IMCA Safety Flash 25/16

October 2016

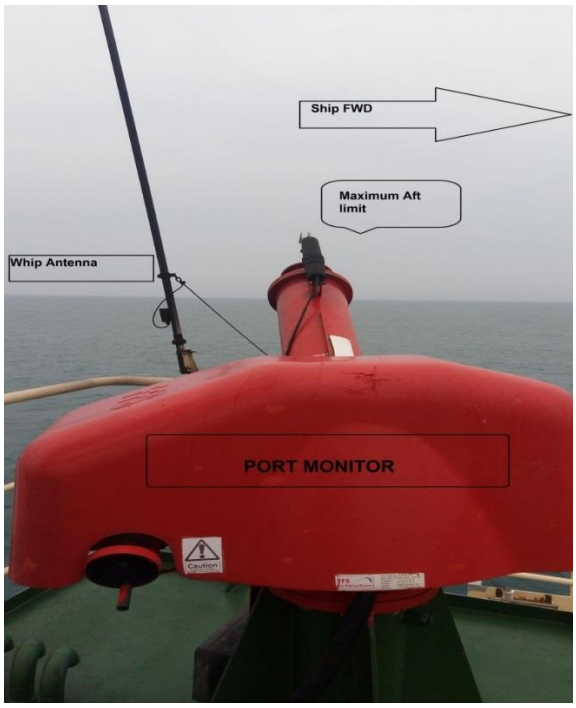
Summary

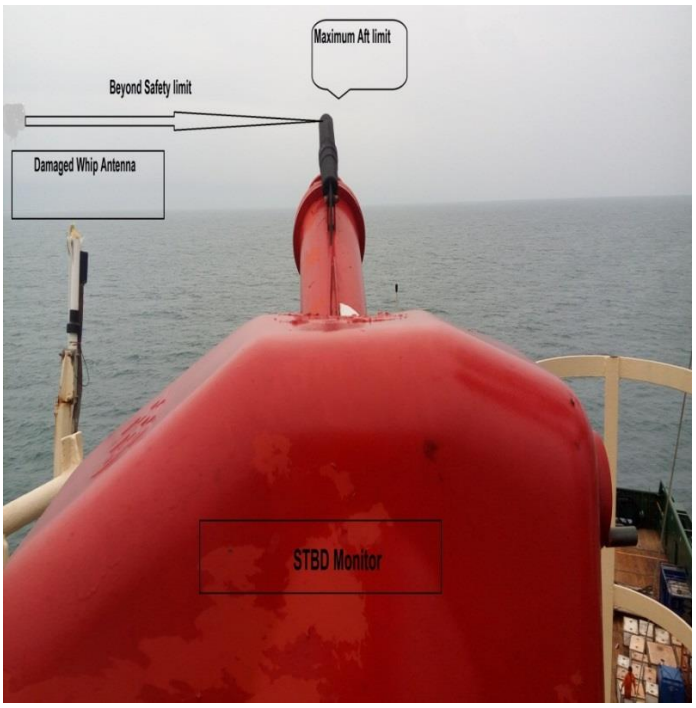
This safety flash has no single theme, although it is possible that there may be similar learnings that can be drawn from them all. In the first, equipment was damaged by a water jet when the limiting equipment failed on a fire-fighting monitor. In the second, we read about the explosion of a PP3 disposable alkaline battery.

The third incident covers a vessel collision; the fourth, a high potential near miss involving grinding near electrical cables. The fifth incident, the first safety incident reported by IMCA members which involves a drone, brings a warning to members to use drones carefully and always with the permission of the local authorities.

1 Fire-Fighting Water Jet Hits Antenna – Failure of Limits, Stops and Safeties

A member has reported an incident in which the water jet from a fire-fighting monitor hit an MF/HF whip antenna and damaged it. The incident happened during monthly testing of fire-fighting equipment. It was discovered that the horizontal travel of the fire-fighting monitor went beyond acceptable limits, allowing the water throw to hit and damage a nearby whip antenna. The testing was immediately stopped and damage was assessed.





Our members' investigation revealed the following:

- Maintenance on this fire-fighting monitor had been carried out earlier by third party contractors;
- The **root cause** was determined to be incorrect adjustment of turning limit switch of the fire-fighting monitor;
- It was noted that it was important to regularly check the turning and elevation limit switches settings of fire-fighting monitors.

Our member took the following corrective actions:

- The limiting for the monitor was adjusted so that its throw remained in a safe sector of operation with no ship's equipment or structure in line with the water throw;
- On completion of major maintenance on machinery/equipment, full trial runs and acceptance tests should be conducted to ensure satisfactory operations;
- Machinery and equipment not used regularly during normal operation of the vessel – such as fire-fighting monitors and pumps – should be tested at regular intervals in accordance with the vessel's planned maintenance schedule. Before such tests it should be confirmed that all safety settings and limits installed in the system are functioning correctly;
- Our member reiterated the importance of **stopping the job** if work is being done in an unsafe manner.

