

IMCA Safety Flash 13/14

July 2014

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 Bell Re-claim Failure Resulting in Minor Injury

A member has reported an incident in which a member of a dive team suffered minor injuries when equipment in a diving bell failed under pressure. The incident occurred during saturation diving operations at 110 msw. The bellman was assisting diver 1 and diver 2 to prepare for diving activities. On opening the reclaim return line hull valve the internal in line water trap was immediately pressurised and ruptured. Perspex fragments of the water trap dispersed inside the bell causing superficial lacerations to the bellman's left ear and face. The force of the blast caused a small rupture to the tympanic membrane in his left ear. Diving activities were aborted and divers were returned to the living chamber. The injured person was further assessed/treated by the diving medical technician in consultation with a physician ashore and with assistance of the on board medic.



Showing reclaim before and after failure

Our members' investigation revealed the following:

- ◆ In 2013 the diving bell underwent refurbishment and total re-build and as part of this process the external check valve was removed and then re-installed;
- ◆ The diving bell had made 23 successful bell runs since being refurbished;
- ◆ The reclaim compressor solenoid had failed resulting in non-operation of the cross feed actuator, in turn causing pressure to be retained in the exhaust line;
- ◆ The bell return line external check valve had been previously incorrectly installed (inverted) during the refurbishment, allowing stored gas in the exhaust line to pressurise the internal in line water trap once the reclaim return line hull valve was opened by the bellman.

The root cause of the incident was determined to be that the check valve was incorrectly installed (inverted). A contributing factor was that the planned maintenance regime did not include increased frequency of filter change since the refurbishment; the reclaim compressor was started remotely.

Our member drew the following lesson:

- ◆ During refurbishment and before being certified for use, the saturation system was subject to a number of audits and inspections conducted by third party specialist, client, owner, and project personnel. Each time, the inverted check valve had not been spotted. The audits/inspections were consistent with IMCA and industry requirements, but did not consider the system at the individual component level required to identify the incorrectly fitted check valve.

Members may wish to look at the following incidents involving pressure failure in saturation diving equipment (keywords: *pressure, saturation*):

- ◆ [IMCA SF 08/06](#) – Incident: 1 *Trapped pressure release incident*
- ◆ [IMCA SF 07/14](#) – Incident: 1 *Thermos cup exploded after being in hyperbaric environment*

2 Near Miss: Unauthorised Release of Shore Controlled Mooring Lines

A member has reported a near miss incident in which mooring lines were released from shore without permission from the vessel bridge. The incident occurred when the vessel started singling up her mooring lines for departure from a shipyard. The vessel was loaded with a module, which restricted the view aft from the bridge. The vessel was moored “Mediterranean style”, including her stern, with two bow anchors, six wire ropes and two conventional mooring lines. Four of the six wire ropes were under shore control.

When the crew of the vessel (with pilot on board) started to single up her mooring lines, the four wire ropes under shore control at the aft side of the vessel were simultaneously released by shore side personnel. This was done without permission from the bridge, when the tugs were not yet in position. This release of the mooring lines could not be observed from the bridge. The bridge was notified with some delay by an additional lookout aft of the vessel. By swiftly ordering propulsion astern, the vessel master avoided heavy stress and possible breakage of the two remaining mooring lines. The vessel remained under control and a tug was made fast before releasing the remaining two mooring lines.

There were no injuries, damage to assets or uncontrolled vessel movements, owing to the swift and effective action from the vessel master.

Our members’ investigation revealed the following:

- ◆ A pre-departure meeting with all involved parties was carried out two days prior departure. Due to adverse weather, it was clearly stated at that meeting that the vessel would single up line by line;
- ◆ Proper precautions were taken, such as hazard identification (HAZID), toolbox meetings and Job Safety Analyses, mooring/unmooring plans;
- ◆ Actual departure was delayed by last minute modification works on the cargo;
- ◆ The vessel master repeatedly refused to start to single up as the gangway was still in place due to delayed works on the cargo;
- ◆ The release of the shore side mooring lines was not stopped by the vessel’s superintendent;
- ◆ The vessel’s superintendent was not equipped with a radio. It was agreed to communicate by mobile phone.

