IMCA Safety Flash 18/14

November 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

1 Failure of Bell Winch Clutch Coupling during Bell Recovery

A member has reported an incident in which a winch clutch failed during bell recovery. A diving support work barge was performing riser installation in saturation mode. The saturation dive system was third party hired equipment with technicians provided by the supplier. The system model is of a type the diving contractor also owns and operates.

During recovery with three quarters of the bell submerged the clutch between the winch and the hydraulic motor disengaged causing an in water descent of the bell to 10 msw. There were no injuries to bell occupants or topside support personnel.

The secondary motor and clutch assembly was engaged and the bell was recovered to surface, locked-on and transfer under pressure (TUP) without further incident. The faulty equipment was replaced and a load test was carried out to 14.88Te

Subsequently two further dry bell runs were carried out on each motor during which the bell was lowered to below surface and lifted back to hooks.

What went wrong?

Excessive wear of the clutch components and their retaining device provided enough 'slop' in the assembly to allow space for separation of the coupling. The winch brake did not engage and prevent the free fall as the fail safe hoist lever was not immediately released upon descent (both the internal disc and external band brakes engage only when the lever is in the neutral position).

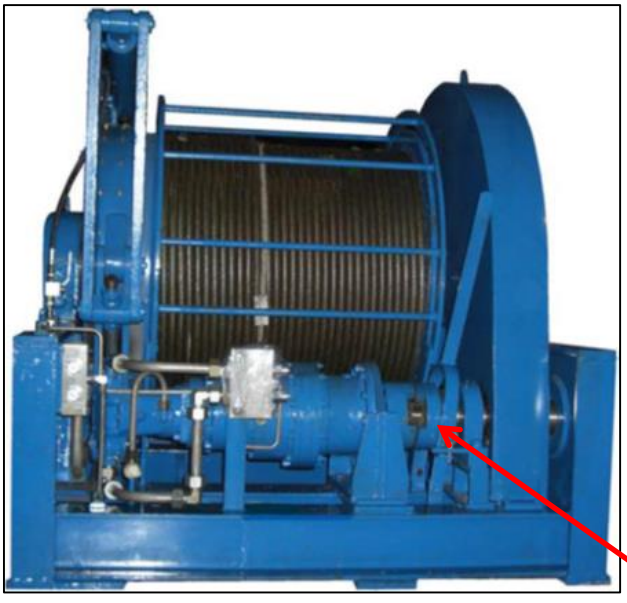


Figure: bell winch showing the clutch coupling mechanism in the undogged and locked position (LR).

Figure: material loss on the bronze bushing

Figure: clutch cog wear showing ½ the actual gap against the replacement clutch.

Our member's investigation revealed the following:

The leading edge of the clutch on the load bearing side pushed the pinion coupling outwards causing wear of both the bronze bushing and the engaging edge of the clutch cog, providing a gap which eventually allowed unintentional disengagement of clutch.

It was learned that a similar loss of control incident involving identical wear of the same components on that system had occurred several years previously.

Of the many system 'General Safety Recommendations', and 'Operating Procedures' listed in the supplier/manufacturer's manuals are the following:

- Read all warning tag information and become familiar with all controls before operating the winch;
- Slowly hoist or lower (main bell winch). The gearbox brake will automatically release and the hand brake automatically opens;
- Inspect rigging, drive and hydraulic hoses at the beginning of each work shift. Defects should be corrected immediately;
- Check all hinges, clevises and grease points.

Our member noted the following causes:

- Worn/damaged components led to an unintended disengagement of the clutch;
- The location/position of the components involved does not lend immediately to direct observation;
- An inadequate inspection regime: information regarding the correct operation and maintenance was available from the manufacturer however, the planned maintenance system (PMS) used was of a general type and had omissions of critical component care;
- Failure to follow up on recommendations resulting from the initial incident.