Members may be aware of an unfortunate incident which occurred on an offshore support vessel (OSV) during September 2016, also during testing of a water cannon, in which one crewman died and three were injured.

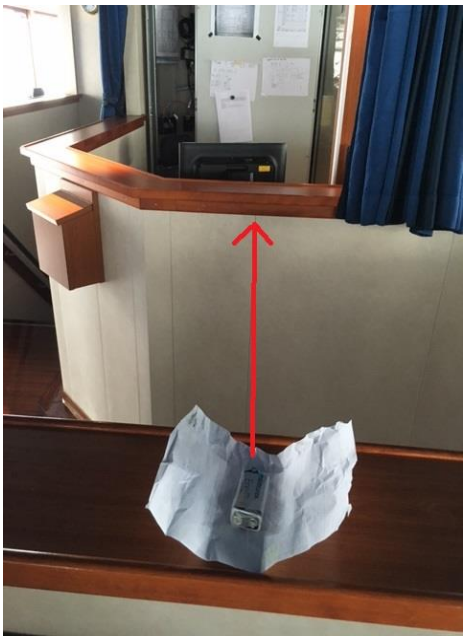
Members may wish to refer to the following incidents (search phrase: *limit switch*):

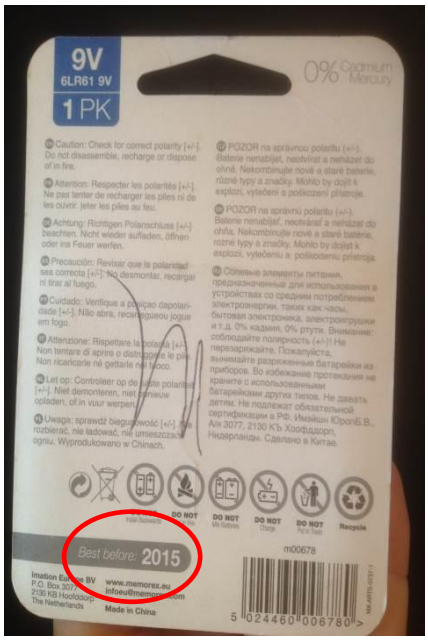
- IMCA SF 09/06 – Incident 2 – *Fatal accident with lifting appliance* [an immediate cause was the failure of a limit switch on a crane];
- IMCA SF 01/13 – Incident 2 – *Damage to crane winch* [an immediate cause was that the operator disabled a limit switch without approval].

2 PP3 9V Battery Explosion

A member has reported an incident in which a PP3 9-volt battery exploded. A loud bang was heard on the vessel bridge. Initially the noise was believed to be a lightbulb failing, but no trace could be found other than some debris embedded in a partition wall and a fragment which landed on a surveyor's shoulder.

After conducting a thorough search, a PP3 type 9-volt battery was discovered wrapped in a piece of paper with the terminals taped over ready for disposal. The bottom was blown off the battery housing exposing the individual 'AAAA' batteries inside. Fortunately, there were no injuries.





The following **causal factors** were identified:

- The battery was used beyond its recommended expiry date (see 3rd image);
- As a result of this over-use, one or more internal cells had leaked causing an internal short circuit;
- The battery overheated causing catastrophic failure.

Our member took the following actions:

- Vessel checked for similar brand or make of battery – two such batteries were found in packaging, both expired. These were disposed of safely;
- Further checks were made of all other batteries currently in use or in stock to ensure expiry dates were not exceeded;
- Safety flash was issued to company globally and IMCA.

Whilst this incident involved a disposable alkaline battery, members will note that there have been explosions reported which have been caused by failure or malfunction of:

- **Lead-acid** batteries (IMCA SF 05/13 – Incident 1 – *Explosion causing fatal injury during maintenance of metocean buoy);*
- **Lithium-ion** batteries (IMCA SF 17/14 – Incident 2 – *Lithium battery pack explosion*).

All batteries involve dense storage of large amounts of energy, and as such, contain inherent hazards. Members may wish to reiterate the importance of good battery management for all forms of batteries, whatever battery chemistry may be involved. This should particularly be the case for rechargeable Lithium-ion batteries.

3 Collision Between Vessels

A member has reported an incident in which there was a collision between a survey vessel and a pipe-carrying vessel. The incident occurred during vessel manoeuvring inside an anchor pattern. A survey vessel was instructed by a pipe laying barge to proceed towards the pipe-carrying vessel which was tied up alongside the barge, and then to moor alongside to complete a crew change. Upon entry of the 500m zone, the survey vessel was travelling at a speed of 4 knots maintaining a direct heading toward the barge. This was necessary because of the location of the mooring lines for the barge anchor pattern.

The Chief Officer attempted to slow down and change the heading on a distance of about 200m from the moored pipe-carrying vessel but identified the inability to alter the azimuth direction. The vessel Master, on taking

command, attempted to alter the course of the vessel using the bow thrusters but to no effect. The survey vessel subsequently made contact with the pipe-carrying vessel causing some damage.