Following the incident, our member drew the following conclusions and recommendations:

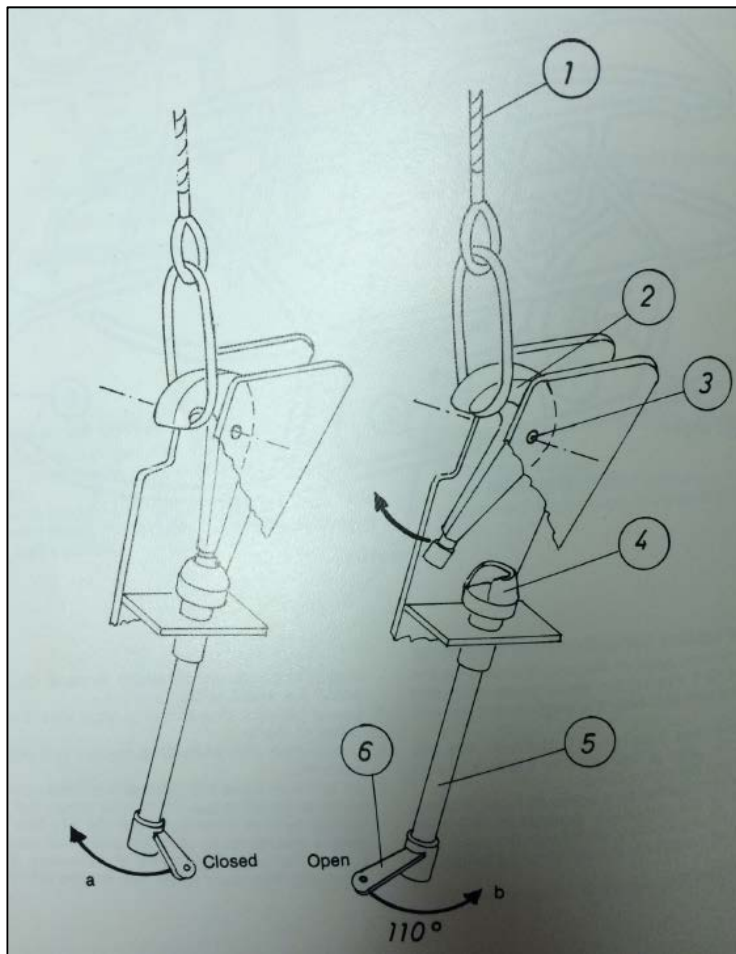
- ◆ The last minute modification works on the module and the resulting delay of departure were improperly and ineffectively communicated to and between parties involved. The delay resulted in a change, for which Management Of Change procedures should have been followed in order to effectively prevent the incident as occurred;
- ◆ Reliance on mobile cell phones for operations is inadequate. All responsible parties should communicate by radio with an agreed protocol;
- ◆ Effective and immediate communication between the vessel master and the vessel superintendent is a vital and critical safety factor during such operations and should be catered for accordingly in project execution plans;
- ◆ The shore-based linesmen provided by the shipyard clearly demonstrated a lack of awareness of the risks involved. To lower these risks, when employing third-party personnel for critical operations, the qualifications and training of those personnel involved should be prominently addressed and audited beforehand in project HSE plans.

Members may wish to refer to the following similar incidents (key words: *mooring, lines*):

- ◆ [IMCA SF 04/09](#) – Incident: 3 (from the UK P&I Club) *Mooring incident*;
- ◆ [IMCA SF 04/10](#) – Incident: 1 *Person Injured by Mooring Lines*;
- ◆ [IMCA SF 07/10](#) – Incident: 2 *Crewman Fatally Injured During Mooring Operations*.

3 Failure of Lifeboat Release Hook Mechanism

A member has reported a recent high potential incident involving the failure of a lifeboat release hook mechanism. The incident took place during the quarterly mandatory lifeboat lowering operations. The forward release hook mechanism opened resulting in the lifeboat dropping into a vertical position, but remaining suspended from the aft hook. Four persons were onboard the lifeboat at the time, but were uninjured.



