

IMCA Safety Flash 02/14

February 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 Hose Fire Caused by Flashback in Oxygen & Acetylene Hoses

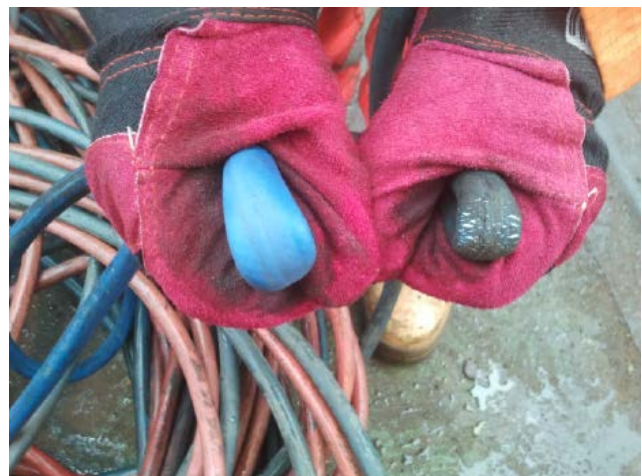
A member has reported an incident in which a sub-contractor's oxygen and acetylene cutting hose burst and caught fire. The incident occurred when the welder was ready to ignite the cutting torch head. The acetylene valve on the quad was slowly opened; the welder then opened up the oxygen and acetylene valves on the cutting head and ignited the tip. Instantly, there was a bang and flames were seen coming from a coil of oxygen and acetylene hoses on the deck. The burst created sufficient ignition and force to cause the hose to split in three separate places. The splits were located at the in-line hose connection points. The fire was immediately extinguished by the fire watcher who was able to fold over the two hoses thus preventing further gas flow. The gas supply was isolated at the cylinder and the hoses were vented. There were no injuries.



Figure: Showing damaged hoses after fire



Work-hardened and perished hose



New (L) and old (R) hoses

Our members' investigation noted the following:

- ◆ The primary safety condition breached in this incident was: ***always use the correct tool safely to carry out the job***;
- ◆ Following the incident an inspection of the hoses revealed brittle and perished sections along the whole hose;
- ◆ It was suspected that the non-return valve on the cutting torch was inoperative, allowing a 'flashback' to take place within the hoses;
- ◆ Pre-use checks by the welders revealed that they set up the equipment without leak checking connections prior to using the equipment;
- ◆ The sub-contractor had a suitable leak detection substance but none was available at the incident site, and therefore the leak testing of cylinders and connectors had not been carried out.

Our member drew the following lessons:

- ◆ Use a proprietary leak detecting spray or solution suitable for use with oxy/fuel systems, to check all fittings prior to use. Soapy water or solutions containing grease or oils should NOT be used on oxygen systems;
- ◆ Leaking or damaged components should be replaced immediately;
- ◆ Leaking hoses should not be repaired, but should be shortened to remove damaged sections. The shortening and refitting should be conducted using appropriate and correct tools and equipment designed for that task. Screw tightened crimps ('jubilee clips') should not be used, as their use increases the risk of leaks due to the potential for over/under-tightening;
- ◆ All welding and cutting equipment should be inspected prior to use, including:
 - Condition of hoses any perished hoses should be replaced immediately
 - Flashback arrestors are fitted at both gauges
 - Non return valves or flashback arrestors fitted at torch side
 - Correct hose crimps are used at all fittings
 - Leak tested
 - Gauges are serviceable
 - All fittings are free from oil and grease contaminants
 - Ensure thread tape is not used on any connections
 - Bottle key in place on acetylene cylinder
 - Cylinders securely stored upright
 - Bulk gas storage has a minimum separation of 3 meters.

