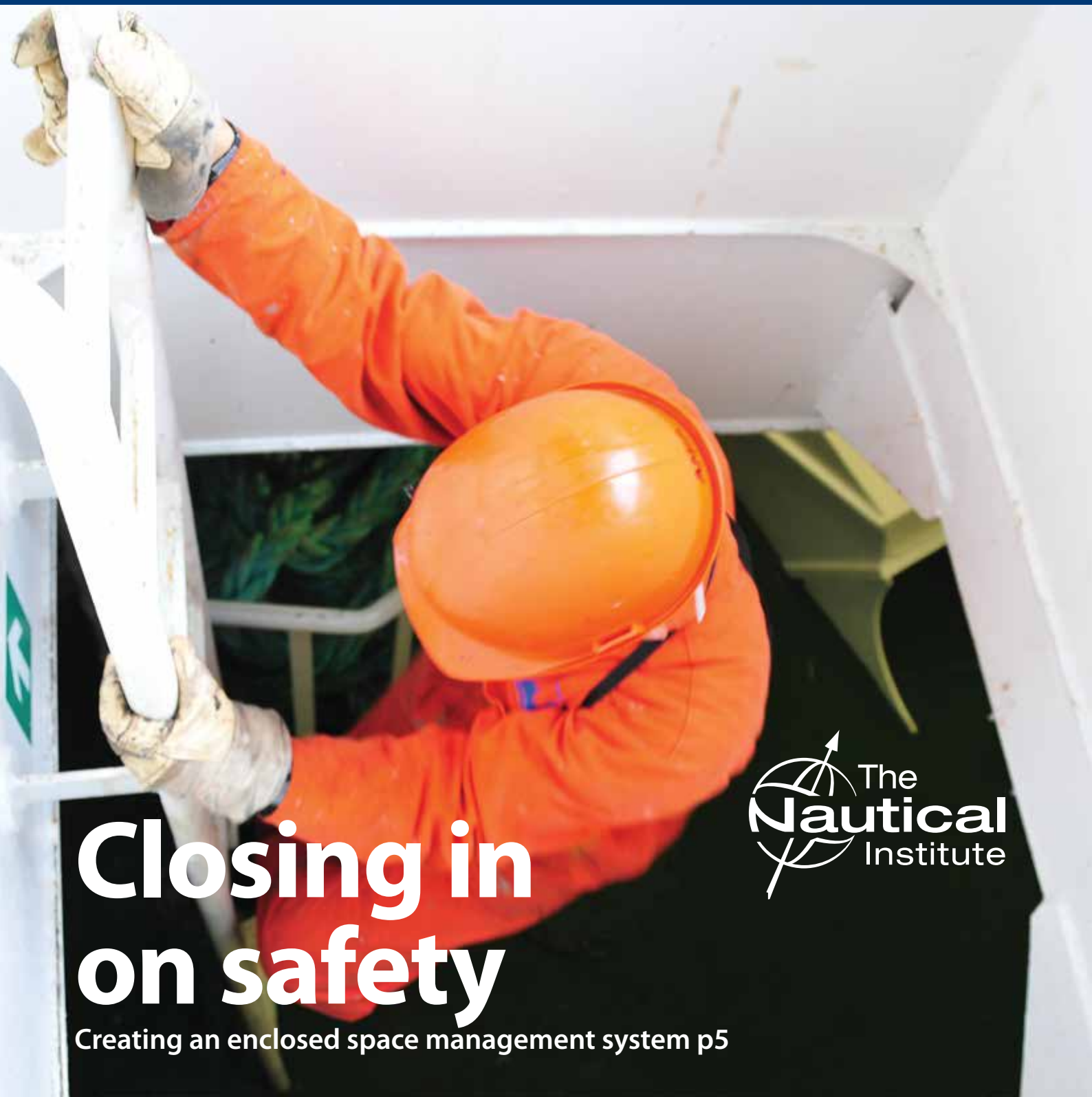
August 2013 www.nautinst.org

Seaways

The International Journal of The Nautical Institute



Closing in on safety

Creating an enclosed space management system p5

The Nautical Institute

Philip Wake MSc, FNI Chief Executive

Focus

Your way to CPD

> We are promoting the concept and means of CPD to the maritime industry at large and hopefully making people realise how important it is for the success of their business.

