IMCA Safety Flash 01/11

January 2011

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 Broken Right Index Finger

A member has reported an incident in which a worker broke the index finger on his right hand. During a maintenance period it became necessary to deballast a methanol tank. As a result of the envisaged high work load there were three chief officers onboard and additional staff. The senior chief officer instructed the second chief officer to de-ballast the starboard tank through the port manifold Avery Hardoll connection to sea. It was known that the non-return valve (NRV) was not in place.

The second chief officer had noted on the previous day that the line was open and the Avery Hardoll cap was off, and therefore he started the pump. However, there was immediate back pressure showing on the gauge and no discharge was noted. The second chief officer concluded that the Avery Hardoll cap must in fact have still been on the line and so a deckhand was instructed to remove the cap. The deckhand stood to one side, and tried to move the cap by hand but was unsuccessful and therefore tapped it with a hammer. The cap was ejected from the manifold and struck the deckhand on his right hand, lacerating and breaking his index finger. The deckhand received first aid onboard and subsequently went to hospital for minor surgery to his finger.

Showing discharge manifold from which cap was blown

Following investigation, the following points were noted:

- The cap had not been removed from the discharge manifold prior to energising the pump and pressurising the line;
- The second chief officer was experienced and the subject of good reports, who was not fatigued and acknowledged awareness of the procedure and the responsibility to ensure the lines were set up and the cap removed;
- The assumption that the line was open was incorrect – the second chief officer acted out of character, made an incorrect assumption and did not follow procedures;
- The risks associated with not having a NRV in place were not considered;

- Had procedures been followed the incident would have been prevented;
- The Avery Hardoll male connection was damaged and did not function as designed. Had it operated properly it would have sealed the pipework, preventing the pressure build up behind the cap;
- Whilst the decision to use the line cannot be faulted (i.e. the lack of a NRV made the configuration all but identical to a water ballast tank which does not have an Avery Hardoll) the presence of a NRV would still have been a barrier against incident;
- Having made the initial misjudgement and as a consequence pressurised the line, the task should have been stopped and a new toolbox talk convened to consider the risks and take appropriate action to mitigate them;
- The root cause of the incident was failure to follow procedure and to stop the job once a deviation from the norm was experienced.

A number of lessons were drawn from this incident:

- Had procedures been followed the accident would not have happened;
- The presence of a NRV in this context would act as an additional safety barrier;
- Having made the initial misjudgement and as a consequence pressurised the line, the task should have been **stopped** and a new tool box talk convened to consider the risks and take appropriate action to mitigate them.

2 Inappropriate Use of Snap Hooks

A member has reported that, in spite of efforts to prevent the practice, regular incidents involving the inappropriate use of hooks have continued to occur. A number of incidents have been reported, including dropped objects, accidentally released buoyancy and near misses.

This issue concerns the use of snap hooks when handling or deploying loads instead of shackles or 'safety' type hooks with load capable latches. It is necessary to use these because some loads are capable of 'floating' during transition through the splash zone and/or during transit through the water column.

The most common incidents involve dropped objects. These occur because of the relationship between the surface area and mass of the object being lifted, combined with water resistance, as well other factors such as vessel movement and winch speed. When snap hooks are used in such circumstances, the gates or latches can be opened or broken by the rigging and the load is at risk of being dropped.

Our member made the following recommendations:

- All loads should be checked for the likelihood of this happening in line with existing industry-wide engineering and rigging good practice;
- Only suitably trained people should be used to select the appropriate rigging and sling loads for lifts;
- All non-engineered subsea load handling should use shackles or safety hooks rather than snap hooks;
- Snap hooks can be used for loads where there is no risk of the load becoming 'light' during the transit to/from deck. They should not be used unless the operation has been thoroughly checked and endorsed by competent personnel.

Our member notes that suppliers have been approached to address the latch design issue and analyse potential strength upgrades. New safety hook designs that can be operated by an ROV operable are being evaluated.

