IMCA Safety Flash 10/12

October 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.

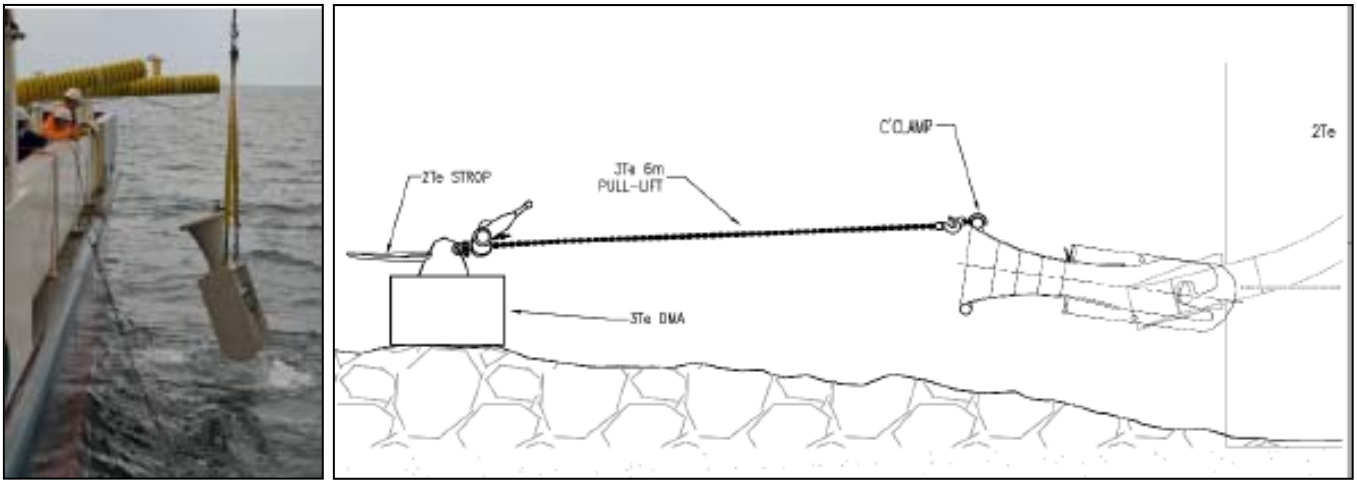
The effectiveness of the IMCA safety flash system depends on receiving reports from members in order to pass on information and avoid repeat incidents. Please consider adding the IMCA secretariat (imca@imca-int.com) to your internal distribution list for safety alerts and/or manually submitting information 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

1 Diver Injured During Subsea Lifting Operations

A member has reported an incident in which a diver was struck and injured by a two tonne weight as it was being deployed from the vessel crane during subsea installation work. The incident occurred when two divers were assisting in the installation of an external bell mouth on to its protruding J-tube mounting points at an offshore wind turbine base pile in 23 metres of water. Shortly after the start of the dive it was decided to send down a two tonne dead man anchor (DMA) and a lever hoist. These were required to pull the bell mouth into the correct alignment for fitting. Before the DMA was deployed, the diving supervisor instructed both divers to move in a specific direction to a safe location away from the bell mouth. The divers were also told to look upwards to observe the DMA deployment. Diver 1 initially followed these instructions but he later moved back into the danger zone without direction from the supervisor. Diver 1 was subsequently struck by the DMA as it was lowered by the vessel crane from the surface. Diver 1may also have been pinned to the seabed by the weight of the anchor for a few seconds until it was lifted off him by the crane. The injured diver was treated on-board the vessel and subsequently evacuated to hospital by helicopter. The diver was released from the hospital later the same day and sent home on temporary sick leave.

The incident demonstrates that divers keen to complete their work may be tempted to move into danger zones during the course of subsea lifting operations.



Bell Mouth and Intended Underwater Arrangement

Our member's investigation revealed the following:

Immediate causes

- Lack of knowledge of the whereabouts and depth of the subsea load during its deployment through the water column;
- Over-rapid lowering of the load;
- The subsea load was lowered all the way to the seabed with no appropriate mid-water stop point;
- The diver was directly below the load as it was being lowered;
- Poor communication and co-operation between the diving supervisor and the divers;
- Owing to misunderstanding, diver 1 failed to follow the instructions of the diving supervisor;
- The diving supervisor failed to realise or notice that the diver had moved back into the danger zone.

