Safety Flash

05/23 – February 2023

IMCA Safety Flashes summarise key safety matters and incidents, allowing lessons to be more easily learnt for the benefit of all. The effectiveness of the IMCA Safety Flash system depends on members sharing information and so avoiding repeat incidents. Please consider adding **safetyreports@imca-int.com** to your internal distribution list for safety alerts or manually submitting information on incidents you consider may be relevant. All information is anonymised or sanitised, as appropriate.

1 LTI: person crushed in watertight door

Applicable Life Saving Rule(s)

What happened

An electrician was crushed and severely injured while working on a watertight door on a vessel. He was evacuated by helicopter. The incident happened when the door opened unexpectedly, during adjustment of a proximity sensor for the door.

Just before this adjustment, the electrician had closed a ball valve in the hydraulic system, believing this was a safety valve which would prevent the door from opening. Once working on the system, the selector switch on the primary operating system, which is used to open and close the watertight door, did not return to the neutral position enabling a signal to be sent to the PLC (programmable logic controller). When the electrician manually aligned the sensor which he had to repair, a signal went to the PLC and the door opened unexpectedly crushing him between the door and the deck.

Vertical watertight door

Watertight door opening on dummy (DEMONSTRATION)

What went wrong

- The system was not isolated at the time of the incident – no Lock-out/Tag-out of system was in place;
- There was no request for a Permit To Work (PTW) nor was a Job Safety Analysis (JSA) prepared for the activity;
- The ball valve did not isolate the hydraulic system:
  - The ball valve was not a safety valve;
  - The ball valve was leaking.
- The door opened when the command “open” came in from the PLC. This command came in because the selector switch was damaged and did not return to the neutral position once released;

Selector switch

- When the door is operated, visual and audible alarms are initiated. The alarms and signals were not fully operational nor working.

Lessons learned

- Ensure energised systems are isolated and locked out before working on them;
- Ensure there is a Permit To Work in place, a Lock-out/Tag-out procedure, and a suitable and sufficient job safety analysis before you start;
- Hydraulic system ball valves are not “safety valves”. Take care that you fully understand what you’re working on, and ensure systems are fully de-energizing before putting yourself in the line of fire;
- The switch on the primary operating system was not in working condition but there were not sufficient spares on board to replace them. Sufficient spare parts should be on board, so these can be replaced immediately.

Members may wish to refer to:

- Fatality: Crew member crushed between TMS and snubber ring *[equipment under maintenance, not isolated]*
- LTI: head injury *[person injured by a provisions lift under maintenance]*
- Lost time injury (LTI): Stored pressure release – Crewman lost an eye *[poor risk awareness, no Permit to Work, no Lock-out/Tag-out]*

2 LTI: finger crushed while moving mobile gantry crane

Applicable Life Saving Rule(s)

Bypassing Safety Controls | Line of Fire

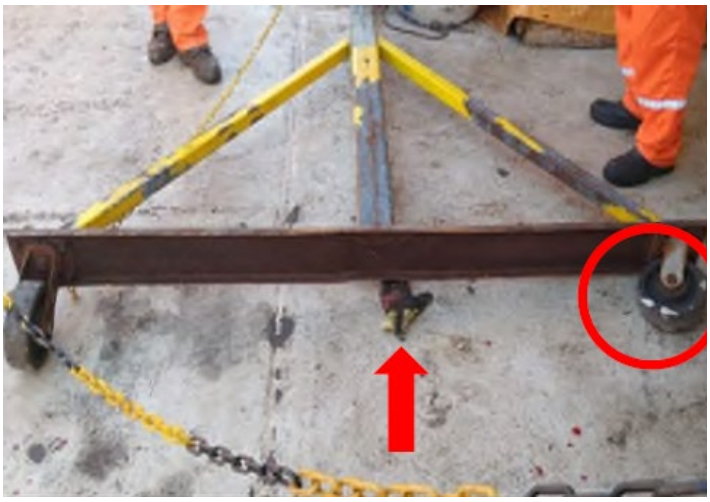
What happened

A crew member suffered a crushed index finger during manual handling of heavy equipment. The bosun, the deck supervisor and two others were working on disassembling the mobile gantry crane to move it to another location. They successfully took the gantry to pieces and manually moved one of the support legs. They decided to use a pallet trolley to shift the second support leg. They found that they could not get the second support leg (on the pallet trolley) past the first support leg which was blocking the way. So, theZ deck team attempted to manually reposition the first support leg.

