

# Seaways

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# Measuring risk

Developing an effective approach



# Focus

## Learning from others

“  
The reporting and promulgation of accidents is essential to ensure that mistakes in operation or design are not repeated  
”

An essential role of *Seaways*, indeed of the Institute generally, is to facilitate the transfer of knowledge from experienced professionals to those wishing to acquire further skills and expertise at whatever stage of their career they may be. This is of course the key purpose of the Mariners' Alerting and Reporting Scheme (MARS) but also applies to all the articles and reports within the journal. It applies equally to the full time mariner in commercial or naval fleets and the part time or volunteer crews in the sail training sector. Peter Cardy, Chairman of Sail Training International (STI), argues that the reporting and promulgation of accidents is essential to ensure that mistakes in operation or design are not repeated, and that casualties many years ago are still highly relevant today (see pp 6-7). Working with STI, we hope to encourage far more MARS reports from this sector without compromising confidentiality and will be addressing their members at conferences during the year.

The same transfer of knowledge applies to the launch of our latest book, *Numerical Weather Prediction*. Certainly a step change from the old meteorology lectures of our early training and a fascinating read (see p 8). It is published in our now preferred handy sized format to be inexpensive and more accessible to members and other customers. Perhaps what has not changed a great deal over the years is the magnetic compass. Many still looked like a relic of the early 20th century if not even before that, but you ignore them at your peril for at least two reasons. You may actually need the relic in an emergency if GPS fails or the gyro breaks down, and the Port State Control inspector may take a keen interest if there are signs of neglect – ultimately this could lead to a costly detention. Rod Hesp's article (see pp 9-10) provides good advice in a very practical manner based on his years of experience as a Compass Adjuster, and we would be delighted to hear from other compass adjusters with a view to providing them with a 'special interest' forum within the Institute.

Sometimes it is helpful to provide an element of repetition with articles covering subjects that have been

explored before. This is certainly the case with new legislation such as the ILO Maritime Labour Convention 2006 which has been ratified and will come into force in August this year (see pp 22-23). Many people are still learning about this important consolidation and updating of regulations affecting many aspects of the seafarer's working life, and there continues to be much debate on how it is going to be implemented by individual flag states and further enforced by port states. Similarly, risk assessment is a much written about concept and the subject of some very complex academic papers. Fortunately, Professor Sergey Gorb with Alex Gorb, take a much more practical approach and promote simple forms to help with the process (see pp 12-15). Neither of these subjects is new to *Seaways* but readers may have missed them previously or would benefit from refreshing of knowledge and the acquisition of fresh ideas on them.

### AGM 2013

The Notice for this year's AGM is on page 5, and by the time you read this the brochure will be available for download from the Institute's website as well as the special AGM website set up by the Sri Lanka Branch. We thank the Branch for volunteering to host the Event which promises to be a rich professional and cultural experience in Colombo on 31 May and 1 June. Please make every effort to attend, as discounted air fares have been negotiated and Sri Lankan hospitality is renowned for its friendliness and generosity. Online registration will be available via [www.niagm2013.yahoo.com](http://www.niagm2013.yahoo.com)

**ERRATUM:** An article entitled 'Where is my pivot point?' written by Mr Arthur de Graauw, Director of Port Revel Shiphandling (France), was published in the March 2012 edition of *Seaways*. This article should have indicated as introduction the following sentence: 'Hugues Cauvier's paper (The Pivot Point, November 2008) triggered much discussion on the Pivot Point: what is it, where is it located?' We apologise to Mr Cauvier for the inconvenience caused by this omission.



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# Mariners' Alerting and Reporting Scheme

MARS Report No. 245 March 2013

## MARS 201310

### Expert advice can avoid reefer cargo damage

(Edited from Skuld P&I Club bulletin Apr 2011)

→ Damage to refrigerated cargoes during sea transport can arise due to:

- Insufficient pre-cooling;
- Improper stowage that could restrict air circulation or lead to shifting/crushing;
- Improper ventilation;
- Improper packaging;
- Malfunction of the reefer machinery;
- Deviation from the required cooling temperature;
- Contamination or taint.

Many importing countries have strict health and sanitary regulations that prohibit damaged cargo from being landed, making it very difficult and costly to dispose of a spoilt consignment.

