

Case study for onboard safety meeting

Engine room fire

Please read the below story of an incident. Keep our company's standards and procedures in mind while reading to compare with the actions of the crew below as we will discuss the factors which led to the incident occurring.

A laden bulk carrier was on passage between two ports in Europe. In anticipation of a larger electrical load due to cleaning of the cargo holds, auxiliary engines (A/E) Nos. 1 and 2 were on a parallel load-sharing configuration.

All the engine officers were present in the engine control room (ECR). A safety meeting was held to emphasise the importance of carrying out risk assessments, toolbox meetings and to discuss the lessons learnt from a recent incident onboard one of the sister vessels. During the safety meeting, the engine ratings were carrying out their assigned tasks. One of these tasks was the renewal and cleaning of lube and fuel oil filters. As the engineer officers were busy in their meeting, the ratings were not supervised in their work.

Suddenly, flames were seen between the two running generator engines. The fire alarm system sounded and the officers called the bridge in order to clarify if they could stop engines. Engineers then tripped the main supply breakers on the switchboard, stopped the auxiliary engines and all other running machinery whilst the emergency generator came on load.

Now, thick black smoke reduced the visibility in the engine room, forcing all staff to evacuate the machinery space. While the crew mustered, the ventilation trips, flaps and quick closing valves were operated, to seal and isolate the engine room. The onboard fire team entered the space wearing heat protecting suits and Self-Contained Breathing Apparatus (SCBA) and extinguished the fire with portable and semi-portable extinguishers. The crew continued to monitor the space for any other outbreaks of fire. A few hours later, they re-entered the machinery space to verify that the fire was completely extinguished.

Subsequently, after carrying out all the appropriate operational safety checks, Aux. engine #3, (located on the lower platform), main engine and other machinery were restarted and the vessel resumed her passage.

In the evaluation and investigation after the incident, it was discovered that a sudden shearing of one of the three bolts that secures the lubricating oil filter of A/E #2 had displaced the cover. Lube oil under pressure splashed onto various hot components on both generators and ignited. It was also discovered that the lube oil primer pumps had continued to operate after shutdown of engines and generators, because of power being restored by emergency power source. This resulted in the spill of all the lube oil in the sump of the A/E #2 engine – which fed the fire.

It was also found out that the filter cover bolts were improperly tightened and there was a lack of proper inspection routines. Regular inspection is important as it is known that these fittings could be subject to excessive wear or loosen due to vibration / internal pressure.

Spray shields and extra securing arrangements for cover bolts were not manufactured and fitted for lube oil pipes and filters for the auxiliary engines on board; and that had severe consequences for this vessel.

How to improve by lessons learnt

Based on the case and the keywords below, you should now perform an onboard risk assessment of the incident and the factors which led to it. Bear in mind the company's SMS procedures when answering the questions. Please also discuss the following questions in order to increase awareness;

Keywords for discussion:

- Leadership, supervision and delegation. A clear understanding among officers of which tasks can be delegated to ratings and which cannot.
- Familiarisation of air control; are we familiar with all the openings to the engine room that may need to be closed in a fire situation?
- Fire hazards and combustible oil (fuel oil, lubricating oil and hydraulic oil). What makes them flammable?
- General cleanliness in our engine room; accumulation of oil in drip trays, gutters and bilges. "Nice-to-have" parts inside your engine room. (Plastic sheets, cardboard, wooden planks, used paint tins etc.)
- Identify sources of ignition in your engine room. Identify hot surfaces (exhaust pipes, engine surfaces etc.), rotating machinery, electrical equipment, hot work, electric tools etc.
- Fire-fighting capabilities; list your capabilities and discuss advantages and disadvantages of such equipment.

1 What factors contributed to the incident in the above case?

2 Risk Assessment: Could some of the factors identified be present on board your ship? How frequent could they be present? How severe could it be if they are present?

3 What measures would you suggest in order to mitigate the risk? Any additional barriers that could be introduced?