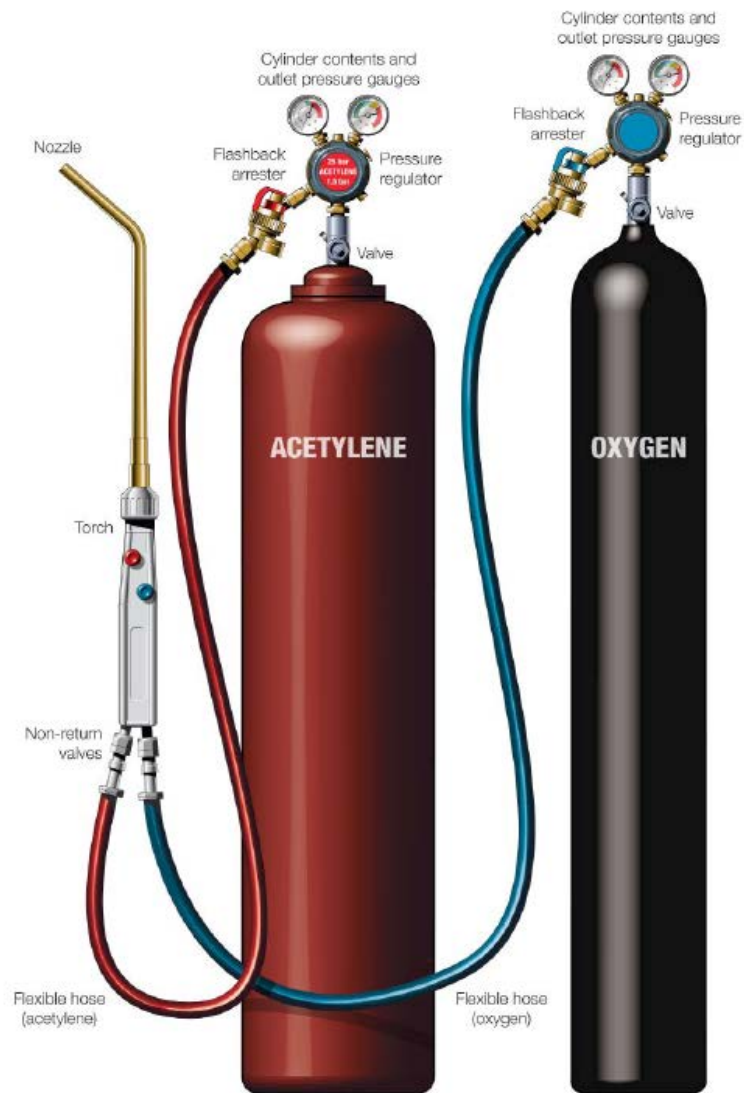


Figure: Showing correct set-up of Oxygen/Acetylene equipment

Our member concluded:

- ◆ 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. After a flashback, carefully check for damage to the torch, hoses, regulators, flashback arresters and other components. Replace parts if needed.

Members may wish to refer to previous safety flashes relating to the use of oxy-acetylene equipment, some of which are referenced below:

- ◆ [IMCA Safety Flash 09/08](#) – Incident 2: *Abrasion of Metal Casing*
- ◆ [IMCA Safety Flash 09/09](#) – *Poor Maintenance and Subsequent Failure of Welding Equipment* which also includes a handy pre-mobilisation/demobilisation welding check list. See www.imca-int.com/media/49038/imcasf09-09.pdf
- ◆ [IMCA Safety Flash 07/12](#) – Incident 2: *Small Fire and Minor Injury during Gas Cutting*
- ◆ [IMCA Safety Flash 08/13](#) – Incident 5: *Fire caused by hot work*

2 Fatality in Ballast Water Tank – Working at Height in a Confined Space

A member has reported an incident in which a crewman died after falling in a confined space onboard a vessel. A ballast tank was open for steel repairs; permits to work were in place for these repairs. The incident occurred during an investigation of air quality and gas detectors in this tank. A tank or manhole watch was present, and three persons entered the tank and began to climb down. The checks were performed and the three persons began to climb the 11m ladder out of the tank.