The injured person (the bosun) started dragging the first support leg, without waiting for help, by grabbing its base from below. As he did so, a vertically positioned wheel turned, causing the support leg to collapse onto his finger and crush it against the deck. First aid was provided and the bosun had to be medevaced for further treatment ashore.

Mobile gantry crane *image: www.hoistuk.com/products/portable-mobile-gantry/*

Grabbing the base of the support leg (simulation)



The wheel on the right turned, causing the leg to collapse

What went wrong

- There was inadequate planning, lack of communication, lack of supervision, and lack of experience in handling manual loads;
- Company procedures were not followed: the Risk Assessment was inadequate. No account was taken of:
  - The weight of the gantry;
  - How many people would be needed to move it safely;
  - The technique to be used and the route through which the loads would be moved.
- **No-one stopped the job** – "*What are we doing here? Let's just stop a moment and re-assess the situation…*"
- There was insufficient safety awareness of the considerable "line of fire" risks faced – no attention was paid to the pinch point risk.

Actions taken

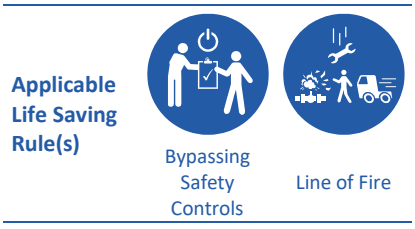
- The company discontinued the use of this very heavy steel mobile gantry crane with no safety locks on the wheels, and replaced it with a new, much lighter Aluminium mobile gantry crane with wheel safety locks;
- Easier access between port and starboard deck areas was created by modifying (extending) the height of cable tray pipes to avoid the necessity of assembling/disassembling of the gantry crane before movement;
- Re-emphasised crew training on Permit to Work and Risk Assessment – with particular emphasis on identifying the Hazards related to Pinch Points;
- Conducted further training with on-board leadership on the importance of applying safety tools such as toolbox talks, "step back and take 5", stop work policy, etc.

Members may wish to refer to:

- Fatal incident during change-out of chain wheel (gypsy) on anchor handling tug supply (AHTS) vessel *[Contributing factors were inadequate design for this task, and insufficient lifting or handling appliances for the task]*
- Finger injury during maintenance work – restricted work case *[no-one stopped the job; they carried on with an unplanned – and hazardous – solution to a problem]*
- Fractured finger while handling metal plates *[the task was unsafe by design; there were generic risk assessment, and manual handling was not properly risk assessed at all]*

3 LTI: crew member crushed finger when opening fire flap

What happened

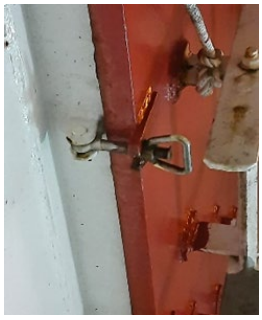


A crew member injured his finger while opening an emergency fire flap. The incident occurred after an annual test of the deluge system during which the emergency fire flaps had to be closed. Two crew members were releasing the securing butterfly nuts on the fire flap for the emergency generator. The final nut would not release owing to air pressure on the flap. A rope was attached to the hatch and pulled to reduce the pressure, to allow the butterfly nut to be released and to prevent potential uncontrolled swing of the hatch due to pressure build up. As the last butterfly nut was released, one of the workers got his index finger accidentally jammed between the hatch door and the frame as his colleague was still pulling the hatch in the opposite direction. His finger was crushed; he was sent ashore to hospital, where X-rays revealed a broken finger.

