IMCA Safety Flashes summarise key safety matters and incidents, allowing lessons to be more easily learnt for the benefit of all. The effectiveness of the IMCA Safety Flash system depends on members sharing information and so avoiding repeat incidents. Please consider adding **safetyreports@imca-int.com** to your internal distribution list for safety alerts or manually submitting information on incidents you consider may be relevant. All information is anonymised or sanitised, as appropriate.

1 Communications: LTI finger injury during lifting operations

Applicable Life Saving Rule(s)

Bypassing Safety Controls

Line of Fire

What happened

During demobilization lifting operations, a rigger's right ring finger was crushed between the crane hook and a lifting eye.

A vessel was demobilizing with a third party crane operator and banksman hired to perform lifting activities moving items on deck. A Toolbox Talk (TBT) was held before operations started. A container was being lifted from the vessel to the quay, using a quayside crane. The container was lifted and set down on the quay, and crew detached the rigging from the container lift points. Three of the hooks were loose and on top of the container and one hook was still attached to the container lifting eye, when the crane operator started hoisting. The rigger foreman's finger got jammed between the top of the hook and the top of the container lifting eye. His right ring finger was crushed between the hook and the lifting eye still attached. Surgery was required to amputate the fingertip.

What went wrong

- The injured person had his hands on the crane hook;
- Miscommunication: the third party crane operator thought the company rigger foreman gave the signal to hoist. However, both the company rigger foreman and lift supervisor assert that the hand signal to *lower* the load was given;
- Our members' investigation found that:
  - Roles, responsibilities, communication, and risks during lifting operations were not discussed during toolbox talk (TBT);
  - The toolbox talk was held in English and translated into another language for the third party crane operator who did not speak English;
  - There was inadequate lift planning;

- The banksman remained on the quayside during the lifting operations and had no view of the lift and did not take control; the company rigger foreman (the injured party) took over the role of banksman. The hand signal that was given remains unclear;
- The gloves worn by the rigging crew did not have the required impact rating;
- Demobilization was not included in the project management plans or project bridging document.

Actions

- Agree and understand roles, responsibilities, and communication protocols before starting work;
- Ensure that EVERYONE involved understands what is going on, and that they have confirmed that understanding back to you in a satisfactory way;
- Ensure there is a clear lift plan available for routine lifts;
- Ensure mobilization and demobilization activities are included and clearly defined in project documentation and corresponding risk assessments.

Members may wish to refer to:

- LTI: finger injury during lifting operations ["*there was a breakdown in communication between the deck crew members; the injured person was not clear of the pins when the mechanism was re-engaged*"]
- Line of fire LTI: Finger injury during lifting operations ["*roles and responsibilities on deck were unclear. The injured person, who was a dedicated flagman and should have been supervising the operation, stepped in to stabilize the load*"]
- Lost time injury (LTI): Finger injury during main engine exhaust valve overhaul *["Poor communication – although in plain sight of each other the noise of the engine room meant that verbal communication was not possible …the fitter didn't see or understand the hand signals from the second engineer…"]*

2 COBRA System - Hose coupling cross threaded

What happened

During diving operations, diver 1's right-hand COBRA hose had a "champagne" leak coming from the connection at the hat. The diver was instructed to return to the bell and the hose was changed. After the hose was changed, the diver lock-out checks were carried out and completed.

Once on the seabed, diver 2 was instructed to check diver 1's COBRA hose for leaks; a small champagne leak was noted. Diver 2 was able to stop the leak by tightening the knurled collar on the COBRA hose.

At the end of the dive, diver 1 returned to the bell, the bellman inspected the divers' hat and it was identified that the right-hand hose knurled retaining collar at the hat connection had been cross-threaded and not fully tightened. This resulted in the hose pulling free from the hat when the bellman lifted the hat clear of the divers head with the pulley system.

What went wrong?

Our member noted the following error precursors:

- In the work environment, there was a lack of alternative indication – no other indication that the coupling is fully engaged, other than visual and the Rotawink green indicator. There was poor access and equipment layout – the bellman has limited manoeuvrability within the bell when fitting the hose.
- With regard to human nature, there was an assumption that the Rotowink would remain red if the coupling was not properly engaged (cross threaded).

Lessons learned

- Bellman and dive supervisor followed the pre-lockout checklist correctly and verified that the Rotowink indicator was green.
- The Rotowink (shown here) is a visual indicator that turns green when the system is pressurised and ready for use. Although coupling was cross threaded, the Rotowink remained green throughout the dive indicating that the system retained a positive pressure;
- Ensure awareness is provided on:
  - The potential for the coupling to be misaligned.
  - The Rotowink may still give a green indication when coupling is misaligned.
  - When correctly connected there must be no visible threads, as per **fig 2** above.
- Engaged with supplier to request a review of COBRA coupling mechanism to see if engineering solutions within existing pressure couplings can be used (i.e. HP gas spin fits).

Members may wish to refer to:

- IMCA D 018 *Code of practice for the initial and periodic examination, testing and certification of diving plant and equipment*
- COBRA bailout system – guidance note

3 Diver experienced an air flow restriction

What happened

At the beginning of an air dive at 23msw, a diver experienced an air flow restriction. The system used was considered as a Mobile Surface Supplied System, the daughter craft was moored to the platform, the mother vessel was ready in the vicinity at about 200m.