#### Recommended precautions

- 1 Written instructions should always be obtained from the shipper prior to loading refrigerated cargo. These instructions should include details of pre-cooling, carriage temperature, ventilation and stowage requirements;
- 2 The vessel should obtain a certificate from a class surveyor or other competent expert prior to loading, stating the condition and suitability of the refrigeration machinery and reefer compartments for the carriage of the specific cargo in question. For containers, pre-trip inspections should be carried out;
- 3 Any confirmation, doubt or ambiguity must be queried and resolved in writing;
- 4 The vessel should never accept carriage instructions that the vessel will not be able to comply with;
- 5 Temperature ranges must be strictly adhered to, and in case of unavoidable deviation, the vessel's P&I insurer must be immediately notified;
- 6 For controlled atmosphere (CA) shipments, the carriage instructions should include recommended concentration of oxygen (O<sub>2</sub>) and carbon dioxide (CO<sub>2</sub>) and, if relevant, other gases (eg hydrocarbons);
- 7 Whether loaded inside containers or the ship's hold, proper stowage with sufficient horizontal and vertical air gaps or channels must be ensured;
- 8 The floor/deck must be dry, clean and the drains must be clear;
- 9 Pre-cooling may take up to 24 hours before the set or desired carrying temperature can be maintained;
- 10 For containers, the air vent must be set or controlled as per shipper's instructions.

#### Case study

A container ship encountered a storm during her voyage. The heavy seas washing over the deck rendered about 130 reefer containers without electrical power. The cargoes comprised perishable, frozen and chilled cargoes. The owners immediately contacted the P&I Club. Information regarding the nature of the cargo in all the containers, their

set and monitored temperatures and the carriage instructions were passed to an expert. He recommended a prioritised sequence of repair, ensuring that the units with the most susceptible cargo were powered up first. All the affected reefer power sockets and circuit breakers were repaired or changed by the crew as soon as the weather improved over the next few days, but by following the recommended sequence, there was no cargo damage or claim.

## MARS 201311

### Inadequate maintenance caused partial release of bulk CO<sub>2</sub>

→ A vessel was preparing to sail from port after completing discharge when multiple alarms sounded. It was observed that the automatic emergency stop system for the engine room supply fans had already tripped the blowers and the fixed CO<sub>2</sub> gas release alarm had been activated. The generator engines automatically shut down, resulting in a total blackout of the vessel. The crew evacuated the machinery space and mustered, after which the C/E, 1/E and electrician went to the CO<sub>2</sub> room to investigate. From the condensation and frosting on them, it was evident that eleven cylinders making up one of the several banks of gas for the protection of the E/R had discharged into the main distribution manifold. Fortunately, the main directional dump valve for the E/R remained shut, averting the flooding of the protected machinery spaces and the risk of asphyxiating many of the crew. Later, the residual manifold pressure of about 10 bar was carefully vented via a hose to the atmosphere outside the CO<sub>2</sub> room. (MARS 200778 shows that such temporary or improvised modifications to a high-pressure system can have grave consequences, including multiple fatalities – Ed)

A joint investigation conducted by Port State Control Officer (PSCO) and Classification Society surveyor found that:

- 1 The set screw designed to regulate the check stem valve operation was not torqued to the required setting, causing it to lift at a much lower pressure than designed;
- 2 A revised maintenance instruction issued by the makers two years before the incident, containing the procedure and the special tool required for adjusting the torque on each cylinder's set screw had not been made available to the vessel or to the service contractor which had recently completed the annual servicing of the system. It was later found that the service contractor was not licensed by the maker;
- 3 The ambient temperature inside the CO<sub>2</sub> room had reached 50°C, causing abnormally high pressure to build in the cylinders, eventually resulting in the check stem valve lifting.

#### Corrective/preventative actions

- 1 All vessels had their systems checked by authorised service contractors and a number of deficiencies were noted and rectified;
- 2 The incident was shared with the makers of the fixed fire-extinguishing systems fitted on company-managed vessels, their authorised representatives / servicing agents and it was ensured that correct and appropriate maintenance information, instructions and equipment were provided to all vessels.

Visit [www.nautinst.org/MARS](http://www.nautinst.org/MARS) for online database

**MARS 201312**

**Hydraulic oil leak starts fire in engine room**

➔ On a tanker on passage, the fire alarm suddenly sounded. At the same time, the engine room crew saw small flames and smoke rising from the after exhaust manifold and cylinder heads of the running main engine. After extinguishing the localised fire, it was discovered that hydraulic oil from the cargo pump system had leaked from a flange connection in the vent/overflow line situated directly above the main engine cylinder head platform.