What went wrong

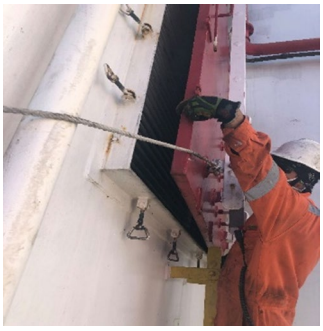
Our members' investigation noted the following:

- Risk seen as tolerable – the work party considered the work to be safe. There was inadequate understanding of the risks involved: opening and closing of fire flaps was not captured during Toolbox Talks, nor in the Risk Assessment for the annual inspection on the deluge system;
- There was a lack of proper planning, and there were inadequate resources – the weight of hatch door was not taken into consideration when assigning the job. Also an inappropriate tool was used (a rope) to ease the pressure on the nut;
- No Stop Work authority was exercised – The job should have been stopped and reassessed when the team came across difficulty in releasing the nut.

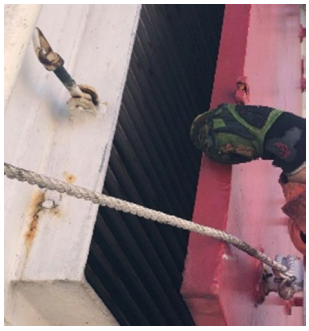


Unable to release one butterfly nut

AB to tie a rope and pull the hatch in the opposite direction in order to ease the pressure. (AB cannot see colleague)



Butterfly nut finally released…



Trying to open the hatch while AB is still pulling the rope in the opposite direction. Finger caught when hatch closed

Lessons learned

- Ensure suitable and sufficient risk assessment is conducted for all tasks, whether routine or non routine, and that all aspects of the task are covered;
- Ensure all personnel involved in any operation are properly briefed in detail during toolbox talks regarding hazards associated with the task, and controls in place to ensure safe and smooth operation;
- Risk Assessments and toolbox talks are not one-way conversations, but an opportunity for ALL team members to speak up and ask questions, discuss the task, ensure all control measures are in place and that everyone is clear on their duties and responsibilities during the job;
- If you need to change things, don't just carry on: exercise the Stop Work Authority. Stop, step back, and reassess the task to find a safer, easier alternative;
- Understand "Line of Fire" – see IMCA short video here and longer video here.

Members may wish to refer to:

- Injury caused by closing fire flap
- Lost time injury (LTI): leg injured while dealing with vent flaps
- Finger injury: pinch point

4 High potential incident: person struck by Yokohama fender

Applicable Life Saving Rule(s)

Bypassing Safety Controls | Line of Fire

What happened?

During the lifting of a Yokohama fender onboard a vessel in harbour, a person placed himself in the line of fire between the fender and bumper bars protecting an electrical services panel. He was struck and injured as the fender moved. The injured person had to move into the line of fire between the fender and the bumper bars in order to release cargo strap sea fastenings from the fender which were attached to the vessel bulwark. At this point the Yokohama fender pivoted and he became trapped between the fender and the bumper bar frame. Operations were immediately stopped and the vessel medic was called. The injured person was taken to a shore-side hospital for further examination. After medical examination he was released back to the vessel the same day.

Post Incident re-enactment – where the person stood at the time of the incident

What went wrong

- In this particular instance, this Yokohama fender was not accessed from the rear, as was usual, but from a position that put the crewman in the line of fire;
- Neither the vessel task plan nor the Task Risk Assessment (TRA) for mooring operations included the lifting and installation of Yokoyama Fenders, nor did they take into account the line of fire risk;
- Human factors and risk perception - the injured person did not wait for the Yokoyama fender to stabilise before going into the line of fire. The incident occurred very fast; there was no time for the other members of the team to react and intervene.

