IMCA Safety Flash 32/17

December 2017

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.

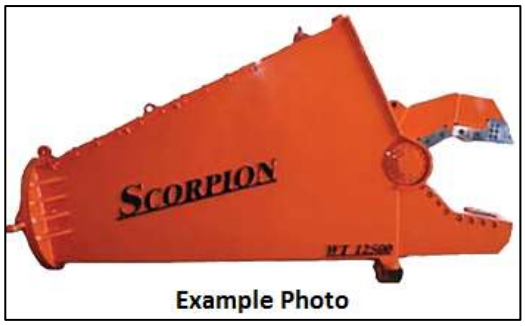
A number of other organisations issue safety flashes and similar documents which may be of interest to IMCA members. Where these are particularly relevant, these may be summarised or highlighted here. Links to known relevant websites are provided at www.imca-int.com/links Additional links should be submitted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

1 Load Exceeding Safe Working Load (SWL) Leads to Overstressed and Damaged Rigging

What happened?

During a recent decommissioning operation, shears were used to cut a pipeline. The shear tool was rigged to the crane in a vertical fashion. The shear tool was placed on the pipeline at the cut location and when the shear jaws closed around the pipe to make the cut, the shear tool was pulled downward due to the 'bird's beak' design of the jaws.



Example Photo

As a result, the load quickly increased the tension on the rigging over the safe working limit (SWL) of the rigging resulting in damage (deformation) to the rigging. The crane operator was instructed to immediately reduce load to an acceptable level.

The shear tool was placed on the seabed and the damaged rigging was removed from the arrangement. The shear tool was then re-rigged to the whip line for recovery to the surface.

This incident resulted in damage to property (hook and shackle) but could easily have been a good deal more serious, having the potential to have harmed the diver who was working close to the shear tool.

What were the causes?

The **immediate causes** of the incident were:

- Failure to recognize the hazard of the shear tool pulling downward during cutting operations;
- Inadequate preparation/planning.

The **root causes** were found to be:

- Lack of knowledge;
- Inadequate communication.

Lessons learnt

- Placement of the shear tool and the amount of 'slack' available to make a cut will have an impact on the outcome;
- Ensure SWL of rigging arrangement is communicated to crane operator prior to lifting operations;
- Ensure rigging drawings are available. If not, a hand sketch should be prepared locally and reviewed/approved prior to lifting operations.

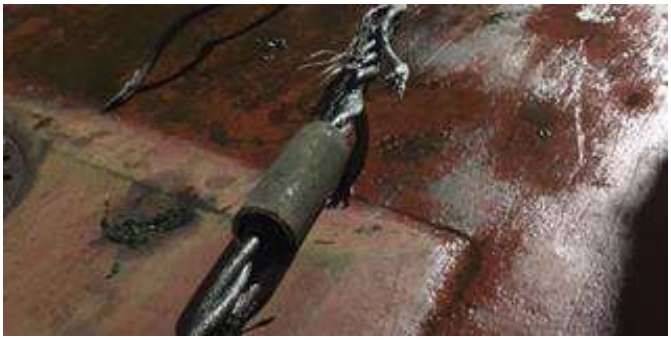
Members may wish to refer to the following incident (search phrase: '*overstressed*'):

- Tombarra fall wire fatality: Updated reports

2 Failure of Steel Wire Sling

What happened?

During offshore wind farm construction, pull wires were being laid. One small vessel was acting as a winch vessel, and another as an anchor. These vessels were connected with a steel wire rope sling. During wire pull operations, the steel wire rope sling failed. When the wire failed the energy stored in the steel wire rope sling and the rigging arrangement was released, causing damage to the rigging arrangement, load cell, Panama chock and the deck of the winch vessel. There were no injuries, as a 'clear deck' instruction was in place.



What went wrong? What were the causes?

The wire failed at the splice inside the ferrule following an increase in tension. It was concluded that the mechanism of failure was a low-cycle fatigue fracture.

Further detailed investigation showed that dynamic forces on the hold-back or anchor arrangements were higher than anticipated, leading to the overstressing and therefore the failure of the wire. These peak forces were not picked up during manual logging.

Similar failures have occurred due to the splice failing under higher than anticipated dynamic loading causing the splice to pull from the ferrule.