**Result of investigation**

- 1 At the previous discharge port, a submerged cargo pump hydraulic motor had malfunctioned. In preparation for carrying out repairs, an engineer had closed the vent-cum-overflow line valve located before the service/header tank without draining the line;
- 2 Due to the residual pressure in the line, the flange connection (later found to have loose fasteners) leaked and a fine spray of hydraulic oil began falling on the hot surfaces on the top of the exhaust manifold and ignited after attaining self-ignition temperature.

**Root cause/contributory factors**

- 1 Inadequate work planning – line was not depressurized/drained before closing of valve before header tank;
- 2 Inadequate management of change – the hydraulic piping had been modified some years ago to tap off a new branch line before the header tank leading to an offline oil filtering system. A stop valve was fitted before the branch without properly assessing risks;
- 3 Inadequate communication – the engineer who closed the valve failed to inform other members of this fact.

**Corrective/preventative actions**

- 1 Ship's staff removed the stop valve from the vent line, and the piping was re-modified to ensure that the offline filtration circuit was independent of the vent/overflow line;
- 2 All joints in the hydraulic system lines were inspected for proper condition and tightness;
- 3 Sister vessels fitted with the same filtration plant were advised to check the lines to ensure that the overflow line could not be inadvertently shut. All vessels were instructed to thoroughly inspect all nuts and bolts on flange joints and tighten them.



View of smoke as fire-fighting team began extinguishing the fire



Flange joint on vent / overflow line with loose nuts located high above after exhaust manifold of main engine



View of hydraulic header / service tank before corrective action

**MARS 201313**

**Inadvertent release of senhouse slip caused fall and injury**

**Official report edited from Marine Safety Forum Safety Flash 12-46**

➔ A crewmember was engaged in spot chipping/descaling of the platform where a fast rescue craft (FRC) was stowed. At the aft end of the platform, there was very limited access space between the outboard motors of the FRC and the two removable safety chains strung across and secured by senhouse slips.

As the seaman was attempting to move between the FRC and the safety chains to sweep up the debris from the platform, he unknowingly leaned heavily on the upper chain and inadvertently released the senhouse slip. The safety chain suddenly dropped and the seaman lost his balance and fell over the lower safety chain and into an empty half-height open top container located below.

This incident could have had very serious consequences, but fortunately the injured person fell only a short distance and landed on a stack of empty pallets inside the container, sustaining only minor cuts and bruises.

**Result of investigation**

- 1 No task-specific risk assessment was conducted for the assigned work – especially to consider the difficulty in accessing, working and moving in the area;
- 2 The two safety chains were excessively slack;
- 3 The two senhouse slips did not have a 'lip' on the end of the arm to prevent unintentional release.



View of after end of platform showing restricted room between FRC and safety chains



Straight arm of the senhouse slip aided its unintended release

■ **Editor's note** Senhouse slips meant for emergency applications should preferably be oriented vertically so that gravity assists in keeping the locking oval link in a safe position until a deliberate operator action is initiated to manually release the device. For added safety, the arm must incorporate a curved end or a raised 'lip' or a 'bump' at its end. For rigging horizontal safety chains, snap hooks are more convenient and efficient. See illustrations below.



Senhouse slips incorporating a curve, raised lip or hook at the end of the lever arm are safer



Carabiner-type snap hooks with spring gates are more efficient for securing safety chains

#### MARS 201314

### Foot injury

➔ At the end of the day on a vessel at sea, two crewmembers were engaged in securing the grit blasting equipment on deck for the night. While moving the machine to its intended stowing position, the trailing grit hose snagged on an obstruction. As one person went to free the hose, the other seaman found it impossible to hold the top-heavy, wheel-mounted unit. As the unit toppled over, the seaman let go and tried to jump clear, but the equipment fell on his left foot. Despite his steel toed-safety boots, the impact inflicted a serious crush and cut injury. He was stretchered to the ship's hospital, and was given first aid and treatment according to radio medical advice.

#### Root cause/contributory factors

- 1 Lack of proper risk assessment and situational awareness;
- 2 Insufficient manpower to safely control the movement of heavy wheeled equipment.

#### Lessons learnt

- 1 Crewmembers must jointly conduct a proper appraisal and risk assessment, ensuring sufficient manpower is deployed for safe conduct of every task;

- 2 If an unsafe situation arises, the work should be immediately stopped and the situation corrected with all the appropriate safeguards put in place prior to resuming the work;
- 3 All team members must maintain a high level of situational awareness at all times.