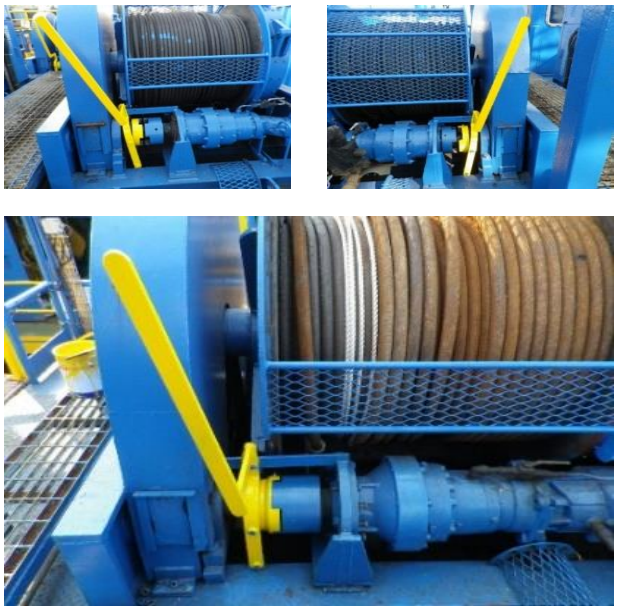
Our member took the following immediate actions:

- Repaired and made function test of the equipment;
- Forwarded advice to the system supplier and held meetings soon after;
- Reviewed system maintenance and operating procedures;
- Sent pre-investigation internal notification to worksites, requiring inspection of like components where installed;
- Formal investigation initiated.

The following preventative actions is being taken:

- Clean and apply fresh paint of bright, unlike colours to the two opposing jaws of such couplings to highlight any developing increase in spacing and increase visibility/retain awareness of the critical components. Currently, the modification has been implemented on the bell winch system on one of the saturation diving systems. The method is not limited to this particular equipment and should be considered for application wherever safety critical components are installed, especially if they have a history of a previous incident;

Before



After

- Measurements of the coupling jaws to be taken over time and logged in order to monitor wear and tear on this and similar devices;
- Once every two weeks, alternate the primary and secondary clutch and motor in order to reduce wear and tear and monitor the system;
- Increase the thoroughness of inspections for third party equipment with the use of company saturation system function test protocol, updated to include the particulars of the components involved in this incident;
- Revision of company maintenance schedules for inclusion of a segment on critical components and with closer attention to specifics. Note: grease nipples are not applicable to this area. 'Open gear lubricant' is the requirement (at the bushing interface).

Members may wish to refer to the following similar incidents (key words: *clutch, brake, failure*):

- IMCA SF 01/00 – Incident 4. *Lifeboat winch failure*;
- IMCA SF 08/01 – Incident 1. *Failure of ROV lift umbilical winch brake*;
- IMCA SF 18/09 – Incident 2. *Fatal incident onboard a dive support.*

2 Master Link Failure during Testing of Overboarding Chute

A member has reported an incident in which a master link failed during articulation of an overboarding chute. As one of the final stages of mobilisation of a jumper deployment spread to a project vessel, an overboarding chute (circa 25Te) was being function tested on completion of securing to deck grillage. The function test involved operating the chute articulation mechanism by connecting to the crane main line to lift and move (traverse) the chute from its upper resting position, past top dead centre then lowering into its lower (deployment) position where it rests on stoppers and is secured via swing bolts. As the chute went through top dead centre a 38.3Te master link failed in the rigging assembly resulting in the chute making an uncontrolled movement forward, into its deployment position. Based on crane data the load applied to the chute hinge mechanism (between chute and grillage) at the time of failure was circa 80Te; more than 50Te greater than the weight of the chute assembly. It should be noted that the crane data indicates the load at failure exceeded the Safe Working Load (SWL) (38.3Te) but did not exceed the Minimum Breaking Load (MBL) of 153.2Te.

The chute sustained damage in several areas to the extent that it and the deployment spread had to be demobilised from the vessel. No-one was injured but the potential existed for a person to be struck by the failed master link as it fell to deck.