Examples of modern ROV-friendly safety hook designs

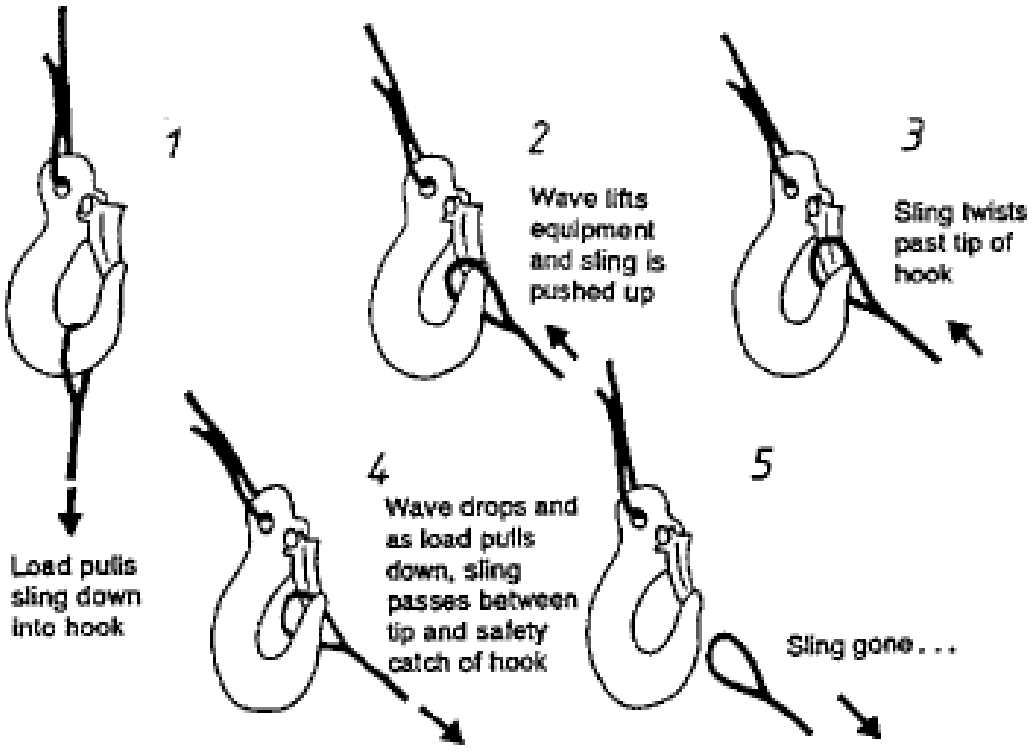

Illustration of how loads can be lost from snap hooks (AODC 18)

Members may refer to IMCA document AODC 018 - *Attachment of loads to lifting hooks during diving operations* for further information.

3 Functional Safety of Control Systems

The Australian National Offshore Petroleum Safety Authority (NOPSA) has recently published the Safey Alert 45 (attached) regarding the functional safety of control systems. This is designed to raise awareness of possible problems with control systems for cranes, diving systems, pipe handling equipment etc, and may be of relevance to IMCA members.

This information can also be found at http://www.nopsa.gov.au/alert/Alert45.pdf

NOPSA

NATIONAL OFFSHORE PETROLEUM SAFETY AUTHORITY

SAFETY ALERT 45

Functional Safety of Control Systems

What happened?

NOPSA has encountered a number of instances, in a diverse range of applications, where Operators have introduced equipment or systems that have potential weaknesses in the design of their safety-related control systems.

In some cases, Operators have been unaware of the significance of control systems as control measures against Major Accident Events and Dangerous Occurrences, and have consequently not used appropriate safety management techniques in their design and operation.

What could go wrong?

Inadequate design of safety-related control functions can cause death or injury when they do not perform in the intended manner. Examples include unsolicited movements of machinery, failures of interlocks, or excursion of processes beyond safe limits.

Since the source of harm results from the incorrect functioning of the control system, and not directly from the physical implementation of the control system itself, the term 'functional safety' is used to describe the subject.

