IMCA Safety Flash 21/16

August 2016

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

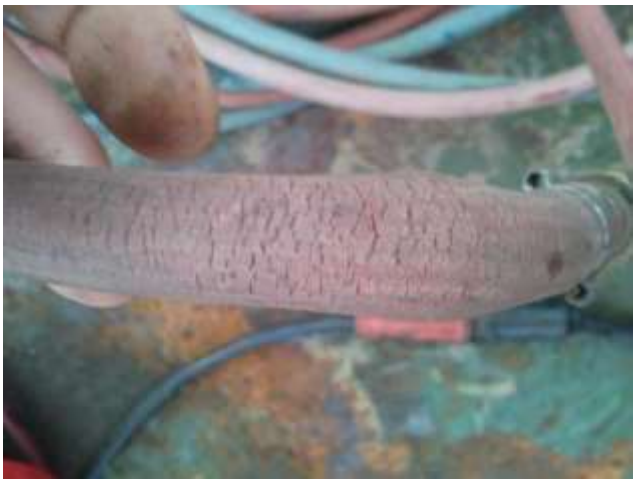
Any actions, lessons learnt, recommendations and suggestions in IMCA safety flashes are generated by the submitting organisation. IMCA safety flashes provide, in good faith, safety information for the benefit of members and do not necessarily constitute IMCA guidance, nor represent the official view of the Association or its members.

Focus: Equipment Failure

All the incidents highlighted here relate to equipment failure. In the first, we return to the importance of the proper care of cutting and welding equipment. In the second, failure to spot incipient failure led to the failure of mast stays. The final three incidents relate to the failure of lifting equipment caused by corrosion.

1 Proper Care of Oxy-Acetylene Cutting and Welding Equipment

A member has noted a number of incidents resulting in fires caused by perished hoses and flashbacks involving oxy-acetylene cutting equipment, and has shared the following information with IMCA for use as part of a safety flash.



Left: work-hardened and perished hoses

Right: difference between new and old hoses

Flashbacks and backfires

Flashbacks are commonly caused by a reverse flow of oxygen into the fuel gas hose (or fuel into the oxygen hose), producing an explosive mixture within the hose. The flame can then burn back through the torch, into the hose and may even reach the regulator and the cylinder. Flashbacks can result in damage or destruction of equipment, and could even cause the cylinder to explode.

The following precautions will help to prevent flashbacks:

- Use the correct lighting-up procedure;
- Purge the hoses before lighting the torch to remove any potentially explosive gas mixtures;
- Use a spark igniter and light the gas quickly after turning it on;

- Ensure the cutting torch is fitted with spring-loaded non-return valves;
- Use the correct gas pressures and nozzle size for the job;
- Maintain the equipment in good condition.

These measures will reduce the risk of a flashback but will not completely eliminate it. Non-return valves will not stop a flashback once it has occurred.

Protecting cylinders from flashbacks:

- Fit flashback arresters to both the oxygen and fuel gas hoses near to the regulators;
- For long lengths of hose, fit arresters on both the torch and the regulator;
- The fitting of a flashback arrester is not a substitute for safe working practice. If a flashback has occurred, carefully check for damage to the torch, hoses, regulators, flashback arresters and other components. Replace parts if needed.

Equipment checks

- Use a proprietary leak detecting spray or solution suitable for use with oxy/fuel systems. Do not use soapy water or solutions containing grease or oils on oxygen systems;
- Repair or replace leaking components immediately;
- Remove damaged or leaking sections of hose, do not attempt to repair;
- Refit hose tails using crimp clips designed for that task;
- Do not use screw tightened crimps (jubilee clips). Their use may increase the risk of leaks due to the potential for over/under-tightening;
- Inspect all sub-contractor or third-party welding and cutting equipment before use, to ensure:
  - hoses are not perished or leaking
  - flashback arresters are fitted at both the gauge and torch ends
  - correct hose crimps are used at all fittings
  - equipment is leak tested
  - gauges are serviceable
  - all fittings are free from oil and grease contaminants
  - ensure thread tape is not used on any connections
  - a cylinder key is in place on acetylene cylinders
  - cylinders are securely stored upright in a ventilated space
  - bulk gas storage is properly separated.

Members may wish to refer to the following incidents (search word: *acetylene*)

- IMCA SF 02/14 Incident 1 *Hose Fire Caused by Flashback in Oxygen & Acetylene Hoses*

2 Mast Head Securing Wire Parted

A member has reported an incident in which one of the wire stays securing a mast head, parted. A deck officer on watch heard a loud metal banging sound on the monkey island deck. Immediately both the radar switched off and someone was sent to investigate. One set of mast head securing wires (the port side) had parted from the long bottle screw and the strop had become entangled with a radar scanner. As a result, there was damage to the front side (radiation side) of the radar scanner cover, and the lower lamp assembly for the main mast head lights was damaged. The entangled strop was cleared away; temporary repairs were made to the radar scanner, and both radars tried out again.

The root cause of the incident was inadequate maintenance and inspection – failure to notice corrosion and impending failure.

