IMCA Safety Flash 07/01

July 2001

These flashes summarise key safety matters and incidents, allowing wider dissemination of lessons learned 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 Failure of a Shackle

A member has reported an incident which resulted in an injury to one of its crew, when an abandonment and recovery wire was being spooled off a winch. The shackle connecting the messenger wire to a pad eye welded on the end of the abandonment and recovery wire failed and hit an observer on the thigh.

The shackle failed due to an increase in load, resulting from the lack of flexibility and torsional strength in the connection.

The company concerned has carried out the following actions:

i) the vessel has revised its procedure and the messenger wire is now spliced on to the core of the abandonment and recovery wire;

ii) a review of similar operations is to be undertaken, to ensure that the possibilities of bending and torsion are considered in the design of any connection. Adequately sized shackles are to be used or alternative flexible connections should be designed;

iii) all personnel to stay clear of wires under tension and adequate guarding to be provided and used during such operations.

2 Dangerous Occurrence involving a Mobile Crane

A member has notified us of a serious incident involving a mobile crane onboard one of its vessels. The crane was being utilised to install a spool piece subsea. The crane was severely overloaded and its track lifted off the vessel deck as it started to topple over. The load was released and the crane fell back to deck, suffering extensive damage in the process. The overload protection mechanism on the crane had been deactivated.

The company involved has notified all of its vessels and work sites, which were requested to inspect their cranes and lifting equipment to ensure that all overload protection mechanisms are installed, operational and activated.

It has stressed that no unauthorised modifications of lifting equipment are permitted.

The company has also reiterated its policy for lifting operations, which includes ensuring:

- any safety devices installed on lifting equipment are operational and activated;
- the load does not exceed the dynamic or static capacity of the lifting equipment, in accordance with the conditions on the approved capacity chart for the lifting equipment;
- the actual load has been verified, including a test, if necessary.

3 Explosion Caused by Ignition of Paint Vapours

A member has reported the following incident, whereby an explosion occurred in a tank on a barge. Fortunately, nobody was injured, but the incident resulted in significant structural damage to the barge.

The water tank had been painted and the second coat of a three-layer epoxy coating system had been completed, 48 hours prior to the explosion. During the paint curing period, the tank hatch cover had been left open for ventilation, but no mechanical blowers or extractors had been provided. This allowed solvent vapours – emitted from the coating materials – to build up inside the tank, forming an explosive atmosphere. Vapours escaped from the tank to the surrounding area via the

open tank hatch. This vapour trail eventually reached a source of ignition – an electric fan being used to ventilate an adjacent tank approximately 5-6 metres from the tank hatch. This electric fan was not ex-rated. The vapour trail ignited, causing a flash back to the tank hatch, resulting in an explosion inside the tank.

Under normal atmospheric conditions, the solvent vapours are heavier than air. There was, however, no breeze that evening, allowing the vapours to seep through the tank hatch and along the deck, forming a vapour trail several metres long. The vapours were at a temperature above their flash point (25°C), as the ambient temperature was 31°C.

The company has identified the root cause of the incident to be lack of ventilation during the curing period, mainly due to:

- lack of technical and product safety information on site; combined with;
- limited technical.

The company involved found, on investigation, that neither the painting contractor nor the manufacturer's representative had attended the risk assessment meeting and that the risk of explosion during the curing period had not been identified or assessed. The appropriate material data sheets for solvents and the paint were not available on site, nor was the manufacturer's code of safe practice for tank lining applications.

The company has subsequently made thirteen recommendations to prevent such an occurrence happening again, including:

- the need for all safety-critical tasks involving sub-contractors/suppliers to be subject to a formal risk assessment;
- operations, marine and warehouse management need to ensure that all material safety data sheets and applicable codes of safe practice are available, understood and followed during the storage, handling and use of chemicals, solvents, paints and other dangerous substances.

4 Grinding Stone Incident

We have received information of an incident involving a cup grinding stone. In this incident, the cup stone exploded. However, the findings are considered applicable to any type of abrasive wheel.

