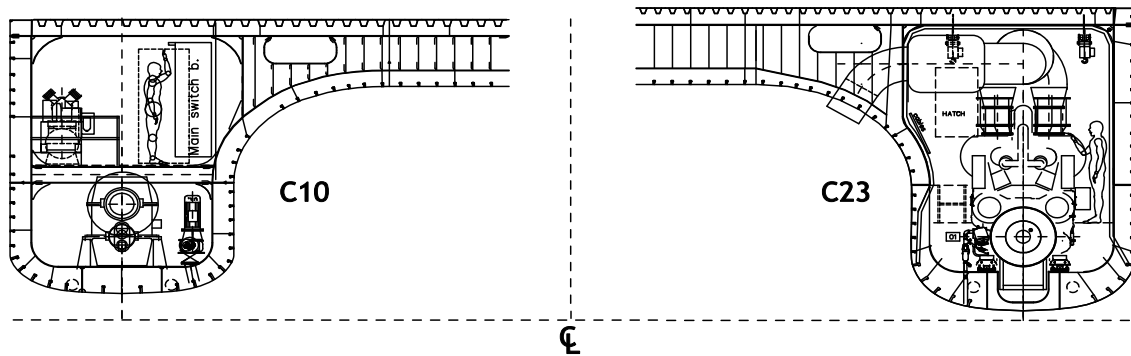


Figure 5. Arrangement of the engine rooms.

A Caterpillar 3618TA propulsion engine is installed in each engine room and connected via the gearbox to the water jet propulsion system. The fire broke out in the port engine room, the general layout of which can be seen in Figure 6.

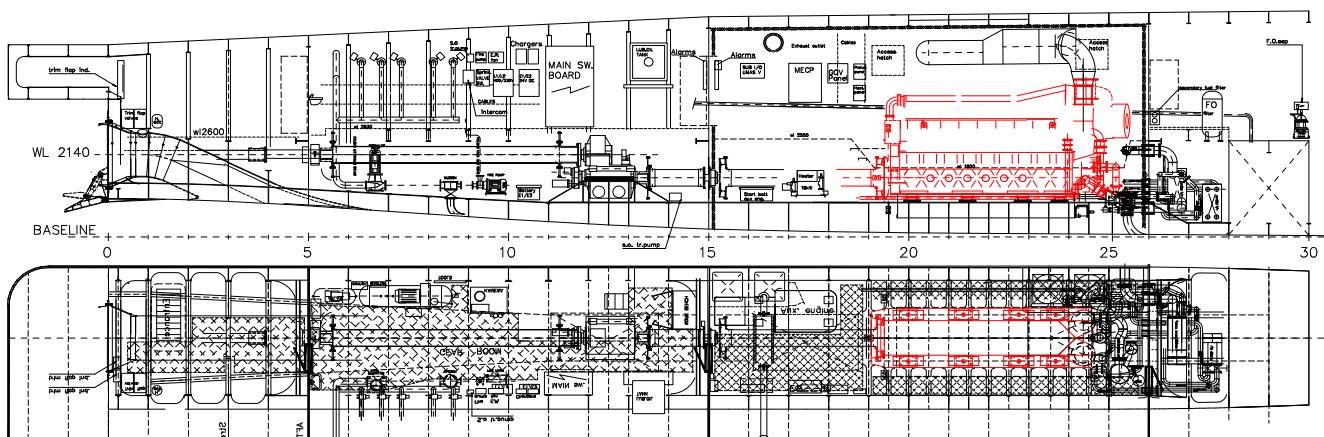


Figure 6. General layout of the port engine room.

The Caterpillar 3618TA engine has an 18-cylinder V-arrangement. Figure 7 shows a diagram of the engine. Cylinder no.17, which is where the fire occurred, has been highlighted.

