

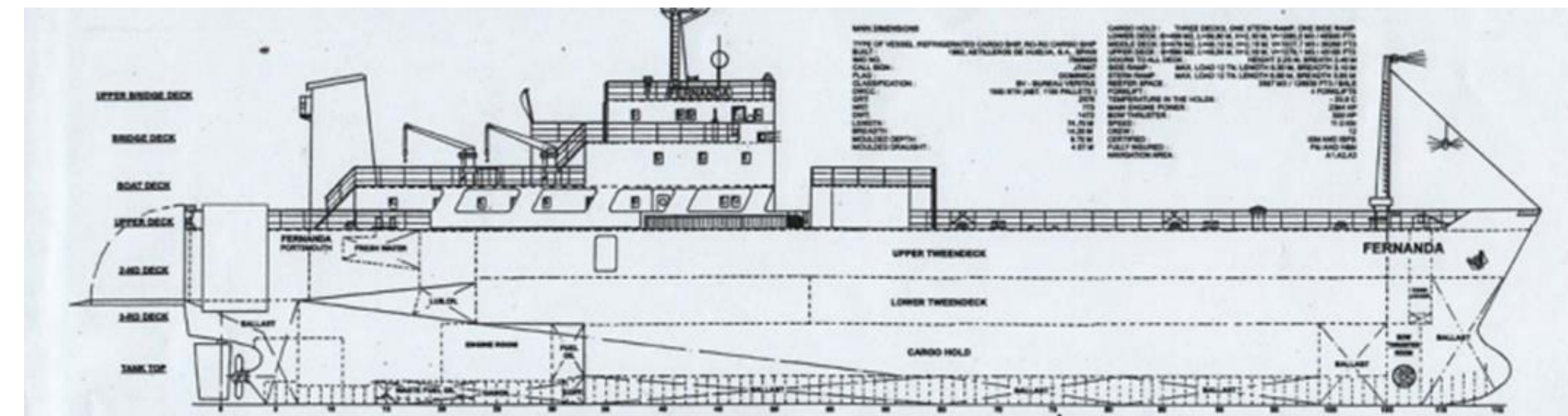
Engine Room Fire



Engine Room Fire

BACKGROUND

- **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.
- The vessel was not certified for unmanned machinery space operation.
- So at the time of the incident the Second Engineer (2/E) and one rating were on watch in the engine room.
- 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 maintenance work on a lub. oil separator, before the C/E instructed him to retrieve some fuel injectors at the engine room store located on upper deck.
- Meanwhile the rating on watch with the 2/E was working in the Electrician's Store also located on the upper deck.



FERNANDA

Source: Commonwealth of Dominica Maritime Administration

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THE INCIDENT

- **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.**
- **The machinery space and steering room fire detector was illuminated, and he was not able to reset these.**
- **The Bosun who was also on the ship was instructed to go down and investigate the matter.**
- **The Bosun quickly returned and reported heavy smoke coming from the starboard side of the engine room.**
- **As the 2/E returned to the engine room he had met the Bosun. The 2/E had not heard the fire alarm and opened the door to the engine room and also noted heavy smoke.**
- **At that moment the main engine stopped resulting in a power blackout and the emergency lighting came on.**
- **The Master made an announcement on the public address calling the crew to their fire stations.**

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THE INCIDENT (continued)

- The Bosun, together with a deck rating, donned a BA in order to enter the machinery space and assess the condition inside.
- After entering through the accommodation they immediately saw flames on the starboard side. They returned to the bridge and reported the fire.
- Afterwards the General Alarm was sounded, and the crew began to close fire dampers and machinery space ventilation openings.
- 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 the Halon system was released.
- 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 coastguard, who in turn contacted the ship to request information and broadcast a MAYDAY RELAY requesting all vessels in the vicinity to be stand by. No MAYDAY message was broadcasted by the FERNANDA.
- Though the released Halon initially appeared to contain the fire it could not extinguish the fire and the serious situation was becoming serious, so the Master and requested the Coastguard for the crew to be evacuated.