In the incident, a pipe welder was using a pneumatic grinder to bevel the end of a 3" pipe when the grinding stone exploded, striking the welder on his shoulder.

The investigation revealed that the guard used on the grind was not the correct one for a cup stone and that the flange was not the correct size for the stone.

The following common errors were identified in the use of grinding stones:

1. use of flanges of uneven or too small diameter;
2. use of washers instead of flanges;
3. flanges without proper clearance or relief;
4. excessive tightening, causing flanges to bend;
5. failure to clean all dirt and foreign material from sides of wheels and flanges;
6. forcing a wheel onto an arbour where fit is tight;
7. use of any loose washers or bushings to try to make a wheel fit a machine for which it is not intended;
8. failure to use blotters on wheels.

5 Oxy-Arc Cutting

The investigation into a diver fatality on a subsea structure involving oxy-arc cutting has identified that the most likely cause of the explosion was that gas trapped in a cavity above the diver was ignited by a spark. The gas was likely to have been generated during the oxy-arc cut on the spool directly below the cavity.

The company involved has issued the following instructions to its personnel regarding subsea oxy-arc cutting:

- oxy-arc cutting should only be used if there are no practical alternatives;

- any oxy-arc cutting operation needs the approval of the relevant manager for that operation and a specific task plan and risk assessment covering the detail of the particular task need to be in place;
- supervisors should ensure all hazards have been identified, the risk properly assessed and that control are clearly specified, communicated and in place prior to work commencing;
- divers who use oxy-arc equipment should be trained in its use;
- divers who are to carry out oxy-arc cutting should be fully aware of and understand the risks and risk control methods to be adopted;
- supervisors and oxy-arc equipment operators need to ensure that there is no possibility of gas entrapment, creating a potential explosion hazard, prior to striking an arc;
- supervisors and oxy-arc equipment operators need to ensure that any potential location where gas could be trapped is completely vented before striking the arc. This will probably require creation of a vent hole. Flushing the cavity with air is not likely to be sufficient;
- oxy-arc equipment operators should not energise the Broco rod unless oxygen is flowing through the rod. Hydrogen from electrolytic action can otherwise build up in the rod, creating an explosion hazard.

6 Checking of Safety Helmets

Our attention has been drawn to an injury on a drilling rig, when a heavy bolt fell 14 metres and hit a roughneck on the head. He was wearing a safety helmet, but the incident nevertheless resulted in a lost time injury.

The operator has stated that this injury could have had a much more serious outcome if the helmet had been more than four years old, as plastic 'hard hats' degrade through time.

The following simple checks have been suggested to ensure that head protection is adequate:

i) The shell should be inspected for dents, cracks, nicks, gouges and any damage due to impact, penetration, abrasions, rough treatment or wear that might reduce the degree of protection originally provided. Hats showing signs of damage or wear should be replaced immediately.

ii) Hard hat shells are susceptible to UV light damage, temperature extremes and chemical degradation. Signs of degradation include: stiff or brittle shells, a faded, dull or chalky appearing shell. Shells exhibiting these characteristics should be immediately replaced.

A recommended test for degradation is to compress the shell inward from both sides about one inch and then release the pressure without dropping the shell. It should return to its original shape quickly. A comparison can be made by testing a new shell. If the elasticity is not similar to a new shell, it should be replaced.

iii) The suspension should be inspected for cracks, greyed or cut crown straps, torn headband or size adjustment slots, loss of pliability or other signs of wear. Suspensions exhibiting these characteristics should be removed from service and replaced immediately.

iv) Important points to remember:

a) Hard hats struck by a blow should be replaced;

b) Hard hats are designed to protect impacts from above, not from the side or rear;

c) Never modify the shell or suspension of a hard hat;

d) Avoid contact of the hard hat with electrical devices;

e) Do not store hard hats in direct sunlight;

f) Do not sit on hard hats;

g) Do not wear anything inside the hat that would affect the clearance between the shell and head;

h) Do not paint hard hats.

v) Users should establish a regular inspection schedule for their hats to evaluate the status of the shell and the suspension.