The last person climbing up had the gas detector in front of him on a band around his neck; the detector was attached to a rope on his back. The gas detector got stuck between him and the ladder when he was nearly at the top. He tried to free himself but lost his grip and fell 10m to the bottom of the tank, and suffered serious internal injuries.

He was evacuated from the ballast tank and subsequently med-evaced by helicopter but died on the way to hospital.

Primary Contributing Factors

Our member's investigation revealed the following primary contributing factors:

- ◆ The position of the gas meter being carried by the casualty whilst climbing the ladder. He was carrying the gas meter on his abdomen during his ascent of a vertical ladder;
- ◆ Carrying the gas meter on the abdomen during descent and ascent of a vertical ladder was not recognized as a risk or hazard;
- ◆ Absence of fall protection, whilst the existing Job Safety Analysis for entering a confined space makes mention of fall protection, this was not discussed at the toolbox meeting prior to the job starting. Also, there was no permit to work (PTW) in place for the entry of confined space. This meant that the persons involved were not reminded about the recommendation for fall protection.

Secondary Contributing Factors

Our member identified a number of secondary contributing factors:

- ◆ The gas measurements in confined spaces were considered routine, whereby the need for, PTW and identification of associated risk/hazards were overlooked;
- ◆ Inadequate monitoring of compliance – the confined space had been open for over a week; multiple activities had taken place, with PTW, in that time, but nobody had recognized the absence of the fall protection (inertia reels) as described in an existing job safety analysis (JSA);
- ◆ Failure to follow rules & regulations – two key company rules were not followed:
 - The requirement to issue a PTW for the gas measurement and inspection activity in the confined spaces
 - Existing company procedures for working in confined space;
- ◆ Organization – the casualty was performing safety officer duties for which he did not have the relevant formal training and competence;
- ◆ Existing procedures or instructions were not adequate and did not identify requirements for descending & ascending into (ballast) tanks.

Conclusion, Recommendations and Lessons Learnt

Our member concluded that the following safety barriers were breached:

- ◆ Complacency in properly executing safety procedures;
- ◆ Failure to follow procedures;

- ◆ Not recognizing hazards and risks associated with the job;
- ◆ Insufficient training and instructions.

The following lessons were learnt:

- ◆ No equipment to be carried by hand or other means which impacts safe climbing or descending on ladders;
- ◆ Company procedures provide no clarity with regard to maximum length of ladders and fall protection to be used;
- ◆ Preventive safety equipment to be used for climbing on ladders;
 - Decent anchor point to be made
 - Safety Harnesses (lanyards & shock absorber to be removed) and life lines (as fall arrestors) to be used;
- ◆ Preventive measures to be taken while working in confined spaces;
 - Escape route should be determined and prepared before job starts
 - Rescue equipment should be readily available at confined spaces in which work is being done;
- ◆ Helicopter evacuation procedure should be improved;
- ◆ Communication in emergency situations to be reviewed and improved, along with an increase of on board emergency training related to confined spaces;
- ◆ Work assessment/risk assessment to be done prior to start of onboard repair and maintenance jobs.

