IMCA Safety Flash 10/04

November 2004

These flashes summarise key safety matters and incidents, allowing wider dissemination of lessons learned 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 Uncontrolled Decompression of Diving Bell

Keywords: Decompression

A member has reported an incident involving the uncontrolled decompression of a submersible decompression chamber (SDC) during diving operations. The three man bell vented to surface from 175 fsw when the last man leaving accidentally kicked open a ¼-turn valve. Thinking that a seal had been lost, he immediately continued through the man-way to the TUP and secured the door behind him. The valve was located on the bottom inner door and was not accessible from the outside as the outer bottom door was in the closed position. The bell was allowed to vent to surface as the decompression occurred at a rapid enough rate such that it was deemed inadvisable to try and 'catch' the leak with the addition of more gas. There were no injuries or equipment damage reported.

Elements contributing to the incident according to the first report are listed as:

- the valve having been the wrong type and size;
- previous man-way sealing problems which initiated the assumption that the source of the leak was in the man-way. This in turn prompted a hasty retreat through to the TUP.

The immediate action was to remove the handle from the stem to avoid a recurrence. Subsequently the oversized ¼-turn ball valve was replaced with a small bore needle valve to affect a permanent solution.

Sealing problems due to misalignment were evident at the initial stages of the mobilization when the system was being function tested onboard the diving support vessel. Several modifications to the skid and clamping device had to be made prior to achieving a successful pressure leak test. The system was a recent rebuild and the project was the first one for its current configuration.

Had the valve been kicked open with three men inside prior to opening the door to the TUP, the consequences could have been dire. The combination of the crowded circumstance, the possible loss of visibility from the condensation build up and the focus on a leak anticipated in another area of concern (the man-way) would have made a controlled response very unlikely.

The company has summarised the key issues as follows:

- The valve originally installed was not suitable for purpose in terms of both size and type;
- The testing and commissioning of a new or re-build system should be completed prior to its installation on a project vessel;
- System familiarisations and drills should note and highlight the most likely sources of potential leaks – in this case the bottom door hatch (this is the rationale behind the double valve arrangement of a bell flood up valve);
- Caution should always accompany movements within confined spaces.

2 Fatality – Fall from Scaffold Opening/Breakdown in Co-ordination/Communication

Keywords: Heights

Attached is a safety circular issued by the Singapore Ministry of Manpower, which has been passed to us by a member. Although the notice is from last year, the company has re-issued it as a reminder to its personnel. The incident involves a number of safety issues including working at height, communication, lighting and management of change.

3 Lightning Strike

Keywords: Near-Miss

A member has reported an incident which occurred while a yard rigger was preparing to lift some pipes from ground level. A sudden lightning strike struck the shore crane's jib and a flash of lightning found its way onto the shackle, missing the rigger by a few inches. The rigger was holding the nylon web sling at the time. He was not hurt.

It was observed afterwards that there was a burn mark on the web sling. It was believed that most of the lightning's energy had been transferred to ground through 'earth', but apparently some of this energy had gone through the crane sling and onto the shackle.

Fortunately, no injury was sustained and there was no fire. However, it was observed afterwards that there were minor burn marks on the lifting belt the rigger had been using (see pictures below).

The company involved has noted the following indicators of potential lightning in work areas:

- dark clouds forming overhead and/or inclement weather conditions;
- thunder or 'rumbling' sound as the rain approaches from a distance;
- lightning flashes in the distance as rain approaches work areas.

The company has noted the following precautions to be taken in the event of these specific potential lightning conditions:

- avoid standing next to tall structures or working at height;
- do not stay in open areas;
- do not use mobile telephones in open areas;
- take shelter in covered areas or buildings;
- do not use mobile or berth cranes due to the height of crane booms.

Members should consider the potential risk such weather can pose and the ways in which the risks can be minimised.