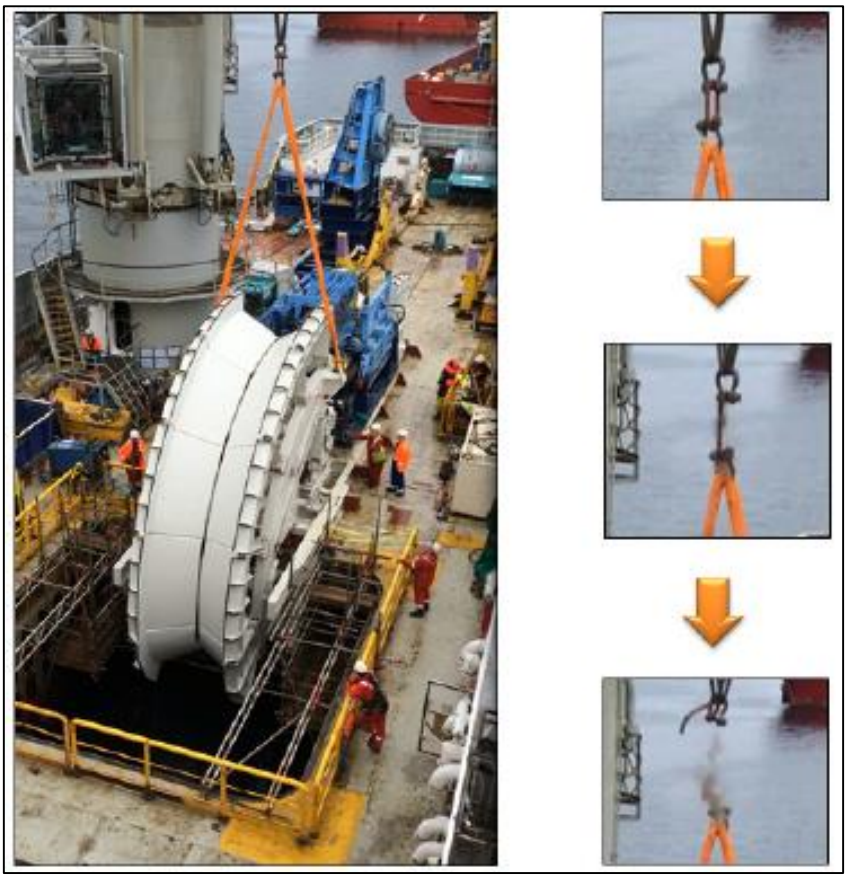


Figure: showing overboarding chute (L) and failure of master link (R)

Our member's investigation noted the following:

- Whilst the **immediate causes** of the incident contributed to the failure of the master link, the **root cause** was attributed to a failure to develop and apply an effective safe system of work;
- The deployment spread mobilisation procedure did not include the function test;
- No lift plan was in place for task despite being identified as an existing control measure in the hazard identification and risk assessment (HIRA);
- The absence of details on expected loads, lift plan, and required crane movements was not challenged;
- Operations review, HIRA and procedure approval process did not recognise the risk of lifting the chute while attached to the deck (over pull). There was also no indication that this was considered at site either;
- The requirement to closely monitor the load was not recognised;
- Analysis of the failed master link identified defects that could have caused failure below MBL. The process of establishing the cause of the defects was ongoing.

Our member concluded that although rigging failures such as the above were relatively few in comparison to the frequency of lifting operations in our industry, there was no cause for complacency in our approach to working around suspended loads. In all cases the complexity of lifting activities must be understood in order to ensure the task is suitably planned and risk assessed. Where there is any apparent lack of information or concerns then this must be openly challenged and resolved.

The following actions were taken:

- Reviewed all master links onboard; quarantined any William Hackett 38.3Te master link with batch number H678/1-8;
- Management/Supervisory personnel to discuss alert with their teams and reinforce expectation that anyone can request further or challenge information that may compromise the safety of the task;
- Recognise the potential risks associated with moving loads that are attached to the deck (or similar) as part of reviews, and ensure an appropriate level of detail in procedures, lift plans and risk assessments accordingly.

Members may wish to review the following similar incidents (key words: *master, link*):

- IMCA SF 12/11 – Incident 1. *Offshore tank container rigging failure*;

- IMCA SF 07/14 – Incident 6. *Master link and sub-link failures on lifting equipment*;
- IMCA SF 11/14 – Incident 1. *Failure of master link during subsea lifting operations*.

3 Hydraulic Umbilical Winch Operation – Trapped Thumb

A member has reported an incident in which a member of the deck crew injured their thumb while operating a hydraulic umbilical winch. The vessel deck crew were recovering hydraulic power hoses from subsea onto a hydraulic umbilical winch drum, when the winch operator trapped his thumb between the safety guard and the drum. The operator was wearing the correct personal protective equipment (PPE) for the task. After the incident, the operator removed his glove and noticed a small amount of blood; he reported the incident immediately to his supervisor who in turn contacted the medic. The extent of the injury was a small abrasion to the left hand and the thumbnail had lifted.