The Institute's policy on Continuing Professional Development (CPD) has gone through various evolutionary phases over the years, but has always centred on supporting and encouraging members in their own efforts to undertake CPD and hence develop their careers. There have been many debates about structured CPD, points or hours systems, and even mandatory requirements, but for the present we are content to raise the awareness of the importance of professional development and ensure that the work of the Institute provides a rich source of knowledge from professionals for others to learn from. In doing so, we are also promoting the concept and means of CPD to the maritime industry at large and hopefully making people realise how important it is for the success of their business. We have also provided a means for members to record their CPD activities, linked to their membership record, and encourage them to reflect on the learning outcomes and value of the activities they have engaged in (see p 13). If employers take CPD seriously they should review such records through their appraisal system, so we hope this web-based facility will be an additional and tangible benefit of membership.

So how can you or should you engage in CPD? For those serving at sea, or ashore and still maintaining their STCW qualifications, there are the statutory courses and examinations so that requirement is clear cut. Nevertheless, reflection on the learning outcomes of these courses and how they were provided is just as valuable. Employers' courses and seminars are another source and are generally very focused on the specific needs of the company but have the added advantage of bringing sea and shore staff together to exchange views and seek solutions. Another example in this category are Bridge Resource Management (BRM) courses, which many companies run themselves or utilise training providers with the necessary simulator facilities. The benefits of this training on a regular basis are set out by Simon Hughes (see pp 8-10) and, as collisions and groundings are again on the increase, it really is CPD that can save the company's bottom line from disaster. BRM has been included in the STCW 2010 Manila Amendments so will, in any case, become a mandatory requirement for Certificate of Competency holders by 1 January 2017.

Commercially organised conferences are very varied in subject matter and can be equally varied in usefulness so should be selected with care. The Institute supports some of these where appropriate and negotiates a members' discount. Given the relatively high cost of such conferences, members utilising these discounts will soon recoup the cost of their annual membership subscription – a very tangible benefit which also applies to the much lower cost seminars run by the Institute and its branches (see 'For your diaries' p 2 and the website for details of current events and discounts available).

Enclosed Space Entry

For those members and industry colleagues within striking distance of the SusCon Campus of NW Kent College near London on 11 September, we encourage you to attend the London Branch seminar on 'Entry into Enclosed Spaces' (see enclosed brochure or website for details). This is the sequel to the hugely successful seminar held in Aberdeen last year by the North of Scotland Branch, which naturally focused on the offshore sector, whereas this one will embrace the broader shipping industry. Whatever the type of ship, the issues are essentially the same and the Institute will remain at the forefront of efforts to eradicate the needless deaths and injuries arising from these dangers. This work will encompass the full range of Institute activities through publications, seminars, web forums, and input to the IMO. The need for a management system dedicated to enclosed spaces is set out by our colleagues and partners in the seminar at Mines Rescue Marine this month (see pp 5-7), and the theme will continue to be addressed in the Institute's other publications and books.

So there are many ways of gaining CPD, including the personal aspect of self-study by simply reading the publications issued by the Institute and other publishers as well as the regulatory bodies such as the IMO. There is, however, some concern as to whether the right books, in addition to the mandatory ones, are reaching the ships in these days of tight budgets (see Bridge Libraries pp11-12). We certainly encourage companies not to scrimp on such inexpensive and yet valuable sources of knowledge for their people and to consider what it says about the company's attitude to professionalism if they do.

p5

p8

Mariners' Alerting and Reporting Scheme

MARS Report No. 250 August 2013

MARS 201344

20 kg is still too heavy

➔ Two engine crew, the chief engineer and an assistant, were working on a deck air compressor. Work entailed the removal of a reduction valve which weighed approximately 20kg and is situated in a base approximately one metre from the deck and with limited access. The chief engineer lifted the valve from the base and then took it up a flight of stairs to the workshop. Soon after this task he experienced pain and discomfort in the lower abdomen. He was given bed rest and treatment as per medical advice for a suspected hernia and repatriated at the next port.

The company investigation found

- Although access to the reduction valve was limited, the use of mechanical means such as lifting strops or chain block was not considered for lifting the valve.
- No trolley was used to transport the valve, nor was the load shared between two crew with strops.
- The chief engineer disregarded established procedures for lifting and carriage of heavy objects with a view to quickly completing the job. The position of the valve was already identified as a hazard.

■ **Editor's Note:** It is often the case that senior managers are the most likely to contravene safety procedures for a variety of reasons. It is crucial for senior managers to lead by example, not just to ensure their own safety, but to set an example for others.

MARS 201345

Gas vapours cause illness

➔ A vessel was engaged in the discharge of gasoline to multiple small barges alongside; an operation that lasted seven days. This vessel used a closed discharging system throughout. However, the barges used an open loading system, topping off via open tank lids. The deck watch on the vessel was situated in the vicinity of the discharge manifold, which was subject to occasional gusts of wind; crew members could smell the occasional gasoline vapour. The chief officer does not appear to have known, initially, that the barges had engaged in open loading and that crew members were being subjected to gasoline vapours. Once advised of this fact he instructed all crew to wear gas masks during their deck watch period. Three days after the end of the discharge operations, a member of the deck crew began to experience symptoms that appeared to be due to gasoline vapour exposure such as increased heart rate, dizziness, pain and coldness.

