IMCA Safety Flash 19/19

August 2019

These flashes summarise key safety matters and incidents, allowing wider dissemination of lessons learnt from them. The information below has been provided in good faith by members and should be reviewed individually by recipients, who will determine its relevance to their own operations.

The effectiveness of the IMCA safety flash system depends on receiving reports from members in order to pass on information and avoid repeat incidents. Please consider adding the IMCA secretariat (imca@imca-int.com) to your internal distribution list for safety alerts and/or manually submitting information on specific incidents you consider may be relevant. All information will be anonymised or sanitised, as appropriate.

A number of other organisations issue safety flashes and similar documents which may be of interest to IMCA members. Where these are particularly relevant, these may be summarised or highlighted here. Links to known relevant websites are provided at www.imca-int.com/links Additional links should be submitted to info@imca-int.com

Any actions, lessons learnt, recommendations and suggestions in IMCA safety flashes are generated by the submitting organisation. IMCA safety flashes provide, in good faith, safety information for the benefit of members and do not necessarily constitute IMCA guidance, nor represent the official view of the Association or its members.

1 Fire in Incinerator Exhaust Gas Manifold

What happened?

During burning of sludge in the vessel incinerator, there was a high exhaust gas temperature alarm. Smoke appeared from the incinerator exhaust gas manifold, followed by a fire inside the exhaust pipe.

19:34: the alarm sounded, and the crew mustered. The vessel course was altered to prevent the spread of smoke. Boundary cooling of the funnel was started; the fire team entered the incinerator room with extinguishers to fight the fire but were unable to extinguish it.

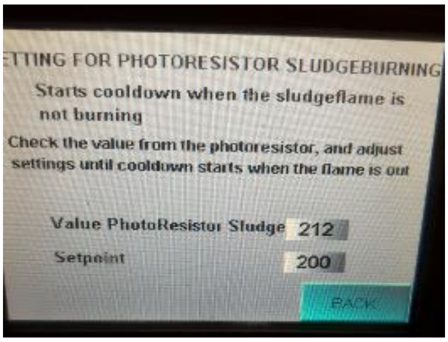
19:41: the fire team left the incinerator room and sealed the door. Minutes later, the sprinkler system for the incinerator room was activated.

20:01: the fire extinguished and the sprinkler system was stopped.

Smoke and high temperatures remained for over an hour; boundary cooling continued until the situation was stabilized at around 21:00. A fire watch was maintained until midnight. There were no injuries but there was some damage to the equipment in the incinerator room.

Exhaust sensor was tampered with

Exhaust sensor



Setpoint on sludge resistor is set to low

The incinerator was only used for burning sludge, at a temperature somewhere between 810-850°C. For some reason the flame extinguished.

Detailed Sequence of Cause of Fire

- A set point value on a control resistor was set too low, such that the equipment was not able to detect that the flame had failed, and so kept pumping sludge into the combustion chamber;
- The temperature dropped slowly to below 810°C; at that point the automatic diesel burner triggered and started its cycle – the burner ignited and started burning fuel;
- This re-ignited the hot sludge already in the combustion chamber and caused a 'fireball' inside the exhaust pipe;
- This in turn caused the exhaust temperature to rise, which triggered a high exhaust gas temperature alarm;
- This stopped the sludge system from pumping more sludge into the incinerator, and the system should then have started to cool down;
- However, since there was an accumulation of sludge left inside the combustion chamber, the sludge just kept on burning and the temperature continued to rise;
- After five minutes, the emergency stop button was activated and this cut the power to the incinerator, and all fans stopped;
- There was still sludge left inside the burning chamber floor, which continued to burn unassisted;
- Since the flue gas fan was not running, the exhaust started going out through ventilation holes on the incinerator and this triggered the smoke detectors inside the incinerator room.

What went wrong?

- It was discovered afterwards that a set point value on a control resistor was set too low, such that the equipment was not able to detect a flame failure;
- The exhaust sensor had been tampered with.

What lessons were learned?

Have a full, detailed and comprehensive understanding of what happens to incinerators and other similar equipment when the **EMERGENCY STOP** button is pressed, and/or when power fails and restarts. This applies not only to incinerators but to all complex machines. Ensure that incinerator flame failure devices are tested as part of the vessels' planned maintenance system.

Members may wish to refer to the following three incidents, none of which are fires. Two have as a cause, lack of understanding of the technicalities of how certain equipment works. In the third, a serious incident arose from poor understanding of the consequences of a power outage.

- US Coast Guard safety alert 07/17 – CO_2 hazards *[USCG noted: "As a result of…poor understanding of, and communication of, the hazards involved, the safety of crew members…was placed at risk"]*;
- LTI as a result of load dropped from lifting magnet *[causes: insufficient technical understanding, undocumented "common practices" in use by experienced crew that were not completely understood by all]*;
- Failure Of Pipe Handling System Causes Injuries And Fatalities *[cause: as a consequence of a power outage, a complex system behaved in an unplanned and poorly understood way]*.

2 Seawater Entering Cabin Caused Electrical Fault

What happened?

During vessel operations, a porthole in a passenger's cabin was left untightened and slightly ajar. This allowed for seawater to enter the cabin and seep into the electrical socket under the porthole causing a short circuit resulting in burnt wiring and smoke in the cabin. A passenger observed the smoke and raised the alarm; the response team attended the scene and immediately isolated the supply.

The Master subsequently held a time out for safety – involving all passengers and crew – to highlight the safety failings, potential outcomes and improvements required regarding this near miss.

What went wrong?

- Cabin occupants failed to ensure that portholes were closed during vessel transit.