The use of programmable control devices is increasingly prevalent throughout industry due to their inherent flexibility and relatively low cost. While this flexibility can result in risk reduction unachievable by other means, without adequate precautions it can also introduce other risk factors. These other risks may not be as visible, and can remain undetected for long periods, until manifesting themselves as a Dangerous Occurrence or an accident event.

Key Lessons:

If the failure of a control system could create a hazard which may result in an accident or Dangerous Occurrence, then it is safety related. Systems include: crane control; automated pipe handling; diving control; process control; emergency shut-down; gas detection; high integrity protection systems (HIPS); dynamic positioning; drilling table control; and well control.

Operators should carry out an audit of their control systems to identify those that are safety related, and reassure themselves that such systems are adequately designed, constructed and maintained to reduce risks arising from their use to as low as reasonably practicable.

In particular, NOPSA draws Operators' attention to control systems where programmable devices are used. These devices include programmable logic controllers, smart instruments, computer-based safety management systems, motor drives and any other devices containing microprocessors.

Contact

For further information email alerts@nopsa.gov.au and quote Alert 45.

4 Serious Failure of CO2 Fire-Fighting System

The United States Coast Guard (USCG) has published Alerts 10(a)-10 abd 10(b)-10 (attached) regarding the failure of a CO_2 fire-fighting system during a fire in a machinery space on board a new vessel.

Members can find further information by following these links:

- Wrong instructions: a recipe for failure;
- Simple failures render CO_2 system inoperative.

UNITED STATES COAST GUARD
U.S. Department of Homeland Security

MARINE SAFETY ALERT

Assistant Commandant for Marine Safety, Security and Stewardship

December 21, 2010
Washington, DC

Alert 10(a) -10

WRONG DIRECTIONS: A RECIPE FOR FAILURE
Safety Alert 1 of 2

This safety alert addresses critical concerns uncovered during an ongoing marine casualty investigation and should be of vital interest to Ship Builders, Classification Societies, Owner / Operators and others involved with vessel operations.

A machinery space fire onboard a relatively new vessel was effectively responded to and extinguished by the vessel's quick response team firefighters using portable extinguishing equipment. However, before it was declared completely extinguished and approximately five hours after the fire started, the master of the vessel made the decision to release CO2 from the vessel's fixed firefighting system. It failed to operate as designed. Subsequently, crewmembers were unable to activate it manually and CO2 was never directed into the machinery space.

While the casualty investigation remains ongoing, the following issues were discovered that could have negatively affected the crew's emergency response and may have contributed to the CO2 system failure.

- Shipyard commissioning test procedures appear to differ from procedures documented in the vessel's Firefighting Instruction Manual (FIM). Commissioning procedures indicate that the discharge line selection to a specific protected zone should be made prior to releasing the gas contrary to the directions in the FIM.
- The FIM refers extensively to a Control Panel (left following image) that differs vastly from the one onboard the vessel (right following image).

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- The FIM states that the CO2 Release station is on the Starboard side of the vessel when In fact it is located on the Port side.

- The FIM incorrectly uses the word "Pull" when it should read "Turn" in reference to the operations of valves.

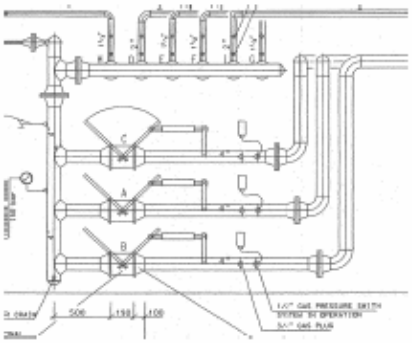
- The FIM contains the following confusing language "Once the fire has been extinguished make sure that the temperature has decreased before investigate the area same time is needed to wait hours."

- The FIM references elements of an Emergency Shut Down (E.S.D.) graphic on numerous occasions. However, the graphic display was not found on the vessel.

- The FIM contains photographs of the internals of the CO2 release stations that appear to differ from actual CO2 release stations onboard the vessel.

