BSAFE

INCIDENT CASE STUDY

No.10 | AUGUST 2021

ENGINE ROOM FIRE

THE *FERNANDA* A 2,576GT RO-RO SHIP BUILT IN 1982 (FIGURE 1) WAS NEARING THE END OF HER VOYAGE, WHEN A FIRE BROKE OUT IN THE ENGINE ROOM. DESPITE AN EARLY DECISION TO DEPLOY THE SHIP'S FIXED HALON FIREFIGHTING SYSTEM THE FIRE COULD NOT BE EXTINGUISHED, AND THE CREW HAD TO BE EVACUATED BY HELICOPTER. NO CREW MEMBERS WERE INJURED. HOWEVER, THE FIRE WAS NOT COMPLETELY EXTINGUISHED UNTIL 8 DAYS LATER AND THE SHIP WAS EVENTUALLY DECLARED A CONSTRUCTIVE TOTAL LOSS **(FIGURE 2)**.

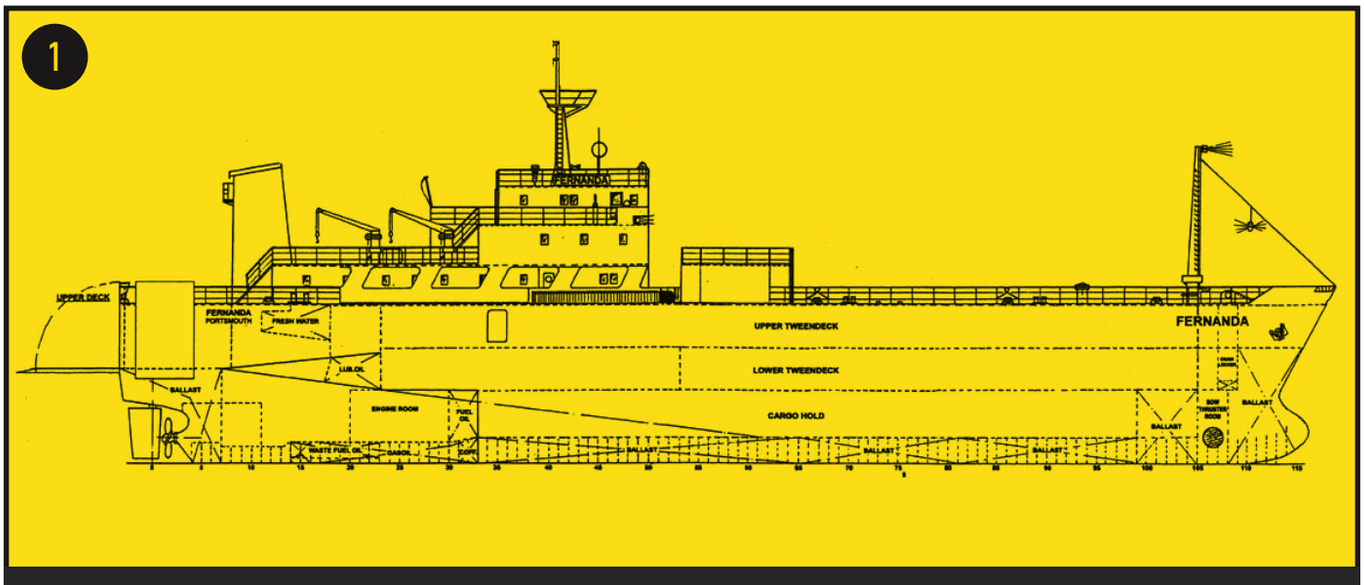

FIGURE 1 THE *FERNANDA*
SOURCE: COMMONWEALTH OF DOMINICA MARITIME ADMINISTRATION

WHAT HAPPENED

On the time of the incident the Second Officer (2/O) was on watch on the bridge while the Second Engineer (2/E) and one rating were on watch in the engine room, as the vessel was not certified for unmanned engine room operation.

At the beginning of his watch, the 2/E recorded the machinery parameters in the log book indicating that everything was per normal operations. He then carried out a maintenance procedure on the lube oil purifier. The C/E, who had been on watch from 0600 – 1200, came to the machinery space to check the operation of the purifier. He then instructed the 2/E to prepare some fuel injectors for the main engine, after which he retired to his cabin to rest. The 2/E went to retrieve the fuel injectors at the engine room store which was located at the aft end of the upper deck close to the machinery space entrance.