Figure: hydraulic winch showing control lever and the guard in which the operator trapped his thumb

Figure: position of operator at time of incident (mock up) - hatched markings on the guards are post-incident

Figures: showing varying distance between winch drum and guards

Figure: added strip of additional guarding and safety tape to highlight potential 'pinch' points to operators.

Our members' investigation noted the following:

- The operator was not in the correct location for operating the equipment. He was forward of the winch. The winch controls were located at the rear of equipment where adequate guarding was provided;

- The operator or any other person should not have had physical access to the moving parts (such that an entrapment is possible) regardless of their position. Persons working controls should ensure they were not in a place where they would be exposed to any risk to their health or safety as a result of the operation of those control;
- Gaps between the safety guards, located on the forward side of the winch, were found to vary in gap size ranging from 5mm to 15mm; it was found that the larger gap increased the risk of entrapment;
- The incident highlights the importance of having adequate guarding fitted to all equipment. It was found on this occasion that guarding can become a hazard in itself if gaps are not kept to a minimum. Subsequent checks on similar equipment located on other vessels highlighted further issues relating to the guarding provided;
- This incident highlights the requirement for guarding to be re-assessed on an ongoing basis during maintenance periods and during the completion of risk assessments.

Our member reports that the crew have made suggestions as to how to improve the guarding and these will be implemented onboard. The improvements were to add a strip of additional guarding in an effort to close the 15mm gap and in addition to this apply safety tape (as shown above) to highlight potential 'pinch' points to operators.

This is a reminder for all involved in tasks to watch out for pinch points and look out for one another at all times and to stop the job as required. Please see the following IMCA safety promotional material:

- Pocket card: *Caught between and pinch points – Click here;*
- Safety poster: *Watch out for pinch points – Click here;*
- Safety DVD: *Slips, trips and finger nips – Click here.*

Members may wish to refer to the following similar incidents (key word: *pinch*):

- IMCA SF 09/07 – Incident 1. *Pinch points on winches – Hand Safety*;
- IMCA SF 12/08 – Incident 3. *Hand injury*;
- IMCA SF 05/12 – Incident 3. *LTI: Crewman's finger pinched when moving the gangway*.

4 Injuries Sustained Whilst Trying to Stop Moving Objects

A member has reported two similar incidents, which happened within two days at two very different locations, in which persons were injured whilst trying to stop moving objects. The first during pipe handling at an onshore yard, the second during maintenance work on a vessel under way. The first incident was classified as a medical treatment case, the second as a first aid case.

Incident 1 – trying to stop a rolling pipe

During routine pipe handling at an onshore yard a pipe rolled from the forks of a wheel loader. Although this should not have happened the situation was not of itself dangerous. All personnel were at a safe distance as per procedure. The speed of the rolling pipe was low and there was a lot of empty space around. The pipe first rolled 1.5m from the loader and a further 1.8m to come to a stop. However, the banksman guiding the operation followed after the rolling pipe trying to stop it. When putting his foot against one pipe end he slipped and the pipe end rolled over his foot.

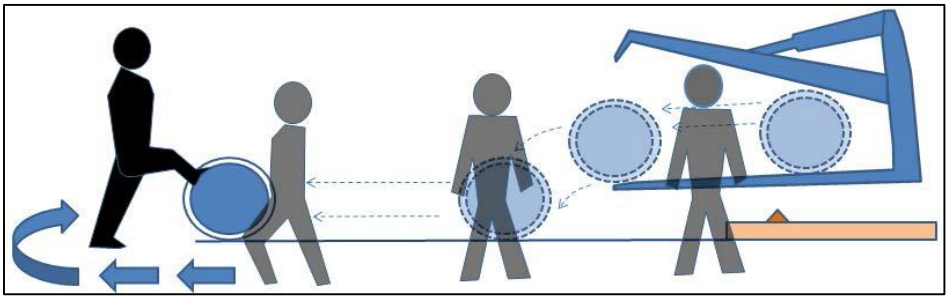


Figure: showing the sequence of events demonstrating his initial safe position (light grey) to his final position (black)