- The CO2 release stations installed on the vessel have instructional placards that refer to elements of a completely different control panel then the one used onboard the vessel.

- Shipyard piping schematics and drawings do not appear to match the actual installation. The schematic at the right shows the "A valve" for the Aft Machinery Space in the center position vice the bottom position as it is installed on the vessel.



Because of these and other issues, the United States Coast Guard **strongly recommends** that Vessel Builders / Shipyards, Classification Societies, Insurers, Owners / Operators, System Service Personnel, and others involved with these systems:

- Ensure that all supporting documentation, piping schematics, plans, manuals, component labeling and instructions are consistent with each other and relevant to the systems, equipment, and components installed onboard the vessel.

Developed by the U.S. Coast Guard Headquarter's Office of Investigations and Analysis, Washington, DC. Questions may be addressed to HQS-PF-fldr-G-PCA@uscg.mil.

Distributed by the Office of Investigations and Analysis: http://marineinvestigations.us

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UNITED STATES COAST GUARD
U.S. Department of Homeland Security

MARINE SAFETY ALERT

Assistant Commandant for Marine Safety, Security and Stewardship

December 21, 2010
Washington, DC

Alert 10(b)-10

SIMPLE FAILURES RENDER CO2 SYSTEM INOPERATIVE

Safety Alert 2 of 2

This safety alert addresses concerns discovered during an ongoing marine casualty investigation and may be of interest to Ship Builders, Classification Societies, Owner / Operators and others involved with vessel operations.

A machinery space fire onboard a relatively new vessel was effectively responded to and extinguished by the vessel's quick response team firefighters using portable extinguishing equipment. However, before it was declared completely extinguished and approximately five hours after the fire started, the master of the vessel made the decision to release CO2 from the vessel's fixed firefighting system. It failed to operate as designed. Subsequently, crewmembers were unable to activate it manualy and CO2 was never directed into the machinery space.

The following issues pertaining to the CO2 system were discovered.

- Numerous piping and hose connections leaked extensively. When the system was activated, on scene video taken by the firefighters showed numerous leakages into the CO2 room. Post casualty, while pressure was still on the system, some of these leaks continued even after the connections were tightened. (Photograph at right.)

- The zone valve for the aft machinery space which admits CO2 from the bottle bank manifold to the space failed. Specifically, the ball valve's opening actuating arm fell off the valve when the gas powered piston actuator attempted to move it. The ball valve actuating arm was held in place by a very small machine screw and washer. When firefighters attempted to open the valve manually using the provided hardware it could not be moved. The valve was only able to be moved after the gas pressure was relieved from the inlet side of the valve. (Photograph at right.)

- Actuating arms to five of the six other zone valves were found loose. They were also attached by small machine screws. (Photograph at right.)

- Hemp type pipe sealant was used extensively on pipe threads throughout the system and in some instances seems to have entered the system. (Photograph at right.)

- Certain elements of the distribution manifold contained low points which allowed the accumulation of water within piping that could not be drained. Such a circumstance could cause corrosion that could possibly negatively effect operation of other components. (Photographs at right.)

- The CO2 system's pilot and co-pilot bottles did not appear to operate correctly according to the firefighters involved and thus had to be manually activated using the valve handles located on top of the cylinders. Additionally, during the event, the bank bottles were similarly activated due to the uncertainty of their release. At least one pilot bottle activation hose was reported to have leaked.

- The system had been recently serviced and inspected by an authorized service provider.

Because of these and other issues, the United States Coast Guard **strongly recommends** that Vessel Builders / Shipyards, Classification Societies, Insurers, Owners / Operators, System Service Personnel, and others involved with these systems:

- Carefully and critically review, routinely inspect and maintain, verify and test their Fixed Fire Fighting installations to ensure that they will operate correctly during an emergency.

Developed by the U.S. Coast Guard Headquarter's Office of Investigations and Analysis, Washington, DC. Questions may be addressed to HQS-PF-fldr-G-PCA@uscg.mil.

