



DUTCH
SAFETY BOARD

Ship abandoned after fire

Escape – Coast of Latvia – 22 February 2023



▲ Figure 1: The cargo vessel Escape. (Source: Latvian Coast Guard)

Introduction

On the night of 22 February 2023, a fire broke out in the funnel of the Dutch container ship Escape. The crew commenced fighting the fire. After a time, the ship's electricity system failed, meaning the fire-fighting pumps could no longer supply water for tackling the fire. Given that the fire was not yet fully extinguished and the crew no longer had any means of fighting it, the Escape's captain then gave the order to abandon the ship.

Investigation

Within the shipping industry, the Dutch Safety Board has the statutory obligation to investigate serious and very serious occurrences involving Dutch seagoing vessels. This obligation also extends to the investigation of serious and very serious occurrences involving or on board seagoing vessels in Dutch territorial waters. The Dutch Safety Board carries out these investigations in accordance with the Dutch Safety Board Act and EU Directive 2009/18/EC of the European Parliament and of the Council of 23 April 2009 establishing the fundamental principles governing the investigation of accidents in the maritime transport sector. Investigating who is to blame or liable is expressly not a part of the investigation by the Dutch Safety Board.

Because the vessel was evacuated but there were no victims and the fire remained confined to the funnel, international regulations dictate that this is a marine casualty subject to the provisions for a serious marine casualty. Pursuant to the Dutch Safety Board Decree¹ and the Casualty Investigation Code of the International Maritime Organization (IMO), the Dutch Safety Board is mandated to investigate this occurrence. In the light of its preliminary investigation, the Safety Board found that there are lessons to be learned with regard to operations on board the vessel. On that basis, it was decided that an abridged report on the incident should be prepared. This report is limited to the probable cause of the fire and the subsequent action taken to fight the fire.

Course of events

The Dutch container ship Escape left the port of Klaipėda (Lithuania) on the evening of Monday 20 February 2023, bound for Riga (Latvia). In the course of the following morning, 21 February, problems arose with the thermal oil system. There were pressure fluctuations within this system, resulting in an automatic slowdown of the main engine. The fluctuation problem became worse, with the pressure in the system falling and the temperature rising. In consultation with the chief engineer, the captain decided to stop the main engine and drop anchor so as to investigate the problem and if possible solve it. At 10.35 hours (LT), the Escape anchored to the north of Ventspils (Latvia) at the entrance to the Gulf of Riga.

¹ Section 4 Dutch Safety Board Decree.

Thermal oil is used on board the Escape as a heating medium for heating, *inter alia*, fuel (tanks) and for the central heating of the crew accommodation. To heat the thermal oil, an exhaust gas boiler was used to extract residual heat from the exhaust gases produced by the main engine. When the main engine is not running, an oil-fired auxiliary boiler is used to maintain the temperature of the system.

After an initial investigation, the chief engineer concluded that the thermal oil system had become contaminated. With the available testing equipment, he was unable to determine conclusively whether the contamination was caused by (cooling) water or by fuel (diesel). After consulting the vessel manager's technical manager, the chief engineer decided to partially replace the thermal oil with fresh, clean oil. There was only a limited supply of oil available on board, however, and it was not enough to replace all the oil in the system. As far as possible, potential sources of contamination were also temporarily shut off from the thermal oil system. Given that the distance to go Riga was not big, the crew restarted the main engine, with the chief engineer and the captain agreeing to proceed at low power. This kept the temperature of the exhaust gases relatively low, with the aim of 'boiling out' the system. This would bring about controlled evaporation of the water from the system. Despite this measure, the temperature of the thermal oil rose to above 100°C and the pressure began to fluctuate again. During the remainder of the voyage, there were recurrent engine room alarms, caused by the heat in the thermal oil system. There were also a number of fire alarms, which on checking were found to be false. The crew assumed that refilling and restarting might have allowed some thermal oil to find its way onto a fire detection sensor, leading to the false alarms.

Sailing at reduced power, the Escape reached a speed of about 6.5 knots. The vessel was expected to reach the Riga pilot station at about 06.00 hours the next day (22 February). At about midnight, the captain left the bridge to get some rest before arrival. The chief engineer had also sent the engine room crew away to take a rest. He himself was still present.

Just before 01.00 hours, the fire alarm sounded again. The chief engineer made a quick inspection of the engine room and saw no fire at that time. He also reported this to the second officer on the bridge. Not long after, the chief engineer noticed that oil was running from the funnel into the engine room. He alerted his engine room crew and started draining off the thermal oil. The third engineer then alerted the chief engineer that a fire had broken out in the funnel. The engine room crew immediately stopped the main engine. It quickly became clear that the fire was too big to fight on the spot. The chief engineer therefore decided to activate the CO₂ fire extinguishing system in the engine room. He checked whether all the crew members who he thought were in the engine room had left it. The boatswain – who had come to the engine room to assist with the firefighting – was also told to leave. The chief engineer did not wait until all the crew members had reported to the muster station and had been counted. One of the other engineers started up the emergency generator and the close-down crew shut the engine room vents. The vents at the top of the funnel did not close, perhaps due to fire damage. The chief engineer then activated the CO₂ system.

