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 Structural failure of rescue boat

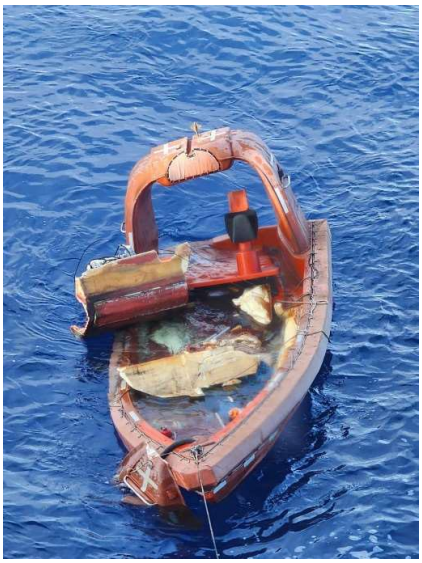
Applicable Life Saving Rule(s)

Line of Fire

What happened

A rescue boat suffered a catastrophic structural failure whilst unattended on the davit. Whilst no activities were being performed by crew on the rescue boat station, the structure of the boat failed causing the lifting frame and the console assembly to be torn off the hull. The hull then dropped into the sea. The remains of the rescue boat were retrieved for further investigation. There were no injuries.

Immediately after the incident, a general alarm was sounded and a muster was conducted to ensure everyone was present and no-one was injured or overboard. The area near the rescue boat station was isolated, and a supply ship with available rescue boat was contracted to be in the vicinity of vessel having lost her rescue boat.



What went wrong

Investigation showed that

- Forces applied to the fall wire were either equal to or greater than a 1.1 x overload test, as observed on the shock absorber displacement during factory acceptance testing of the boat;
- There were signs that the hydraulic cylinder (shock absorber) was being over-compressed;
- The accumulator of the hydraulic cylinder (shock absorber) was found to be pre-charged with a pressure above that used during the factory acceptance testing of the boat;
- The operations manual provided did not make it clear enough that manual cranking of the davit could cause a possible overload of the load-bearing structure of the rescue boat;

- It was possible for an average crew person to apply sufficient force to the manual cranking handle as to overload and collapse the load-bearing structure of the rescue boat.

What was the cause

Constant excessive force applied to the lifting frame of the boat, eventually led to the lifting frame and the console assembly being torn off the hull. There was constant excessive force applied to the lifting frame of the boat because the shock absorber was unable to absorb the forces caused by excessive manual hand cranking. This happened because:

- The operations manual did not make it clear that it was possible to overload the boat lifting frame by hand cranking the davit;
- The crank lever system available had no means of monitoring or controlling the loads being applied;
- The ongoing damage to the boat and its lifting structure had not been spotted by OEM yearly inspections;
- The shock absorber hydraulic cylinder (shock absorber) was not properly maintained;
- The method of stowing the fast rescue boat not using a cradle but pulling the boat structure against the vertical stoppers increased the likelihood of severe structural damage.

Actions taken

- A technical alert was issued to the fleet and all similar rescue boats were duly inspected;
- The hand crank assembly was replaced by a torque wrench, which permitted some control of the hand cranking forces applied to the rescue boat;
- The stopper on the davit was modified;
- Improved site acceptance and on-site assessment when installing equipment from an OEM, including thorough toolbox meetings between vessel engineers and third-party (OEM) representatives on site;

Lessons learnt

- Ensure authorised service personnel service and maintain critical components of lifting equipment;
- Ensure that pressures in hydraulic components such as accumulators are set correctly and are fully understood by the users.

Members may wish to refer to:

- Lifting frame detached from fast rescue craft (FRC)
- Damage to rescue boat during lowering
- High potential near miss – Rescue boat davit failure (MSF)

All incidents and events used as part of IMCA Safety Flashes are dealt with, and will continue to be dealt with, using **full anonymity and the strictest confidentiality**. However for this particular incident our member Constellation Oil Services is happy to be contacted for any further information. Please contact tjordani@theconstellation.com in this instance.