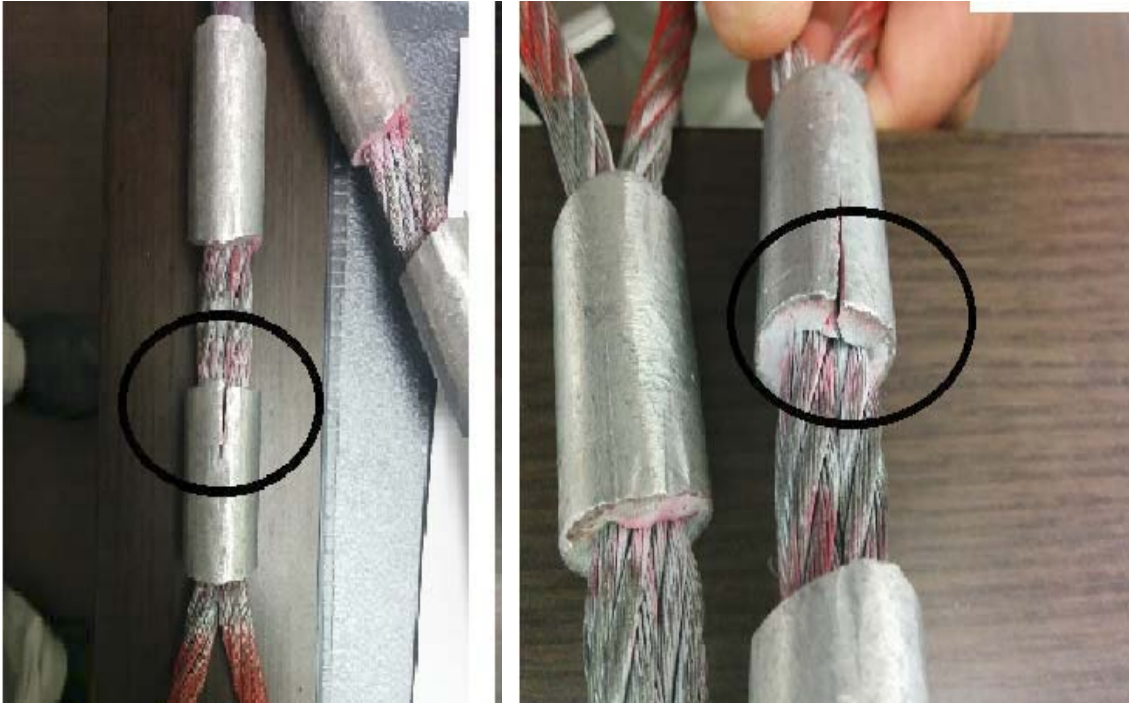
Members may wish to refer to previous safety flashes relating to confined spaces, some of which are referenced below:

- ◆ [IMCA Safety Flash 05/00](#) – Incident 1: *Confined Space Incident*
- ◆ [IMCA Safety Flash 12/08](#) – Incident 1: *Ballast Tank Hydrogen*
- ◆ [IMCA Safety Flash 06/11](#) – Incident 2: *Confined Space - Multiple Fatalities*

3 Damaged Wire Rope Slings

A member has reported an incident in which rope access personnel were found to be using damaged wire rope slings, which could have led to a dangerous situation and/or accidents.





Showing damage to wire rope slings

Our member took the following actions:

- ◆ All wire rope slings were inspected and checked before use at site (visual inspection) for deformities and wear and tear;
- ◆ Test certificates to be inspected before slings are used at site/yard;
- ◆ Ensured personnel were fully aware of this issue;
- ◆ Proper personal protective equipment (PPE) should be worn while lifting/handling slings;
- ◆ Manufacturer of the slings notified in regard to any defects/cuts/kinks in wire rope slings;
- ◆ Damaged wire ropes and slings should be removed from service immediately.

Members may wish to refer to:

- ◆ [IMCA M 179](#) – *Guidance on the use of Cable Laid Slings and Grommets*
- ◆ [IMCA SEL 019](#) – *Guidelines for lifting operations*

4 Vibration-Induced Fatigue on Process Pipework

The National Offshore Petroleum Safety and Environmental Management Authority of Australia (NOPSEMA) has published the following safety flash regarding a discovery, during a recent inspection at a facility, of vibration-induced fatigue cracking and evidence of rectification work carried out on several small bore connections on seawater cooling pipes. The operator of the facility initially did not report the incident as a dangerous occurrence (damage to safety critical equipment), as it was considered only a 'minor weep'.

The potential dangers of vibration-induced metal fatigue or other vibration-induced damage to materials and equipment go beyond just process pipework on oil and gas installations and could have much wider implications for IMCA members. For this reason IMCA is passing this safety flash onto its members.

The safety flash can be downloaded from www.nopsema.gov.au/assets/alert/Alert-58.pdf