IMCA Safety Flash 21/15

December 2015

IMCA is currently working on a different means of searching through safety flashes, initially the titles of safety flashes, but in the long term, ideally, also the content of the safety flash. What this means is that over the next few safety flashes there may be a change in emphasis in those "similar" events to which members' attention is drawn.

The focus or theme of this safety flash is lifting. All the incidents involve cranes, lifting or loading operations.

1 High Potential Near Miss: Safe Working Load (SWL) Plate Fell from Crane Auxiliary Block

A member has reported a near miss incident in which an object – a steel SWL plate weighing 0.7 kg - fell from a crane block onto the deck. The incident occurred when a crane fast line was being used for loading operations from the quayside. A banksman and two riggers were on the quay in the process of choking off the lifting slings and connecting them to the crane fast line hook. During this task a steel SWL plate (0.7kg) fell from the Crane Auxiliary Block which was not being used at that time. The SWL plate fell from approximately 71m in height and landed at approximately 5m away from the working party. The DROPS calculator tells us that such an object falling from such a height could have caused a fatality had it hit someone.

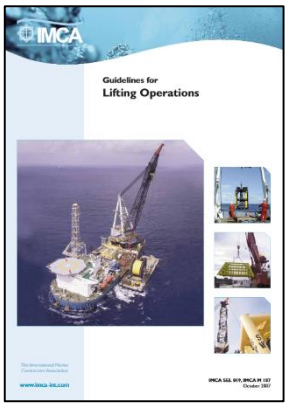
An all stop was called immediately and the crane was taken out of service.

Our member noted the following:

- The SWL plate fell from the crane auxiliary block and there were similar plates still on this block and on the main block. Both these blocks, and the whip line block, had all been replaced during the re-fit period to enable the crane to operate subsea for a particular project;
- The means of securing the plates was of poor design – several plates including the one dropped were attached by four rivets of dissimilar metals (aluminium vs steel) promoting galvanic corrosion process and salt water corrosion;
- All plates showed signs of corrosion behind the plate – however deterioration of the rivets was not visible on the plate surface;
- All plates were flush against their fixings and looked secure to any visual inspection;
- There was no significant weather at the time of the incident.

The plates were removed. SWL and other identifying information was stencilled on the crane instead. There was an inspection of similar hook blocks elsewhere to verify that there were no loose objects or unsecured plates. The crane supplier/manufacturer was informed of the incident (lessons learnt to prevent further reoccurrence).

There had been a rash of similar incidents in recent years where objects not relating to the load have fallen from cranes. Members may wish to refer to the following incidents (search words: *crane, dropped*):



- IMCA SF 04/11 Incident 1 – *Crane boom dropped object;*
- IMCA SF 15/14 Incident 1 – *Dropped object near miss – unsecured plastic box fell from load being lifted by mobile crane;*
- IMCA SF 02/15 Incident 1 – *Dropped object near miss: falling crane block;*
- IMCA SF 10/15 Incident 1 – *Near miss: dropped object fell from crane boom;*

Members are reminded of IMCA SEL 019 – *Guidelines for lifting operations.*

2 Dropped Object Near Miss: Small Parts Falling From Crane Rest

Two members have reported incidents in which a Teflon pad fell from a crane rest during the parking of the crane.

Incident 1

During piling operations on a chartered vessel, the crane had been used to recover an upending tool to deck. After de-rigging the crane, the riggers left the deck, while the crane operator proceeded to park the crane. Upon placing the crane boom in the rest, a Teflon pad weighing 6.9kg, dropped 8.8 meters from the starboard side of the crane rest down to the deck. The pad dropped directly to the deck and landed in an open area, just aft of the crane rest.

Had a person been hit by a dropped object of this weight falling from this height, a fatality could have been the result.

Teflon pad.

Location of Teflon pads on crane rest.

Our members' investigation noted the following:

- Although at the time the incident was reported to the officer on watch, the company was not informed of the incident until approximately two days later, in which time the crane had been used several times with an identical pad still in situ on the port side of the crane rest;

- Inspection of the dropped pad revealed that sheared parts of only two of six securing bolts remained in the pad;
- A similar incident had occurred on the same vessel some 10 months earlier, where the pad was found to be loose due to sheared retaining bolts;
- This earlier occurrence had not been investigated, allowing a repeat incident to occur with greater consequences;
- The Teflon pads and their retained bolts were inadequately or poorly designed;
- More frequent inspections of crane rest pads should be conducted to identify defects.