2 High potential: spontaneous opening of Hydraulic Release Shackle (HRS) pin

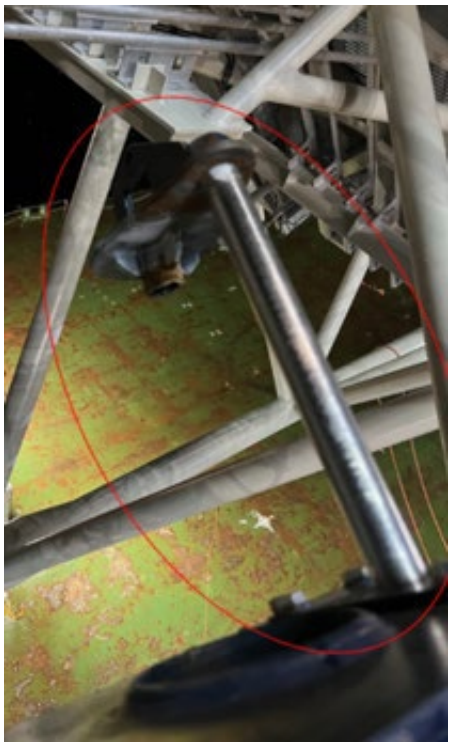
Applicable Life Saving Rule(s)

Bypassing Safety Controls

Safe Mechanical Lifting

What happened

During lifting operations on a vessel, a hydraulic release shackle pin opened on its own. The incident occurred when the main crane auxiliary block was connected to the flare lifting slings, hydraulic hoses, and Hydraulic Release Shackles (HRS). A blue colour coded HRS spontaneously opened from its original secured position and dropped approx. 4-5 meters from its position and was left hanging from the hydraulic hose. An “All STOP” was called. No-one was harmed.



Broken connection

Bent connection plate

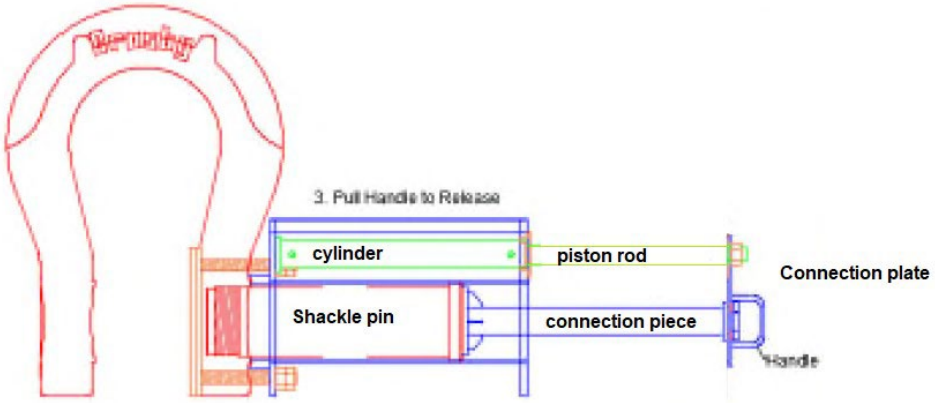


Diagram of the Hydraulic Shackle set-up

What went wrong

After rigging back the 'blue shackle' to its position and performing function tests to this same shackle and the other 3 HRS units, it was then identified that the 'yellow colour coded' HRS was damaged (broken piston) and further damage was identified to the initial 'blue colour coded' HRS (bent piston rod). The operation was subsequently abandoned.