Our member suggested that all similar securing arrangements should be inspected and tightened periodically and renewed or replaced, as necessary. Extra attention should be paid to all lashing and securing arrangement when heavy weather is prevalent.

Members may wish to refer to the following incidents (search words: *mast*)

Here are included a number of incidents relating to equipment failure on masts – as strictly distinct from wires parting.

- IMCA SF 04/10 Incident 2 *Falling Object*
- IMCA SF 07/15 Incident 3 *Near Miss: Equipment Failure: Broken Mast Arms*
- IMCA SF 10/15 Incident 2 *Dropped Object Near Miss: Antenna Parts Worked Loose and Fell to Deck*

3 Lifting Sling Failure on Freefall Lifeboat

The Transport Accident Investigation Commission of New Zealand (TAIC) has published a report on an incident in which there was a lifting sling failure on a freefall lifeboat on board a general cargo vessel.

The vessel was alongside and the crew were conducting a launch-and-retrieval drill for the vessel's freefall lifeboat. The lifeboat was lowered into the water with no crew on board. Four crew members then boarded the lifeboat and manoeuvred it around the harbour for 10 minutes before connecting it back to the retrieval davit. A purpose-built lifting sling made up of four wire rope pennants was used to connect the lifeboat to the retrieval davit. Once the crew were seated with their restraints fastened, hoisting the lifeboat from the water commenced. The lifeboat had been hoisted

to about deck level when first one and then the remaining three wire pennants parted and the lifeboat fell several metres back into the sea.

One of the crew members had released his restraints in anticipation of disembarking the lifeboat. He was thrown clear of his seat and sustained a cut to the head, requiring overnight hospitalisation. None of the other three crew members was seriously injured. The lifeboat was undamaged.

Initial findings were that the wire pennants had parted under tensile overload because they had all been significantly weakened by severe corrosion. Corrosion had gone undetected inside a plastic sheathing that the manufacturer of the lifting sling had placed around the wire pennants. The presence of the plastic sheathing encasing the wire rope meant that neither the crew nor the various surveyors tasked with inspecting the launching system could inspect and maintain the wire rope as required by IMO SOLAS regulations.

Members may wish to pay particular attention to the possibility of hidden corrosion, particularly that which may be hidden under sleeves or sheathes on lifting slings, wire ropes or other lifting equipment.

Further information here.

4 Hyperbaric Lifeboat Emergency Lifting Chain Link Failure

A member has reported an incident in which a chain parted during the recovery of a hyperbaric lifeboat (HLB) during routine testing and maintenance. On recovery of the HLB the vessel crane started the lift and when the weight on the crane load readout was approximately 7 tonnes, one leg of the chain set parted when two links split through their link ends. Since the HLB had not yet been fully lifted out of the water the drop was minimal and the parted chain dropped back onto the top of the HLB. There was no damage to the HLB shell due to the soft covering over the chain links.

Chain link and protective cover

Chain link failure

Corrosion on cross section of failure zones

Our member's investigation noted the following:

- Periodic inspections of the chain were in date and on record;
- Significant corrosion was discovered on the chain, raising concern about the pass/fail criteria used on the previous visual inspection;
- The cross section of the failure locations revealed corrosion indicating the presence of cracks prior to failure;
- The protective covering is a potential obstruction to thorough and effective inspection of the individual chain links;
- Environmental conditions at the time of the incident were stable and could not have contributed to high impact loads;
- The chain set has been returned to the manufacturer for mechanical testing and analysis. The results of this testing are pending.

Our member took the following immediate corrective actions:

- Stopped the job;
- Lifted the HLB back in its original position using the davit system;
- The chain set was removed and quarantined.

The following remedial actions were suggested by our member:

- All HLB lifting chain sets should be re-inspected by full removal of the protective covering to gain complete access to each link for a thorough visual inspection;
- The inspection should be conducted by an authorised authority against an acceptable industry standard of acceptance criteria with emphasis on wear, cracks, pitting and corrosion.

NB Further remedial actions pending the outcome of the manufacturer's investigation may be available in due course.

Members may wish to refer to the following incidents (search words: *chain*, *link*, *failure*)

- IMCA SF 06/11 Incident 4 *Failed Chain Link - Catastrophic Failures in Mooring System*
- IMCA SF 18/14 Incident 2 *Master Link Failure during Testing of Overboarding Chute*

5 Load Chain Failure Owing to Corrosion

UK Step Change in Safety has published a bulletin regarding two incidents in which there were failures of load chains owing to corrosion. These occurred during the installation operations of primary steel under deck. The load chain failures occurred on 10 tonne chain hoists within a 10-day period. These chain hoists had been used during installation of the primary steel sections and on completion of the lifting part of the operation 4 x 12 tonne turnbuckles were attached to each section as fixed rigging.

Upon discovery of the chain failures the offshore team stopped the job, made the work site safe and reported the failures to the respective supervisor immediately. The 12Te turnbuckles remained secure at all time through the operation. Extensive investigation attributed the failures to stress corrosion cracking (SCC) due to hydrogen embrittlement.

Further information can be found here.