Mariners' Alerting and Reporting Scheme

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In this issue of MARS, we would like to highlight some of the risks posed by fires and firefighting on vessels. It is hard to imagine another trade or industry where workers are expected not only to do their regular work but also be expert firemen too – yet as seafarers our lives may depend on it!

The three events detailed below are a study in the spectrum of responses and outcomes. These vary from the tragic, with loss of life, to the tragicomic, where there were no fatalities but a full range of bumbling improvisation. Finally, the third occurrence is a study in cool heads, patience, and proper technique. The crew undertook boundary cooling for four hours before any further action. With proper training, regular, credible and realistic scenarios, as well as effective debriefings after each exercise, crew can handle almost any fire situation. The exception may be as described in the first incident below; new ultra-large container vessels (or maybe passenger ships?) may have more unevaluated and unanticipated risks than current best practices have accounted for.

MARS 202115

Nightmare fire scene

As edited from TSIB (Singapore) MIB/MAI/CAS.035

➔ A very large, recently constructed container ship was loaded and underway in darkness when a smoke alarm sounded in number 3 cargo hold. With the Master on the bridge, the Chief Mate went to the muster/fire control station. He was in charge of the Emergency Team, and besides mustering (including headcount) he would oversee the firefighting and boundary cooling operation. The Master noted the apparent wind about four points on the starboard bow and adjusted the vessel's heading to starboard to minimise the effect of smoke on the accommodation, but maintained speed.

On the starboard side main deck, crew closed all 16 natural ventilation flaps for hold 3, but were unable to complete this task on the port side due to heavy smoke and heat. Some of the crew reported a strong chlorine-like smell while closing the ventilation flaps on the cross deck, and suffered some breathlessness with itchy burning sensations.

About 30 minutes after the first alarm the Master opted to release the appropriate amount of CO_2 into the hold for the safety of the ship and its crew, although the ventilation flaps on the port side could still not be closed. Boundary cooling continued on deck but copious amounts of smoke were coming from hold 3. Thirty minutes after the first release of CO_2, the Master ordered all non-essential crew to the bridge and ordered a second release of CO_2.

About seven minutes after the second CO_2 release, the water mist system in the engine room auto-activated, indicating that temperatures in the engine room were possibly elevated. Soon afterwards, the Master ordered a distress call. All remaining crew were ordered to the bridge. About 15 minutes later, the Master had all of the remaining CO_2 released into hold 3, but there was little effect. Ten minutes after this, with the majority of the crew now in the wheelhouse, acrid smoke entered the space and created a panic reaction. Crew evacuated the bridge and broke up haphazardly into four groups.

Almost an hour after the evacuation of the wheelhouse, a group of seven crew and the Master boarded the starboard lifeboat and successfully abandoned ship. Once in the water they took on 14 other crew that had already abandoned in a liferaft and another one from the water. Of the 27 crew, 23 survived although the one crew recovered from the water later was pronounced deceased.

The official investigation found, among other things, that no. 3 cargo hold contained a block stowage of 55 containers of sodium dichloroisocyanurate dihydrate (SDID). It is possible that the cargo in one or more of these containers underwent self-decomposition. The block stowage exacerbated the rate of reaction and heat production which resulted in the uncontrollable spread of the fire.

Lessons learned

- The complexities and interconnected risks of large modern container ships, including loading of certain dangerous cargoes below deck, may have outstripped the current accepted best practices and fire fighting arrangements, not to mention fire fighting training of crews on these ships.
- One example of the above: how are the crew to safely close all of the ventilation flaps manually when heat and smoke are present? In this case it was not possible. Although this arrangement conforms to class rules, maybe it is no longer suitable.

Natural ventilation flaps (Sister ship)

- It is important to close the ventilator flaps/dampers in the accommodation and machinery spaces for the protection of the crew, even for an under-deck cargo fire.

- For at least 90 minutes after the fire was discovered, the Master maintained a fairly high speed of at least 15 knots. Best practice would have the ship brought quickly to bare steerage to reduce apparent wind while still keeping the management of smoke in mind. Although he was intending to reduce the effect of smoke on crew engaged in firefighting, this could have been done at a very slow speed with helm adjustments and thrusters.

There are many more lessons learned from this report than it is possible to list here. Interested readers should visit the full report at the Singapore Ministry of Transport website. It can be found at https://bit.ly/39k3c4F or by searching the file reference given at the beginning of this report.

MARS 202116

No practice makes no-one perfect

As edited from TSB (Canada) official report M20A0003

➔ A large shrimp-processing/fishing vessel was engaged in fishing. At approximately 1515, the bosun awoke to the smell of smoke. On leaving his cabin, he saw flames through the window of the closed sauna door and smoke venting from the top of the door. He went to the mess-room and alerted the crew members there. One crew member took a fire extinguisher and accompanied the bosun back to the sauna while another crew member went to the bridge.

The bosun opened the sauna door and the other crew member emptied the fire extinguisher in the direction of the flames. The door was then closed and the two left for the muster station on deck 03. Meanwhile, the OOW had activated the fire alarm and announced over the PA system that there was a fire on board; this was not a drill.

Some crew members mustered with their lifejackets at the muster station and began preparing the vessel's fire hoses while other crew awaited instructions from the chief mate, who had remained on the bridge. One person was still unaccounted for.

The second mate donned breathing apparatus (BA) and went to deck 03 to check the cabins. After confirming that the deck had been evacuated, he returned to the bridge, donned a fire suit, exchanged the air cylinder on his BA and left the bridge for the forward deck.