Our member's findings included:

- There was some complacency: assumptions and decisions were made without full compliance or verification against requirements (manufacturer manual, company procedures, etc.);
- The way the job was to be done, was changed before it started, without any form of Management of Change process taking place.
  - The method chosen was to do set up the hydraulic release shackle (HRS) using vessel crane Hydraulic Power Unit (HPU). There was evidence that the procedures and manufacturer's requirements for operating the vessel crane Hydraulic Power Unit were not adequately complied with;

- There was evidence that some crew involved did not comply with and were not even aware of, certain other procedures and documentation pertaining to this work;
- There was no operational risk assessment, nor task risk assessment for the change of set-up, and general non-compliance with procedures;
- An opportunity was missed to have detailed review of the risks and controls for the HRS system and its compatibility to the vessels crane hydraulic system.

Lessons

- Communication: there was less than effective communication between the main parties involved in this operation;
- Remain curious: take nothing for granted. Keep questioning all aspects of what may go wrong. Ask "What if?" Dedicate time to go through all potential risks to consider and implement adequate mitigation controls;
- If in doubt, **STOP the JOB!!**
- Addressing change: ensuring we respond to the need for change in an open-minded and positive way.

Actions

- Ensure all decisions made regarding changes to critical equipment set up are conducted in line with manufacturer requirements;
- Conduct general review for similar equipment across projects and worksites.

Members may wish to refer to:

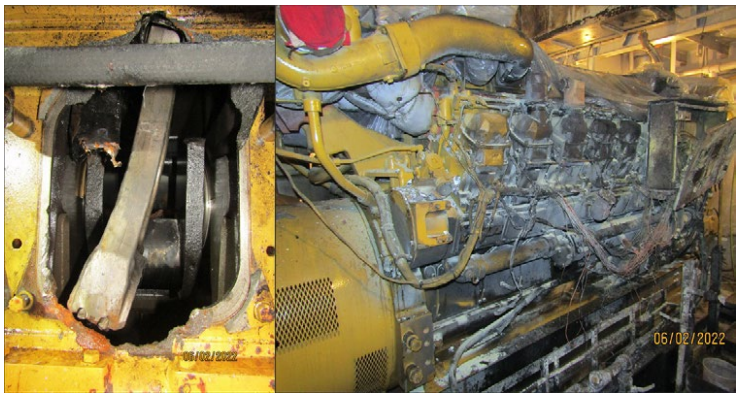
- Near-miss: Rigging recovered with missing nut from tri-plate shackle
- Near-miss: Missing nut and split pin on shackle

3 NTSB: Diesel Generator Engine Failure

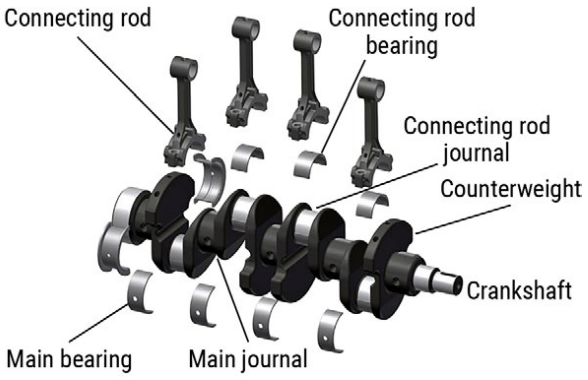
The National Transportation Safety Board of the United States (NTSB) published "Safer Seas Digest 2023", which includes a number of incidents which may be of interest to IMCA members. This is one of them.

What happened

An offshore supply vessel was conducting sea trials after a long period of maintenance, when its no. 3 main diesel generator engine suffered a mechanical failure that resulted in a fire in the engine room. The crew extinguished the fire before it could spread throughout the vessel. There were no injuries nor pollution reported, but damage to the vessel amounted to around $1.1 million.



Damage to crankcase and connecting rod of no. 3 main engine



Typical components of a diesel engine crankshaft

During the maintenance period, service technicians identified a standard-sized connecting rod bearing on the no. 3 main engine that did not meet the service company's specifications and, in accordance with their policy, replaced all the connecting rod bearings with standard-sized bearings. They also removed and inspected the no. 6 main bearing, which, unbeknownst to them, was undersized with a smaller inner diameter.