Deep laceration and crush injury despite wearing safety boots with a steel toecap

#### MARS 201315

### Hull projections can damage fenders

➔ A cargo ship of a novel design called at our terminal recently on her maiden voyage. She had all her deck cranes fitted along the ship's port side and the pedestals extended beyond the shell plating like vertical sponson or blister tanks. As such hull protuberances can potentially damage the fenders on the berth, it is important that vessels provide this information well before the ship's arrival. Indeed, the Master of the vessel did admit that a port had filed a claim for fender damage against another sister ship. Accordingly, it may be prudent for shipowners, naval architects and shipbuilders to avoid designs that involve projections beyond the side shell of vessels.



View from astern showing two vertical projections on port side shell



Closer views of hull projection showing risk of fouling and damaging fenders at wharf

#### MARS 201316

### Surveyor fractured wrist after fall on deck

➔ While inspecting cargo tanks after completion of discharge at an oil terminal, the accompanying surveyor tripped over a longitudinal on the main deck. He fell heavily on his right wrist, fracturing it. It was observed that the injured person had not worn proper safety footwear, although the fall could not be directly attributed to this omission.

## Lessons learnt

- 1 Proper PPE must always be worn by all personnel on board ship, regardless of whether they are ship's crew or shore-based personnel/visitors;
- 2 Persons must move with caution in areas that may have obstructions, especially under low lighting conditions;
- 3 Clothing must allow free and unrestricted movement of limbs.

## MARS 201317

### Seaman injured during hold washing

➔ An A/B on a bulk carrier at sea was instructed to remove cargo residue adhering to the forward Australian ladder of the hold while the deck crew was carrying out hold washing operations. The seaman descended to the top platform, bringing with him a fully pressurised fire hose fitted with a jet nozzle. Having cleaned the upper platform and first section of the vertical ladder, he directed the water jet downwards at the middle landing for several minutes, but was unable to dislodge a lump of cargo still sticking to the landing. Instead of turning off the water temporarily while he lowered the hose to the next level, he decided to jam the running hose's nozzle in a gap between the rods at the bottom of the upper landing. Then, without seeking assistance from other crewmembers, he began descending the middle section of the vertical ladder, intending to physically remove the cargo. As his head came level with the nozzle, it suddenly jerked clear and whipped violently, hitting him on the face. The whipping hose could have struck the seaman repeatedly and could have even knocked him unconscious/off the ladder with fatal consequences, but fortunately, he quickly

moved away from the danger zone, sustaining only a laceration and bruise above his right eye. Fortunately, the C/O who was in the vicinity of the hold entrance trunk on the main deck, heard the seaman's shouts. After shutting off the hydrant, he assisted the injured person to the ship's hospital, where he was administered first aid.

### Root cause/contributory factors

- 1 No risk assessment was conducted before commencing the hold washing operation;
- 2 Inadequate work planning, briefing and supervision – a pressurised fire hose must always be handled by at least two persons, with another person to supervise and to assist from the deck;
- 3 Dangerous practice of assigning an inexperienced seaman to handle a high-pressure hose at height without assistance;
- 4 Failure on the part of the injured person to identify the hazards from an unsecured, unattended, pressurised fire hose.

### Corrective/preventative actions

- 1 The hold washing operation was immediately suspended and a safety meeting was held to review the task, past working experience of each crewmember, and safe working procedures were communicated to all involved;
- 2 In future, a responsible officer or team leader will ensure that all work teams will be under the charge of an appropriately experienced crewmember, and that a 'buddy' system will ensure that every crewmember is monitored and can avail themselves of immediate assistance at all times;
- 3 The incident was circulated to all vessels in the fleet to prevent recurrence.

## MARS: You can make a difference.

### You can save a life, prevent injury and contribute to a more effective shipping community.

Everyone makes mistakes or has – or sees – near misses. By contributing reports to MARS, you can help others learn from your experiences. Reports concerning navigation, cargo, engineering, ISM management, mooring, leadership, design, training or any other aspect of operations are welcome, as are alerts and reports even when there has been no incident. The freely accessible database (<http://www.nautinst.org/mars/>) is fully searchable and can be used by the entire shipping community as a very effective risk assessment, loss prevention and work planning tool and also as a training aid.

Reports will be carefully edited to preserve confidentiality or will remain unpublished if this is not possible.

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