Lessons learnt

- Because the 'clear deck' instruction was followed, ensuring that no personnel were in the 'line of fire', there were no injuries;
- One of the investigation findings was that an incorrect calculated sling breaking load (CSBL) was assumed. Hence the working load limit (WLL) of the steel wire sling was also incorrect. When a steel wire sling is assembled, a reduction in WLL for the assembly is applicable depending on the end termination and the factor of safety. In this case, the termination efficiency (K_T) for a 'super splice' or 'super loop' is 90%. For example, if the steel wire had a CSBL of 100 Tonnes, a factor of safety of 3:1 and a termination efficiency of 0.9, then the assembled wire sling should have a WLL of 30 Tonnes – i.e. CSBL = WLL x S_F x K_T. This reduction was not included on the certificate's WLL that came with the assembled wire rope sling. Clear marking, certification and utilisation of equipment must be checked thoroughly when new equipment is delivered;

- The forces on the wires were measured via a load cell. These readings of the load cell were logged manually. Data logging should be automated allowing continuous (digital) logging of the load cell data. This data can then be used to check which forces are being exerted on wires and if workability limits are reached.

Members may wish to refer to the following incidents:

- Near miss: Corrosion caused crane boom failure during heavy lifting
- Failure of hose reel bearing housing

3 Arm Injury Whilst Using Pillar Drill

What happened?

The Marine Safety Forum (MSF) reports another incident wherein a crew person was injured following misuse of a pillar drill. Crew were in the process of using a piece of 2mm metal plate to manufacture a metal blank for a pipe on the vessel's hot water system. It was necessary to drill a small hole (6mm) at one end of the plate. For this operation, it was decided to use the workshop pillar drill. Whilst drilling the metal plate the drill bit became stuck. This then forced the metal plate out of the drill vice. When the operator reached up to stop the machine the metal plate that was stuck to the drill bit dislodged, flew off the drill bit and hit his left arm.

What went wrong? What were the causes?

The MSF alert identifies the following issues:

- The task had not been properly risk assessed;
- The wrong tool had been selected for the job;
- The vice holding the job had not been sufficiently tightened;
- The speed of the drill had not been adjusted for drilling metal;
- The injured person was "*not wearing his personal protective equipment (PPE) correctly*".

The MSF alert can be found here www.marinesafetyforum.org/images/msf-safety-alert-17.14.pdf.

It is conspicuous that this is the third incident reported during 2017 in which crew have injured themselves whilst using a pillar drill. Members may wish to reiterate to their crews the fundamentals of safety when working with rotating machines of all kinds. Please refer to the following similar incidents:

- Hand injury whilst using pillar drill (MSF)
- Finger injury during work with rotating machinery

4 Finger Injury While Using a Crowbar to Try to Shift a Large Shackle

What happened?

During anchor handling operations, one anchor was on deck and crew were required to connect a wire socket to the anchor by using a shackle. The wire socket was in a difficult position for the shackle to be connected; to overcome this difficulty, the deck crew used a crowbar to try to get these items aligned. The crowbar eventually slipped while it was in use for the shackle's pin connection and consequently a crew member suffered an injury to the right ring finger.

The injured person received first aid treatment on board. He was subsequently sent to a barge to be checked by an available medic. The recommendation of the medic was that he be sent to hospital ashore.

What went wrong? What were the causes?

Similar incidents involving connection/disconnection of shackles are known to the industry, and have often led to serious injury. Causes identified include inadequate identification of pinch points, and improper use of tools.

Lessons learnt

- Hazards can be hidden and risky situations may not always be identified;
- All crew members involved in similar tasks should be aware that use of crowbars on rigging under tension is not safe. Capstans or tugger winches should be used to reposition chains, wires or anchors. Only after everything is safe and without residual tension should the rigging team perform manual work;
- Another point to remember: never place your hand (or any part of your body) 'in the line of fire'.

This is a recent incident and is still under investigation. Any additional lessons learnt identified will be communicated following the investigation completion.

Members may wish to refer to the following incident:

- Lost time injury (LTI): Gangway deployment
  - *[A crowbar was used to exert pressure on the lower section of the gangway, to allow the outboard pin to be removed. During this process, both the bosun and the AB were standing within the steps of the gangway when an outboard pin jumped out this section slid up quickly and trapped the bosun and able seaman. This extremely serious incident could have been avoided entirely by following the correct procedures.]*

5 Unplanned Release of Stored Energy: Worker Struck and Injured by Tensioning Tool

What happened?

