

IMCA Safety Flash 02/03

February 2003

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

I Incidents involving Accommodation Ladders

Keywords: Rigging

IMCA has recently been provided with a document submitted to the International Maritime Organization's (IMO) Sub-Committee Ship Design & Equipment by the delegation from Canada which describes two incidents, one resulting in a fatality and the other in a serious injury. They are not particularly new, but still appear to be relevant.

The paper points out that, under the SOLAS Convention, only accommodation ladders used for pilot transfer are required to be inspected. Whatever the likelihood of them being inspected as part of any other survey, the Canadian delegation suggests that there is no defined set of rules relating specifically to accommodation ladders and that inspections can, therefore, be no more than perfunctory. The proposal is to amend SOLAS to cover this area. In the meantime, the two incidents submitted are reported below (details taken from Canada's proposal) and highlight the construction, maintenance and inspection faults which led to the incidents:

- ◆ Since 1999, Canada has investigated two accidents involving accommodation ladders which resulted in death and injury. The results of the investigations were that routine inspections and maintenance had failed to detect the deteriorated condition of the ladders and their fittings. The accidents were on a bulk carrier in 1999, where one person was seriously injured, and on a container ship in 2001, which resulted in a fatality;
- ◆ In the 1999 accident, six people were disembarking the bulk carrier onto a water taxi when the accommodation ladder's turntable separated from its upper platform. Two people were thrown from the ladder. One fell into the water, while the other fell onto the bow of the water taxi and sustained serious injuries;
- ◆ In the 2001 accident, the deck crew of the containership was raising the accommodation ladder to its stowage position when a pad eye welded to a supporting steel deck post broke in two. The sudden fracture of the pad eye violently released a steel snatch block that was shackled to it, which then struck a crew member, who died from his injuries.

Investigations of the two accidents resulted in a number of findings:

- ◆ In the 1999 accident, the construction of the accommodation ladder was found not to conform to its design specifications. Furthermore, the construction of the ladder's turntable did not allow for regular inspection, or for the lubrication of its central pivot pin. The condition of the pin had deteriorated to a point where it had seized in its housing. It was determined that the pin had fractured under the influence of external applied forces, as the ladder was moved into the disembarking position. This permitted the ladder to separate from the turntable. The poor quality of the pin attachment welds also indicated that the turntable had not been fabricated professionally.
- ◆ In the 2001 accident, it was determined that the pad eye had been cracked in two places and that these cracks had been in existence for some time prior to the accident. The cracks had not been detected during planned maintenance and had slowly become enlarged, to the point where they could no longer take the applied load. The general condition of the accommodation ladder and its fittings was also poor: the band brake around the winch motor was found broken; the securing pin on the lock nut of the central pin of the turntable was missing; there was scale and corrosion built up around the lock nut, the pin, and also on some sheaves; the underside of the davit arm was heavily corroded in places; and the side plates of the sheaves attached to it bore signs of past contact with other external objects.

2 Incident during Lift Bag Operations

Keywords: Lifting

A member has reported an incident where a lift bag connected to a 10" blind flange made a rapid uncontrolled ascent to surface. No damage or harm was occurred, but the event had the potential to cause both considerable damage (e.g. to ships' thrusters, subsea infrastructure, etc.) and injury (e.g. by dragging or from dropping onto divers).

Divers were operating at around 40 metres (130 ft) close to a well head protection structure. They were attempting to move the 10" blind flange using a lift bag. The bag and flange suddenly broke free and ascended to the surface out of control. The bag and load arrived on surface quickly, where they drifted away from the ship.

The resulting investigation identified the following immediate cause of the incident – an oversize bag had been connected to the 10" flange, which appeared to have snagged on something in the vicinity of the protection structure, preventing it freely raising the flange. The divers and diving supervisor were unaware of the snag and continued to fill the bag with air. The bag was over-inflated in relation to the 490kg flange's weight and, when the snag point freed, the bag shot towards the surface with the load attached. The dynamics resulting from the rapid acceleration and mass of the flange with the movement of the entrained mass of water created a dynamic force well in excess of the breaking strength of the 'hold-back' rope.