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WHAT HAPPENED (CONTINUED)

FIGURE 2 *FERNANDA* SHOWING EXTENSIVE FIRE DAMAGE ON AFT PART
SOURCE: COMMONWEALTH OF DOMINICA MARITIME ADMINISTRATION

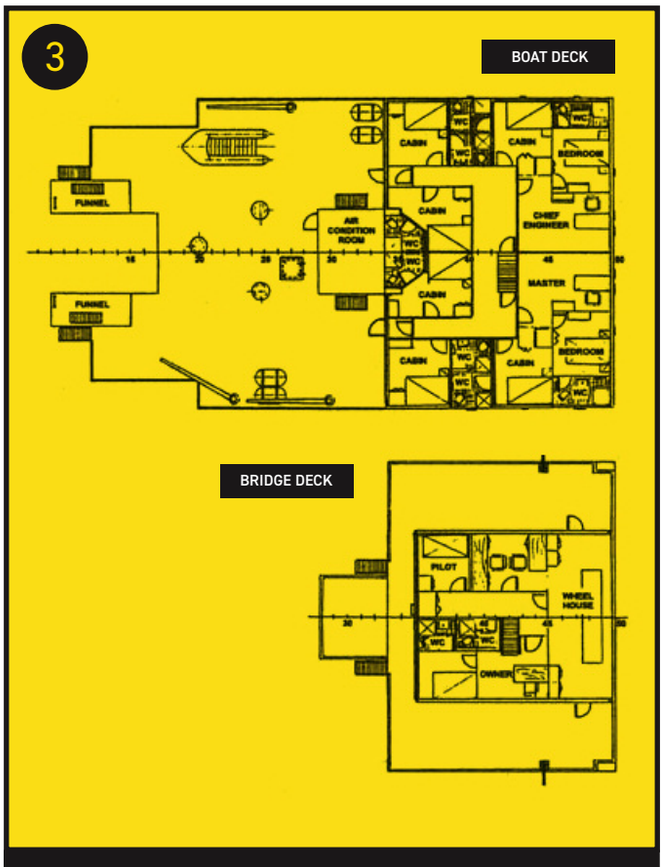

FIGURE 3 MASTER'S CABIN AND BRIDGE DECK
SOURCE: COMMONWEALTH OF DOMINICA MARITIME ADMINISTRATION

Meanwhile the rating on watch with the 2/E was working in the Electrician's Store which was also located on the upper deck.

The Master was in his cabin when about 1250 UTC he heard the alarm from the fire detection panel and immediately went to the bridge **(Figure 3)**. The machinery space and steering room fire detector was illuminated. He tried to reset the detector but could not do so. The Bosun was on the bridge so the Master instructed him to proceed to the engine room to assess the situation. The Bosun quickly returned and reported that heavy smoke was coming from the starboard side of the engine room. As the 2/E returned to the engine room he met the Bosun who said the steering room was on fire. The 2/E had not heard the fire alarm and opened the door to the engine room and noted heavy smoke. At that moment the main engine stopped which resulted in a power blackout and the emergency lighting came on. He then went to the door on the other side of the engine room and noted that the smoke was not as heavy but still could not be entered without wearing a breathing apparatus (BA). The Master made an announcement on the public address calling the crew to their fire stations.

The Bosun, together with a deck rating, donned a BA in order to enter the machinery space and assess the condition inside. They entered from the crew accommodation and immediately saw flames on the starboard side. They returned to the bridge and reported a large fire in the machinery space. The Master ordered the 2/O to sound the general alarm. The 2/E went on deck to assist with closing the fire dampers and machinery space ventilation openings and eventually returned to the bridge. The Master quickly made the decision to utilise the fixed Halon firefighting system. Once the machinery spaces had been secured and all crew members accounted for he instructed the C/E and 2/E to release the Halon system.

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WHAT HAPPENED (CONTINUED)