Yokohama fender and bumper bar positioning

Cargo strap sea fastening still attached to Yokohama fender

Actions taken

- Reviewed how Yokohama fenders are stored on board vessels, with reference to reducing and controlling Line of Fire risks in the task of securing and relocating fenders;
- Reviewed vessel task plan and risk assessments for mooring operations, to ensure inclusion of:
  - lifting and installation of Yokohama fenders where appropriate;
  - Line of fire, personnel positioning, entrapment risks and escape routes.
- Heightened focus on controls, barriers, and risk management where Line of Fire risks have been identified;
- Considered regular “After Task” reviews as a key part of task planning to focus on learning, safety, and human/performance improvement;

- Ensured that the obligation and expectation to exercise the Stop Work Authority is clearly communicated and understood by all parties. Always ensure an area is safe before entering after an All Stop has been called.

Members may wish to refer to:

- Near miss: load lifted without notice putting crew in the line of fire
- Non-fatal man overboard incident ["*Whilst retrieving the forward mooring rope from the sea (which was stuck between the forward Yokohama fender and the barge at the time)…*"]

5 LTI: Carbon Monoxide (CO) poisoning during Oxy-Acetylene brazing

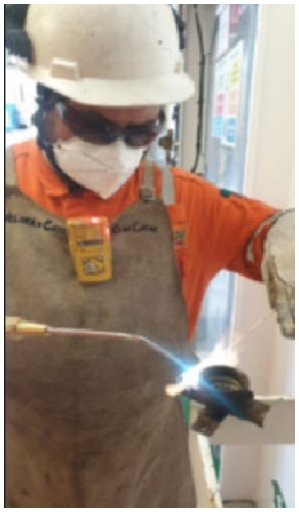
Applicable Life Saving Rule(s)

Bypassing Safety Controls

What happened

A crew member suffered from Carbon Monoxide (CO) poisoning during oxy-acetylene brazing. The incident occurred when the crew member was involved in the repair of a broken valve, part of the Freon pipe system for refrigeration. While doing the brazing on the gas return isolation valve, the crew member felt unwell, but continued the job. The task was completed after one hour and then the crew member felt breathing difficulties, was coughing and experienced chest pains. After a coffee break, the crew member sought medical assistance on board. Medical assessment showed had low oxygen saturation level. A medevac was activated due to possible respiratory distress or even heart problems.

Faulty gas return line valve



Atmosphere Gas Test (no mask was used in actual incident)

What went right

- The method statement for repair was to use oxy-acetylene brazing and TIG (Tungsten Inert Gas) welding methods;
- All safety controls such as Hot Work PTW, Risk Assessment, Toolbox Talk were in place for the job.

What went wrong

- The crew member did not wear a face mask during the welding job. The company's procedures did not require the wearing of a face mask for this gas welding, although the wearing of a face mask was identified as a control measure in the risk assessment;
- The risk assessment for the job was incomplete:
  - Wearing of a face mask was indicated in the PTW as an "additional protection only";
  - The need for a portable exhaust ventilation system was not identified for this working area;
  - The risks and hazards associated with TIG welding were not identified;
- The crew member did not take regular breaks during the task as indicated in the Risk Assessment, and kept on working when he felt ill rather than stopping and reconsidering;
- The crew member was unaware of the risks and hazards associated with TIG welding. The molten metal gives off molecules of metal and ozone which are harmful to respiration.

Lessons learned

- Review condition and availability of portable exhaust ventilation equipment onboard and order more if required;
- Wear a welding mask when carrying out welding jobs;

- Review Risk Assessment for the task with regard to:
  - Use of portable exhaust ventilation systems to ensure adequate ventilation;
  - Duration of exposure time and rest periods.
  - Regular testing of air in areas where CO may be present;
  - Risks and hazards associated with Tungsten Inert Gas (TIG) welding.
- Use respirators with appropriate canisters, in conjunction with personal CO monitoring, for short periods under certain circumstances where CO levels are not exceedingly high (OSHA PEL for CO is 50ppm of air averaged during an 8-hour time period);
- Further appropriate refresher training for welders on risk and hazards of all types of welding used onboard;
- Further education for all crew about the sources and conditions that may result in CO poisoning as well as the symptoms and control of CO exposure.

Members may wish to refer to:

- SIMOPS – Smoke from hot work task enters confined space
- USCG: two alerts relating to gas releases