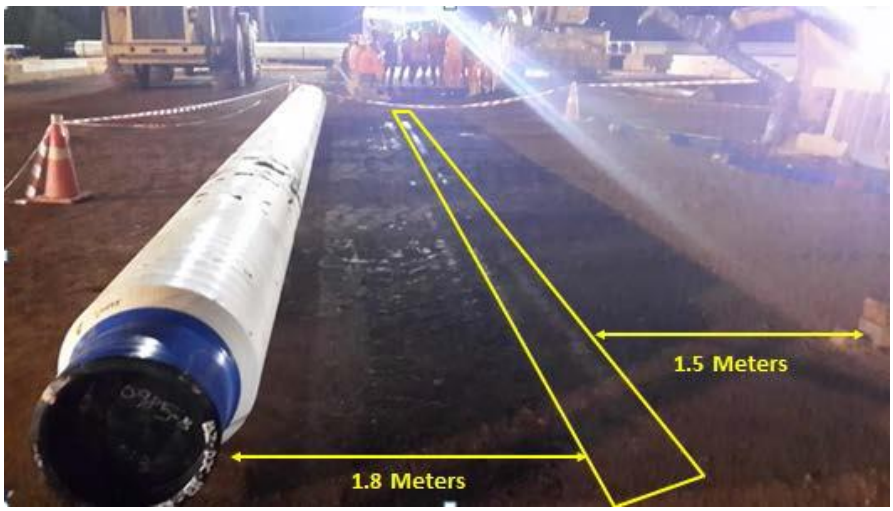


Figure: showing location where pipe dropped and rolled

Figure: position of IP when attempting to stop the pipe rolling

Figure: final position of IP

Incident 2 – Trying to stop a moving chain block

This incident happened during routine maintenance work on a gearbox. It is usual to conduct such activities while at sea under good weather conditions. For that day however the bridge had announced that bad weather was upcoming. Although the crew members were aware of the vessel motion they did not consider them severe enough to impact the safety of the worksite. However, the vessel started rolling with a double amplitude of 7° which caused a chain block suspending a lifting frame to start uncontrolled travelling along its lifting beam. A mechanic tried to catch the chain of the chain block, in order to regain control of the lifting frame before it could hit equipment or personnel in the vicinity. While doing this, his little finger got stuck in one of the chain links which caused an injury to the top of his little finger.

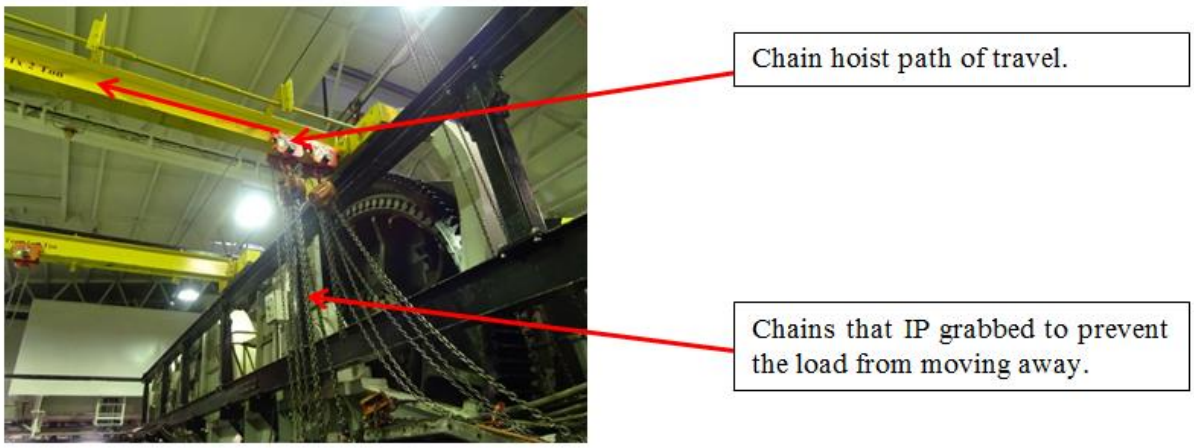


Figure: showing chain block location

Our member notes: this safety flash is not about the root causes of loss of control over the objects, which in both cases were very different. It is about the immediate cause, stepping in without thinking to try and stop something. It serves to highlight the reactions of people stepping in and trying to rectify the situation, to bring the object under control again, stopping it. This appears to be a natural behaviour. A couple of years ago a lifting supervisor noticed that a lifting shackle was incorrectly positioned and stepped in to rectify the situation. The shackle toppled over and injured his hand.

Often such reactions are in a hurry or even in a state of panic. People are not aware of potential risks in that particular situation because they do not take (or have) the time to think. There can be a lack of oversight and understanding of the situation.