A CO₂ fire extinguishing system displaces the oxygen in the air with the heavier CO₂ gas, thus eliminating one of the basic conditions for fire (the presence of oxygen).

Vessels equipped with a CO₂ extinguishing system have bottles filled with CO₂; these are located in a separate area. There is a control cabinet outside the engine room for activating the extinguishing system. As soon as the control cabinet door is opened, an audible and visible alarm automatically goes off in the engine room to warn that the system will be activated. The engine room ventilation system also stops automatically. One can then actually switch on the system in the control cabinet, automatically opening the CO₂ tanks and routing the gas through piping to nozzles in the engine room, filling the engine room with CO₂ and displacing the oxygen present.

Meanwhile, the second officer had alerted the captain, who immediately came to the bridge and ordered the second officer to sound the general alarm. The coastguard was also alerted from the bridge. The whole crew assembled and began fighting the fire from outside. They cooled down the funnel from outside and extinguished the small fires ignited by the hot oil around the outside of the funnel.

Use of the CO₂ extinguishing system in the engine room made it necessary to start up the emergency generator in another area in order to supply electricity. A short time after, the on-board electricity supply nevertheless failed. As a result, the lights went out and the fire-fighting pump ceased operating. Flames could still be seen in the top of the funnel. Because it was no longer possible to fight the fire any further, the captain gave the order to abandon ship. The whole crew boarded the freefall lifeboat and left the ship. They were then taken on board by a cargo ship that was already on its way to render assistance.

The Escape was later taken in tow by salvagers and towed into Riga. After it arrived there, the emergency generator's day tank was found to be still full of fuel, but the cooling water level was too low. After the salvagers had topped up the cooling water, the emergency generator was started up. After a while, it stopped again due to overheating. The vents for the emergency generator were found to be closed. The salvage workers then opened up the ventilation and again topped up the cooling water. After being restarted, the emergency generator then continued to run without any problems.

Investigation findings

- The fire on board the Escape started because the temperature of the thermal oil had risen too high when the system was being boiled out. Together with the water vapour being released from the system, thermal oil found its way onto the hot exhaust pipe of the main engine.
- To save time, the chief engineer did not follow the applicable procedure when activating the CO₂ system. The system was activated without consulting the captain and obtaining his approval. The entire crew were not first assembled to make sure everyone was present.
- The emergency generator's vents were closed, as a result of which it received insufficient ventilation and became too hot. It consequently stopped and the ship's electricity supply failed.

Lessons learned

- ▶ Boiling out a thermal oil system with the aid of exhaust gases from the main engine presents an increased risk of fire. Because the main engine is primarily intended to provide propulsion, it is more difficult to raise the temperature of the thermal oil in a controlled manner. Controlling the temperature is easier if the auxiliary boiler is used.
- ▶ When the CO₂ system is used, it is extremely important to consult the captain and obtain his permission. Following the applicable procedure and counting all the crew members at the agreed muster station excludes the possibility that someone is still in the area that is going to be filled with CO₂.
- ▶ When the emergency generator is started up, it is important for the crew to check that the vents are open. Clearly marking these vents can prevent the close-down team – who close those vents in the event of a fire – from also closing the emergency generator's vents. Fire drills should also include the crew learning which vents are those that belong to the emergency generator.

Responses to the draft report

Pursuant to the Dutch Safety Board Act, a draft version of this report was submitted to the various parties involved. The following party was requested to check the report for factual inaccuracies and inconsistencies:

- JR Shipping

This party indicated that it had not found any factual inaccuracies.

Vessel data for Escape

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| Call letters | PBBU |
| IMO number | 9491501 |
| Flag State | Netherlands |
| Home port | Harlingen |
| Type of vessel | Container ship |
| Year of construction | 2011 |
| Shipyard | Sainty Shipbuilding (Yangzhou) – China |
| Length | 168.1 m |
| Beam | 25.6 m |
| Maximum draught | 10.5 m |
| Gross tonnage | 17368 |
| Main engine | Wärtsilä |
| Propulsion | Controllable Pitch Propeller (CPP) |
| Maximum propulsion power | 14520 kW |
| Vessel certificates | All valid |



The Dutch Safety Board

When accidents or disasters happen, the Dutch Safety Board investigates how it was possible for these to occur, with the aim of learning lessons for the future and, ultimately, improving safety in the Netherlands. The Safety Board is independent and is free to decide which incidents to investigate. In particular, it focuses on situations in which people's personal safety is dependent on third parties, such as the government or companies. In certain cases the Board is under an obligation to carry out an investigation. Its investigations do not address issues of blame or liability.

Dutch Safety Board

Chairperson: C.J.L. van Dam MPM
E.A. Bakkum
Secretary Director: C.A.J.F. Verheij

Visiting address

Lange Voorhout 9
2514 EA The Hague
The Netherlands

Postal address

PO Box 95404
2509 CK The Hague
The Netherlands

Telephone

+31 (0)70 333 7000

Website

safetyboard.nl

E-mail

info@safetyboard.nl

*N.B.: This report has been published in the Dutch and English language.
If there are differences in interpretation the Dutch report prevails.*