The chief engineer, second engineer, and maintenance man were working in the shrimp-processing factory when the alarm sounded. The chief engineer sent the second engineer and maintenance man to the muster station and then went to the engine control room, where he met the missing person from the muster. He sent the person to the muster station then conferred with the bridge. Approximately 10 minutes after the fire alarm sounded, everyone on board was now accounted for.

At the muster station, one person was now dressing in the fire suit but was encountering difficulties. The boots did not fit, the suspenders broke, and the helmet visor was cracked. Once the fire hoses were ready, he proceeded to the forward deck. When he reached the forward deck, neither he nor the other crew members there received direction on how to fight the fire. He took the initiative to enter deck 03 with a fire hose, alone and without a safety line, as the line had broken. Another crew member remained on deck to assist with the fire hose and open the forward hatch.

Dense smoke limited visibility as the firefighter descended the ladder and arrived on Deck 03. When he entered the tanning room within which the sauna was located, he stumbled and fell over boxes that were stored there. Recovering, he used the fire hose to spray in and around the sauna, inside the tanning room, and the adjacent changing room. Before returning to the forward deck, he tried to close the sauna door but was unable do so, and left it open.

When the second mate arrived on the forward deck, he proceeded down the hatch with a prepared fire hose and a makeshift safety line. He was unable to see through the dense smoke, and inadvertently blocked the way of the firefighter leaving the sauna who was ascending the ladder. The low-pressure alarm was sounding on his BA.

The crew on deck now decided to fight the fire with two teams of two, but air in the BAs was low for team one and soon the alarms sounded. They returned to the muster station. As there were no spare air cylinders on board they re-entered Deck 03 with a fire hose, employing dust masks as airway protection.

Team one could see another firefighter in front of the tanning room door, but could not progress further because the fire hose was not long enough to reach the sauna door. They sprayed the entrance to the tanning room with water while the other firefighter sprayed the inside of the tanning room and the sauna door. At approximately 1630, the three crew members retreated from the tanning room area and closed up access to deck 03 to contain the fire. Crew members on the forward deck then closed the accommodation fire dampers in the vents to suffocate the fire.

By approximately 1745, the heat and smoke from the fire was dissipating. It was considered likely that the fire was contained within the sauna and smouldering. Once the fire was fully extinguished, burned pieces of a wooden footrest were found below the sauna's electric heater, indicating that the footrest may have been on the heater when it was turned on. With the heater left unattended, the heat likely ignited the footrest, starting the fire.

Burned sauna and heater

Among other things, the investigation found that past fire drills conducted on the vessel had been repetitive, and did not include realistic emergency scenarios. Crew would start the main and emergency fire pumps, inspect and pressurise the fire hoses, and then simulate a fire on deck by spraying the trawl doors with water. The crew did not perform post-drill evaluations.

Lessons learned

- Regular fire drills, using varied and realistic scenarios, are critical to confirm that firefighting equipment is in working order and to reinforce crew's knowledge of how to use the equipment and of their assigned emergency duties.
- Post-drill evaluations in a round-table discussion with all involved are a valuable tool for quality assurance and continued improvement.
- While hindsight can be said to be 20:20, in this case it remains debatable whether the first intervention of opening the door and emptying a fire extinguisher in the general direction of the fire was effective or only gave the fire more air. Normal procedures would have put boundary cooling in effect, followed by properly dressed and equipped firefighters attacking the fire in an organised manner with a pressurised hose for full effect and safety.

- It was over an hour after the fire had been discovered and after the attempted fire suppression with hoses before ventilation dampers were closed to starve the fire of oxygen. This is yet another indicator of lack of practice and familiarity with fire suppression procedures.
- Attacking the fire with dust masks as breathing protection was, to say the least, a dangerous act.

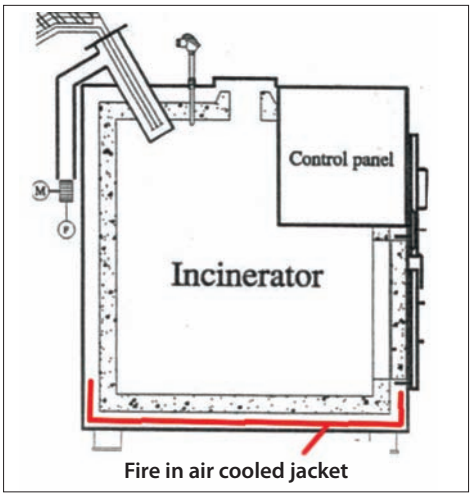
MARS 202117

Incinerator fire under control

➔ A vessel underway started its incinerator to incinerate oily rags and sludge. About five hours later, after the job was completed, the incinerator was stopped. All specifications appeared normal and the furnace temperature was noted to be 950°C. Following the company procedure, the crew continued to monitor the incinerator during the cooling off period. By 1900, five hours after the incinerator had been turned off, the temperature of the furnace was noted to be 280°C and the blower fan was still running.

At 2032, the duty engineer noticed smoke coming from the outer body of the incinerator. On closer inspection, he could see paint peeling off the body of the incinerator. The temperature of the incinerator body was between 250-350° C. He informed the Chief Engineer and an emergency response was initiated. The crew mustered and fire parties began boundary cooling. Boundary cooling was continued for about four hours until heat indications suggested that the fire was extinguished.

During the investigation it was found that the fire had started in the air-cooled incinerator chamber jacket. Later, it was found that refractory and outside body plates were intact. Traces of oil were found between the sludge dosing door and the combustion chamber, which was an indication that oil had accumulated in the double shell refractory lining.



Fire in air cooled jacket

Lessons learned

- Even during the cool off period, an incinerator must be attended to and regularly checked.
- Boundary cooling and cool heads are a great asset when fighting a shipboard fire.

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