Our member's investigation noted the following:

- There was a loss of control over both azimuth thrusters:
  - Potentially the autopilot system engaged due to some mechanical failure or to human error
  - Neither the manufacture's representatives or service engineer, nor the investigation team could advise on the definite cause;
- A potential contributory factor was design deficiency:
  - One single switch controlled both "independent" steering systems
  - Autopilot option overrode both azimuth thrusters, with no automatic disengagement available
  - When the autopilot is engaged it is not visually apparent to the operator
  - The ergonomics of the bridge console layout could potentially result in an alternative identical switch in the same vicinity as the autopilot switch (in this case, the gyro selector) being operated;
- The 500m zone vessel speed requirements were not followed – despite the requirement for a maximum vessel speed of 2 knots in this particular safety zone, a speed of 4 knots was maintained for most of the distance, with further and possibly consequent **failure to stop** the vessel in close proximity to barge (around 200m away);
- Company requirements for vessel heading were not followed – procedures forbade the use of offshore installations as navigational waypoints. The bridge crew on the survey vessel steered directly towards the barge;
- The incident was not reported to the company ashore in a timely way or through appropriate and proper channels.

Members may wish to refer to the following incidents (search word: *collision*):

- IMCA SF 11/11 – Incident 5 – *Collision between OSV and barge;*
- IMCA SF 12/15 – Incident 3 – *Collision between crew boat and anchored barge;*
- IMCA SF 10/16 – Incident 1 – *Vessel in collision with floating dock.*

4 High Potential Near Miss Incident: 440v Cable Damaged by Grinder

A member has reported an incident in which live 440v cables were damaged by a grinder. The incident occurred during a vessel mobilisation, when a rigger/welder was tasked with fitting cable protection covers over a bundle

of 4 x cables which had been run across the aft deck. They were routed across the deck from the on-board Reel Drive System. Rubber cable protection covers had originally been fixed in place, but these fixings had dislodged. The rigger/welder advised that more robust covers could be fabricated (out of aluminium), which he proceeded to do in a designated hot work area. Whilst the vessel was alongside, the rigger/welder proceeded to install the newly fabricated covers.

During this time the angle on the covers had to be altered so they would neatly butt up against each other. On several occasions the rigger/welder removed the covers to a more suitable location on deck to modify or improve the fit. On the last modification the cable protection covers were left in place and the rigger/welder proceeded to grind over the bundle of cables, making contact with the live 440v, 250A cable.

Cables routed across the deck

Prefabricated Aluminium covers

Damaged cable

When he realised that cable had been damaged, the rigger/welder immediately **stopped the job** and applied insulating tape to the cable, to prevent any ingress from the damp conditions. He was not aware that the cable was live. He then reported the incident. Around two hours later, the power to the damaged cable was isolated at the supplying junction box and a pad-lock put in place as a lock-out mechanism, as per company procedures.

Our members' initial investigation revealed the following:

- The task was not properly planned or risk assessed:
  - The Permit to Work did not cover this specific task (it covered Hot Work/Welding/Grinding only)
  - The Job Risk Assessment (JRA) did not cover grinding in vicinity of live electric cables or the requirement for electrical isolations of the cables;
- The toolbox talk was not specific to the task being undertaken by the rigger/welder;
- There were no isolations in place whilst working next to live electric cables;
- Electrical isolation was not applied immediately after the incident, and did not occur until 2.5 hours later, posing further risks to other crew members working on deck/in the vicinity.

Members may wish to refer to the following incidents (search word: *electrical*):

- IMCA SF 05/13 – Incident 3 – *Near miss: exposed live electrical cable*;
- IMCA SF 14/15 – Incident 3 – *Electrical shock – failure of isolations and barriers.*

5 Consequences of Launching a Drone from A Vessel in The Suez Canal

A member has reported an incident in which the Suez Canal Authority has recently detained a vessel following the launch of a drone to photograph the vessel proceeding through the Suez Canal. During the Suez Canal Authorities (SCA's) subsequent inspection, they confiscated the drone and its memory card and the vessel was detained in anticipation of further investigations by the Egyptian authorities.

Although the intention when launching the drone was simply to document the vessel proceeding through the Suez Canal, the use of the drone may have been considered a threat to national security by the Egyptian authorities.

Our members' recommendation was that drones and unmanned aircrafts should not be used in port or sailing within a country's territorial waters except for official reasons and with agreed permission of the authorities and company.

Members will note that the developing drone technology can be used for illegal purposes as well as for valid commercial purposes. There are currently no common or international rules governing the use of drones. Regulations concerning the use of drones differ from one country to another and failure to comply with any given legislation may lead to a criminal prosecution. Members are recommended to be fully aware of, and comply with, any local regulations concerning the use of drones and unmanned aircraft in countries where their operations are taking place.