The Nautical Institute
1971 - 2011
celebrating 40 years

SEAWAYS

March 2012

The International Journal of The Nautical Institute

Casualty management guidelines

eNavigation

ECDIS operations

The big 'E'

Time waits for no maritime professional – as the saying goes. This is an increasingly important mantra, particularly in the age of electronic navigation and eNavigation. For those of you who ask the difference between the two, and we suspect there may be many: eNavigation is a specific work programme of the IMO to harmonise the collection, integration, exchange, presentation and analysis of navigation information. This initiative is explained by Mr John Erik Hagen (pp 14-16), who is the Chairman of the IMO eNavigation Work Groups. The strength of this IMO initiative is that it should lead to greater harmonisation of navigation information and communication on an international basis. This will be essential for safety and international trade. The weakness, however, is the time it will take to obtain agreement by all nations and stakeholders, particularly in a time of such rapid technology advancement.

Electronic navigation is with us now and is epitomised by ECDIS with GPS. We recognise that this is widely relied upon, or even over-relied upon. The training requirements for ECDIS came into force in January 2012 as per the Manila amendment to STCW, and the first phase of ECDIS carriage requirements will begin as of July 2012. Our President Captain James Robinson is quoted as saying that 'ECDIS is a complex system and will be one of the most essential tools for supporting mariners in their efforts to ensure the safety of navigation and protection of the marine environment'. The ability to harness the power of ECDIS and to avoid catastrophe due to incompetence is largely down to training and familiarisation. Many of shipping's leading international organisations have worked together to develop guidance to assist ship operators, flag states and training providers to interpret the IMO minimum requirements to maximum effectiveness. This guidance was published by the NI in February and is reproduced on pp 12-13. Mariners questioning the effectiveness of their ECDIS training should bring such guidance to the attention of their employers.

Should the importance of ECDIS be questioned, the advice given by the UK P&I Club in the second part of their three part series (pp 8-10) should be heeded. They state that 'It is becoming increasingly evident that far from reducing risk, ineffective operation of complex ECDIS systems resulting from poor management practice or training can actually increase the risk of incidents such as collision and grounding with the interface between computers extenuating the so called 'human element''. As stated in many of the Institute's publications and *Seaways* articles, ECDIS is a revolutionary change in the task of navigation and needs to be taken extremely seriously in terms of training and onboard operational practices and procedures.

So, eNavigation will take some time to come to fruition, and current technology marches on – where does this leave us? Ideally with a balanced and pragmatic approach. Mike Sollosi is not only the Chief of the Office of Navigation Systems for the US Coast Guard, but also the Chairman of the IMO Safety of Navigation Sub-committee (Nav) and has outlined how a Coastal State has adapted, and continues to adapt, eNavigation type services in the here-and-now (pp 21-22). This article was taken from his address to the important conference on eNavigation, reported on pp 27-28.

Such technological developments and the corollary maintenance of competencies for their use, both onboard and ashore, define the commitment to being a modern maritime professional. Unfortunately, if all goes wrong casualties occur. Even at this stage, professionalism and training is essential, as outlined by John Noble (p 6), introducing the NI's *Casualty Management Guidelines*.

Conclusion

Continuing Professional Development (CPD); contribution to evolving technology; teamwork – all goals of The Nautical Institute.

Features

The Nautical Institute
Mariners' Alerting and Reporting Scheme
MARS Report No 233 March 2012

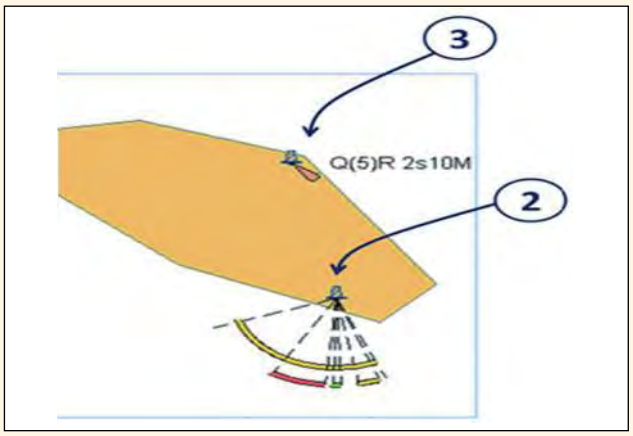
Providing learning through confidential reports – an international cooperative scheme for improving safety

MARS 201213
ECDIS anomalies and IHO data checks

The International Hydrographic Organization (IHO) has issued a set of data comprising two fictitious Electronic Navigational Chart (ENC) cells and four sets of tests to check for a number of anomalies or unexpected behaviour in systems and to allow operators to see whether their ECDIS software is up to date and conforms to the latest ECDIS standards for displaying chart data. (*Seaways* January 2012).

