



SIMPLIFIED SAFETY INVESTIGATION REPORT

201610/029

REPORT NO.: 22/2017

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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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Course of events

Thomson Majesty was enroute to Calvi, France from Livorno, Italy with 1478 passengers and 579 crew members. On the day of the departure, at about 2115, the duty engineer was in the control room. Soon after, the engineering officer of the watch (OOW) returned to the control room and briefed the duty engineer on the status of the main and auxiliary engines.

Minutes later, the OOW looked towards the CCTV monitors and observed smoke and flames from auxiliary engine no. 4 (Figure 1).

The auxiliary engine was immediately stopped by pressing the emergency stop button, the circuit breakers for the preferential tripping were opened, and the alarm raised. The watertight doors were closed and the oiler, who was in the engine-room at the time, grabbed a fire extinguisher to

MV THOMSON MAJESTY Engine-room fire South of Gorgona Island 21 October 2016



Figure 1: The start of the fire captured on CCTV

fight the fire.

In the meantime, the chief engineer, who was in the officer's messroom, heard a loud noise in the alleyway. Upon enquiring, he walked out of the messroom and noticed smoke in the alleyway. He was also informed of a fire in the engine-room.

The chief engineer rushed to the engine-room, where he observed that auxiliary engine no. 4 had been stopped whereas the three other auxiliary engines were still running. Taking stock of the situation, the chief engineer informed the master of the fire and status of the engine-room.

The chief engineer requested that the fuel oil feed and booster pumps for auxiliary engine no. 4¹ and the ventilation fans are stopped, and fire flaps closed. In the meantime, within 19 seconds, the fire had become more intense, the smoke was more dense and visibility was significantly reduced (Figure 2).



Figure 2: The extent of the fire and smoke density 19 seconds after the fire started

The engine-room fire squad had also assembled under the supervision of the chief engineer. Within a few minutes of the assembly of the fire squad, the fire was brought under control and extinguished with the use of portable fire extinguishers.

Due to the fire, the rubber bellows fitted on the cooling water line in way of auxiliary engine no. 4 was damaged and leaked heavily (Figure 3). Consequently, before the crew members could identify and rectify the problem, the cooling water expansions tanks leaked dry and the running auxiliary engines

¹ Stopping the two pumps for auxiliary engine no. 4 caused a fuel oil starvation on auxiliary engine no. 3 because both engines share the same pumps.

shut down automatically due to the activation of the fresh water high temperature alarm at about 2200. The situation was, however, alleviated with the automatic starting of the emergency generator.



Figure 3: Damaged rubber bellows

Subsequently, the damaged bellows was replaced, the system replenished, and purged from air. Power was restored at about 0200 on 22 October 2016 and the vessel returned to Livorno with two auxiliary engines and two main engines running. No injuries had been reported.

Extent of damage

The damages were contained within the proximity of auxiliary engine no. 4. Electrical cables routed above the auxiliary engine and other control cables had to be cleaned and replaced where necessary (Figure 4).



Figure 4: Damaged control cables

The engine-room in general had visible soot damage and a number of light fixtures had evident heat damage.

Cause of the fire²

The engineers had carried out maintenance on the auxiliary engine on the day of the fire. Maintenance records indicated that the main fuel oil supply and return lines had been dismantled and replaced with new pipes. The fuel lines were fitted in close proximity of the fire seat and therefore the initial inspection of the crew members was directed towards that area.

When the fuel oil return pipe was disconnected from the high pressure pump on unit no. 6, it was observed that the O-ring was damaged (Figure 5). The pipe was located very close to the turbocharger and the aft exhaust gas manifold. It was therefore confirmed that the fuel oil leak had originated from the fuel oil return pipe because of the damaged O-ring.

² 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 and incidents from occurring in the future.



Figure 5: Damaged O-ring

It was also noticed that there were no records to confirm whether the O-Ring had been renewed before the system was boxed up again earlier during the day of the fire. Whereas it was not excluded that the (old) O-ring's physical and chemical characteristics had changed, it was also very possible that the O-ring got displaced before it was fitted and was permanently damaged when the flange was tightened. Consequently, there was no tight seal and eventually, fuel oil under pressure leaked from between the flanges and the spray. It was therefore evident that the system was either not tested after the repair job was completed or else, if tested, no leaks were detected.