The International Association of Oil & Gas Producers (IOGP) has published Safety Alert 293 about an incident in which a worker was struck on the head and seriously injured when a tensioning tool came loose and hit him.

A four-yearly task was in progress, to check the tension of bolts on the bearing of a floating storage and offloading (FSO) unit turret. During moving the bolt tensioner, a part (the puller, weighing 13kg) fell between the bearing stud bolts of the inner (static) and outer (rotating) bearing races. Before it could be removed the FSO weathervaned, trapping and compressing the tensioner part between the two rings of bolts. A crew member went to investigate further. As he crouched over the tensioner part, it suddenly came free and struck him in the head causing serious injury. He was promptly medevaced to hospital onshore.

Turret working location

Tensioner part trapped between bearing race stud bolts

What went wrong? What were the causes?

- The risk of a tensioner part falling and becoming trapped between the stud bolts was not recognised in the job safety analysis (JSA), work procedure or turret vendor documentation;
- This risk was not recognised by the crew member, who placed himself 'in the line of fire';
- No **stop work authority** was applied when the task deviated from the expected work process;
- The design of the turret bearing races and stud bolts location allowed the tensioner part to become trapped and compressed when the FSO weathervaned.

Actions taken

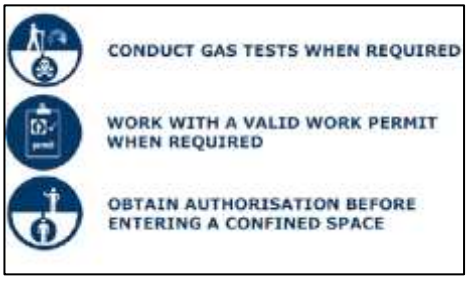
- Provide additional safeguarding tools and equipment to prevent the tensioner puller from dropping in between the inner and outer stud bolt or even this tool and equipment could help to support the re-tensioner while moving along the race;
- Investigate a manual handling tool that will reduce the risk of accidentally dropping the tensioner parts;
- Review the JSA and work procedure to include routine and unexpected risks and provide troubleshooting guidance. Include JSA to consider weather limits for the work and use of a tug on the FSO stern;
- Reinforce use of **stop work authority** if work deviates from normal conditions. Investigate if this task should be performed by a specialist contractor rather than the FSO crew;
- Develop 'line of fire' awareness training;
- Share information with other operating assets with a FPSO and future project FSO, to design out the hazard, e.g. put the two bearing races and rings of bolts at different elevations.

Members may wish to refer to the following incidents relating to the unplanned release of stored energy:

- Stored energy near miss: Person nearly hit by equipment caught during light daughtercraft operations
- High potential stored energy incident: Inner buoyancy module clamp failure during removal
- Fatality: Stored pressure release

6 Near Miss: Worker Temporarily Trapped in Confined Space

What happened?



On a vessel in a shipyard, a member of the painting team accessed a tank to perform an inspection. Around three hours later, a worker was assigned to close this tank, and this was done – but the painter was still inside. The painter only noticed he was trapped in the tank around 15 minutes after the manhole cover was closed. Fortunately, in less than an hour, personnel assigned to cleaning duties outside the tank's surrounding could hear knocking sounds from inside the tank and called for assistance to investigate. The manhole cover was opened, and the painter was able to exit the tank unharmed. Further check-ups with a doctor confirmed no impacts to his health and safety.

What went wrong? What were the causes?

- There was no stand-by person outside the tank;
- The painter entered the tank alone, even though the 'buddy system' was a practice expected by the shipyard;
- The painter accessing the tank was a team leader and as such, had specific training for confined space entry, but still disregarded the implementation of control measures;
- There was no valid permit to work (PTW) in place for the task, and hence there were no control measures in place, such as safe atmosphere monitoring, ventilation, or illumination.

Lessons learnt

A safety stand-down was led and conducted by the shipyard management with their employees. While this incident happened to shipyard workers during shipbuilding, the lessons learnt are applicable to all IMCA members operations.

This incident is under investigation and further updates may be communicated in future.

Members may wish to review the following IMCA documentation and safety promotional material:

- IMCA SEL 032 – *Guidance on safety in shipyards*
- Short video – *Confined space: The dangers*
- Short video – *Permit to work*

Members may wish to refer to the following incidents:

- Confined space entry incidents – a reminder
- Confined space fatality in shipyard