4 Head Injury

Keywords: Helmet/Lifting

A member reports that a diver, whilst working on deck, suffered a severe head injury while attempting to align two 8" flanges on the deck of a DSV. The assembly was a subsea buoyancy tank which was being connected to two flexible risers. The risers were coiled on a deployment reel and the tank was temporarily secured on a raised launch cradle on the opposite side of the vessel. In an effort to rotate the riser flange into alignment with the tank flange, three drift pins were placed through the 3, 6 and 9 o'clock bolt hole positions on the riser side and partially into the tank side flanges. In order to assist rotation, a come-along and nylon strop were attached to the pin at the 3 o'clock position and tension was applied in what was thought to be a controlled manner while the pin at 6 o'clock was knocked into place. The pin at 3 o'clock deformed, was forced from its position, bounced off of a structural member and the man who was working on the bottom pin was struck. The blunt end of the pin struck and tore a hole in the visor of his safety helmet before leaving a gash in his forehead. Diagnosis was a compound fracture of the skull and loss of integrity to the sinus cavity. Four hours of reconstructive surgery and ten days in hospital followed. A minimum of two months' recuperation is required before any diving medical can be applied for.

This blow to the head by the drift pin was caused by the violent release of the pin from its position under tension. The misalignment of the flanges was not foreseen, so a specific job safety analysis (JSA) for the task had not been undertaken. Although the team had taken time out to discuss and agree upon an approach to the alignment, the method chosen held an unidentified risk. The behaviour of the pin under the tension of a side pull, applied in such a configuration (partial insertion into the tank flange bolt holes and against a shifting surface), was unpredictable and not under the full control of the men performing the task. Despite efforts to retain the pins with lanyards and hand holds, the forces developed and the destructive potential were not anticipated.

The evidence of the torn safety hat, in addition to the injury, points to a significant force at impact. Due to the fact that damage was sustained, a report and enquiry will be made to the manufacturer. The consequences of the casualty not having worn his personal protective equipment (PPE) in this instance would, no doubt, have been even more severe.

The root cause of the incident will also be reviewed by the company. It advises that likely subjects at the moment are:

- Was the use of a swivel flange considered at any time?
- The original installation schedule stipulated assembly of the flanges after the risers had been deployed from the reel. This would have allowed a greater degree of mobility to the risers as compared to when on the reel. Was a management of change procedure engaged at this juncture?
- Over the course of the engineering phase of the project several people were replaced for one reason or another. What effect did this have on the integrity of the procedures?
- The vessel was due to sail within 24 hours of the incident. Did this constraint place pressure on the crew to rush the task prior to heading to sea where hazards would have been magnified on a moving vessel?

5 Loss of Position of DP DSV

Keywords: Umbilical

A member has reported that a DP diving support vessel was in the midst of a diving operation when it rapidly moved off location by some 107 metres from the work site. Two divers were locked out at the time. Diver 1 was working while diver 2 was at the bell on the guide weight. The effect of the force was such that diver 1 could not return to the bell on his own, nor could Diver 2 manage to haul him back via the umbilical. Once recovered to the bell, the diver, overcome with carbon dioxide toxicity as a result of overbreathing inside the helmet, began to vomit almost immediately upon having his helmet removed. He was settled down, put on BIBS and gradually recovered.

The company's investigation concluded that the 'run off' was attributed to the effects of a Soliton. A full description of this phenomenon can be found at http://citeseer.ist.psu.edu/hsu00nonlinear.html (also see www.falkirk-wheel.com/edinburgh/information/john_scott_russell.html). However, by the simplest definition they are subsea waves of significant risk potential for diving and ROV operations. Detection by slight surface irregularities with either the naked eye or radar is possible. They tend to be seasonal and, although their direction of travel is somewhat predictable, reliance on direction alone as a precaution is not advised.