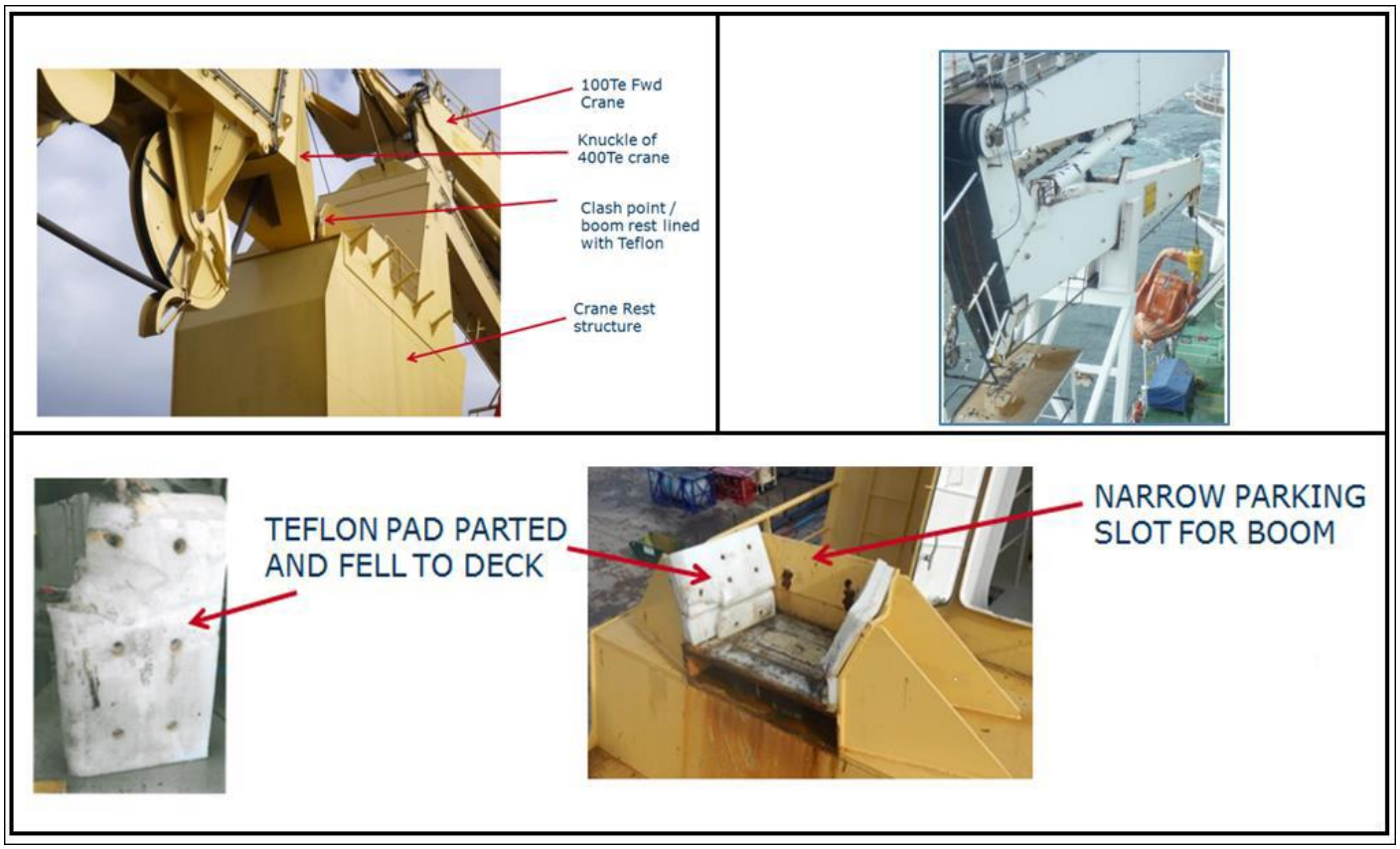
Our member concluded that the fundamental design of the pad was flawed. The purpose of the pad is to buffer impact and movement between the crane and the crane rest to provide protection to the crane boom during parking, stowage and start up. The weakness in the design was demonstrated by the fact that this was the second similar incident to have occurred. Additionally, had the earlier incident been investigated and remedial action taken, this second incident need not have occurred.

Our member took the following actions:

- Inspection of the condition of crane rest pads and associated retaining bolts;
- Addition of crane rest pads to planned inspection/maintenance routines;
- Considered the use of secondary retention devices on crane rest pads;
- Reinforced the importance of reporting incidents in a timely manner;
- Ensured deck crews took a "Time Out for Safety" (TOFS) to reinforce safe crane technique, including the requirement to bank the crane at all times – including parking and releasing the hook/headache ball from its stowage box.

Incident 2

A member reported frequently dropped objects from crane rests during parking and when the crane boom was raised out of the crane rest. The falling objects had been Teflon or wooden landing pads, rubber protection, steel cover plates and nuts/bolts. An example is highlighted below:



Our member identified the following causes:

- The crane rest had a tight fit/narrow parking slot for the crane boom;
- The crane rest protection cracked and although bolted dislodged as a result of everyday contact from the crane boom;

- Additionally it was difficult to monitor the landing/raising of the crane boom from the crane cabin.