Predive checks were performed and recorded on deck before starting the dive. When at depth, 23msw, diver 1 reported the air was getting tight and informed his supervisor he was going onto bailout. The Diving Supervisor first increased the pressure on primary supply, then switched from primary to secondary supply, and instructed the diver to close his bail out. The diver did so and confirmed he was on main gas. The Diving Supervisor aborted the dive. The diver returned back to surface and was safely recovered on deck. The daughter craft went back to the mother vessel for investigation of the equipment by the dive technician.

The event lead to the abort of the dive, no-one was injured. Operations were interrupted for investigation and the event was recorded as a near miss.

What went right?

- All equipment maintenance was in-date, and IMCA audits were done at the mobilization;
- Equipment familiarization had been performed at the start of the project;
- The dive system was maintained daily throughout the project;

- The dive system has been used daily for a month with no incident, this was the 103rd dive of the project;
- On investigation, the following was noted:
  - Diver 1's helmet was completely checked and tested and was found in normal working condition;
  - Diver 1's umbilical was checked and found free of twist, bent and deformation.

What went wrong?

- Diver 1's panel was tested at 15 bar with all needle valves fully open. It was noticed that Diver 1's primary needle valve was hard to open fully.
  - Direct cause: The needle valve was not opening as it should, restricting the air flow;
  - Root cause: Premature fatigue of the equipment, could be due to an overtightening of the valve over time.

Actions taken

- The needle valve was replaced with a new one;
- Updated the pre-dive checklist to include an item to confirm that the status of the valve is open fully with a ¼ turn back;
- Amended onboard procedures - to not overtighten the valves either when opening or closing;
- Supervisors and divers to report any anomaly in the equipment, even when they seem minor;
- A debriefing was done with the whole team covering the emergency procedure for loss of main air.

Members may wish to refer to:

- Near miss: sudden Loss of air from diver bail-out bottle
- Bailout manifold failure
- Partial pressure of oxygen (PPO_2) getting low in bell

4 Subsea transponder wire parted

What happened

A tripod positioning transponder wire parted from the tripod framework whilst the vessel was repositioning and needed to re-plumb the transponder. No assets were close by at time of incident. Whilst coming up on the winch it was noticed that there was no weight on the wire; on recovery to the surface it was discovered that the 4mm diameter wire had parted approximately 1m from the tripod lifting eye. The lost tripod was subsequently recovered to deck by divers and the crane.

What went wrong?

The equipment failure was caused by excessive wear and tear on equipment; the wire was corroded and was not replaced frequently enough.

Action

- Replaced the damaged wire and conducted a performance test prior to use;
- Regular visual inspection prior to launch and during recovery now conducted;
- Replacement of the spool wire every 6 months added to the vessel PMS.

Members may wish to refer to

- Rigging failure – clump weight dropped to seabed
- Capstan wire parted during deployment of anchor buoy
- Lifting operations: wire hoist rope failure

5 MAIB: Blockage of fixed CO2 fire extinguishing system pilot hoses

The UK Marine Accident Investigation Branch (MAIB) has published Safety Bulletin 1/2022 into a fire on board a roll-on/roll-off cargo ship in September 2021.

What happened

A fire broke out in the auxiliary engine room on board a roll-on/roll-off cargo ship. In an attempt to extinguish the fire, the ship's crew activated the machinery space's carbon dioxide (CO_2) fire extinguishing system, but only half of the system's gas cylinders opened.

Section through blocked CO_2 pilot hose coupling showing incomplete bore through the stem

What went wrong

Investigation identified that one of the auxiliary engine room's CO_2 system pilot hoses was completely blocked. Subsequent examination and testing of the vessel's fixed fire extinguishing systems identified two other similarly blocked hoses. It was discovered that the pilot hose couplings had not been fully bored through during the manufacturing process. The testing process also identified several coupling leaks in the pilot lines.

In March 2021, the pilot hoses had been replaced during a routine servicing by a fire safety company. Tests carried out at that time did not identify any faults with the system. Following the accident, tests were made of the high-pressure CO_2 fire extinguishing systems on board the other vessels in the company's fleet. These tests identified two similar pilot hoses that were blocked on one ship.

All the affected hose assemblies had been supplied to the fire safety company by one supplier. The hose assemblies had been produced under the terms of the classification society type approval held by that one supplier. Although the type approval required each completed hose assembly to be pressure tested, there was no specific test that gas could pass freely through the hose assemblies.

The hose used in the assemblies was provided in accordance with the type approval held by that one supplier, but that supplier had purchased the couplings from another hydraulics supplier, who in turn had sourced the couplings from a different manufacturer.

Lessons learned

- Ensure that crews are fully acquainted with the procedures for the manual activation of CO2 fire extinguishing systems in the event of the pilot actuation system failing;
- The fire safety company did not identify that some of the hose assemblies were blocked and that there were leaks in the CO2 system pilot lines;
- Neither the suppliers' quality assurance processes, nor onboard installation testing processes, identified that the hose couplings had not been fully bored through;
  - Amended procedures to incorporate a pneumatic flow test of the complete hose assemblies to verify that they are not blocked.

Members may wish to refer to:

- Firefighting (FiFi) Tank Outlet Blockage *[a small mechanism was redesigned to eliminate a potentially life-threatening flaw]*
- Faulty governors *[pieces of a broken valve were carried in the hydraulic system. This caused malfunction of the hydraulic valve.]*