

IMCA Safety Flash 06/12

June 2012

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 webmaster@imca-int.com

I Near Miss: Live Electrical Cable

A member has reported a recent near miss incident involving live electrical cables on board a vessel. The incident has highlighted the importance of close interface between contractors working onboard and the vessel crews. During the demobilization of contractor equipment, the equipment had to be *locked out and tagged out* to ensure that it was no longer live and hence safe before work started.

The contractor, assisted by vessel crew, locked and tagged out electrical system in the engine control room. Once the power was verified as locked out at the equipment and isolated at the breaker in the deck distribution box, work started. During the work, the lock out key was passed to another member of the contractor team who proceeded to the engine control room to remove the lock out/tag out and re-energised the system. The de-energised cable from the equipment had been disconnected and placed on the chassis but when the lock out/tag out was removed from the engine control room switchboard, the cable became live at 440 volts.

Assuming that the cable remained de-energized, another contractor employee moved the cable to access the work and in that movement and action, his hand was very close to the live cable ends. The live cable ends touched the chassis and arced causing a loud bang. An immediate safety stand down was enforced by the contractor. There were no injuries.

A number of issues were identified which contributed to the incident:

- ◆ The job was planned by the contractor without reference to or liaison with the vessel operator or client;
- ◆ There was insufficient communication between the contractors' personnel and the vessel crew;
- ◆ There was no job safety analysis (JSA) conducted;
- ◆ A permit to work (PTW) should have been required for this kind of electrical isolation work, but was not raised;
- ◆ The lock out/tag Out mechanism should have allowed the use of multiple keys;
- ◆ A voltage discrepancy for breaker isolation resulted in the contractors' personnel being unable to confirm zero voltage;
- ◆ The deck cabinet was exposed to the elements and not easily accessible, and hence not fit for purpose;
- ◆ The electrical drawings were not properly 'controlled' documents: There was no drawn by, checked by, approved by and no class or type approval;
- ◆ The labelling on the breakers was not sufficient to purpose.

As a result of this incident, which could have resulted in a fatality, eighteen corrective actions were identified and are in the process of being implemented.

For further reference, members may wish to consult the following:

- ◆ [IMCA M 205](#) – *Guidance on operational communications*;
- ◆ [IMCA M 206](#) – *A guide to DP electrical power and control systems*.

2 Failure to Follow Gas Quad Procedures

A member has reported an incident in which a quad of diving quality air was mistakenly connected to a saturation system instead of diving quality oxygen and was injected into the chamber during metabolic make-up. The incident occurred during mobilisation operations; two 48 bottle gas quads were delivered to the vessel and were signed for by the on shift life support supervisor (LSS). Gas quads of diving quality oxygen had been expected, but a mistake had been made during the ordering process and the incorrect gas had been ordered. Diving quality air had been selected instead.

The quads were delivered to the vessel and signed for but no thorough checks, as per the existing procedure, were completed to identify that it was not the correct type of gas. The quads were removed from the lorry on the quayside and then lifted aboard into the correct gas storage area. Later that day, the on-shift LSS went up to the gas storage area and connected the first of the gas quads into the system. However, this task was stopped mid-way through without the full range of operational checks being completed, as the LSS left to attend a project briefing.

Following the completion of the project briefing the LSS did not return to the gas storage area to complete the remaining checks for the task. The divers entered the dive chamber system, where saturation control proceeded to blow them down to a holding depth of 20 metres of seawater (msw). This blow down was completed using the correct gas from the onboard storage. After several hours in the chamber at the holding depth the oxygen content (ppO₂) in the system dropped and automatic injection of further oxygen was activated. After approximately 15 minutes the on-shift LSS noticed that following the O₂ injection the oxygen content (ppO₂) had not risen to the expected levels and decided to investigate by inspecting the quads on deck.

On finding that the attached quad was diving quality air and not diving quality oxygen, the LSS immediately isolated the attached quad and vented any remaining air from the system to prevent further ingress of nitrogen to the chamber. The divers in the chamber were checked for any signs of ill effects, but none were found. The incident was reported to the vessel management and an investigation began.

An investigation revealed a number of factors and procedural failures which led to this incident occurring.

- ◆ The incorrect type of gas was selected during the ordering process which led to the incorrect type of gas being delivered to the vessel;
- ◆ There were established company procedures which were not followed: *'Safe Working Practices – Gas Management. Section 3.4 All diving breathing mixtures should be checked on receipt and rechecked immediately prior to connecting them to a diving gas supply or breathing apparatus charging system. Analysis should additionally be continued whilst on line and in use'*
 - the on-shift LSS did not complete all the required company procedural checks to ensure that the gas being received and signed for was what the vessel actually required
 - the on-shift LSS did not correctly inspect the quad or gas type prior to connecting the quad to the system as per the above-mentioned procedural requirements
 - saturation control did not fully analyse the gas prior to the automatic injection being activated and the gas entering the system, as per the procedural requirements.