The company investigation found that although a risk assessment had been completed prior to the discharge, it did not consider the risk of open loading and cargo vapours. As such, precautions relating to open loading had not been identified in the pre-operations meeting or ship/shore checklist.

Although the manifold watch crew were acutely aware that the barge was engaged in open loading and that cargo vapours were noticeable during certain weather conditions, they did not bring it to the immediate attention of the chief officer.

The direct cause of this incident is due to crew members not wearing the correct PPE for the duration of the discharge operation. There are correct procedures and practice in place for such an operation, but the chief officer had not been made aware that they were required by either the barge loading master or by the manifold watch.

■ **Editor's Note:** The company investigation identified the direct cause of the incident – the lack of proper PPE. However, open, clear, complete and unequivocal communication is always the best defence to help prevent accidents. There may also have been other contributing factors that have been missed. For example, was the chief officer so preoccupied with other duties that he could not verify, for himself, the actual unloading conditions at the manifold?

MARS 201346

Caustic soda and eyes – inadequate protection

Official Report as edited from BSU (German Maritime Investigation Board) 301/09

➔ A chemical tanker was at anchor where her tanks were to be prepared for loading a new cargo of 50% sodium hydroxide solution, also known as caustic soda. Two crew were detailed to remove the residues of the previous cargo using a mobile pump. Both were wearing protective equipment; cotton overalls, rubberised jackets, safety boots, protective gloves, open-sided eye goggles and safety helmets.

Portable pump with pressure side (red dotted line), suction side (red continuous line) and hose clamp used to attach hoses to pump.

The bosun stood at the coaming of the entry hatch to the tank to keep an eye on the work. The Master was also nearby. While the caustic soda was being pumped out, the hose parted from the pressure side of the pump (red dotted circle in photo), spattering one crew member with the caustic solution. A small quantity of the product also entered his eyes. The victim was immediately taken to his cabin where his eyes were continually rinsed with water until the arrival of rescue services. The victim was transported to the hospital and treated as an in-patient for ten days.

Root causes:

- Given that contact with only a 5% sodium hydroxide solution can cause extremely severe chemical burns, the protective equipment used was inadequate for the planned manoeuvre using a 50% solution. The IBC Code states that protective clothing made of chemical-resistant material as well as tightly fitting eye goggles and/or face shields are needed for caustic soda. The cotton overalls and eye goggles used, which were open at the sides, did not meet these requirements.
- There was a substantial lack of training with respect to the crew's ability to handle cargo on a chemical tanker.
- The safety awareness of the ship's command, deck officers and deck crew was not sufficient for safe and proper handling of the sodium hydroxide solution. The Master, tank cleaning team and bosun were all near the forward part of the vessel, yet none took action with regard to the inadequate safety clothing of the tank team.

■ **Editor's Note:** Here again we see a lack of safety leadership. It appears that the team had not done their homework with respect to working with caustic soda. The IBC Code is the best source and reference for working with chemicals. Had the crew employed the procedures found in this important reference work, chances are there would not have been the injuries sustained as in this instance.

MARS 201347

Incinerator fire due to dirty solenoid valve

➔ While at sea a fire occurred on the waste oil incinerator. The local fire alarm for the incinerator area was activated and the appropriate fire extinguishing mist system for the incinerator was triggered. Ship's staff immediately closed-up to the incinerator but found that fire was already extinguished with only slight smoke remaining. The incinerator had been in use even though one of the two fuel line solenoid valves had been damaged and was awaiting spare parts. The fire damage included electric cables, burner protector, door switch and fuel solenoid valves.

The company's incident investigation found that:

- The crew did not follow procedures to clean the burner before use. Uncleaned carbon deposits and the eventual failure of the second solenoid valve led to the fire.
- A non-routine risk assessment was not conducted when the first solenoid valve failed, hence no additional controls were placed on the use of the incinerator for operation with only one solenoid valve.
- New solenoid valves were ordered on an urgent basis but had not arrived onboard due to vessel's operating pattern. The ship's staff felt that they were obliged to use the incinerator due to the lack of available shore facilities. This concern was not shared with the shore management in order that alternative arrangements for the removal or disposal of accumulated materials could be made.
- There is no generic risk assessment for incinerator operations and the incinerator operating procedures need updating.