5 Lifting Operations – Securing Equipment

The Marine Safety Forum has published Safety Flash 11-02 (attached) regarding an incident in which, owing to a failure of communication, attempts were made to lift equipment which was still secured to the deck. Although no harm was done, the incident could have resulted in serious injury to personnel and damage to the equipment being lifted.

Further information can be found at http://www.marinesafetyforum.org/upload-files//safetyalerts/msf-safety-flash-11.02.pdf

Members are reminded of IMCA SEL 019 – *Guidelines for lifting operations* and IMCA SEL 020 – *Guidance for operational communications: Part 2 - Lifting operations*, with regard to communications during lifting operations.

Marine Safety Forum – Safety Flash 11-02

Issued: 5th January 2011

SUBJECT: Lifting Operations – Securing Equipment Incident

INCIDENT

After gas racks had been loaded onto the supply vessel from the rig, the crew members decided to secure them to an adjacent tank with a webbing sling until they could be secured with the tugger wire.
Once the backload was completed the tugger wire was applied around the cargo but due to the weather conditions it was decided to leave the webbing strapping in place until later.

On arrival in port the tugger wire was released but due to various distractions (one of the crew sustained an injury due to a slip and fall and required treatment) and other duties the webbing sling was not removed from the gas racks or tank.

The cargo handlers arrived on the vessel and began the offload from forward to aft (on the blind side of the strapping), as they lifted the tank the gas rack also lifted and tipped over. The job was stopped immediately. (See pictures).

HAZARDS IDENTIFIED

Although there was no immediate harm done, this incident could have resulted in serious personal injury to cargo handlers or vessel crew and / or damage to work equipment.

CONTROL MEASURES

The main issues identified were inadequate communication between vessel crew and cargo handlers and a failure to identify potential hazards during lifting operations.

Communication – A toolbox talk and effective planning involving all personnel involved in the task (Vessel Crew and Cargo Handlers) should be used as a means of communicating any hazards or relevant information associated with the task.

Hazard Identification – Assessment and inspection of any loads prior to lifting should identify any hazards before the lifting activity begins.

6 Failure of Home-Made Equipment

The Marine Safety Forum has published safety flash 10/23 (attached) regarding an incident in which there was a potentially catastrophic failure of uncertified and 'home-made' equipment – a piece of chain welded to a stainless steel shackle.

This information can also be found at http://www.marinesafetyforum.org/upload-files//safetyalerts/msf-safety-flash-10.23.pdf

IMCA would like to pass this on to its members in light of the most recent IMCA safety flash 08/10 regarding the '*Welding of shackles*', which can be found at https://members.imca-int.com/documents/core/sel/safetyflash/2010/IMCASF08-10.pdf

Marine Safety Forum – Safety Flash 10/23

Issued: 9th August 2010

Subject: High Potential Incident Following Failure of Home Made Equipment

A supply vessel was instructed to return to port due to poor weather conditions at the field. The Captain instructed the deck crew to ensure the containers on deck were adequately secured using chain lashings. The chain lashings were put in place and the decision taken by the deck crew to use the tugger winch to tighten the lashings. When the tugger was tensioned up the chain lashing parted and a piece of flying debris struck and broke the bridge centre aft window. The investigation found that a home chain connection (a piece of chain welded to a stainless steel shackle) had at some stage been introduced into the cargo lashing system. This was probably done so the tugger wire hook could be quickly connected. Being home made it was not certificated and there was no way of knowing its breaking load. We do not like the expression but this was an accident waiting to happen. The deck crew are extremely fortunate not to have been killed or seriously injured.

Lessons learned:

- The main and overriding lesson from this incident is that home made equipment or tools can never be tested or certified appropriately and often fail sometimes with serious effects. They should never be made or used;
- Home made tools are often made for expediency. However almost always a proper tool or piece of equipment can be sourced from an appropriate supplier. In this case the ship could have requested an enlarged link and connector;
- When using a winch all parts of system being used (shackles, chains, wires, slings, etc.) must have a breaking load higher than the force the winch can exert and certificates to prove it;