The following actions were taken:

- ◆ Robust review and application of existing procedural requirements for gas management;
- ◆ Onboard management to create specific standing orders to support the requirements and implementation of the gas management procedures;
- ◆ Identify and clearly communicate who onboard is authorised and competent to receive and verify gas deliveries;
- ◆ Vessels to utilise Analox portable ATA analyser to ensure gas analysis is complete before connection to a supply system.

3 Near Miss: Saturation Diver Lost Gas Supply

A member has reported a near-miss incident in which a saturation diver on the seabed lost reclaim and immediately thereafter, lost his main gas supply. The incident occurred during pipeline free span correction measurements at a depth of 100m. The diver made his way back to the bell on emergency gas, and while doing so, requested 'up on my hose'. However no such action followed. Slightly over a minute and a half later the diver had made his way unassisted back to the bell on emergency gas. As he passed by the bell stand-off ring he became aware that his hose was trapped between the stand-off ring and the guide weight. Once the diver was inside, the bell was raised and the umbilical retrieved and inspected for damage. The diver was unharmed.

An investigation revealed the following causal factors:

- ◆ There was no written procedure for setting the bell directly on the guide weight during dives;
- ◆ Egress from the bell was between the guide weight and the stand-off ring rather than between the stand-off ring and the lower bell ring;
- ◆ In-boarding of the bell launch and recovery system (LARS) resulted in a decrease in the gap between the guide weight and the stand-off ring which subsequently trapped the excursion umbilical to the extent that gas flow through all lines was interrupted. A video image of the gap area was available at the control panel of the LARS but not in dive control.

It was noted that the following things went right:

- ◆ The diver, upon informing his supervisor of the loss of gas, immediately went on emergency gas and started to return to the bell;
- ◆ The supervisor immediately provided secondary gas from dive control and advised the diver accordingly. Gas to the pneumo-fathometer was also established within seconds;
- ◆ The stand-by diver checked and announced full pressure from the bell immediately upon learning that the diver was on emergency gas;
- ◆ The incident was recorded and retained on the DVD for review and use as historical evidence and training;
- ◆ Timely initial advice, incident notifications and follow up documentation to required parties were in place;
- ◆ Everyone reacted to the event in a quiet and professional manner without panic.



A view of dive bell showing pinch point location

The following actions were taken and recommendations made:

- ◆ A stand down and investigation was initiated prior to continuing diving operations;
- ◆ An enquiry was made to the system manufacturer as to the intended method of entry and exit from the bell.¹ It was confirmed that the normal route was between the stand-off ring and the lower bell ring. The use of twin 12 litre cylinders with flotation attached impeded access through the designed route (540 mm). The bottom hatch opening is itself 700 mm. It was further agreed that the space limitation would compound matters in the performance of a rescue dive. For this reason the route chosen was not altered for the remainder of the project;
- ◆ Investigation as to the feasibility of modifications to increase the gap to 800 mm are on-going with the manufacturer and the owner;
- ◆ For subsequent dives a sign was posted at the LARS control console advising landing of the bell upon the guide weight while divers are locked out, with reminder to confirm with the Supervisor prior to any movement of the launch equipment while diving. A statement to this effect was included in written procedures and communicated throughout the company;
- ◆ Letters of recognition were presented to key individuals involved on the matter of a successful and well performed recovery.

¹Our member's policy on guide weight/bell interface position while diving is to set the bell on the guide weight in order to eliminate the pinch point. This may be adhered to as a general approach however there may be cases where this is less than desirable such as with 'light' bells or excessive heave. An assessment should be done on a case by case basis accordingly. Such an assessment should consider the optimum position required for an emergency rescue.

4 Two Recent Incidents involving Injuries

The Marine Safety Forum (MSF) has published the following two safety flashes regarding incidents in which workers onboard vessels have injured themselves.

- ◆ The first incident occurred when a crewman was using an electric angle grinder at the top of a ladder and lost his balance, dropping the grinder, which caused a cut above his right knee. The report can be downloaded from www.marinesafetyforum.org/upload-files//safetyalerts/msf-safety-flash-12.17.pdf;
- ◆ The second incident occurred when an engineer was working on an electric air compressor which had not been switched off, isolated or tagged out. The machine started up whilst his fingers were in the path of the fan, causing lacerations of his fingers which resulted in the vessel being re-routed back to port. Isolation of the compressor was not conducted as the engineer deemed the task to be a 'two minute job'. The report can be downloaded from www.marinesafetyforum.org/upload-files//safetyalerts/msf-safety-flash-12.18..pdf.

5 Near Miss: Cable Reel Deck Cargo Broke Loose

The Nautical Institute (NI) has published the following safety flash regarding an incident in which a wooden cable reel, weighing about 11 tons, broke loose in heavy seas when a chain link parted. Through swift action on the part of the master and the crew, the reel was secured and was not lost.

The report can be downloaded from

<http://www.nautinst.org/en/forums/mars/mars-2012.cfm/Cable%20reel%20deck%20cargo%20broke%20loose>