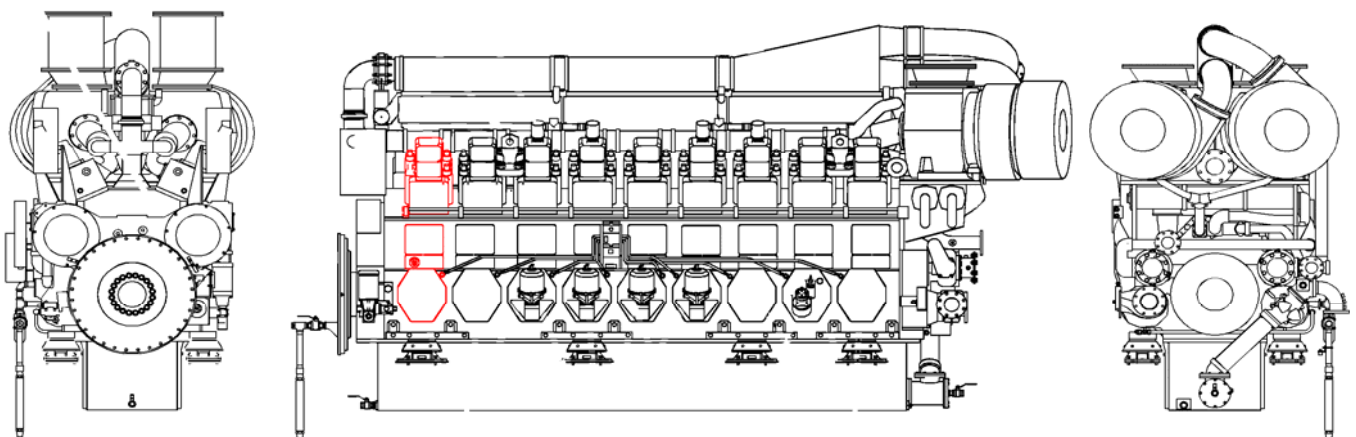


Figure 7. Caterpillar 3618TA engine schematic.

Specifically, the fire occurred in the fuel return line of cylinder no.17, as shown in Figure 8.

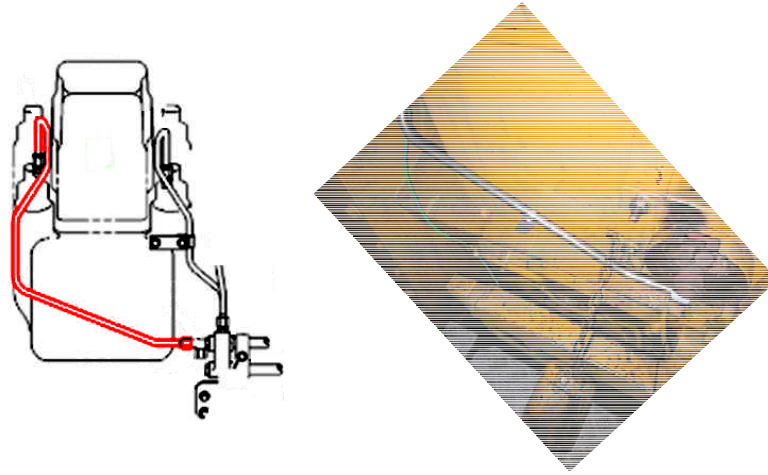


Figure 8. Cylinder no.17 fuel return circuit.

#### 4.2. Fuel return line

The Caterpillar 3618TA engine consumes 201 g/(kWh). Therefore, when running at full power, its fuel consumption is 28 litres per minute.

The low-pressure fuel system in a diesel engine supplies the engine with a flow rate that is much higher than the engine requires when operating at full power. The high-pressure pumps take the amount of fuel that corresponds to the power at which the engine is running, and the remaining fuel is sent back to the return tank. This mechanism ensures positive pressure in the suction of the high-pressure pumps. In this specific case, the supply to the low-pressure pumps was 144 l/min, and the return was 116 l/min. Thus, a flow rate of approximately 6.5 l/min was flowing through the fuel return line of cylinder no. 17 at a maximum pressure of 350 kPa.

