IMCA Safety Flash 12/19

May 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 Partial Pressure of Oxygen (PPO_2) Getting Low in Bell

What happened?

During saturation diving at approximately 147 msw, the diving supervisor noticed that Partial Pressure of Oxygen (PPO_2) was getting low in the diving bell. The supervisor instructed the bell man to inject some Oxygen into the bell. The bellman opened the main valve which charges a smaller bottle (buffer tank) with oxygen. He then closed the main valve and opened the second valve which allows the dosage of Oxygen to enter the bell. A few minutes later, he observed that the main bottle was empty. He secured the valves and notified the supervisor. The supervisor began to purge the bell with saturation breathing mix and instructed the bellman to put on a built-in breathing system (BIBS) mask. A few minutes later, the supervisor instructed the diver to return to the bell, remove his helmet and put on a BIBS. The bell was recovered to the surface. Once brought to the surface, the entire oxygen set up was checked for leaks, and operational status. There were no issues found with the equipment.

Location of panel

Valve set up

New panel

Close up of valve

Our members' findings were:

- Bell O_2 make-up was routinely performed by Bell divers;
- The oxygen panel was inconveniently located behind the diver #2 umbilical;
- The panel was capable of opening both valves at once, allowing the buffer bottle to be introduced into the bell, and into the main O2 supply.

What actions were taken? What lessons were learned?

- Bell O_2 make up performed by life support technician (LST) by flushing with premix instead of bell divers adding O_2;
- Tubing was added to redirect Bell O_2 to near the saturation bell scrubber fan;
- The oxygen panel was moved 45cm from the old position, re-installed and the divers were given instruction on its operation;
- The new valve configuration – a sliding mechanism and the tight tolerance if the valve is opened - will remove the likelihood that both valves could be open at the same time;
- The buffer tank was changed from a single penetration to a double penetration, with valves top and bottom in lieu of a single in/out valve.

Members may wish to refer to:

- High Potential Near-Miss: Poor O_2 Content In Supplied Air – Diver Temporarily Lost Consciousness
- Failure To Follow Gas Quad Procedure

2 Oxygen Service Regulators

What happened?

It was discovered on several dive sites that regulators being used on high pressure gas quads of greater than 25% oxygen were not actually suitable for oxygen service. Component parts of an oxygen system are said to be fit for oxygen service when they are both:

- Oxygen clean;
- Constructed from components with high temperature resistance.

While the items had been delivered oxygen clean to the proper specification, some of the component materials were found not to be oxygen compatible. Additionally, the regulator type supplied was a venting model, whereas a non-venting model was recommended.

What was the cause?

Product knowledge was insufficient/incomplete on the part the buyer at the time of purchase.

What actions were taken? What lessons were learned?

A thorough reading of specifications should be made before selection of a product. The understanding that the regulators were delivered clean for O2 service convinced the end users that they were suitable.

The certificate which the supplier includes separately, if requested and at additional cost, states:

> *"Note: Specifications of materials in regulators for Oxygen Service is the USER'S RESPONSIBILITY."*

Our member has performed a management of change (MoC) procedure for the change-out of all affected company regulators (on quads and in dive panels). A risk assessment was performed, and the results indicated the need to retrofit fully compliant oxygen service regulators that are not only oxygen clean, but also constructed of oxygen compatible materials. However, it was considered that there were enough mitigations in place to retain the use of the venting model for select purposes such as gas quads in designated no hot work areas on open decks.

Over the course of the transition, company personnel and suppliers are being informed about the change and the reasons for it.

IMCA members are advised to ensure that all regulators or other components intended for use within oxygen systems are fit for oxygen service, i.e. that they are oxygen clean and made from oxygen compatible material.

3 Theft from Vessel at Anchor

What happened?

A vessel was boarded by thieves whilst at anchor at Callao, Peru. This was not noticed by the crew until they went forward to anchor stations to weigh anchor, at about 0445 hrs local time. The anchoring crew found the door to the forward mooring area was secured from the other side. The crew forced open the door by removing hinge bolts, first ascertaining that the intruders were no longer present.

The effectively secured access door to the mooring space restricted the intruders to the forepeak of the vessel. Following checks, it was found that mooring ropes were missing from the bosun store.

The vessel managed to weigh anchor and complete further operations without any delay.