Root causes

- Inadequate hazard identification and risk assessment;
- No common toolbox talk held before the start of the operation;
- No lift plan or safe working procedure for deploying the load whilst divers were in the water;
- Reliance on the diver following instructions; failure to take sufficient account of human factors leading to errors (mistakes and violations);
- Complacency – the operation was perceived as being a simple, familiar and repetitive task, and personnel may have been operating within a "comfort zone".

Our member drew the following lessons from the incident:

- All personnel (including divers) should attend toolbox talks to review the plan before the start of subsea lifting operations;
- Appropriate risk assessment should take place to cover the particular challenges of vessel lifting operations in support of diving operations;
- Lift plans prepared by competent persons should be in place before the start of subsea lifting operations;
- Ensure effective communications between all members of the lifting team;
- Personnel (including divers) should never work underneath loads;
- Divers should retreat to confirmed safe locations (e.g. the dive basket or bell clump weight) during the lowering or lifting of loads through the water column and remain there until they are alerted that the chosen stop point has been reached;
- Use of travel length indicators to stop loads at an agreed distance above seabed;
- Use of specific lift deployment speeds in lift plans/procedures;
- Loads should be lowered in a controlled manner at specific and agreed speeds, rather than in free fall;
- Equipment and procedures should be in place to enable the crane driver and diving supervisor to know the depth of loads as they are lowered through the water column;
- Use of suitable stop points in the water column so that loads are not deployed straight to the seabed (or lifted straight to the surface), allowing time for divers to retreat to a safe location.

Members may wish to refer to the following IMCA documents:

IMCA SEL 019 *Guidelines for lifting operations*

IMCA M 205 *Guidance on operational communications* (also available as IMCA D 046)

IMCA D 014 *IMCA International Code of Practice for Offshore Diving*

2 *Tombarra* Fall Wire Fatality: Updated Reports

The UK Marine Accident Investigation Branch (MAIB) has published two updated reports on the investigation of the fatality of a rescue boat crewman on board *Tombarra* in February 2011.

The first is Report 19A/2012 *Part A - The failure of the fall wire.*

The following key issues are highlighted in this report:

- A rescue boat fell 29 metres killing one of the boat's four crew;
- The boat's fall wire parted following the failure of a proximity switch which enabled the davit's winch to overload the wire;
- A holistic view of the design, approval and compatibility of davit and winch systems is essential to prevent individual components of the system being overstressed to the point of failure;
- It is essential that ships' crews always test safety devices before use and do not rely on them for their safety.

The second is Report No 19B/2012 *Part B - The weight of the rescue boat.*

The following key issues are highlighted in this report:

- The rescue boat was found to be 50% overweight. During the investigation, other rescue boats were found to be up to 110% overweight;
- The additional weight was due to water ingress through the hull and subsequent entrapment in the boat's internal stiffeners and foam-filled compartments buoyancy spaces, and could only be removed by drilling holes or removing the deck;
- The crew were unaware that the boat was significantly heavier than designed;
- The number of other rescue boats, made by differing manufacturers which have also been found to be overweight, indicates that the problem of water entrapment within buoyancy spaces is widespread and potentially extends to lifeboats and leisure craft;
- The investigation identified the need to weigh the boats on a regular basis.

The two reports are available from:

Report 19A/2012 *Part A - The failure of the fall wire* www.maib.gov.uk/cms_resources/TombarraPartA_Report.pdf

Report No 19B/2012 *Part B - The weight of the rescue boat* www.maib.gov.uk/cms_resources/TombarraPartB.pdf

The UK MAIB's earlier preliminary findings and updated findings were published in IMCA Safety Flash 05/11 and IMCA Safety Flash 09/11.

3 Lifejacket Recall - Mullion Compact 150N ISO 12402

The Marine Safety Forum (MSF) has published the following Safety Flash regarding a potential safety concern with the Mullion COMPACT150N ISO 12402 LIFEJACKET, once it is inflated. Mullion has recalled all COMPACTLIFEJACKETS which have been sold since 1 December 2011 if they have a YELLOW valve in the oral inflation tube. See the diagrams in the link below for more details.

The Safety Flash can be downloaded from www.marinesafetyforum.org/upload-files//safetyalerts/msf-safety-flash-12.38.pdf

4 Damage to Davit-mounted Small Boats

The Marine Safety Forum (MSF) has published two recent Safety Flashes regarding damage to davit-mounted daughter craft.

In the first instance, the damage was caused by the hull of the daughter craft compressing the hollow 'D' Rubber pads on the cradle and the hull coming into direct contact with the steel cradle. The report can be downloaded from www.marinesafetyforum.org/upload-files//safetyalerts/msf-safety-flash-12.36.pdf.