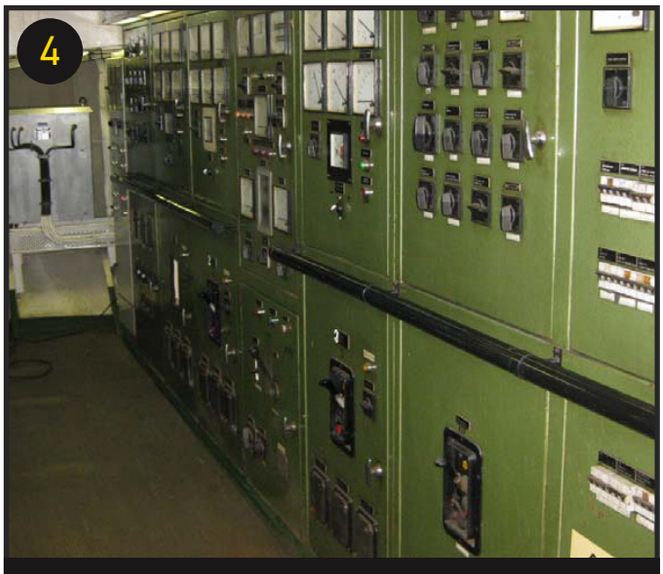

FIGURE 4 MAIN SWITCHBOARD
SOURCE: COMMONWEALTH OF DOMINICA MARITIME ADMINISTRATION

At approximately 1310 UTC the Master contacted the ship's managers as well as their agent in the next port to brief them on the situation. The agent contacted the local coast guard, who in turn contacted the ship to request information and broadcast a MAYDAY RELAY requesting all vessels in the vicinity to be on standby. No MAYDAY message was broadcasted by *FERNANDA*. It quickly became clear to the Master that while the Halon initially appeared to contain the fire a serious situation was developing in the engine room. The Master advised the coast guard about the rapid deteriorating situation and requested that the crew be evacuated. The crew donned their immersion suits and lifejackets, and the Master ordered them to launch two life rafts from the port side. At the time *FERNANDA* was 6 miles offshore and was rolling heavily in a heavy sea and swell. At 1320 UTC the coast guard advised that a rescue helicopter had been dispatched to the scene together with a local lifeboat and tug.

The Master donned an EEBD and went to his cabin to retrieve the crew's official documents. On his return the bridge was smoke filled and he went first to the bridge wing and then to the open deck where the crew was mustered having launched the two life rafts and were awaiting the arrival of the rescue helicopter. The first helicopter arrived at 1436 UTC and the entire crew were evacuated by 1456 UTC and taken to the nearby Red Cross Station.

After the evacuation the coast guard towed *FERNANDA* to a nearby port. As the fire appeared extinguished it was decided to open the stern door to clear the cargo hold for smoke. However, the ingress of air into the cargo spaces caused the fire to reignite and to a greater extent than previously. The volume of smoke was so great that it was decided to tow the vessel back to sea to allow the fire to burn out.

Following the incident the coast guard conducted an investigation of the machinery space and concluded that, as far as it could be determined, the fire started in the main switchboard **(Figure 4)** located at the aft part of the main engine room.

LESSONS LEARNED ON NEXT PAGE

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LESSONS LEARNED

THE FOLLOWING LESSONS LEARNED HAVE BEEN IDENTIFIED. THESE ARE BASED ON THE INFORMATION AVAILABLE IN THE INVESTIGATION REPORT AND ARE NOT INTENDED TO APPORTION BLAME ON THE INDIVIDUALS OR COMPANY INVOLVED:

- Following the fire an investigation of the machinery space was conducted and it was established that the fire started in the main switchboard located in the aft part of the main engine room. From here the fire quickly spread upwards through open accesses to the funnels and later to the crew accommodation and navigating bridge as well as to the upper tween deck cargo compartment. As the switchboard was extensively damaged during the fire it was not possible to identify the cause of the fire.

- Two fire dampers, one at the upper extremity of each funnel and also one access to the refrigeration machinery space on the tank top level were left open when the engine room was being closed down in preparation for the operation of the HALON fixed fire-fighting system. This is thought to have contributed to the development of the fire in the early stages of the event by allowing air to be drawn into the engine room. This also reduced the effectiveness of the HALON fixed fire-fighting system when it was operated. Two other accesses from the cargo spaces to the companionway from the crew accommodation are thought to have contributed to the spread of fire to the cargo spaces.

- The location of the emergency fire pump in the steering gear room rendered it unusable due to the presence of heavy smoke in the access to the steering gear room. The access hatch was too small to enter the space when wearing a breathing apparatus.

- Housekeeping resulting in oil drums, oily rags and other garbage in the engine room may have contributed to the development of the fire based on the history of housekeeping issues during past inspections as well as evidence observed in areas of the engine room during the investigation. However, It should also be noted that the general housekeeping found on board the vessel was observed after a number of days of ongoing fire as well as heavy seas and, therefore, should not regarded as direct cause of the fire.

- The onboard Shipboard Emergency Situations Manual was reviewed as part of the investigation. Although there were clear measures in place for the prevention and detection of fires in the machinery spaces, the review recommended that the managers should conduct a thorough review of the relevant portions of their Safety Management System specific to fire detection and prevention to ensure that they remain ship specific and adequate in all fire situations.

- The onboard annual drill schedule only prescribed a fire drill to be conducted monthly and did not give the Master any guidance with respect to nature of the drills to be conducted and the training elements to be achieved.

CONTACT

For more information on this incident email lossprevention@tindallriley.com

THIS CASE STUDY IS DRAWN FROM THE INVESTIGATION REPORT PUBLISHED BY THE COMMONWEALTH OF DOMINICA MARITIME ADMINISTRATION AT:
http://rns.is/pdfs/fernanda_final_report.pdf