Fuel oil alarms

Although the entire arrangement was fitted inside a 'hot box' which is designed to contain fuel oil leakages, the 'hot box' did not seal tight, with a side opening on the turbocharger side.

The alarm fitted inside the 'hot box', which should have triggered because of the fuel oil leak did not activate. However, a few minutes before the fire started, there was a low pressure alarm recorded (followed by an exhaust gas temperature alarm) which, however, either did not raise any particular concerns or went unnoticed.

SAFETY ACTIONS TAKEN DURING THE COURSE OF THE SAFETY INVESTIGATION³

During the course of the safety investigation, the Company issued a Fleet Circular, outlining the following:

1. Crew members assigned to the engine-room must be alert on and prepared for risks associated with hot spots. This is in light of statistical studies released by DNV GL, whereby it is indicated that more than 60% of all engine-room fires have been initiated by a hot spot, and oil coming in contact with hot spots will generally result in one of the fiercest fires;
2. Crew members shall ensure that exhaust lagging or heat shields are properly replaced / renewed after completion of any work on the main or auxiliary engines;
3. The importance of identifying fire hazards and taking measures to eliminate fuel leaks. Regular inspection of oil fuel and lubricating oil pipes and associated fitting should be carried out and fuel leak sources rectified immediately;
4. Fuel oil leak / drain lines from the hot box to the leakage tanks are properly maintained to avoid blockages. Leakage alarm systems should be tested regularly;
5. Routine maintenance, inspections and testing of fire-fighting equipment, including drills and exercises for enhancing crew training in their use, should be carried out effectively;
6. The importance to spend some time to critically review procedures and practices to determine what can go wrong (risk assessment);
7. The importance for crew members to be aware of the location of the ventilation system fire dampers and shutdown devices/remote stops;
8. The importance for the ship's engineer to be aware of the location of the water-mist system and its operation;
9. The importance of not ignoring the alarm system, which may otherwise prevent timely actions;
10. The critical importance of following up an updated PMS/AMOS system;
11. The chief staff engineer shall supervise the repair and maintenance of critical systems and ensure that checks are carried out following routine maintenance or repair works;
12. Reference is to be made to the results of the thermographic inspection, which has been carried out on all the main and auxiliary engines on board *Thomson Majesty* and another ship under the Company's management.

Moreover, the Company has:

13. contacted the maker (Wärtsilä) to assist with technical issues and to provide a technical advice on hot box design and possible upgrades; and
14. organised courses for fire fighting and fire safety/risk assessment during winter layup for all crew members.

³ **Safety actions should not create a presumption of blame and / or liability.**

SHIP PARTICULARS

Vessel Name:	<i>Thomson Majesty</i>
Flag:	Malta
Classification Society:	DNV GL
IMO Number:	8814744
Type:	Passenger
Registered Owner:	Majesty Trading OPCO LLC
Managers:	Optimum Shipmanagement Service S. A.
Construction:	Steel
Length Overall:	207.1 m
Registered Length:	191.4 m
Gross Tonnage:	41662
Minimum Safe Manning:	20
Authorised Cargo:	Not Applicable

VOYAGE PARTICULARS

Port of Departure:	Livorno, Italy
Port of Arrival:	Calvi, France
Type of Voyage:	Short International
Cargo Information:	Not Applicable
Manning:	1478

MARINE OCCURRENCE INFORMATION

Date and Time:	21 October 2016 at 21:28
Classification of Occurrence:	Less Serious Marine Casualty
Location of Occurrence:	43° 17.04' N 009° 54.18' E
Place on Board	Engine-room
Injuries / Fatalities:	None reported
Damage / Environmental Impact:	Localised damages to electrical and control cables, soot damage, and damages to various light fixtures.
Ship Operation:	In passage
Voyage Segment:	Transit
External & Internal Environment:	Clear weather and good visibility. The sea was calm with a variable light breeze. Air temperature was 18 °C.
Persons on board:	2057