

## IMCA Safety Flash 11/17

May 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.

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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](http://www.imca-int.com/links). Additional links should be submitted to [info@imca-int.com](mailto:info@imca-int.com)

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### Theme: Dropped Objects

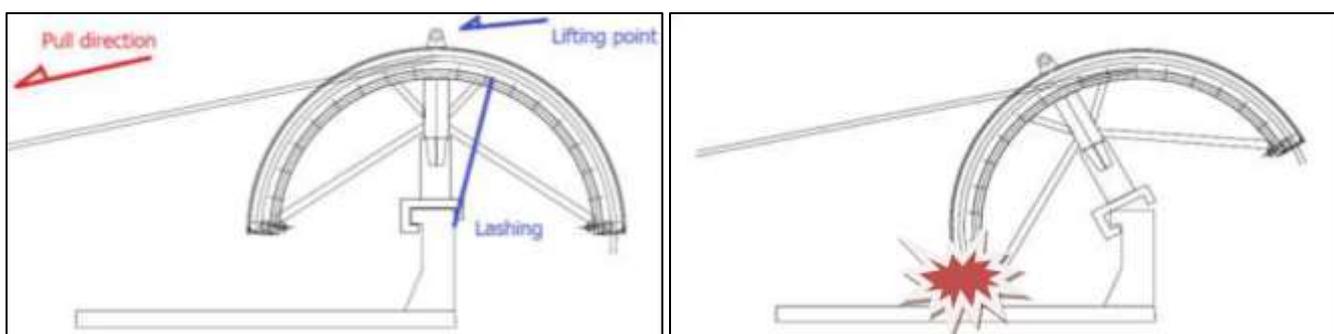
This safety flash brings together five incidents relating to dropped objects or potential dropped objects. In the first, someone was injured when equipment fell after being unsecured. In the second, lack of understanding of how magnetic lifting equipment worked led to a lost time injury (LTI). The third incident covers the fall to deck from 16m of a part weighing 600kg. The last two incidents are near miss incidents relating to potential dropped objects.

#### 1 Dropped Object Injury: Equipment Shifted When It Was Incorrectly Unsecured

##### What happened?

On a cable laying vessel, a cable quadrant had been rigged on the bulwarks, seated in a pedestal mounting and secured via lashings on the outboard side. Normal operations required the deck crane to be secured and taking the quadrant's weight before the securing was removed. However, during this incident, the securing was removed before the deck crane was secured.

As a result of being unsecured, movement in the cable caused the quadrant to topple and fall to the deck, striking a crewman in the leg. The incident caused minor grazing to the leg and soreness. First aid was administered and the crewman returned to work for the next watch. The incident could easily have resulted in more serious or permanent injuries. Our member treated as a high potential near miss.



##### What were the causes of the incident?

- ◆ Failure to correctly follow procedure and secure the deck crane before the lashing were removed;
- ◆ Failure to clearly identify who was in charge;
- ◆ Reliance on control measures (outboard securings) that provided only a single point of failure.

## What lessons were learnt?

- ◆ Communication & Control – it is essential to identify who is in charge before starting lifting operations. This avoids confusion or miscommunication, and should be highlighted during Toolbox Talks;
- ◆ Control measures should be reviewed to identify potential improvements. Although certain control measures may have worked in the past, we should always review them to see if improvements can be made. In this example, fixing the pedestal mounting itself would have reduced the risk of toppling when the outboard securing was removed – or even if the securing had failed during operations;
- ◆ All crew should be aware of the control measures that are in place, where to find them, and how to maintain them during operations. Again, this should be done by reviewing job safety assessment (JSA) during the Toolbox Talk and by conducting site walk-about before beginning.

## Actions

- ◆ The pedestal mounting will be fitted with tipped bolts to secure it directly to the bulwark in future;
- ◆ Management will designate a specific person in charge for deck operations.

Members may wish to refer to the following incidents:

- ◆ [Unsecured object fell and injured crewman](#);
- ◆ [Loading and securing of containers](#);
- ◆ [Loading and securing of cargo](#).

## 2 LTI as a Result of Load Dropped from Lifting Magnet

### What happened?

A load dropped from a permanent lifting magnet hit a person's hand resulting in an LTI. Polished metal elements had to be lifted a few centimetres with a permanent lifting magnet, in order to put supports underneath it. This task had taken place without mishap around one hundred times when the load dropped without warning.