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THE INCIDENT (continued)

- At the time FERNANDA was 6 miles offshore and was rolling heavily. At 1320 UTC the Coastguard advised that a rescue helicopter was dispatched to the scene together with a local lifeboat and tug.
- The crew donned their survival gear and the Master ordered them to launch two life rafts from the port side.
- 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 went on deck where they were awaiting to be evacuated.
- The first rescue helicopter arrived at the ship at 1436 UTC and the entire crew were evacuated by 1456 UTC.
- Thereafter, the Coastguard towed the FERNANDA to a nearby port. Here the stern door were opened. However, the ingress of air caused the fire to reignite. 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 an investigation were conducted and, as far as it could be determined, the fire started in the main switchboard.



Main switchboard

Source: Commonwealth of Dominica Maritime Administration

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REFLECTIVE LEARNING

The questions below are intended to be used to help review the incident case study either individually or in small groups:

- **What do you think could have been the immediate cause of the incident?**
- **What other factors do you think contributed to the incident?**
- **What do you think were the barriers that should have prevented this incident from occurring?**
- **Why do you think these barriers might not have been effective on this occasion?**
- **How often do you conduct fire drills on your ship? Do these involve different scenarios to be trained for each drill?**
- **Do you conclude each drill by evaluating its progress and highlight what went well and identify what could have been improved?**
- **How do you maintain the housekeeping standard on your ship? Anything you feel could be improved?**
- **Are your onboard firefighting manual and procedures ship specific?**

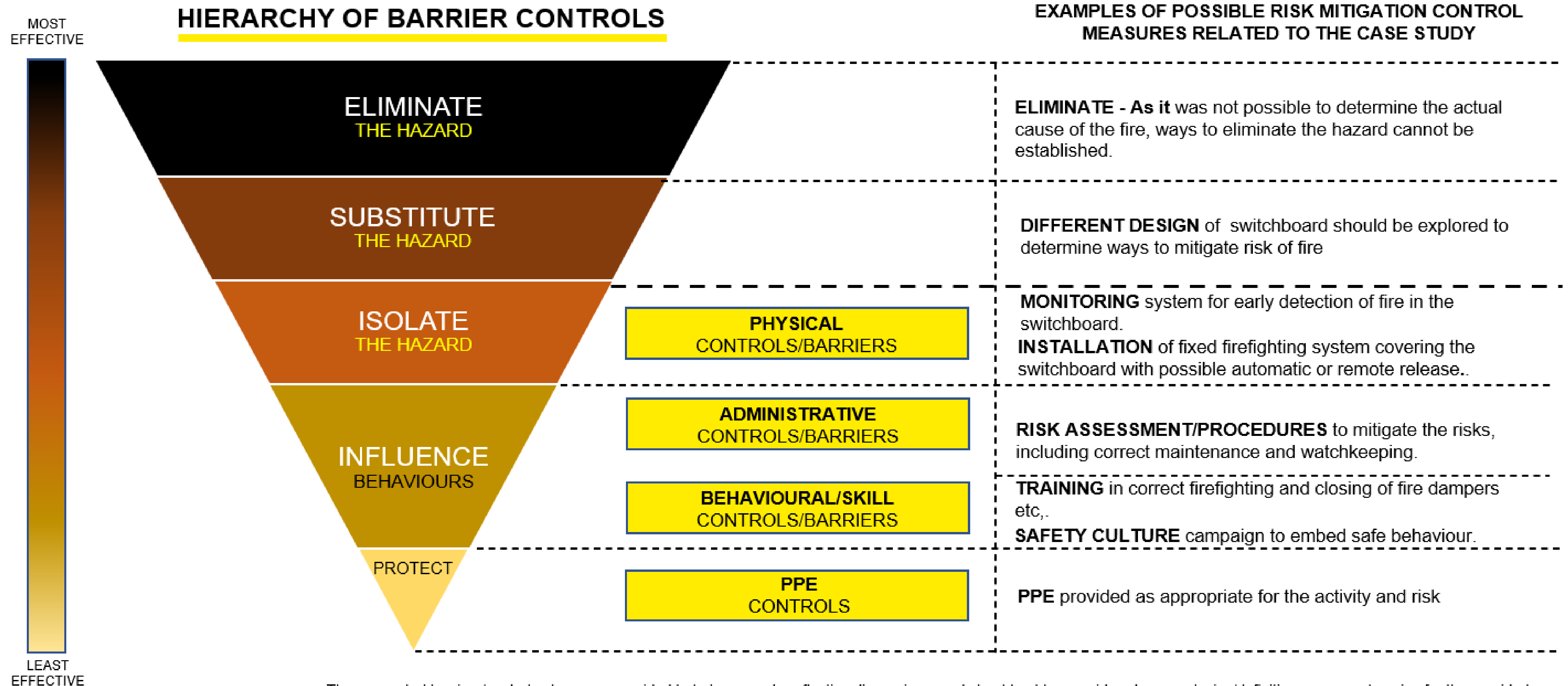
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LESSONS LEARNED