The release hook system in place onboard the vessel is of the Schat-Harding H-80, 'on-load' release type. The basic overview of the system is shown in the figure on the left, with the components noted below.

Item	Component
1	Davit Fall
2	Aft Hook
3	Hook Pivot Point
4	Main Hook Lever
5	Locking Shaft
6	Locking Lever

The mechanism is operated from the aft release point, with both hooks disconnected and engaged simultaneously through operation of the aft release mechanism. A linkage rod connects the aft mechanism to the forward mechanism to enable this single instantaneous operation.

The locking lever (component 6) is twisted 110 degrees at the aft release point and this command is replicated at the forward hook release and the main hook lever (locking cup)(component 4) latches or unlatches the release hook.

The current design of the system does not give the operator direct indication that the forward hook is correctly locked. A single indicator serves both the Master (aft) and Slave (forward) locking systems, but only the position of the aft hook is positively indicated.

Figure 1: Lifeboat hook release mechanism

Our members' preliminary investigation noted the following:

- ◆ The hook release mechanism linkage was found to have failed (sheared) - see Figure 2 - at the forward end of the lifeboat. This is likely (pending final report) to have been caused by misalignment of the hook during re-attachment and/or fragile design of the hook release mechanism linkage;
- ◆ Further inspection onboard found that the forward release mechanism linkage was severely bent (See Figure 3) in one of the other three lifeboats;
- ◆ As a result of the above noted damage, a total of two of four lifeboats were found to have release hooks that were not fully engaged.

The company has recommended that the following actions are taken :

- ◆ Immediate inspection of all lifeboat release hook mechanisms, irrespective of design with the following pointers:
 - Check for integrity and potential damage
 - Ensure that the latching mechanism is fully engaged;
- ◆ Ensure that there are routine checks that all hooks are engaged prior to launch, on completion of recovery and during routine lifeboat inspections.



This photograph shows the linkage rod that sheared on the forward release hook mechanism on the failed lifeboat. With the linkage sheared, the lifeboat release hook was not fully engaged, resulting in the hook releasing.

Figure 2: Showing sheared hook release mechanism from the lifeboat that dropped



This photograph shows the release hook mechanism linkage at the forward locking mechanism.

The arrow indicates the area of severe deformation of the linkage rod, caused by the misalignment of the hook and/or fragile design.

The blue line represents the correct alignment of the linkage rod. In this condition, the lifeboat hooks are not fully engaged.

Figure 3: Damaged hook release mechanism linkage on other lifeboats onboard

Members may wish to refer to the following similar incidents (key words: *dropped, lifeboat, release, mechanism*)

- ◆ [IMCA SF 05/02](#) – Incident 1: *Failure of lifeboat lowering mechanism*
- ◆ [IMCA SF 10/11](#) – Incident 2: *Lifeboat drill – near casualty*
- ◆ [IMCA SF 13/11](#) – Incident 5: *Failure of rescue boat release mechanism*

4 Main ROV Lift Umbilical Parted

A member has reported an incident in which an ROV umbilical parted, resulting in both the tether management system (TMS) and ROV falling to the seabed. The incident occurred during operations, when an ROV was being recovered from a dive using its winch and A-frame. The ROV and TMS were both later successfully recovered from their known position.

Our members' investigation revealed the following:

- ◆ The TMS and ROV package was raised to the A frame snubber assembly using manual winch control;
- ◆ Before engaging the umbilical termination socket into the latching mechanism, the latch indicator registered closed and the snubber skirt was in the raised position as per operating procedures;
- ◆ As the umbilical termination socket (bullet) was being engaged into the latching mechanism, the umbilical parted;
- ◆ Following the failure of the main umbilical, the TMS and ROV fell from the latch box.