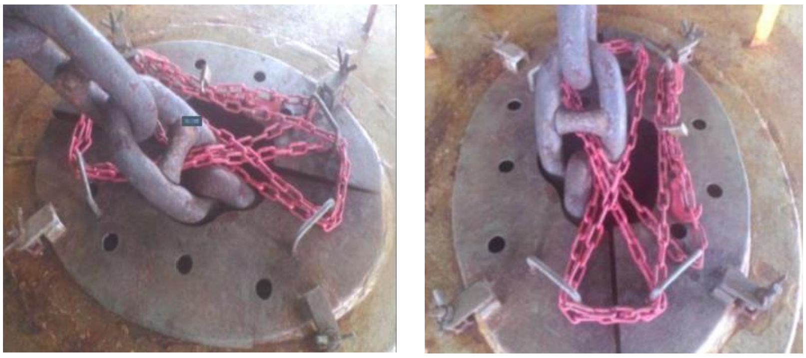
What went wrong? What were the causes?

- It was assumed that the intruders most likely boarding and leaving was via anchor chain and by dislodging a poorly fitted hawse pipe cover. Other boarding possibilities, e.g. ladder and rope and grapnel, appear difficult in this incident;
- The vessel confirmed maintaining anti-piracy watch, however, as watchkeepers monitored from the upper deck, it was inadequate for all parts of the vessel;
- Such thieves commonly use small, silent and unlit wooden boats, which are difficult to spot on the radar.

What actions were taken? What lessons were learned?

- Securing of hawse covering was upgraded to thwart such attempts;

Hawse pipe cover securing (before)



Hawse pipe cover securing (after)

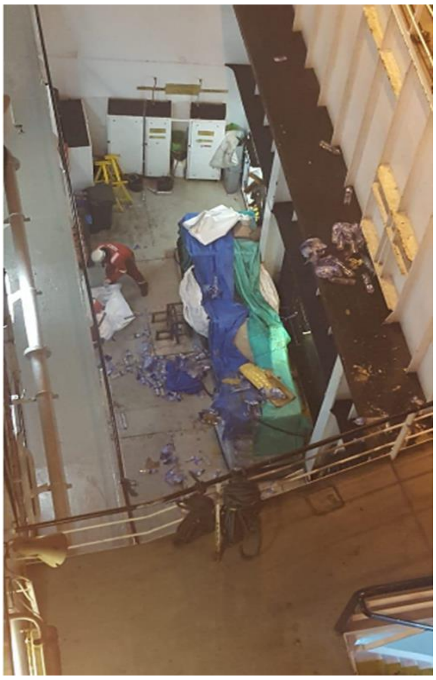
- Vessel security patrol arrangement was amended to include precautions and routines for forepeak surveillance;
- Reinforced bosun store skylight and door securing arrangements;
- Ensured mooring spaces are maintained clear of all items that may be used as tools by thieves;
- Stowed all loose mooring ropes, heaving lines and messengers inside bosun store at piracy prone anchorages/waiting areas;
- Be seen to display vigilance, e.g. flashing high beam torches over-side, use of Aldis lamp or search lamp sweeps and security patrol blowing whistles.

Members may wish to refer to:

- Robbery At Anchor – Vessel Security
- Near Miss: Potential Fall Through CTV Hatch [causal factor: "The passenger re-boarded the vessel without alerting, or seeking the permission of the vessel crew"]

4 Dropped Load – Water

What happened?



Riggers were attempting to lift a pallet of bottled water between decks of a vessel when the load hit an Intermediate Bulk Container (IBC), causing several packets of water bottles to fall from the load. The water bottles were in packs of 6 (weight per pack = 9kg) and fell approx. 11m. This was considered a potential fatality based on the DROPS calculator.

The deck area below the load had been secured and barriered off prior to the lift. There were no injuries.

What went wrong? What were the causes?

- The lift was arguably unnecessary; there were already two pallets of water bottles on the lower deck. Also, alternate means of conducting the lift were not considered;
- The risk assessment/lift plan did not specify a safe method of slinging the load to prevent water from dropping should it collide with vessel structure;
- The risk assessment/lift plan did not identify suitable control measures for the activity of lifting into this deck whilst at sea – there were numerous challenges for lifting operations due to restricted space and visibility, which were not taken into account.

What lessons were learned?