Job Safety Assessments should consider potential loss of control and define what mitigations should be in place.

Members may wish to refer to the following similar incidents (key words *rolling, pipe*):

- IMCA SF 08/06 – Incident 2. *Serious injury during pipestalk rolling operation;*
- IMCA SF 05/14 – Incident 2. *RWC: Injury to foot caused by moving roller.*

Members may wish to refer to the following similar incidents (key words *chain, block*):

- IMCA SF 15/13 – Incident 1. LTI: *dropped object incident.*

5 Dropped Object Incidents

A member has highlighted a number of dropped object incidents in recent months, two of which were considered high potential and reportable to the local regulatory authorities. This safety flash serves as a reminder about the danger of dropped objects, highlighting that there can be no cause for complacency at any time.

High potential incident 1 – dropped ROV hooks

A survey support vessel was closing the ROV hangar doors following recovery of the ROV. This entailed the removal of two 'hooks' that were securing the ROV door in position. Numerous attempts were made to lift the first hook, but it would not move. The crew member then proceeded to unscrew the hook. Unfortunately, on reaching the end of the threaded section, the hook fell to the ROV hangar floor. The crew member then employed the same removal method for the second hook, with the same result. This time the hook fell into the sea.

Figure: ROV hook on floor of ROV hangar

Figure: hooks in use, steel wire secondary securing in place

Our member noted the following:

- A full report on this incident has been prepared;
- The area was made safe and a DROPS sweep conducted for further potential dropped objects (both ROV hangars). A similar dropped object survey was conducted through all areas of the vessel;
- Braided steel wire fastened to hooks were used as secondary hold backs – a permanent solution being assessed from an engineering perspective;

- No personnel permitted in ROV hangar during opening/closing of doors;
- A full Root Cause Analysis Incident Investigation had been carried out.

The following two incidents occurred within 24 hours of one another:

High potential incident 2 – tensioner pad fell 7m to deck

During routine change out of pads on the tensioner a pad was dropped and fell approximately 7m on to the vessel deck. The pads were being changed out to allow for a different dimension of pipe to be fed through. The old/new pads were being passed via a 'human chain' from one person to another, from the tensioner to the deck via a series of work platforms. The operator had removed the securing bolt and a crewman, who was assisting, had difficulty removing the pad as it was tightly fitted. With some effort the pad came loose and the crewman fumbled and dropped the pad. The pad hit the tensioner frame and dropped down through the lay ramp to the vessel deck.

It should be noted that this activity was being conducted under a Permit to Work, with a risk assessment in place. The area was also barriered off so that no-one could enter the area below the tensioner. The vessel crew had taken every precaution to reduce the risk of injury to personnel to ALARP.

Figure: tensioner and height of fall (7m)

Figure: tensioner pad (weight 7kg)

Incident 3 - Plastic ROV Launch and Recovery System (LARS)

During recovery of the starboard side ROV a plastic ladder 'swing gate' arm was observed to fall to the ROV hangar deck from the LARS. Personnel were working in the vicinity, as part of the ROV recovery operation, but were unharmed. The plastic arm weighed 0.75kg and fell 7m to the floor.

Figure: ROV LARS ladder guard (plastic) reinstated

On investigation, it is thought that the swing gate arm was not properly installed and the vessel vibration caused the arm to work loose. An inspection of the port side LARS swing gate arm showed it was in good condition with no issues observed.

Our member noted the following:

- A full DROPS sweep was conducted for further potential dropped objects;
- Dropped object surveys should be carried out, with secondary hold-backs installed (where required) and regularly checked, for new and existing vessels and for new equipment;
- Appropriate control measures (e.g. Permits to Work, Risk Assessments and barriers) are important factors in reducing risks.

Dropped objects are one of the most common types of hazards in our industry. The consequences of an impact from a dropped object can include fatalities and/or serious injuries and/or serious damage. The risks from these hazards must be adequately managed and controlled, like any other risk. To achieve this, due consideration should always be given to the potential for dropped objects, to identifying how they may occur and how they can be prevented.

Members are encouraged to bring these incidents to the attention of their offshore crews, as a means to increasing awareness on potential dropped objects. Before starting any task, all personnel should consider the environment where they work and other activities going on in the vicinity.