The company carried out a risk assessment and made recommendations for operating in waters of known Soliton activity as follows:

- When feasible, schedule work for low season Soliton activity;
- Seek local knowledge and experience with regards to expected activity levels;
- The vessel heading should be into the direction of the most likely Soliton approach regardless of optimum heading for DP or other environmental considerations;
- A dedicated competent person shall remain on radar watch at all times during critical work phases;
- Radar shall be tuned to optimise potential to see approaching Soliton, setting the sensitivity/gain to reduce wave scatter;
- Break away or quick release lines should be installed on all down-lines;
- Facility to overboard the supply end of tool umbilicals with buoys attached should be provided;
- Clear runs for overboard lines on deck should be established and maintained;
- When feasible, two divers should be working together at all times;
- The DP operator is to be alerted when the divers have entered a structure or confined area;
- Optimise control at subsea structure positions;
- Divers should be immediately alerted of all anomalies;
- No diver 'turn arounds' if attached to fixed structures in known Soiliton areas.

SAFETY CIRCULAR ON A FATAL ACCIDENT DUE TO BREAKDOWN IN COORDINATION AND COMMUNICATION < OSD / SY CIR / 04 / 2003 >

By Shipyards Branch, Occupational Safety Department
Ministry of Manpower

INTRODUCTION

In Jun 2003, a painter fell 16 meters from an opening on a scaffold erected inside a tank onboard a ship and landed at the bottom of tank. He was killed on the spot.

Two hand-held lamps & a flood light were provided

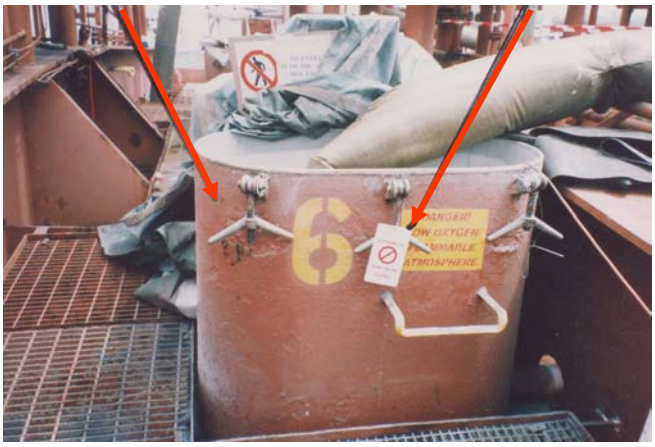
Opening in the scaffold

OBSERVATIONS AND FINDINGS

- The deceased was in the tank to touch up the paintwork for a sensor mounting. While he was walking on a scaffold platform inside the tank, he fell through an opening on the scaffold. The distance of fall was about 16 meters.
- One day prior to the accident, the ship repair manager was informed that the inspection of the paintwork inside the tank had been cleared and accepted by the vessel owner and that the scaffolds inside the tank were ready for dismantling. Instruction was then passed to the scaffold contractor to dismantle of the scaffolds on the next day (the day of the accident).
- The painting foreman, however, was not aware of the instruction to dismantle the scaffold. On the morning of the day of accident, the painting foreman instructed his chargehand to conduct a final check on the tank. The deceased was subsequently assigned to touch up the paintwork inside the tank.
- While he was inside the tank, the deceased fell through the opening on the scaffold work platform. The opening was due to the removal of scaffold planks during the dismantling process.
- Although the "**NO ENTRY**" and "**DO NOT USE THE SCAFFOLD**" signs were clearly displayed at the entrance to the tank, the deceased still proceeded to enter the tank to carry out the touch up work.
- Illumination (lighting conditions) inside the tank was poor.

The deceased had gained access from this manhole

The signage "DO NOT USE THE SCAFFOLD"



LESSONS LEARNT

- Investigations revealed that the cause of accident was attributed to a lack of coordination and communication between the relevant trades which resulted in the concurrent execution of scaffold dismantling and painting works inside the tank. Coordination of work activities established at the vessel safety co-ordinate committee meeting should be properly communicated to all affected parties, including their foremen and workers.
- Shipyards are reminded to instill their workers on the importance to observe strictly all safety signs such as "**NO ENTRY"** signs into confined spaces and tanks.
- Adequate lighting should be provided while work is being carried out inside the tank.