

IMCA Safety Flash 11/15

August 2015

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.

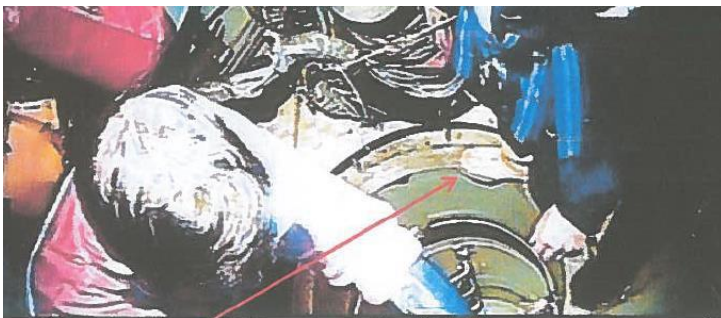
A number of other organisations issue safety flashes and similar documents which may be of interest to IMCA members. Where these are particularly relevant, these may be summarised or highlighted here. Links to known relevant websites are provided at www.imca-int.com/links. Additional links should be submitted to webmaster@imca-int.com

I Lost Time Injury (LTI) and Restricted Workday Case (RWC) following Failure of Diving Bell Door System

A member has reported an incident in which two divers were injured following the failure of a diving bell door. The incident occurred following some bell internal maintenance and surface bell checks, when the bell was being pressurised back onto the saturation chamber system at a depth of 130 feet to allow the two divers to transfer under pressure back to the saturation chamber.

During final checks, dive control were informed by the Life Support Technician (LST) that the seal between the transfer under pressure (TUP) module and the trunk was not possible as he suspected that the door was not “dogged” tight enough shut. The divers were informed, in the bell, of the situation with the top door of the TUP and that the internal bell door would have to come back up so that the dogs on the TUP could be properly secured. Minutes later, the divers were told by the dive supervisor the bell door was about to be opened again. As the bellman was opening the bell door and was about to secure it with the safety chain, the second diver stepped on the rim of the opening before the safety chain was secured. At this instant the door fell onto his feet. The dive superintendent was informed instantly that there had been a failure and the diver’s feet were trapped.

The bellman tried to lift the door off the injured diver’s feet using the diver recovery lifting equipment (mazdam), but due to the weight of the door he was unable to lift it. In attempting to lift the door with the mazdam, the bellman wrapped the rope around his right hand to give extra leverage. At this point, the second diver grabbed the same rope section below the divers hand and pulled sharply downwards, trapping the bellman’s hand in the rope, causing injury to the hand.



SCREEN GRAB SHOWING POSITON OF THE I.P.'S FOOT IN THE PATH OF THE DOOR PRIOR TO THE INTERNAL DOOR DESCENDING ONTO HIS FOOT.



SCREEN GRAB SHOWING POSITON OF THE I.P.'S FOOT TRAPPED BY THE BELL DOOR AFTER THE INTERNAL DOOR DESCENDED ONTO HIS FOOT.



It took around thirty minutes to finally release the diver's feet before he could be transferred into the system for treatment. An initial evaluation of both divers was undertaken and it was clear that one of the divers had suffered significant trauma to both feet whilst the other suffered a serious injury to his right hand. The emergency response team were contacted ashore and medical advice was sought. The divers were decompressed over the next two days and subsequently transferred to a hospital ashore for examination and subsequent treatment. Diver one had suffered fractures and soft tissue damage to both feet and diver two had suffered severe bruising with swelling and tissue damage to his right hand.

Our members' investigation noted the following:

- ◆ The hydraulic ram used to open and close the door had failed;
- ◆ When the ram cylinder was opened, it was identified that the shaft had broken internally at the end where the locking nut holds the piston onto the shaft causing the shaft to pull freely from the cylinder body. This resulted in the door dropping down in an uncontrolled manner;
- ◆ The hand operated hydraulic Enerpac pump had a greater operating pressure than that of the ram and relied on a pressure relief valve to prevent over-pressurisation;
- ◆ Additionally, the failure of the door component prevented free movement of the door during the bellman's attempt to raise it so as to release the trapped diver's feet.

Our member noted the following causes:

Foot Injuries (lost time injury (LTI))

- ◆ Direct Cause:
 - Failure of the hydraulic ram piston rod threaded end at the locking nut inside the ram, resulting in the ram piston rod detaching from the unit, thus allowing the door to fall;
- ◆ Underlying Root Causes:
 - Failure to secure the door in an open position
 - Incorrect placement of divers feet
 - No Planned or Preventive Maintenance System in place for the hydraulic ram
 - Safety Risk Assessment for hydraulic use not applied or assessed
 - No secured guard around trapment area to prevent incorrect foot placement
 - Single point failure, no stage latching of door during raising operation, preventing door closing
 - Too much hydraulic pressure facilitated by hand pump to ensure opening of door;
- ◆ A factor in these root causes was that there was a design failure of the door securing ram system, having a single point failure with no backup.