- Review task risk assessments and lift plans for lifting of stores, to ensure hazards, controls, slinging and securing methods are suitable, clear and specific, and with due consideration to the specific controls required to reduce the likely probability of the event reoccurring;
- Review the requirement for and positioning of stores to minimise lifts to be carried out at sea, e.g. sufficient stores loaded alongside or on main deck.

Members may wish to refer to:

- Dropped Pallet During Loading Of Stores

5 High Potential Near Miss – Unsecured Sheave

What happened?

A hydraulic control lever on a console was inadvertently activated, resulting in the unplanned movement of part of the equipment on a drilling derrick on a vessel. A power swivel crept upwards making contact with a tagline connected to a sheave assembly, leading to a situation where equipment weighing 40kg was left suspended over crew.

What went wrong?

Investigation identified that the tagline's change in orientation caused the upper sheave to invert, resulting in the sheave's hinged gate to open. With the sheave gate open, an assembly with a combined mass of 40kg was left hanging on its winch wire above the manned working platform.

What were the causes

- It was concluded that the potential for unintended activation of the control lever(s) had not been adequately considered during the console's design;
- Once in service, lessons learned from similar incidents *had not been consistently applied* to all similar consoles;
- Poor situational awareness: crew failed to notice the uncontrolled rise of the power swivel – they were alerted by a member of crew positioned on the bridge who observed the power swivel making contact with the sheave assembly;
- Safe systems of work across departments with overlapping responsibilities for the inspection, supply, installation and use of the sheave assembly, had failed to identify the sheave's lack of a secondary restraint and subsequent DROPS risk.

What actions were taken? What lessons were learned?

- Review similar control panels and consoles to mitigate or remove risks arising from inadvertent activation of controls;
- Review and develop a common company standard for winch sheaves and their installation in the context of company operations;
- Improve visibility for workers involved in control locations for this kind of operation – e.g. through better use CCTV systems to better aid operator visibility;
- Review all operations where there is shared or overlapping business or project responsibility to ensure that task risk assessments and associated methodologies clearly define roles and responsibilities.

Members may wish to refer to:

- Near Miss: Dropped Handrail/Gate Near Moonpool
- Near Miss: Falling Transponder On Main Deck
- Fatality: Falling Object

6 Two Battery Issues – Step Change

What happened?

UK Step Change has published two recent safety 'moments' relating to battery safety in two different battery chemistries – the first in a lead/acid battery, the second, in a lithium-ion battery.

Incident 1: Lifeboat Battery Explosion

Weekly maintenance on a lifeboat involved charging the 12V starter battery, conducting voltage checks and starting the lifeboat engine. Following the charging and completion of voltage checks, the battery compartment hatch was closed, and the engine started. At this point the battery exploded. Pieces of the battery and fluid were expelled from the compartment having been partially restricted by the closed hatch lid.

No-one was injured by the blast; the lifeboat itself was undamaged.

What went wrong?

- The battery installed was a wet cell lead/acid type, described by its manufacturer as 'maintenance free', although it could be topped up with distilled water. The model of battery was noted as not suitable for 'installation inside the vehicle';
- The battery had been overcharged weekly for over a year;
- Work instructions were not clear with regard to charging voltage levels required.

What were the causes?

Overcharging caused a depletion of electrolyte within the battery and generation of an explosive mixture of hydrogen and oxygen gas. An internal electrical fault allowed for the ignition of this mixture upon start up.

What actions were taken? What lessons were learned?

- Ensure equipment is suitable for its intended use;
- Provide clear work instructions to avoid confusion;
- Ensure workforce has the correct core skills training/competency;
- Encourage the workforce to be assertive in and identifying and reporting operational discrepancies promptly to avoid inappropriate or unsafe conditions becoming the 'norm'.

The full Step Change alert can be found here.

Incident 2: Lithium Ion Battery Overheated Following Exposure to Water

During a general fire alarm, a deluge system was activated and as a result, a piece of inspection equipment got soaked, causing the internal electronics to become saturated and short circuit. Afterwards, the lithium-ion battery was removed and found to be overheating. Shortly thereafter, the battery started to smoke, and then catch fire. Fortunately, the fire was controlled and extinguished immediately. However, the outcome could have been much worse.

The incident highlights the importance of protecting equipment from water ingress, along with the importance of ensuring that care is taken whenever equipment is being dried out following exposure to water.

See here for further details. A wide range of safety incidents relating to batteries of all kinds, can be found here: www.imca-int.com/alerts/search-safety-flash/?swpquery=battery.