Our member took the following actions:

- Teflon pads have been re-secured using larger washers on the bolts to prevent the bolts from being pulled through the Teflon/rubber, and a secondary chain has been attached to prevent the Teflon/rubber from falling to deck;
- Area around boom rest barriered off before parking/raising the crane boom;
- A dedicated spotter has been used to monitor the crane parking/raising operation;
- Cameras installed to aid inspection of the crane boom rest and assist parking/raising.

Members are recommended to:

- Ensure that all appropriate personnel are aware of the potential for clashes between the crane booms and the boom rest protection;
- Check the condition of Teflon/rubber protection in the crane rests;
- Where necessary, use a spotter to assist with parking/removal of the crane boom in/from the rest;
- Always control the area around the crane boom when parking/lifting the crane boom from the crane rest;
- Highlight awareness of how vessel motion can have a negative impact on crane movements.

Members may wish to refer to the following similar incidents (search words: *crane, parts, dropped*):

- IMCA SF 10/15 Incident 1 – *Near miss: dropped object fell from crane boom;*
- IMCA SF 11/15 Incident 5 – *Near miss dropped object: protector plate drops from crane.*

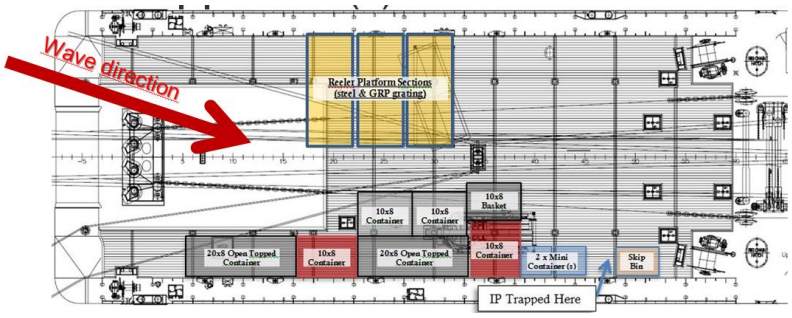
These incidents serve to highlight the need to pay further careful attention to crane maintenance and to the clear risk of parts falling from the crane itself, in addition to managing the risk of objects falling from the load.

3 Fatality During Loading Operations

A member has reported an incident in which a crew member was struck and fatally injured by a mini-container whilst working on back-loaded cargo from a drilling rig. The incident occurred when heavy seas struck the vessel causing sudden movement of landed cargo, upon which the crew were still working to make it fully secure. The movement of this cargo resulted in a crew member being trapped between a mini container and a skip bin. The vessel crew responded to the injured person, releasing him from between the mini container and the skip, and administering first aid and CPR. He was further attended to by a medic who was transferred from the drilling rig. The injured person was transferred to the rig but could not be revived.

The vessel had been alongside the rig for a number of hours during the night, during which time six loads had been transferred to the rig and nine loads (mostly empty containers) back-loaded from the rig. After four hours the weather had started to deteriorate. The chief officer of the vessel advised the drilling rig that the vessel would be ceasing cargo operations and that the drilling rig crew should stop any further loading. The vessel moved approximately 30m away from the rig (still sitting in the lee of the rig for additional shelter). Seas at the time were running between 2m and 3m and the wind was 24 knots, gusting to 36 knots.

During this time the deck crew continued work on securing the cargo. Two Able Seamen (ABs) working on the deck decided that the sea fastening arrangement was not adequate to restrain the two mini containers located at the forward end of the deck. Additional rigging was required to rectify this, and one of the ABs left the deck to go to the nearby rigging store. The tension on the tugger winch was released to facilitate installation of the new rigging. A large wave crashed over the back deck of the vessel and travelled along the length of the deck, with the force of the wave causing movement of some of the landed cargo. The movement of this cargo resulted in the ABs becoming trapped between a mini container and a skip bin, with fatal consequences.



Plan view of vessel.

Photographs showing scene of incident.

Our members' investigation identified the following immediate causes:

- Working in and around unsecured cargo had become part of a familiar routine;
- A vessel with an open stern being used for cargo operations;
- Wave struck cargo;
- Cargo shifted 3-4 m on deck aft to forward;
- The crewman involved did not get out of the "line of fire" or hear the bridge warning over UHF radio.

Our members' investigation identified the following root causes:

- Vessel operations in the 500m rig zone are not recognised as Simultaneous Operations (SIMOPS) for the rig and vessel. There was no process in place to ensure effective communications, load sequencing, deck layout planning, cargo securing plans and optimizing time of vessel alongside rig in Dynamic Positioning (DP) mode;
- The potential for injuries to crew undertaking cargo securing tasks offshore on Anchor Handling Tug Supply (AHTS) vessels (due to open stern) had not been identified as high risk;
- No risk assessment had been carried out for suitability of AHTS vessels performing cargo operations;
- The vessel procedure for cargo loading and unloading did not describe a cargo lashing plan, and although there was a risk assessment for cargo loading, there was no specific risk assessment for the work activities associated with the further securing of landed cargo.