Hand Injury

- ◆ Direct causes:
 - Divers hand placed in a rope bite;
- ◆ Indirect causal factors:
 - Human error and reaction to emergency situation
 - Lack of induction training regarding correct equipment usage and potential hazard.

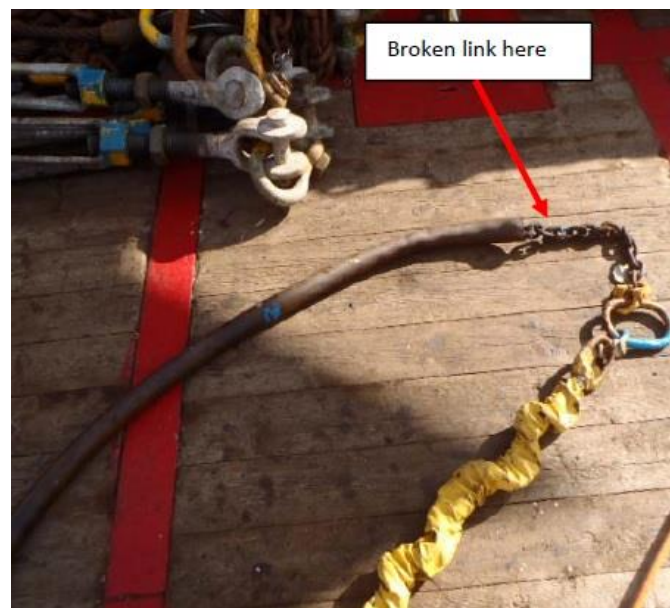
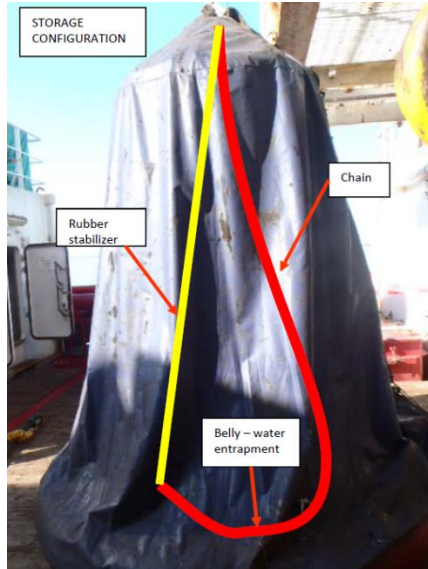
This was a very nasty incident, and similar incidents have occurred in the industry in the past. Ensuring that secondary systems are in place to prevent unplanned closure of the door, and ensuring that door hydraulic systems are included in planned maintenance schedules, will go a long way to preventing recurrence.

Members may wish to refer to the following similar incidents (key words: *ram, bell, door*):

- ◆ [IMCA SF 05/04](#) – Near miss – internal bell door [fell shut narrowly missing bellman's feet];
- ◆ [IMCA SF 07/07](#) – Failure of chamber door hydraulic actuator;
- ◆ [IMCA SF 16/09](#) – Bell bottom door hydraulic operating system failure.

2 Near Miss – Broken Chain on Sling of Personnel Lifting Basket

A member has reported a near miss incident in which a chain link snapped under load. The incident occurred during a six monthly on-board lifting and rigging inspection. A deck foreman was required to arrange the lifting of an empty personnel basket from one place to another on the vessel. The basket was connected to the crane block, the deck foreman gave the command to lift, and as soon as the crane took up the full load of the basket, one of the chain links from the main chain sling of the basket snapped. There were no injuries.



Our member's investigation revealed the following:

- ◆ The configuration of the rigging (the "bungee" was shorter than the chain) created a space or belly during storage, with water trapped inside the plastic cover around the chain. Accelerated corrosion occurred, which may have contributed to chain failure. Corrosion, shock load and/or chain manufacturing process are potential causes for rigging failure;
- ◆ The sub-contractor doing the rigging inspection was not accredited by the manufacturer of the personnel basket to conduct inspections of such baskets. The internal procedure they used was for steel-made work basket, and hence not applicable to a personnel basket;
- ◆ The last load test on this particular rigging and basket had been performed eighteen months before, whereas the load test should have taken place every sixth month as per manufacturer recommendation;
- ◆ The inspection company did not remove the plastic protection cover to inspect the chain, which meant that the visual inspection was not complete.

