IMCA Safety Flash 06/10

September 2010

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

1 Third Degree Burn Sustained During Rope Access Hot Work

A member has reported an incident in which a rope access technician (RAT) suffered third-degree burns whilst engaged in hot work. The injured person was engaged in rope accessed structural cutting activity using an oxy-acetylene torch on a 20 inch pump caisson. During the operation sparks and molten material were blown in the direction of the injured party, and a small piece of molten material was caught in the tongue and ankle protector of his left safety shoe, causing serious burns to the left foot. The injured person was able to stop work, swiftly remove his safety shoe and safely descend to deck level using the rope access gear. Following initial first aid, it was noted that the burn was more serious than could be treated onboard and arrangements were made for the injured person to receive further treatment in hospital ashore.

Figure 1 - Area in which rope access hot work was taking place

Figure 2 – Injured person's safety shoe showing burn damage

The investigation revealed the following:

The direct cause of the incident was failure to use the correct personal protective equipment (PPE). Spat protectors were not readily available, partly due to inadequate organisation. These offer flame retardant protection to part of the under leg, ankle and shoe.

The root cause of the incident was inadequate procedures and standards of work.

- **Procedures -** specific details of hazards and precautions were not implemented in procedures for rope access hot work activities;
- **Risk assessment -** a full risk assessment for rope access-based hot work was not available and the job specific risk assessment used did not reflect any job specific issues;
- **Permit to work (PTW) -** the permit to work showed partially generic pre-setting on hazards and precautions with references to standard rather than specific job safety analysis (JSA);
- **Job safety analysis -** a specific job safety analysis was not available at the time of the incident;
- **Toolbox talks (TBT) -** the quality of toolbox talks was not sufficient and needed to be improved.

Following the incident, the following actions were taken:

- Arrangements were made to make spat protectors available as soon as possible;
- Investigated the use of more substantial protective equipment for persons doing hot work;
- Arranged for all appropriate worksite safety documentation (e.g. PTW, JSA and TBT records) to be available with specific detailed job-related entries;
- Investigated further training for personnel engaged in hot work, particularly flame-cutting.

2 LTI – Severed Tendon

A member reports an incident in which a person suffered a severed tendon, resulting in several months off work. An electrical cable with a thick rubber sheath was being prepared for termination during a mobilisation. A pair of electrical side cutters was being used to cut back the rubber insulating material from the end of the cable being terminated. When cutting, the side cutters were also being pushed into the cable to aid the cut. After three successful cuts the side cutters slipped, stabbing the left hand that was holding the cable. The stab caused a puncture wound to the injured person's middle finger just above the first knuckle.

It was clear immediately following the incident that on clenching the left hand the injured person's finger did not move. On further investigation at the hospital, it was confirmed that the injured person had a severed tendon. Surgery was carried out to reconnect the tendon. It was anticipated that the injured person would be off work for 2 – 3 months.

Following investigation of the incident and its causes, our member noted the following:

- The injury was caused by the incorrect use of sharp hand tools. Although side cutters are often used when stripping back cable, their correct use is for cutting electrical cable or long thin items such as cable ties, at 90°. Side cutters are not specifically designed to cut in the way that scissors do, which is the way they were being used in this incident;
- The task was considered to be part of the basic skill set of an experienced engineer and was not subject to risk assessment or toolbox talks.
- The injured person was not wearing gloves when carrying out this task since gloves would have restricted manual dexterity;
- Cutting towards the body (left hand) meant that when the cutters slipped the hand was vulnerable to injury;
- A safe cable stripping tool had not been considered and such a tool was not available onboard the vessel;
- The use of side cutters had replaced the previous practice of using a Stanley knife for this task as a result of restrictions placed on the use of knives.

Our member drew the following lessons from this incident:

- Even tasks which are classed as part of the basic skill set of an individual should be reviewed occasionally to ensure good and safe practice and the use of the most appropriate tools;
- Tools should only be used for the purpose for which they are designed;
- If it is necessary to remove personal protective equipment (PPE) to carry out a task then that PPE is not appropriate to the task.

Our member made the following recommendations and corrective actions:

- Worksites were reviewed to ensure that the appropriate tools were being used;
- There was a review of the use of protective gloves at the worksite to ensure they were appropriate for the tasks being carried out;
- Personnel were reminded and encouraged to engage in personal last minute risk assessments and to pause before carrying out a task to ensure that they have all the correct tools and PPE and that it is safe to carry on and that nothing has changed.

3 Minor Chest Burns Suffered by Rope Access Technician

A member has reported an incident in which a rope access technician suffered minor spot burns on the chest during cutting operations. A 24 inch pipe approximately 4 metres above the deck was being cut by the rope access technician (RAT), who was suspended by rope access gear and also standing on a ladder. The first cut and the access hole for a shackle, using a standard cutting torch, went smoothly. The internal pipe was covered with a 4 centimetre thick rust layer. When the second cut was nearly completed, some melted particles of rust fell onto the tip of the cutting torch. One of the particles from the tip of the cutting torch was blown away and somehow entered into/below the RAT's protective clothing. The technician felt some very light pain on his chest and continued to work. After shift the technician felt some minor irritation on his chest and sought first aid. Three small burns on the middle of his chest were treated/covered by one plaster.