Potential dropped objects should be risk assessed, giving consideration to its potential and probability of occurrence. Local work areas should be visually inspected for potential dropped objects, removing or securing them as appropriate. Personnel can be reminded that not only can anyone call an ALL STOP, but that they should call an ALL STOP if they see any act or condition they consider is, or may be, unsafe.

IMCA members have reported more than 10 incidents this year involving dropped objects or dropped object near misses. In last year's (2013) IMCA contractor member safety statistics, 23% of reported LTIs were caused by persons being struck by moving or falling objects.

Members are reminded of IMCA promotional material as follows:

- Pocket card IMCA SPC 06 – *Working at height;*
- Pocket card IMCA SPC 12 – *Avoiding dropped objects;*
- Poster IMCA SPP 04 – *Avoiding dropped objects;*
- Working at height DVD – click here.

6 Near Miss: Inadequate Insulation of 690V Bus Bars

A member has reported a near miss incident in which 690V bus bars were found with inadequate insulation. The 690V switchboard had been isolated for a survey, and the panels were opened for inspection. It was observed that not only had the breakers been removed, but the bases had also been removed leaving exposed bus bars. It was also noted that the wire terminations were not fully insulated. The bus bars would be live when the switchboard is in its normal condition, and they have a degree of flexibility, so it is feasible that as they move with vessel vibration they could arc, causing significant damage and injury to personnel if they were present in the area.

Figure: showing blanks on the switchboard panel where breakers had been removed.

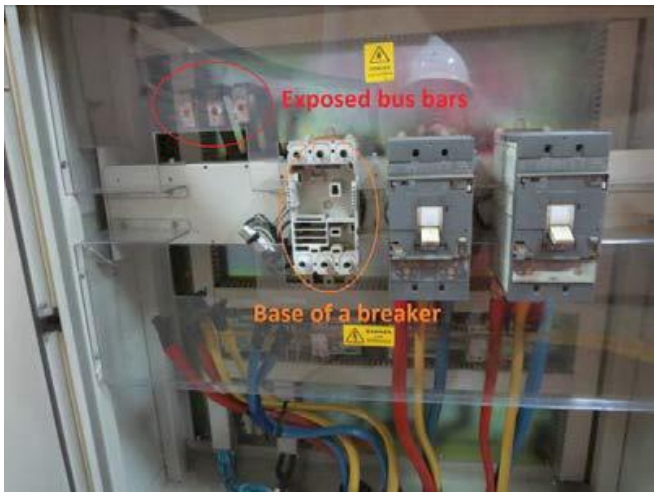


Figure: exposed bus bars

Figure: uninsulated wire terminals

After investigation, our member noted the following:

- Nearly three years previously, two further incidents had occurred in which there were significant breaker failures on the vessel 690V switchboard which had resulted in serious injury to personnel. Short term remediation work had been carried out at that time, and a survey for long term rectification works was being carried out prior to a maintenance period;
- During this survey it was noted that there were blanks on the switchboard panel where breakers had been removed. The missing breakers supply power to a tensioner that is currently not installed. The unused tensioner breakers had been removed to be used in other areas as the vessel had insufficient spares onboard to replace all the breakers impacted by the breaker failure. They were relocated some time ago with the vessel technical management being aware of this;
- Subsequent to the initial failure and prior to the most recent survey this switchboard had undergone a full health care check by a third party which also failed to identify these discrepancies;
- There was no check made to ensure that the third party contractor's work was carried out in a satisfactory manner;
- Spare parts were not effectively managed onboard, with parts removed as necessity at the time not being replaced;
- A management of change process was not used when the breaker and base were initially removed.

Our member concluded that:

- Work standards in insulating the terminations and leaving the bus bars exposed were unacceptable;
- Management of spare parts stock was inadequate and should be improved;
- Management of change and technical oversight needed to be improved;
- Continuity of handovers and outstanding priority works needed to be improved, especially as the personnel involved with the original incident were no longer serving on the vessel;
- Third party contractors require robust supervision and verification of completed work.

Members may wish to refer to the following similar incidents (key words: *insulation, breaker*):

- IMCA SF 02/10 – Incident 1. *Crewman received 440V electric shock*;
- IMCA SF 05/10 – Incident 1. *Near miss: burnt out electrical socket*;
- IMCA SF 06/12 – Incident 1. *Near miss: live electrical cable*.