On further investigation of the Launch and Recovery system (LARS), the following observations were noted:

- ◆ The winch was operating on the core of the drum due to an unusually short umbilical (300m). No line-pull limit was set on the winch drum, which would have been appropriate given the ability of this particular winch to pull in excess of the umbilical breaking strength on the core of the drum;
- ◆ One latch was found to be jammed in a partially open position by the mechanical flag indicator which had rotated and fouled on a section of the snubber frame;
- ◆ Both latch indicator proximity switches were found to indicate closed latch positions when the latches were in fact only partially closed. This could give a false indication on the winch remote control;
- ◆ One latch operating pin was found to be bent and the latch did not action smoothly (possibly as a result of the incident).

The causes of the incident were found to be the combined effect of:

- ◆ The unrestricted line pull of the powerful winch with a very short and relatively thin umbilical (7% of drum capacity);
- ◆ The improper functioning of the latches.

Our member noted that *“modern deep water active heave compensated winches require high levels of installed power to enable them to successfully compensate for vessel movements, and to safely recover the package from up to 4000m. This capability is normally only required when the package is at depth. During recovery when the package is close to the surface the winch drum is normally quite full and the effective line pull of the winch is greatly reduced. This generally prevents the maximum torque capacity of the winch from being applied to the umbilical when the TMS is being engaged into the latching mechanism. In this case the very short umbilical resulted in the maximum line pull being applied to the umbilical when the package was pulled into the A-frame snubber.”*

The following corrective actions were taken:

- ◆ Modified the unique latch mechanism and indicators of this (one-off) LARS to prevent improper function/false readings;
- ◆ Modified procedures to ensure maximum line pull settings are always below the breaking strain of the umbilical.

Members may wish to consider implementing a procedure to check that line pull is below the umbilical breaking strain, and if necessary, consider fitting some form of line pull control. This is particularly important in light of recent trends towards powerful deep water capable winches combined with thinner, lighter umbilicals with a lower breaking strain.

Care should be taken to ensure the line pull of the winch will never exceed the breaking strain of the umbilical, in circumstances which include:

- ◆ a powerful winch;
- ◆ a thin umbilical;
- ◆ short umbilical length.

Members may wish to refer to the following similar incidents (key words: *umbilical, ROV, TMS, dropped, parted*)

- ◆ [IMCA SF 07/05](#) – Incident: 1 ROV free fall incident;
- ◆ [IMCA SF 11/11](#) – Incident: 2 Equipment damage – dropped ROV/tether management system (TMS);
- ◆ [IMCA SF 06/13](#) – Incident: 2 Loss of ROV after umbilical termination failure and damage to ROV during recovery;
- ◆ [IMCA SF 09/13](#) – Incident: 1 High potential near miss: dropped ROV/TMS leading to equipment damage.

5 Unplanned Vessel Contact with an Installation During Lifting Operations

The Marine Safety Forum has published the following safety flash regarding an incident in which a vessel made a very slight contact with an installation during lifting operations. Only superficial paint damage was caused to the platform and the vessel.

The safety flash can be downloaded from www.marinesafetyforum.org/upload-files//safetyalerts/msf-safety-flash-14.31.pdf.

Members may wish to refer to the following similar incidents:

- ◆ [IMCA SF 06-99](#) – Incident: 2 *Automatic control – navigation problem*;
- ◆ [IMCA SF 08-12](#) – Incident: 4 *Platform supply vessel comes into contact with fixed platform*;
- ◆ [IMCA SF 10-12](#) – Incident: 6 *Collision between vessel and installation resulting in damage to both*.

6 Potential Dropped Object – Poor Housekeeping

The Marine Safety Forum has published the following safety flash regarding an incident in which a sledgehammer was found left loose on top of a Cargo Carrying Unit (CCU) whilst it was being lifted from a supply vessel to a platform. The sledgehammer weighed over 2kg and could have fallen 60m. Had such an object fallen off the CCU during the lift and hit someone it would have caused a fatality.

The safety flash can be downloaded from www.marinesafetyforum.org/upload-files//safetyalerts/msf-safety-flash-14.30..pdf

Members may wish to refer to the following similar incidents: (Key words, *CCU, loose, lifting*)

- ◆ [IMCA SF 11/05](#) – Incident: 6 *Near – miss dropped object narrowly misses worker*;
- ◆ [IMCA SF 10/13](#) – Incident: 2 *Loading and securing of cargo*.