Company recommendations:

- A company wide generic risk assessment for the normal operation of the incinerator to be established.
- Vessels to create a comprehensive risk assessment with additional controls when using defective equipment which must be approved by the company.
- Urgent spares to be supplied as soon as practically possible as detailed in the company SMS. Vessels to follow up with office for their delivery.
- Incinerator operating procedures to be updated.
- Vessels to notify the company of their requirements for shore discharge of waste oil when incinerator is defective and cannot be used.
- The critical incinerator parts to be identified on all company's vessels and one set to be kept on board as spare.

MARS 201348

Tiger stripes not enough

➔ An oiler was proceeding to the engine room via the engine casing entrance. After leaving the paint locker he hit his forehead on the inert gas (IG) main line directly above and to the side of the paint locker entrance. The oiler suffered a cut to the forehead.

Root causes

1. The crew member was not wearing correct PPE for the task.
2. The crew member was preoccupied with the task at hand.
3. The IG main line had been previously identified as a hazard, and was already marked with 'tiger stripes'. Nonetheless, due to regular passing of the pipe without incident crewmembers had become complacent about the danger.

Action taken

1. A company wide review of trip and bump hazards on vessels and a reassessment of whether current warning/identification measures are sufficient, or if additional measures are required.
2. In this case it has been identified that 'tiger stripes' on the piping alone were an insufficient visual warning. Tiger stripes have now been painted on the deck and a soft protective covering placed around the flange.

MARS 201349

Off-centre steering position confuses helm orders

Official Report edited from Canadian Transport Safety Board M11C0001

➔ The vessel was downbound through a restricted waterway at night. At a lock, there was a change of pilots. Information was exchanged between pilots and the Master, among others, that the gyro-compass was 3° high. As the Master exchanged information with the new pilot, he assumed conning and operational control of the vessel.

The vessel's pilot card showed a schematic of the navigating bridge that portrayed it as symmetrical either side of the centreline of the vessel. None of the documentation on the bridge indicated the important information pertaining to the conning and steering position, which was offset from the centreline. As it was, the steering stand was almost three metres to starboard of the centreline of the vessel. This resulted in a parallax error of approximately 1.6° to starboard if the line of sight is taken from the steering stand. The pilot was apparently aware that the steering stand was offset from the centreline, but had estimated the potential error to be about 0.5°.

Furthermore, the pilot card did not clearly indicate that the vessel was equipped with an articulated flap-type rudder, nor were the Master or other crew members apparently aware of this.

As the vessel cleared the lock the speed over the ground (SOG) was about 4 knots. The pilot then asked the Master to increase the pitch to 20% and requested the helmsman to steer on a heading of 353° gyro (G) to bring the vessel to the south of the channel centreline. This manoeuvre was standard practice to compensate for the flow coming from the regulating channel, starboard of the vessel. A few minutes later the pilot ordered the helmsman to steer on the light in the middle of the bridge span ahead to bring the vessel back towards the centre of the channel. At this time, Traffic Control also informed the bridge team that the bridge pillars immediately either side of the channel were not illuminated.

By this time the Master and the OOW were close to the pilot and observing the manoeuvre as the vessel proceeded at about 5.5 knots SOG. About one minute later the pilot gave the helmsman orders to bring the vessel's head towards the north pillar of the bridge, which was not illuminated but was visible. Once the vessel was steadied on the pillar, the pilot found the heading to be 349.5°G and ordered the helmsman to steer 349°G (346° True). Since the course of the channel was 348°T, this heading would bring the vessel towards the centre more quickly. The pilot then reduced the pitch to 15%.

Shortly thereafter the pilot observed that the vessel was more to the south than expected, but this was not judged to be abnormal. He then reduced the pitch to 10% for the entry into the narrower part of the channel ahead. As the vessel entered the restricted part of the channel with a SOG of 6.8 knots and a heading of 350°G the helmsman had to apply starboard rudder to keep the vessel on the desired heading (an indication of bank suction astern). Shortly thereafter the vessel's course took a sudden sheer to port. Immediately, the pilot ordered the rudder hard to starboard and requested that the Master activate the bow thruster. The pilot used the CP propeller lever to produce an engine kick ahead, then set the CP propeller lever at full astern but the vessel continued crossing the channel at a 45° angle.

The vessel's bow subsequently grounded on the north bank of the channel some 0.75 nautical miles downstream from the lock they had just exited, the stern to the south side of the channel thereby blocking the waterway; vessel traffic was interrupted for approximately 10 hours until the vessel was successfully refloated.

Some of the analysis and findings of the report indicate that:

Neither the offset steering stand from the centreline of the vessel nor specific and detailed information such as parallax error were provided to the pilot.