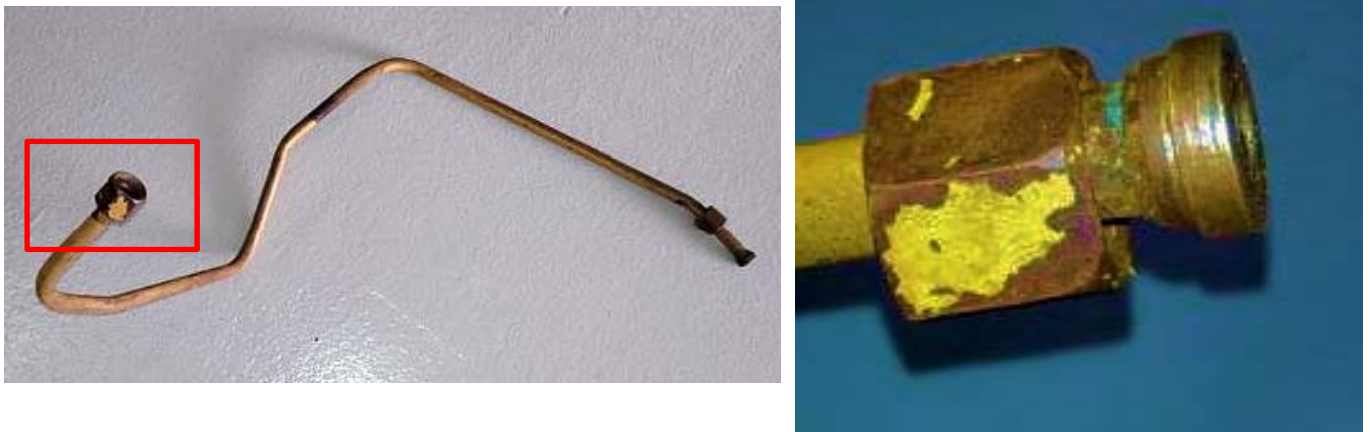


Figure 9. Cylinder no. 17 fuel return circuit pipe and connection detail.

The return line was connected to the engine by a threaded connection to ensure an efficient seal.

Our analysis identified hotspots (over 120°C) in the vicinity of the connection between the return line and the engine. The hotspots were caused by the exhaust system and are shown in Figure 10.

#### 4.3. Fuel leak

The fuel return line of cylinder no. 17 was checked when the ship arrived at the port of Algeciras. No pores or cracks were found in the pipe (Figure), but the connection between the pipe and the block was loose.

As a precaution, cylinder no. 17's fuel return line was removed and replaced.

#### 4.4. Inspections

The ship's engines were periodically inspected. The following should be highlighted:

- Locating and eliminating leaks: A leak inspection was periodically performed by the crew every month. The most recent leak inspection was carried out on the 16th of January 2020.
- Maintenance check every 500 operating hours: The most recent was carried out on the 5th of January 2020.
- Interim maintenance overhaul every 12000 operating hours: The most recent was carried out by external engineers on the 12th of March 2019.

No similar problem was detected by any of these inspections.



Figure 10. Hotspot close to cylinder no.17's fuel return circuit connection.