What actions were taken?

- Ensure all are given full and appropriate vessel induction when boarding, and that all are aware of the need to maintain watertight integrity at all times;
- Ensure full and effective watertight integrity inspections are made and confirmed when leaving port.

Members may wish to refer to:

- Fire in the accommodation: electronic items in cabins

3 Near Miss: Fire/Explosion Thermal Runaway – Lead Acid Battery

What happened?

An overheated and swollen lead acid battery was found on-board a vessel.

What went wrong?

When charging, the temperature inside the affected battery rose beyond the critical level. As the heat was unable to dissipate fast enough, the chemical reaction inside the battery accelerated and led to an even higher charging current and heat generation.

What were the causes?

Heat generated in the battery cell had occurred without any warning signs:

- The battery in question was found to be at the end of its design life and vulnerable to thermal runaway;
- Due to the heat generated within the battery, the battery became pressurised and deformed;
- In addition to design life, overcharging, internal physical damage, internal short circuit or a hot environment are all potential causes for battery fires or explosions.

What actions were taken?

- Depending on the battery configuration; isolate the battery or string of batteries, or shut down the charger;
- Cool the battery and ventilate the room.

What lessons were learned?

- Ensure all batteries are subject to periodical inspection and maintenance; consideration may be given to inspection by infra-red camera to look for hotspots;
- Report any sign of external damage;
- Ensure that battery chargers and procedures are correct for the battery type;
- Consider the installation of a "thermal runaway monitor" on battery packages (UPS);
- Batteries should be in rooms suitable for batteries with the required ventilation, fire detection and fire-fighting capabilities;
- Ensure there is a specific risk assessment and transport/disposal plan relating to the removal of faulty batteries, with specific care being taken to identify the correct personal protective equipment (PPE) to be worn, and any transportation necessary.

Members may wish to refer to the following incidents (all relating to lead-acid batteries):

- 'Routine' Task, Non-Routine Result: batteries stored sideway s leak battery acid
- Dangers of battery charging
- Internal Explosion Within 12v Forklift Battery
- Explosion Causing Fatal Injury During Maintenance Of Metocean Buoy

4 Fire Main Dust Cap Blown Away by Pressure from the Line

What happened?

A fire main dust cap was blown off by pressure from the line and hit the wall 10m away. The incident occurred when a fire team were checking the firefighting water line filling point connection. The filling point had a camlock fitting and the blank end steel dust cap was in position. The fire team proceeded to release the dust cap by disconnecting the clasps. When the clasp was released, pressure from behind the dust cap blew it off, causing it to hit the wall approximately 10 meters away. This caused minor damage to the wall. There were no injuries to personnel.

What actions were taken? What lessons were learned?

Work was stopped immediately. A thorough inspection of the site was made which identified a few fire ring main lines where the same scenario could occur; these were carefully checked, and any trapped pressure was released. Consideration may be given to the fitting of a drain cock which would allow the release of any residual line pressure prior to cap removal.

Members may wish to refer to:

- Working With Hoses and Pressure
- Near miss: Hyperbaric Fire Extinguisher Incident
- Corrosion Damage: Failed Fire Hydrant

5 Smouldering Coiled Extension Cable

What happened?

While ventilating a manhole in the engine room, the fire alarm was triggered when an electrical extension lead overheated, melting the insulation and started smouldering.

What went wrong?

Investigations confirmed that the electrical extension lead was not laid out in the correct manner and was still around 80% coiled. Also, the extension lead was the incorrect specification for the task of providing power to the blower.

What were the causes?

- Seafarers were unaware of the need to run out all the extension lead when using them;
- The extension leads available on board were not of an appropriate or correct specification.

What lessons were learned?

- Provide correct, fit for purpose specification extension leads;
- Ensure coiled electrical leads are unwound totally prior to use and include such instructions in safety management system (SMS) and on coil casing;
- Positive: all fire systems were operational, checked, drilled and crews reacted immediately alarm sounded.

What actions were taken?

- Thorough audit of all extension leads to ensure correct specifications, and removed all non-approved leads;
- Add electrical lead management to power and hand tools procedures, training and challenge tests in vessel SMS.

Members may wish to refer to:

- Near miss: burnt out electrical socket
- Mobile Phone Charger Failures
- Fire in the accommodation: electronic items in cabins
- Small Fire caused by portable fan heater

6 Near Miss Fire – Epoxy Overheating

What happened?

Smoke was seen coming from a 20' freight container on the deck of a vessel. The smoke was caused by remnants of used epoxy which nearly caught fire. When the container was opened by the vessel's fire-fighting team, they found the smoke coming from a number of metal cans containing left over epoxy.

What went wrong? What were the causes?

- When the mixed epoxy containers were put back into the container, they were stored near each other, which meant that the excess heat generated as the epoxy cured, could not be dissipated;
- The freight container was badly ventilated and not suitable for storage of chemicals.

What lessons were learned?

- Chemical storage should always be in accordance with any local regulations;
- Each chemical storage area should have a specific and separate risk assessment.

Our member recommends the following:

- Store epoxy leftovers in metal cans and in small quantities (maximum 2 litres) to avoid the build-up of excessive heat;
- Place cans on a metal drip tray in a well-ventilated area;
- Keep storage area free of any flammable materials;
- Residual epoxy mixture should be observed frequently until the material has cooled down;
- During this curing process, CO_2 and water fire extinguishers should be present.

Members may wish to refer to:

- Explosion caused by ignition of paint vapour
- Inadequate Handling and storage of potentially hazardous substances
- Hazardous substance safety guide