On-board documentation did not clearly identify the vessel's rudder type, nor were the bridge team members aware that the vessel was fitted with an articulated flap rudder.

■ **Editor's Note:** Having a complete and detailed Pilot Card is crucial. Both the offset steering position and resulting parallax error as well as the articulated flap rudder are very important facts that should have been known to everyone involved. Yet, what was not mentioned in the official report was the apparent lack of complete communication between the bridge team, a critical element in good BRM. For example, the helmsman found he had to use more and more starboard helm to keep the required course, an early indication that the stern was experiencing bank suction. This fact should have been communicated to the pilot and Master/OOW instantly, thus giving advance warning of the onset of bank effect. This knowledge would have allowed countermeasures to be initiated before it was too late and the vessel took the sheer across the channel.

MARS 201350

High speed and heavy weather

➔ The vessel had just cleared the jetty and was under pilotage. The telegraph order was given for full ahead. However, the RPM remained low, at 130, with an estimated speed of 5.8 kts. High density black smoke was then seen coming from the funnel. The chief engineer reported to the bridge suspecting a problem with the main engine turbocharger. After safely anchoring, the turbo charger was opened up by ship staff. Upon inspection it was ascertained that the rotor assembly required balancing. After taking the turbocharger cartridge to the workshop for checking, following damage was evident:

1. Turbine blades worn oval on half the wheel profile.
2. Turbine side shaft labyrinth deeply grooved and worn undersize and the shaft bent at the turbine end journal.

3 Turbine end journal bearing was subjected to extreme heat and had turned blue.
4 Shaft bent at the compressor end journal.
5 Compressor impellor worn oval on half the wheel profile.

Given the above findings the rotor assembly was not repairable. The rotor assembly required replacement, along with a few other parts.

Root cause:

Damage to the turbocharger took place due to excessive wear of the turbine side bearing, thereby losing the centre line of rotation. On the whole, the components in the radial direction were found damaged.

The vessel had experienced many days of heavy weather on her last inbound voyage. Due to her small size the vessel was rolling and pitching extensively. This would have caused constant load changes on the main engine due to the change of water depth at the propeller.

The constant load change caused surging of the turbo charger and the lubricating oil could have developed high soot levels caused by the increased piston blow-by (main engine being a trunk piston design) during the load changes.

Also, due to the fact that this engine has a common lubricating system, the turbo charger is lubricated using the main engine crankcase oil. This makes it more susceptible to damage if the lubricating oil contains elevated solids notwithstanding a functional oil filter.

Under normal circumstances (when oil is clean), this may not be detrimental but the circumstances which the vessel had experienced can cause high soot levels to build up very quickly. The soot would most probably act as a grinding agent and increase bearing clearances. The only caution that the vessel's crew had followed was to reduce engine speed to ensure the exhaust gas inlet to turbocharger did not exceed 495˚C; the surging was allowed to continue.

Lessons learnt

Following a review of the sequence of events, it was noted that the main engine RPM was not reduced sufficiently in rough weather, with severe pitching and surging conditions. Due to the small size of the main engine, a four stroke-trunk piston type, even small swells and weather conditions have considerable effect on the engine operations and parameters. Even though the engine RPM was reduced it was not sufficient to eliminate/minimise surging of the turbo-charger. Vessel engineers did not reduce the main engine load further as that would have required change over from fuel to diesel oil. Some of the lessons learnt include:

1 Reduce main engine speed if surging occurs. If further reduction requires changing over engine to diesel oil, this should be carried out and the charterers and owners advised.
2 Ensure main engine lubricating oil purifier is working well.
3 Ensure bypass filters and turbocharger lubricating oil filters are clean.
4 Carry out routine marine grit cleaning on the turbine side.

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.

Editor: Captain Paul Drouin AFNI

Email: mars@nautinst.org or MARS, c/o The Nautical Institute, 202 Lambeth Road, London SE1 7LQ, UK

The Nautical Institute gratefully acknowledges sponsorship provided by:

American Bureau of Shipping, AR Brink & Associates, Britannia P&I Club, Cargill, Class NK, Constellation Marine Services, DNV, Gard, IHS Fairplay *Safety at Sea International*, International Institute of Marine Surveying, Lairdside Maritime Centre, Norwegian Hull Club, London Offshore Consultants, MOL Tankship Management (Europe) Ltd, North of England P&I Club, Sail Training International, Shipowners Club, The Marine Society and Sea Cadets, The Swedish Club, UK Hydrographic Office, West of England P&I Club.

Visit www.nautinst.org/MARS for online database