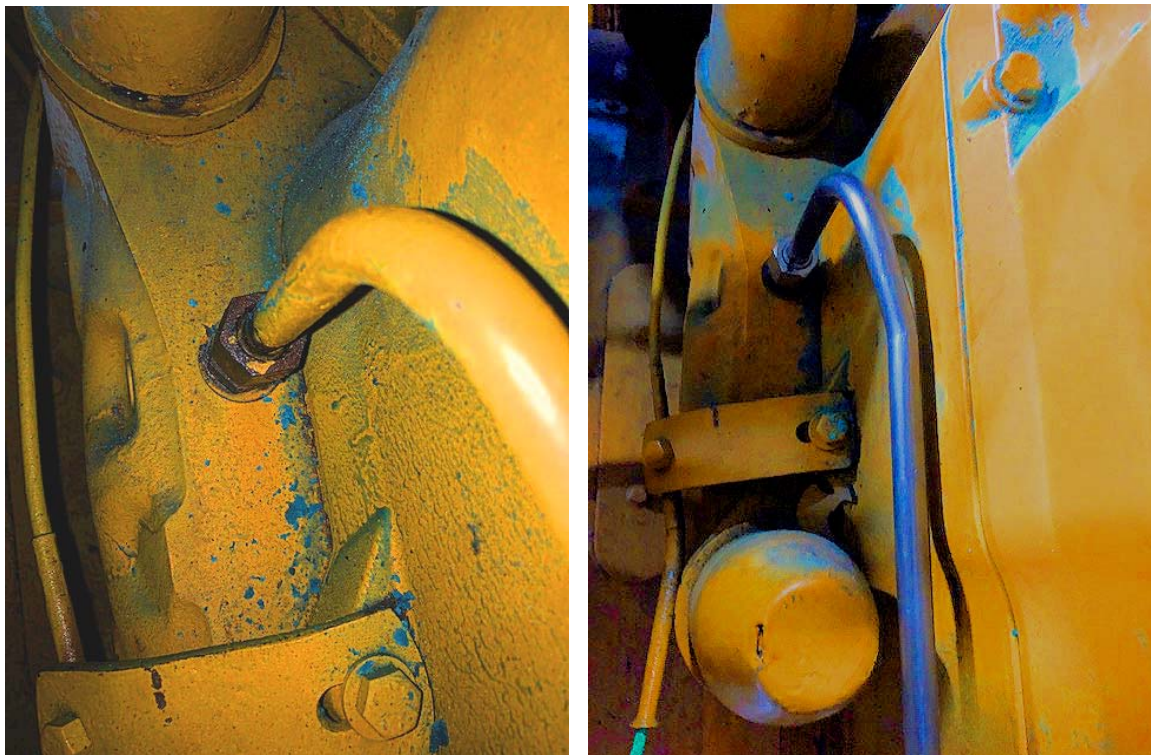


Figure 11. Detail of cylinder no. 17 fuel return circuit connection (before and after repair).



#### 4.5. Measures taken by the shipowner company

At the time of writing this report, the shipowner company - FRS Iberia - had implemented the following measures:

##### Corrective actions

1. Cleaning of the affected areas.
2. Replacement of affected pipes and connections.
3. Inspection of the other fuel lines in the ship's engines.
4. Checking the torque of all connections.
5. Installation of anti-splash adhesive aluminium tapes on all connections.
6. Replacement of used portable fire extinguishers.

##### Preventive actions

1. Inspections have been scheduled to identify any hot spots that could lead to similar accidents.
2. Analyse possible improvements in thermal insulation.
3. Training on fuel system hazards will be provided for crew members working with the engines.
4. Torque periods and practices for connections will be reviewed, including the replacement of the adhesive aluminium tapes.
5. Installation of splash caps for all connections.

##### Other actions

1. Synchronise the clocks of all on-board systems to simplify future investigations.
2. Include a recording system in the engine room's closed-circuit television.

## 5. CONCLUSIONS

Following an analysis of the accident, CIAIM has concluded that it was caused by fuel leaking from the return line of cylinder no. 17, which then came into contact with a hot engine surface. The leak occurred because the threaded connection on the nut that connected the pipe to the engine had become loose. Without ruling out other potential causes, this may have been due to engine vibrations or a failure to properly tighten it during the last maintenance check in which the pipe was dismantled.

## 6. SAFETY RECOMMENDATIONS

In view of the actions already taken by the company, no safety recommendations have been made.