Our member took the following actions:

- ◆ Removed protection cover from rigging and performed thorough visual inspection;
- ◆ Checked that the storage configuration of the rigging does not allow water entrapment and associated corrosion;
- ◆ Investigated the possibility of replacing the plastic protection cover by an easy-to-remove cover type, for easier inspection;
- ◆ Checked personnel basket user manual and reviewed if rigging inspection sub-contractor was meeting manufacturer recommendations during last recertification campaign.

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

- ◆ [IMCA SF 09/07](#) Incident. 3 – *Lifting rigging on ‘frog’ personnel transfer capsule*;
- ◆ [IMCA SF 01/12](#) – *Dropped object: injury resulting from failure caused by corrosion*;
- ◆ [IMCA SF 09/14](#) Incident. 1 – *Serious dropped object incidents*.

3 Uncontrolled Exposure to Hand-Arm Vibration (HAVS)

The UK Health and Safety Executive (HSE) has published a recent report of prosecution of a company where there had been uncontrolled exposure to hand-arm transmitted vibration. The company had “*reckless disregard for their employees’ health*”; HAVS is a serious, permanent condition which frequently has lifelong consequences. For up to 25 staff working in motor vehicle repair workshops, there were no restrictions on the type of hand-held power tools employees used or the length of time they were allowed to operate them.

In the notice, published at <http://press.hse.gov.uk/2015/coach-builders-reckless-disregard-for-workers-health/> HSE also noted that the company had no system to replace those tools that were old or worn out, and there was a lack of maintenance meaning that tools were not running at the optimum level to minimise vibration. Workers were not provided with any information or instruction on how to minimise the risk from vibration and there was no health surveillance programme to check for early signs of HAVS among the workforce.

Members will be aware that the risks associated with the use of hand-held power tools and of developing HAVS and carpal tunnel syndrome are well recognised in the industry. IMCA publishes a pocket safety prompt cards, including [IMCA SPC 17 – Hand-arm vibration](#).

4 Mooring Line Failure Resulting in Serious Injury

The UK Marine Accident Investigation Branch has published a safety bulletin on an incident in which the failure of a mooring line resulted in a deck officer suffering serious head injuries. He was struck by a mooring line that parted during berthing operations. The injured officer, who was in charge of the vessel’s forward mooring party, was airlifted to a specialist head injuries trauma unit for emergency surgery.

The vessel had been declared all fast alongside about forty minutes prior to the incident and the attending tugs were let go. The vessel subsequently moved out of position in the gusty wind conditions during which time the mooring teams were fitting chafing guards to the lines. As the tugs had already been released, the master instructed the officer in charge of the forward mooring party to tension the forward spring lines to warp the vessel back into the correct position. The officer in charge positioned himself aft of the forward springs’ port-shoulder roller fairlead, and positioned a second crewman forward of him in order to relay his orders to the winch operator. As the winch operator attempted to heave in on the springs, the winch repeatedly stalled and slipped under load.

After about ten minutes, one of the spring lines began to rattle and creak, and then suddenly parted. The section of the line between the break and the port-shoulder roller fairlead struck the officer in charge on his head as it whipped back before going overboard through the fairlead.

Following the accident, the Marine Accident Investigation Branch (MAIB) commissioned a series of tests and trials designed to measure the elongation and snap-back characteristics of the mooring lines used on board the vessel in question. Some short video clips of these trials are available with an accompanying voice over – [see here](#).

For the full report click [here](#).

Members may wish to review the following similar incidents (search phrase: *snap-back*):

- ◆ [IMCA SF 04/09](#) Incident. 3 – *Mooring incidents (from the UK P&I Club)*;
- ◆ [IMCA SF 12/14](#) Incident. 4 – *LTI during mooring operations*.

5 Near Miss Dropped Object: Protector Plate Drops from Crane

The Marine Safety Forum has published a safety flash regarding a recent near miss dropped object incident, in which parts fell from a crane. The incident occurred during lifting operations; the crane operator noticed an object falling from the crane. The object turned out to be a piece of nylon protector plate from the crane boom. Weight 0.95 kg, drop 40 m. There was no one working in the area so no one was harmed and no damage was done. Had such an object hit someone it would have caused a fatality.

The safety flash can be downloaded from www.marinesafetyforum.org/upload-files//safetyalerts/msf-safety-flash-15-23.pdf.

Members may wish to review the following similar incidents (search words: *crane, dropped*):

- ◆ [IMCA SF 01/12](#) Incident. I – *Near miss: crane hook block dropped to deck;*
- ◆ [IMCA SF 02/15](#) Incident. I – *Dropped object near miss: falling crane block;*
- ◆ [IMCA SF 10/15](#) Incident. I – *Near miss: dropped object fell from crane boom.*

This incident and the previous incidents in recent years serves to highlight the need to pay further careful attention to crane maintenance and to the clear risk of parts falling from the crane itself, in addition to managing the risk of objects falling from the load.