Investigation revealed the following:

- The direct cause of the incident was molten particles entering through an opening between the buttons of a fully closed leather protective jacket. This personal protective equipment (PPE) was not giving full body protection.

It was suggested the following long-term corrective actions:

- Protective jackets used for hot work should close using "velcro" closing straps rather than buttons;
- Consideration should be given to different kinds of protective clothing, including flexible fireproof hoods designed to cover shoulder, chest and neck area;
- It should be emphasised at toolbox talks and in preparation for hot work that molten particles can enter PPE through the smallest openings.

Figure 1- Protective clothing for rope access technicians showing small opening through which hot particle passed

4 Near Miss: Safety Device (Hard Link) Damaged During Hot Work

A member has reported an incident in which a rope access technician (RAT) damaged his safety equipment during hot work. The technician was gouging out the weld connection around 8 metres above deck. He was working next to his two climbing ropes and was also secured with a hard link. This hard link was connected to the D-link of the technician's harness and to a secure point above the technician.

At the moment the RAT opened the air flow to start gouging, water streamed out of the nozzle instead of air. This resulted in the technician instinctively pulling back the gouging torch. During this uncontrolled movement, the gouging torch connected with the stop descender - a steel part of the technician's climbing gear. Since the technician was connected using a hard metal link to a beam on the platform, the technician's metal climbing equipment made an electrical circuit to earth and current flowed from the gouging torch. As a result, three of the six strands of the hard link were burnt through.

The RAT descended safely to the walkway 8 meters below to check and replace the damaged equipment and subsequently was able to safely resume work. There were no injuries.

Following investigation, the following was suggested:

- Replace metal hard-link with a non-conductive nylon climber's sling;
- Ensure water is drained out of air supply before use with gouging torch.

Figure 1 - Typical metal 'hard-link' for rope access technicians

5 Tug Capsized During Operations

A member reports an incident in which a tug girted and capsized during towing operations. A third-party contractor's tug was acting as a stern tug for a heavily laden barge arriving in port. The master of the stern tug chose to deploy the towline over the stern of his vessel, and intended to maintain position and heading relative to the barge by using the tug's engines. A bridle (Gob) wire was not rigged. As the lead tug increased speed, the master of the stern tug found that he was unable to effectively control the yawing of his tug, and five minutes after connecting to the barge, the vessel took a large sheer to starboard, girted and capsized. The crew escaped without injury.

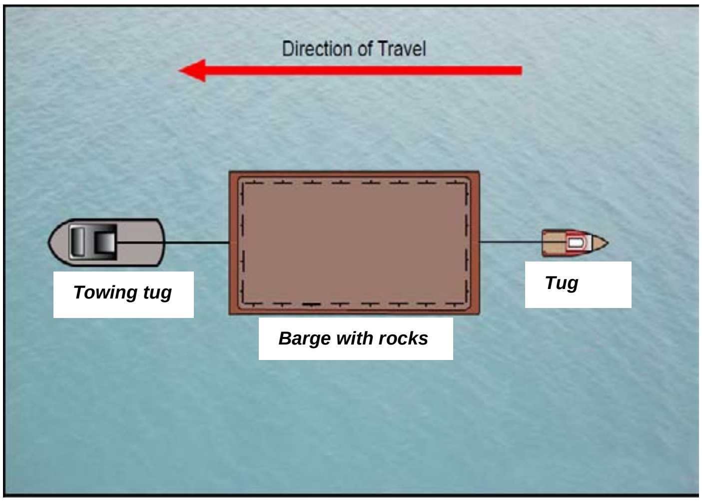

Figure 1- Diagram of the Towing arrangement

Our member conducted an investigation and noted the following:

- For a conventional tug, towing over the stern, particularly while running astern, is an inherently unstable mode of operation;
- The towing speed was too high in this instance;
- The lack of a bridle wire or "gob rope" meant there was no physical safety device to prevent the tug from girting when directional control was lost;
- The tug's master had not been trained in the use of the emergency brake release, had not tested it or witnessed its effect, and could not operate it from the bridge when the tug got into difficulties;
- There had been no prior toolbox talk or discussion between the pilot and the tug masters regarding the entry of the barge into the port, and the pilot was unaware of the intended towing method or operational limitations of the stern tug;
- Crew were working an 18 hour "changeover" period in breach of the relevant working time regulations;
- The tug masters' knowledge and experience were never assessed by the third-party owner, and there was no formal staff training program.

Our member drew the following lessons:

- There should be prior discussion of scope of work between project manager and vessel owners, and between masters and pilots, to ensure suitability of vessels and crews, and full understanding of the task at hand;
- Clear instructions on operational procedures should be provided to all personnel involved in operations;
- Risk assessments and toolbox talks involving all relevant parties should be carried out prior to all towing operations;
- Personnel should be familiar with emergency brake release systems on tugs and test it or witness its effect;
- There should be appropriate implementation and understanding of working time regulations;
- Towing over the stern:
  - Speed should be kept at an appropriate minimum, not more than 3 knots, when a tug with conventional propulsion (single or double) is acting as a stern (steering) boat;
  - Captains of towed vessels should remain aware of using the propulsion, and the combination of forces acting on the hull;
  - The use of a shot string (standard on single propulsion, advisable on double propulsion vessels) helps to keep the towing wire on the aft ship centrally positioned and avoids girting, the towing point being brought to the aft of the ship instead of on the pivot point of the tug. See example in Fig. 2.