The injured person had performed this operation around ten times. He knew about the need for a protective layer and used packing paper as advised by his colleagues. At a certain point, however, with no specific reasons he could recall afterwards, rather than use paper packing material (of thickness 0.1mm) he instead used foil packing material (of thickness between 1.5 and 2.0 mm.)

As the polished element load was lifted, he reached over it to remove some packing material. By chance one of his hands was under the load when it dropped. The load hit his hand, causing an LTI.

### What were the causes?

- ◆ There was insufficient technical understanding of the magnetic lifting system and its requirements;
- ◆ There were undocumented "common practices" in use by experienced crew that were not completely understood by all;
- ◆ The criticality of the 'air gap' was not addressed in any JSAs and toolbox talks;
- ◆ The injured person had not realized the criticality of the 'air gap' when he used thick foil instead of thin paper;

#### The protective layer

To avoid any damage to a polished metal piece being lifted by a magnet, a protective layer is placed between the magnet & the polished surface. Typically, this can be a piece of paper.

#### Magnet holding capacity and the "air gap"

The holding capacity of a lifting magnet depends on the full and uninterrupted operation of the magnetic field. For that purpose the lifted object should have a minimum thickness, and any non-magnetic separation between a magnet's lifting surface and the load, called the 'air gap', reduces the holding power.

This so-called 'air gap' can be anything including scale or paint or the "protective layer".

- ◆ The work instruction was not detailed or specific enough. There was no specific information on:
  - operator instructions pertaining to the selected magnet
  - the reason for the protective layer
  - exactly what the protective material should be and how thick – merely that it should be “cloth”
  - the importance of the ‘air gap’ and its effect on the holding capacity of the lifting magnet;
- ◆ Nobody had challenged the work instruction and crew had continued with what they considered to be a common practice: use a piece of paper.

Load tests after the incident revealed that using this thicker foil instead of thin paper reduced the magnet’s lifting capacity to such a degree that there was no safety margin left. As a result, the load had been lifted just a few centimetres when it dropped.

### Lessons learned

Our member notes that permanent lifting magnets are proven reliable lifting appliances but with known and well documented limitations. Care should be taken to ensure that:

- ◆ Full circulation of information – from operator’s manuals, lifting plans, work instructions, risk assessments etc. – to all persons involved in the use of such equipment;
- ◆ Full understanding – all persons involved should fully understand the limitations and precautions to be taken, including any limitations, for example minimum thickness of the load or the effect of any ‘air gap’;
- ◆ Full sharing of knowledge with respect to undocumented “common practices” that may be known to experienced persons, but not others.

## 3 Dropped Object: Lay Tower Adjuster Leg Pin

### What Happened

The securing pin from a Tilttable Lay System (TLS) adjuster leg, weighing 600 kg, fell 16m to deck. The incident occurred when the keeper plate bolts slackened off. No-one was in the immediate area below the adjuster leg at the time of the event and no-one was injured.

At the time of the incident there was an umbilical in the tower, but the umbilical was not being deployed. If deployment operations had been ongoing, then there would have been the potential for further consequences if the top tension were to have been above the survival capacity of one adjuster leg.



*Right: Close-up of the adjuster leg housing (with bolts, keeper plate and pin missing)*



*The pin*



*Renewed locking key anti rotation bolts and greasing line*

### **What went wrong?**

- ◆ Investigations found that the planned maintenance and inspection regime was inadequate and unclear;
- ◆ During transits the tower was at times kept in operational position which could have allowed excess movement of the pin due to reduced load and increased dynamic movement;
- ◆ The design made it difficult to lubricate the pin adequately which may have caused excess friction.

### **Actions**

- ◆ Following discussions with the manufacturer, the vessel returned to port for investigation, and during the transit to port, Structural Non-Destructive Testing (NDT) of pin connecting parts was undertaken on both legs to verify sufficient load capacity and seaworthiness;
- ◆ Adjuster leg pin put back in place and increased diameter anti-rotation locking key bolts were installed to provide additional bolt shear strength, as per manufacturers recommendation;
- ◆ Additional temporary bolt locking mechanisms (Loctite and locking wires) were installed on both adjuster leg pins locking key bolts to ensure vibration would not loosen the bolts before the permanent solution was ready;
- ◆ A check was made throughout the tower, of the tightness of all critical bolts and pins; new pin, bushing and lubricating lines were installed.