The following points were also noted as having contributed to the incident:

- ◆ The task plan had called for a 500kg air bag to be used, which had been available on the ship's deck. However, the divers had used a 1000kg bag instead, which had previously been used for lifting a pig receiver and was unavailable in the work basket which was deployed on the seabed;
- ◆ The diver had used the normal practice of filling the bag by judicious control of the flow control valve, allowing only sufficient quantities of air to raise the flange slowly. He had checked at various times to ascertain the effective lift, which the flange was experiencing. The flange had risen off of the bottom and remained at an angle of about 45°, but still touching the bottom after over one minute of filling and remained like that for a further 90 seconds of filling. The bag became significantly over-filled;
- ◆ The divers and diving supervisor were unable to see the top of the bag because of in-water visibility and camera viewing limitations. An ROV was not being used to monitor the position of the bag;
- ◆ The way that the air bag inverter line had been rigged, on this occasion, was not in accordance with the specific instructions given in IMCA D 016 Rev. 1 – *Underwater air lift bags* – but instead had been connected to the load itself rather than a fixed point.

A new lift bag operating procedure has been issued by the company, which includes the following points:

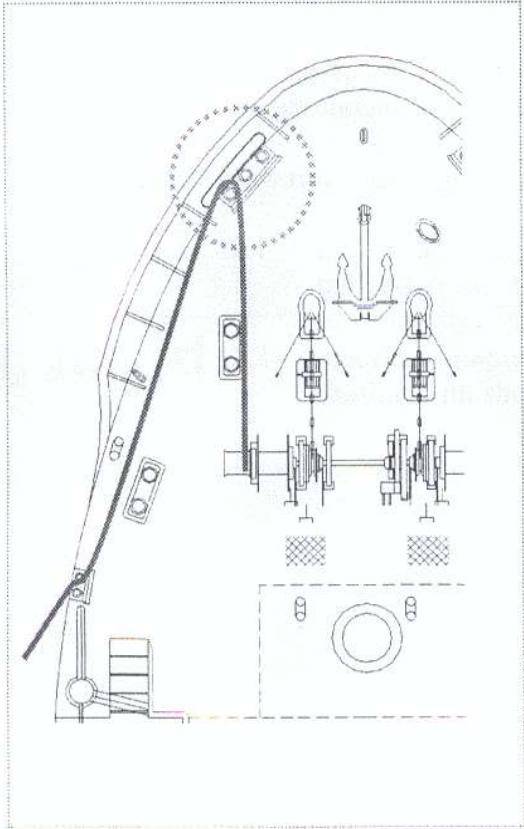
- ◆ All lift bag operations to be conducted in accordance with the revised procedure;
- ◆ The correct sizes of bag, as specified in approved procedures, are to be used;
- ◆ Rigging arrangements for restraining and 'hold-back' lines are to be as specified in the company's instructions and the sizing of these lines is to take into account dynamic run-off situations, not just the marginal static load difference between the load and the lift bag capacity;
- ◆ The clearance of the load and lift bag are to be assured at all points on the lifting route, in accordance with the company's lifting instructions.

3 Fatality Results from Failure of Ship's Mooring Fittings and Supporting Structure

Keywords: Corrosion

The following incident report has been received via the IMO Sub-Committee on Ship Design & Equipment. Although the incident itself is not very recent, the full details have only just been made public. It is worth highlighting because it underlines the importance of keeping a careful check on the structure around the parts of a vessel which are subjected to great forces, such as mooring fairleads. This is especially the case with an aging of heavily worked vessel, despite one which is 'in class'.

The incident concerns a vessel built in 1982, with an overall length of just over 105 metres and a gross tonnage exceeding 3,800. There were four fairleads on the forecastle deck, two on each side (the 'shoulder' fairleads). The fore fairleads consisted of three 200mm diameter rollers and a baseplate measuring 500mm wide by 1,600mm long by 12mm thickness. The ISM shipboard safety inspection manual required that the operating condition of the fairleads be checked every three months. When they had been checked approximately 2½ months before the incident, the chief officer had found them to be in apparently good condition.