Because none of the connecting rod bearings they replaced had been machined, the technicians used standard-sized bearings to replace the no. 6 main bearing, since it was the service company's expectation that both main bearing journals and connecting rod bearing journals would be machined at the same time. There was no record of the main bearing's part number in the service technician's notes; therefore, the technician likely did not identify and record the part number. The service company's standard practice was to replace any removed bearings with new bearings, so a new standard-sized bearing was ordered and installed.

After maintenance was completed, sea trials were scheduled to test and ensure the proper operation of the vessel's engines, propulsion systems, and automatic power management system. During the tests, with the two stern thrusters about 75% load, and the no. 3 main engine about 30% load, the engineering crew in the ECR heard a "large bang" and observed smoke in the engine room. No. 3 main engine experienced a catastrophic mechanical failure. The no. 6 main bearing's incorrect size allowed lube oil to leak from the larger clearances of the bearing in the no. 3 main engine, thus decreasing the lube oil supply pressure to the adjacent nos. 9 and 10 connecting rod journal bearings. The loss of lube oil supply pressure resulted in a rapid temperature increase of the connecting bearings and subsequent fracturing of the bearing cap bolts on the nos. 9 and 10 connecting rods. As a result, several engine components broke free while the engine was running. These components were strewn about the crankcase, blew open the inspection cover and part of the engine block, and allowed hot oil and gas to start a fire in the engine room.

The crew's response to the fire was timely and effective. They quickly stopped the running engines, isolated all fuel supplies, shut down engine room ventilation systems, and closed the space's air dampers and watertight doors to effectively starve the fire of fuel and oxygen, thereby preventing its spread. After the captain called for help, tugboats quickly returned to the vessel to assist it as the crew fought the fire. Additionally, the crew activated the vessel's fixed CO2 fire extinguishing system, which effectively diminished and smothered the fire.

What was the (probable) cause

Investigation revealed that the probable cause of the mechanical failure of the no. 3 main engine and resulting fire was the replacement of a crankshaft main bearing with an incorrectly sized bearing during a previous engine overhaul. Engine service technicians did not correctly identify the removed bearing's part number, which resulted in the loss of lube oil pressure in adjacent connecting rod bearings.

Lesson

When maintenance is performed, correct replacement of machinery components is critical to ensuring safe and reliable vessel operation. Vessel crews and equipment manufacturer technicians should carefully identify and document part numbers of all components removed from shipboard equipment. Tracking systems are an effective form of record-keeping that can be used to ensure proper replacement part selection for reinstallation.

Members may wish to refer to:

- Incorrect information in user manual for fixed fire-fighting system
- Live sub-surface power cable inadvertently cut
- Equipment found live: drawings incorrect for Lock-out/Tag-out
- Incorrect as-built drawing configuration

4 LTI: fall from height during anchor chain handling operation

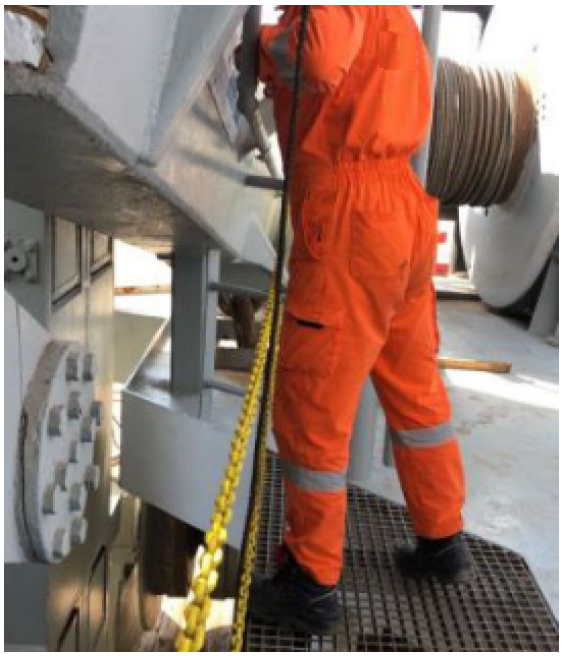
Applicable Life Saving Rule(s)