Our member took the following actions, with a view to minimising the risks associated with cargo operations to As Low As Reasonably Practicable (ALARP):

- Further detailed risk assessment for AHTS conducting cargo operations. Risk assessment should include consideration of engineering controls to minimize excessive water on the vessel back deck (stern door or use of other vessel type);
- A review and update of company adverse weather working guidelines;

- A review of company cargo loading procedure to include cargo lashing arrangements, and further risk assessment for securing cargo;
- A review and update of company cargo securing procedure and risk assessment to include the requirement for a lashing plan and load sequence planning with rig before entering the 500m zone.

The Marine Safety Forum (MSF) has published a number of incidents in recent years drawing the attention of marine contractors to incidents during cargo operations. These have all been passed to members as IMCA safety flashes, but the details will need to be sought from the MSF, whose website is not available at the time of publication of this safety flash. Brief details are set out here:

- IMCA SF 11/12 Incident 5 – *Able Seaman injured by shifting cargo* – a crewman was injured by unstable cargo that shifted when the vessel rolled;
- IMCA SF 09/13 Incident 3 – *Securing of cargo* - in which incorrectly stowed cargo toppled over due to the vessels motion on encountering unexpected adverse weather conditions. The equipment was incorrectly positioned during the outbound load out and was not secured;
- IMCA SF 14/13 Incident 2 – *High potential near miss during cargo operations* – two crewmen narrowly escaped severe crush injuries whilst engaged in cargo back-loading operations alongside a platform. Owing to inadequate communications, a load was lifted and began to swing without warning to crew working on deck.

4 Near Miss: Corrosion Caused Crane Boom Failure During Heavy Lifting

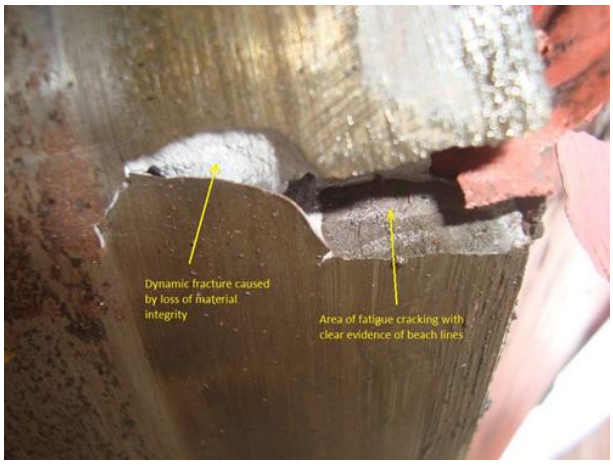
A member has reported an incident in which a crane boom failed under load while lifting a 37T load. The incident occurred after the load was taken up by the wire. The operator then attempted to boom up in preparation to swing the load from the jetty to the vessel. Almost immediately on booming up, the operator heard a loud bang and the load dropped approximately 30cm.

On investigation, it was found that the boom had buckled and cracked. The load was de-rigged safely; there were no injuries, nor was there any secondary damage to the load being lifted, or to the vessel.

The crane boom was disassembled and an investigation was carried out. Our member noted the following:

- A large crack along the welded boom section was discovered which appeared to be old fatigue cracking and internal corrosion of the boom which evolved into a catastrophic materials failure;
- The crane had undergone recent testing by a third party, which did not discover the cracking;
- Testing/certification of the crane did not include Non-Destructive Examination (NDE) of critical areas;
- Several management failings were reported but none of these directly contributed to the incident.

The main cause of the incident was found to be material failure.



Showing close-up of corrosion

Showing point at which crane boom bucked (marked)

The lessons learnt were:

- Lifting procedure was good and allowed accommodation of an unforeseen catastrophic failure;
- Because the operator kept the load as low as possible and no one was in the path of the load there were no injuries or damage beyond the crane itself;
- A more thorough NDE planned maintenance/inspection plan should be drawn up for this type of lifting device to include a spot check Magnetic Particle Inspection (MPI) or similar after-load testing of critical stressed areas - perhaps including life span of critical components.

Our member took the following actions:

- Reviewed the crane planned maintenance system;
- Researched capability and cost of NDE to determine an appropriate amount of inspection versus risk.

In this case, to draw members attention to failures of equipment in general (13% of all incidents), crane incidents (5% of all incidents), or to incidents including the words "boom" (6 incidents) or "corrosion" (4 incidents) may not add any real value.

The following incident may be of interest:

- IMCA SF 11/08 Incident 1 – *Catastrophic failure of vessel main crane wire.*