The vessel had berthed alongside a pier, letting go its starboard anchor with three shackles in the water to the direction of 3 o'clock. Every mooring line, except a bow spring line, was made fast to the shore bitts through each appropriate mooring hole or each fairlead. However, the bow spring line was connected to a shore bitt via two fairleads, in order to prevent the line from chafing against the shell plate, i.e. the spring line from the winch was taken forward to the fore fairlead, around a roller of the fore fairlead to the aft fairlead, then out to the shore bitt (see figure). The mooring lines were polypropylene fibre ropes with a diameter 65mm.

The vessel was departing the port in fine weather and with calm sea conditions. The chief officer was watching the anchor chain tension, the boatswain was behind the windlass, operating the controls, and the other members of the deck crew were beside the port side fairlead, stowing the mooring lines away. The Captain ordered all lines to be cast off, except a bow spring line, then ordered hard-a-port steering and 'dead slow ahead' for about 10 seconds.

The spring line tightened and the ship moved away from the pier. The base plate of the fore fairlead (see inside dotted circle) was torn away from the forecastle deck because of the strong tension on the line. The spring line flew out of the fore fairlead, was catapulted back and hit a crew member on his head. He died quickly.

The torn base plate of the fore fairlead was inspected thoroughly after the incident. One third of the welded part was rusted and cracked, even though the apparent condition had been good.

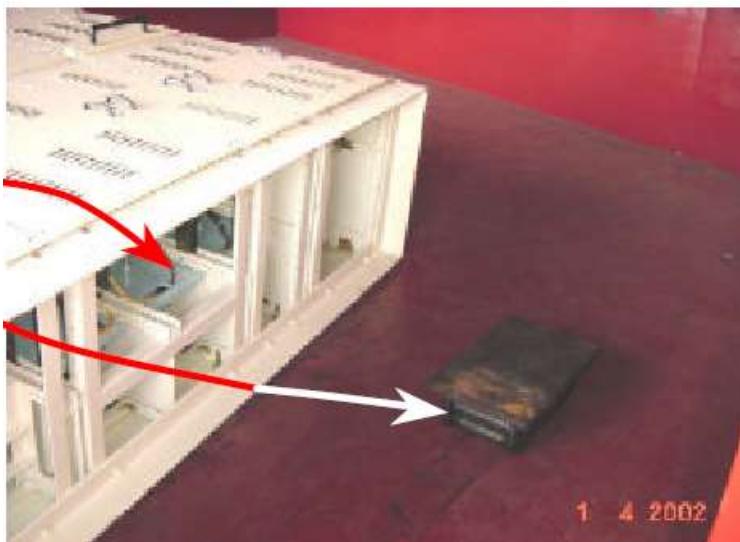
Fairleads are generally used to change the direction of the mooring rope when there is an obtuse angle from a ship to a pier. However, any unconventional mooring line arrangement that shortens the angle creates much stress on the fairleads and causes potential hazards. Therefore, established rules regarding the proper use of fairleads and the strength of supporting structures are needed. Clearly, structural components subject to high stress loadings need careful and regular inspection and the design of mooring equipment should be arranged so as to prevent lines from chafing with shell plates.

4 Fatality Results from Incorrect Handling of Equipment

Keywords: Lifting

IMCA has been advised of a fatality that occurred at a shipyard during the construction of an FSO, while an electrical panel was being moved with the aid of rollers.

The electrical panel weighed 1.8 tonnes, was 2.5 metres high and had a base measuring 2.75m x 0.2m. The bottom was an open arrangement with a flat bar at its edge.



The method of movement was to put the panel on four independent rollers – one under each corner of the panel bottom.