In the second, a number of vessels have reported damage to fall wires. The report can be downloaded from www.marinesafetyforum.org/upload-files//safetyalerts/msf-safety-flash-12.37.pdf.

5 Hand Injury During O_2 Handling and Equipment Maintenance

A member has reported an incident on a dive support vessel in which there was an explosion and a person suffered 2nd degree burns to his hands. The incident occurred during the changing of an O_2 gas quad on a diving support vessel (DSV). The injured person, who was competent and qualified for this work, was wearing full personal protective equipment (PPE) for the task including ear protection. He successfully disconnected and vented the used quad which was at a pressure of around 20bar, closed all relevant valves and removed the O_2 regulator. The regulator was subsequently removed from the empty quad and transferred directly onto a fully charged quad at a pressure of 200bar. The regulator was tightened and the whip lines fitted as per requirements. The injured person then proceeded to open all 16 of the individual pillar valves on the individual bottles; then checked to ensure the regulator was wound back, prior to cracking the king valve to allow O_2 to flow into the regulator.

At this point an explosion occurred and the injured person was exposed to the blast resulting in serious burns to both hands. Because the injured person was shocked due to the sudden blast, he stepped away from the quad. All the pillar valves for all the bottles were open; this allowed the gas to start venting directly from the failed regulator resulting in a potentially catastrophic situation. The injured person tried to close the king valve, but it was later found that the valve seat was damaged during the blast, and thus the O_2 could not be isolated by the king valve. More personnel arrived and helped to close all of the pillar valves bringing the situation under control.

It was later established that the injured person sustained 2nd degree burns to both hands due to the high temperatures created by the blast, despite wearing appropriate hand protection (gloves) on both hands.

Our member's investigation and conclusion noted the following:

- Due to the nature of the incident and the failure of the regulator, the specific cause of the explosion could not be determined;
- The practice of opening all 16 pillar valves meant that once the regulator failure had occurred, the entire contents of the quad was able to vent in an uncontrolled manner;
- The regulator was later identified as being around 12 years old; this was in excess of the recommended working age for this type of equipment;
- There was evidence of white PTFE thread tape having been used on the regulator threads. This could have been a contributory factor and potential fuel for the explosion/fire;
- The PTFE Thread Tape, used for sealing the threads in this operation, was not appropriate or suitable for this O_2 application;
- The pipe work directly after the regulator was a 90 degree elbow joint which is not recommended for gas systems;
- The regulator connection nut flats were found to be damaged (rounded) due to the previous use of incorrect/inappropriate tools;
- The regulator had not been cleaned and inspected to appropriate levels for O_2 operations, prior to connection to a fully charged quad;
- The maintenance records for the regulator were not adequately documented;
- Pressure gauges installed within an O_2 enriched pressurised system should not be used in these cases:
  - The gauge is not O_2 compatible;
  - The gauge has been damaged (including nuts or threads);
  - There is suspicion of tampering;
  - The gauges are over 5 years old and have not been serviced;
  - The gauge operating range is out with the maximum pressure rating of the regulator or cylinder.

Our member took the following actions:

- Personnel working with O_2 to be required to review the appropriate company procedures and also manufacturers' safety, installation and operations precautions;
- Specialised Oxygen Green PTFE Thread Tape (Thread Seal Tape ½" x 260 T-27730A (rated @10,000 psi) should be used for O_2 operations;
- Thread tape must be kept clear of the end of the fitting by 1.5-2 threads;
- A six monthly test and inspection routine for loose O_2 regulators has been added to the planned maintenance system;
- All regulators to be replaced after 5 years of service and a clear maintenance log maintained;
- Maintenance of the regulators should be conducted by a suitably trained and qualified person;
- Revision of PPE for this work to ensure operators are fully protected against relevant hazards of the task;
- Dedicated set of "Clean and Correct" sized spanners should be purchased and kept specifically for use on fittings. Adjustable spanners should not be used;
- A designated clean environment should be established for maintenance of the regulators;
- Pre-use regulator checklist should be developed following manufacturers' guidance notice;
- All O_2 pipe work to be reviewed and 90 degree joints removed wherever possible, in particular on the inlet or outlet from a regulator to prevent friction and potential ignition points;
- Only O_2 compatible gauges shall be purchased as spares and, wherever possible, the same gauge type/model shall be ordered;
- Pressure gauges should be fitted directly to regulators without restrictive or bend connections.