### **Longer term actions**

- ◆ Tower to be in survival mode position during all transits according to the manufacturer's recommendations;
- ◆ Planned maintenance requirements updated and clearly defined for accurate inspection criteria for critical pins and securing mechanisms;
- ◆ Bolt locking mechanisms installed in TLS critical pins (adjusters and TLS pivot) to ensure vibration will not loosen critical bolts.

Members may wish to refer to the following incidents:

- ◆ [Falling object](#) [an object came loose from a mast and fell to deck]
- ◆ [High potential dropped object](#) [an object fell 10m onto the main deck of a vessel during pipe spooling operations]
- ◆ [Objects dropped from pipelay tower](#) [bolts vibrated loose, resulting in the shaft being unrestrained and free to vibrate out along with the end cap].

## 4 Near Miss: Multiple Potential Dropped Objects Discovered During Loading of Spooling Unit

### What happened?

A vessel loaded a spooling unit and other cargo onto a platform. After lifting operations were completed, the platform reported that multiple potential dropped objects (total 19 items) had been identified on the spooling unit. These were mainly loose and unsecured items on the spooler working platform, on its upper level. The following were found, amongst other things: spooler locking pins weighing 7 kg each, securing nuts and bolts, unsecured spooler in cradle, unsecured gratings and unattached grating securing chain.



### What went wrong? – Investigation and findings

- ◆ Three separate opportunities to check for potential dropped objects were lost. Work instructions, procedures and the requirements of company safety management systems were not followed.
  - the vendor did not properly check the spooler unit for potential dropped objects before shipment
  - crew on the quayside did not properly check the spooler for potential dropped objects before load out onto the vessel. A specially designed inspection gantry unit was not used
  - the vessel's deck crew did not visually check the upper working platform of the spooling unit for any loose items before lifting the load to the platform, despite of direct requirement of vessel owners safety management system (SMS).

### What lessons were learnt? And what were the actions?

- ◆ Large and complex objects – such as this spooling unit – should be subject to thorough inspection for potential dropped objects at every stage of the transportation process;
- ◆ Do not under-estimate the hazards of loose objects falling from loads from trailers on the road or during loading operations;
- ◆ Crew should be alert at all times to the danger of potential dropped objects and should never be under the load.

Members may wish to refer to the following incident:

- ◆ [More than a dropped object – the need for vigilance during cargo operations.](#)

## 5 High Potential Near Miss: Incorrectly Secured Overhead Equipment

### What happened?

During operations, it was observed that the connecting shackle pins on two separate items of overhead equipment (fall arrest inertia reels) were loose and could have become detached. If any of this equipment had fallen it could have struck someone underneath with potentially fatal consequences.

### Findings

- ◆ Inspection of the securing arrangements revealed that the wrong securing clips had been used and these had fallen out, enabling the shackle pins to work loose. A split pin or wire seizing should have been used to secure the shackle pin;
- ◆ The equipment was covered by weather protection boxes which prevented easy inspection of the securing arrangement;
- ◆ This incorrect securing arrangement was identified previously but **lessons were not shared** across the fleet or with the contractors who installed this equipment.



“R” clip type that was incorrectly used for this application but is commonly used in diving operations.

### Examples of shackle pin securing methods for different applications



Split pin used when long term securing is required



Wire seizing used for dynamic loads and where vibration may be present



Spring clip used in diving operations

### Actions

- ◆ Conduct a hazard hunt to confirm that any overhead equipment is secured correctly to prevent it coming loose;
- ◆ Visual check of rigging and securing of any man riding or fall arrest equipment for similar issues;
- ◆ Ensure appropriate regular inspection regimes are in place, particularly for locations where visual inspection is difficult – consideration should be given to equipment already positioned at height or concealed from view;
- ◆ Users of fall protection devices may not be able to visually inspect the connections because of location or if weather protection devices are used. In these cases, additional or other suitable inspection arrangements should be in place;
- ◆ Care should be taken to confirm the adequacy of the securing arrangements applied when third parties are engaged to install, maintain or inspect such equipment.

Members may wish to refer to the following incidents, both of which relate to securing arrangements coming undone.

- ◆ [Near-miss: ROV shackle \(potential dropped object\);](#)
- ◆ [Near-miss: Missing nut and split pin on shackle.](#)