The following lessons learned have been identified based on the available information in the investigation report and are not intended to apportion blame on the individuals or company involved:

- **Switchboard** – It is believed that fire started in the main switchboard. It then quickly spread upwards through open accesses to the funnels and later to the crew accommodation and the upper tween deck cargo compartment. However, as the switchboard was extensively damaged during the fire it was not possible to be certain that this was the cause of the fire.
- **Fire Dampers** – Two fire dampers, one at the upper extremity of each funnel, and one access to the refrigeration machinery space on the tank top level were left open during the fire. This is thought to have contributed to the development of the fire in the early stages and also reduced the effectiveness of the Halon when released.
- **Emergency Fire Pump** – The location of the emergency fire pump in the steering gear room rendered it unusable due to the presence of heavy smoke and the access hatch being too small to enter when wearing a breathing apparatus.
- **Housekeeping** – The general housekeeping standard was not found satisfactory and may have contributed to the development of the fire.
- **Shipboard Emergency Situations Manual** – It was advised that the managers 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.
- **Drill schedule** – The onboard annual drill schedule only prescribed a fire drill to be conducted monthly without giving the Master any guidance with respect to nature of the drills to be conducted and the training elements to be achieved.

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The suggested barriers/controls above are provided to help generate reflective discussions, and should not be considered as conclusive/definitive or comprehensive for the provided case study. The risk and control measures relating to any similar scenario or activity must always be appropriately assessed based on the specific onboard arrangement and circumstances.

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CONCLUSIONS

The causes of this incident appear to be connected with the failure or absence of several risk controls and safety barriers, as well as the indication of an ineffective safety culture which resulted in the fire spreading rapidly.

The *FERNANDA* was not certified for unattended machinery space operation. However, at the time of the fire the engine room was left unattended as both the watchkeeping officer (2/E) and rating was occupied elsewhere. Had the engine room been manned at the time of incident. It is likely that the fire may have been detected at an earlier stage, and timely firefighting be initiated limiting the damage.

The level of training appeared to have played a significant role in this incident. Regular detailed drills are imperative to improve the crew's ability to respond to an emergency situation. Therefore, a drill should be thoroughly prepared. It should be executed and timed and on completion it should be evaluated to determine if it could be improved. In this incident proper drills could have identified the difficulties in accessing and closing the fire dampers at the top of both funnels as well as entering the steering gear room to access the emergency fire pump when wearing a breathing apparatus.

Finally, the history of poor housekeeping and the deficiencies raised at past ISM audits indicate the possibility that there had been a breakdown in both the safety management and culture on board.

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QUESTIONS