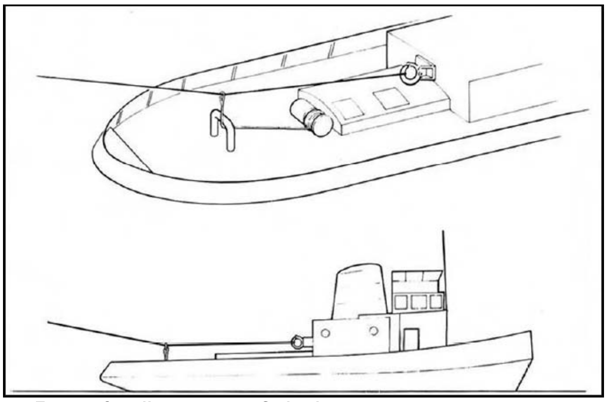

Figure 2 - illustration of ideal towing arrangement

6 Load Dropped Owing to Incorrect Manufacture of "Flemish Eye" Crane Pennant

The UK Health & Safety Executive (UK HSE) has published the attached safety flash regarding the dropping of a 9.5 tonne load on an offshore installation as a result of the incorrect manufacture of a 15 tonne Flemish eye crane pennant. The information can also be found at www.hse.gov.uk/safetybulletins/flemish-eye-crane-pennant.htm

The dropping of a 9.5 tonne load on an offshore installation as a result of the incorrect manufacture of a 15 tonne Flemish eye crane pennant

Introduction:

This safety notice describes a serious incident caused by the incorrect manufacture of a crane pennant. It outlines the actions that should be taken by both the users and the manufacturers of Flemish eye crane pennants and slings.

A Flemish eye rope termination is an eye formed at the rope end by dividing the rope strands into two sections and then splicing these ends to form a loop. The ends of the loop (tails) are secured by a metallic ferrule that is swaged onto the main body of the rope in a press.

A crane pennant is the term used in the offshore industry for a single leg sling with a master link at one end and a hook at the other. The master link attaches to the crane hook block and this ensures personnel attaching and detaching loads on a potentially moving offshore installation or supply vessel are not exposed to the swinging, large mass, crane hook block.

Background:

This incident occurred on an offshore installation during the lifting of a container weighing 9.5 tonnes. A 5m long 15 tonne working load limit crane pennant was connected between the crane hook and the master link on the container sling set. The crane pennant had been manufactured from 36mm diameter wire rope and the eyes on each end had been formed by using the Flemish eye technique. Steel ferrules had been used as the termination and these had been pressed over the Flemish eye rope strand tails. During the lifting of the load the wire rope strands in the tails of the Flemish eye connected to the pennant hook became free inside the ferrule allowing the Flemish eye to unravel and the load to fall. The photograph shows the crane pennant and the Flemish eye tails which have unravelled and pulled out of the ferrule.

The crane pennant and the Flemish eye tails which have unravelled and pulled out of the ferrule

The ferrule-secured system designers[1] published instructions detailed the ferrules that should be used for particular rope diameters. However, 36mm diameter rope was not listed. The crane pennant manufacturer had selected a ferrule (1.5") and considered sufficient tests had been undertaken to verify this selection. This incident has highlighted that these tests did not fully replicate the dynamic (tensile and torsional) loading experienced by an offshore crane pennant.

Action required:

Wire rope slings and crane pennants with Flemish eye terminations have been used extensively in the offshore industry for a considerable number of years. They have proved to be very reliable but it is essential the ferrule-secured system designers published instructions are followed. HSE considers that other manufacturers may have supplied Flemish Eye slings and crane pennants with rope diameters to ferrule combinations that are not listed in the ferrule-secured system designers published data, in the belief they have undertaken appropriate type testing to verify this change.

Users are advised to:

1. Check whether wire rope slings and crane pennants with Flemish eye terminations are in use.
2. Verify with the supplier or manufacturer that the rope diameter to ferrule combinations used in the construction are in agreement with those published by the ferrule-secured system designer.
3. In the case of combinations, which are not in agreement, obtain verification from the supplier or manufacturer they can satisfy point 2 below.
4. Where such verification cannot be obtained, remove these slings from service.

Manufacturers and suppliers of Flemish eye wire rope terminations (ferrule-secured termination manufacturer) should:

1. Only supply wire rope slings and crane pennants that adhere to the ferrule-secured system designers published combination of rope diameters to ferrule sizes.
2. Any additions to these published combinations should only be undertaken with the agreement of the ferrule-secured system designer and verified by a range of type tests representative of the dynamic loadings that will be experienced in service. The results of these type tests should be made available to users if requested.
3. Where slings and crane pennants have been supplied which do not meet the above criteria contact their customers and advise them to remove such items from service.