After lifting the panel onto a temporary platform and setting it on the four rollers, five workers started to push the panel into the switchboard room. The panel was still connected to the crane with workers positioned around the panel. After moving the panel about one third of the way into the room, it was impossible to keep the crane connected due to roof overhang. After removing the rigging, the work crew continued the transfer process.



company's operations manual;

- ◆ Tools and equipment to be checked before use and a preventive maintenance policy implemented to make sure that equipment and tools are in a good condition;
- ◆ Daily 'toolbox talks' to be instigated involving workers and supervisors, typically covering the following:
 - objectives of the work (including whether it is covered by a permit to work);
 - details of the individual activities covered the individual activities comprising the overall task;
 - who is involved in the task and what are each person's responsibilities;
 - what equipment will be used and its condition;
 - what other task(s) will be performed simultaneously in the area by others;
 - what hazards are associated with the work and what control measures can be taken to minimise any risks, including what personal protective equipment (PPE) required and its condition;
 - whether any dangerous substances (e.g. chemicals) are involved and particular precautions needed for them;
 - whether or not weather conditions will affect the work;
 - finally, does everyone understand the task, the safety aspects covered above and are there any concerns not already addressed?

After 3m transfer into the room, the panel bottom lost contact with one of the rollers, becoming destabilised. The panel toppled over and trapped one of the workers. He was crushed and died instantly.

The resulting investigation identified the following causes and contributory factors:

- ◆ • The contact point on the roller was very small, with a high centre of gravity and a small footprint area;
- ◆ The rollers were independent and not guided, needing to be kept in position under the panel by the workers;
- ◆ The rollers had not been adequately maintained and some were not rolling properly;
- ◆ The workers were not experienced in use of the rollers;
- ◆ There was an apparently lack of safety awareness at each level of the shipyard's management.

The company involved has noted the following follow-up actions needed:

- ◆ Adequate safety training of workers to be conducted and the importance of safety to be stressed to management;
- ◆ Preventive measures to be taken and adequate preparations made before the commencement of work;
- ◆ A procedure on the use of rollers to be inserted into the

5 Fatality and Serious Injuries During Heavy Lift Operation

Keywords: Lifting

We have been advised of early details of the following incident which occurred at a construction site during the heavy lift of an alternator. One man was killed and nine others were injured.

A 300 tonne alternator was being lifted using hydraulic jacks and beams. The lift was nearing completion when the equipment collapsed for unknown reasons. The exact cause of the failure is, as yet, unknown, but the company involved has instigated a review of similar types of lift, with the lifting plans and design being checked and verified by a competent specialist engineer.

6 Penetration Injury to Eye during Blending Repair Weld

Keywords: Grinding

A boilermaker suffered a serious eye injury from a fragment of shattered grinding disc penetrating the inner lens of his welding helmet and subsequently his eye. He was grinding a repair weld on the lower stabiliser link of the dragline with a 5" electric grinder when it is believed that the tool jammed. It appears that when the grinder was released, the disc shattered and penetrated the eye protection.

The injured person was transported to an eye specialist for treatment, but has suffered a permanent loss of vision in his left eye.



Preliminary outcomes from the resulting investigation indicate that the following factors may have contributed to the injury:

- ◆ The work environment was restricted, necessitating the boilermaker being in close proximity to the area being ground;
- ◆ The jamming/stalling of the grinder and subsequent failure of the disc wheel;
- ◆ The inner lens of the welding helmet, which should be impact-resistant, may inadvertently been replaced with an 'anti-splatter' cover lens, which would have offered little impact resistance.

The following actions have been instigated by the company concerned:

- ◆ Discussion of the incident, possible causes and interim preventative measures with worksite personnel.
- ◆ An interim measure of mandating a face shield and safety glasses to be worn whilst performing grinding, as opposed to welding helmets;
- ◆ Checking of all welding helmets to ensure the correct lens plates are installed and that they are in the correct position;

7 Injury Involving Contact with a Vehicle Battery

Keywords: Battery

A 12 volt vehicle battery was being disconnected using a crescent wrench, which slipped and grounded out when it came in contact with metal. The person received a burn on his ring finger as his gold ring had come into contact with the wrench. The injury was completely around the ring finger and severe enough to cause concern about the loss of the finger from a lack of adequate circulation.

It has been pointed out that most vehicle batteries have 600-800 cranking amps, compared to 75 amps for stick welding and 300 amps for air arc welding. Severe burn injuries can occur and caution should be exercised when handling such batteries, including removing rings and other jewellery before starting work near or on a battery/connected wires and equipment.