Bypassing Safety Controls


Working at Height

What happened

A worker fell through an opening from one deck to another, and was injured as a result. The incident occurred on an AHTS (Anchor Handling Tug Supply) vessel preparing for a pre-lay operation offshore. Three crew members were involved in the operation: the bosun (who was injured) and two ABs. An AB passed the tugger wire to the bosun, who was then supposed to hand it to the other AB standing on the chain road, for him to attach it to the end of the anchor chain.



"A" deck – the place from which the bosun fell, illustrating the chain he potentially stepped on

According to the CCTV footage reviewed, the bosun put one foot on the chain barrier while passing the wire over. However, as he attempted to move his second leg, he fell through an opening between two chain barriers and landed 2.75m below on the main deck. First aid was administered onboard, and a vessel doctor called for further assessment. The bosun was subsequently transferred to shore for further medical evaluation. He suffered multiple fractures to his right leg and broke a rib.

What went wrong

- The injured person placed his foot on an unstable surface (the chain barrier), which led to the fall;
- There was a lack of proper planning and risk assessment: The specific activities involved were not covered under the anchor handling risk assessment, meaning important considerations, such as safe access to the chain road, were not properly evaluated;
- There was a lack of focus and hazard perception: The potential risk of falling while stepping over an unstable chain was not understood.

What can be learned?

Our member suggests that this incident highlights several critical areas for improvement in planning and implementation of high-risk activities.

- Greater care when accessing locations at height – only correct, proper, secure, stable, and purpose-designed platforms and equipment should be used;
- Better identify potential fall hazards, particularly in areas with open spaces, such as around chain barriers;

- A more thorough and detailed risk assessment should be made for each step of the operation, thoroughly evaluating all associated risks. All identified hazards and corresponding control measures should be clearly communicated to the crew and verified to be in place before starting work;
- Better supervision of high risk tasks, particularly when working at height.

Members may wish to refer to:

- MSF: person injured falling between decks
- Unprotected openings in floor grating – work stopped
- MAIB: Man overboard – unguarded opening

5 Sudden disconnection of pressurised hose

Applicable Life Saving Rule(s)

Bypassing Safety Controls

Line of Fire

What happened

A contractor was performing maintenance on the bulk cargo methanol system on deck of a vessel. Residual water was being pumped out from a cofferdam when a pressurized hose suddenly disconnected. The system pressure was approximately 5.9-6 bar, creating a potential risk of injury to personnel. Fortunately, no one was in the line of fire, and no contact was made. There were no injuries or property damage from this incident.

Disconnected hose end connection

Showing pump

What went wrong

- There was no secondary securing system – no whip check arrestor – installed, even though this was specified in the task risk assessment;
- No-one checked the equipment before starting the job;
- No-one stopped the job;
- The hose end coupling itself appeared as worn out, and this was unnoticed;
- There were no whip arrestors and hose tail couplings available, neither on the vessel or with the contractor doing the work.

Lessons to learn

- Ensure there is sufficient equipment and spares on board to do a safe job – the lack of even a very small part can lead to something being unsafe;
- Ensure pressurised hose connectors have secondary securing – whip arrestors;
- Check your equipment before you start work – it only takes a few seconds. Check the condition of hose end couplings on pressurized equipment, and identify any wear or damage that could compromise their integrity during usage.

Members may wish to refer to:

- Air hose connection failure
- High potential near miss: failure of valve on gas bottle
- BSEE: Unsecured Pressurized Hoses Result in Hand Injuries