The IHO have advised that, as of end of January 2012, almost 400 reports of checks (covering 15 of the 25 or so manufacturers of type-certified ECDIS) have been received by IHO from sea. Despite this relatively low number of responses, all those reports received by the IHO indicated some level of unexpected behaviour was present on all the systems that were checked. However, at the same time, the nature of the unexpected behaviour was not exactly the same in every manufacturer's system.

While the anomalies range in their potential seriousness for safety of navigation, there were concerns raised over the display of underwater features and isolated dangers; the display of complex lights as intended; the display of '*submerged wreck – dangerous*' as intended by the standards; the display of '*underwater hazard with a defined depth*' and the display of Archipelagic Sea Lanes (ASL), Environmentally Sensitive Sea Lanes (ESSA) and Particularly Sensitive Sea Areas (PSSA) properly.



▲ Q2 & 3 portrayal of complex lights. Is object 2 same as in the illustration? Are light characteristics same as in the illustration

Additionally, about 1 in 2 of the reports showed the ECDIS would not be able to display a 'new object' properly if it was introduced by IMO and 1 in 2 of the reports indicated that the ECDIS had limitations in some aspects of the route checking function.

We should all be concerned at the number of reports of systems that appear to have shortcomings in the portrayal of important chart data.

In order that all mariners using ECDIS are fully aware of any limitations in the use of their particular ECDIS, owners, managers, ship operators and ships' officers should ensure that they complete the IHO data checks on their ECDIS/ECS and also report the results back to IHO. If you have not yet received the check data it can be downloaded from the IHO website (http://www.iho.int) via the Newslink button on the homepage.

An article on the IHO data checks and the legal implications was published in *Seaways* (January 2012). This can be downloaded from the ECDIS Forum website at: http://www.nautinst.org/en/forums/ecdis/index.cfm

In the meantime, Masters may need to take extra measures, such as employing particular equipment operating procedures.

MARS 201214
Dangers of poor ECDIS training

I have had several young bridge officers on my previous vessel who did not understand running fixes or - more worryingly - parallel indexing.

We had one ECDIS unit installed on the vessel. Due to this we still had to use paper charts. During a coastal passage I noticed that the OOW continually plotted GPS positions on the paper chart. I had a chat with him and requested that he start to plot the vessel position using range and bearings. I then watched him proceed to the ECDIS unit, take the range and bearing of a headland from the ECDIS and plot this on the paper chart. Needless to say I was stunned. The OOW thought he had plotted a perfectly acceptable position using range and bearings. In hindsight I should have made it clear to him that he should use the radar to take range and bearings. But are we at the stage now that we have to take certified OOWs by the hand and show them the basics of coastal navigation?

MARS 201215

Release of inert gas/cargo vapour mixture at berth

A tanker was berthed at a terminal in the tropics and discharging crude oil. The port is in a notified volatile organic compounds (VOC) controlled area. Soon after discharge had commenced, the terminal requested a temporary cargo stoppage without advising the reason or expected duration (presumed to be due to lack of storage tank space ashore). During this period, due to very high ambient temperature, No 2P COT pressure relief valve opened, releasing inert gas (IG)/cargo vapour mixture to the atmosphere, in breach of the applicable Annex 6 of Marpol.

1. The vessel was carrying Maya crude, a highly volatile and sour (containing hydrogen sulphide) cargo. Cargo was loaded at a higher than usual temperature (48° C) and due to the short voyage, the cargo temperature was unchanged at the discharge port;

2. Cargo tanks were only part-full, so the inerted volume was significant;

3. Prior to berthing, the tank inert gas pressures had been reduced to 70 mm WG;

4. There was a lengthy delay between vessel's arrival and commencement of discharge, which was temporarily suspended a few hours into the operation;

5. There were abnormal heat-wave conditions at the discharge port;

6. During the stoppage, tank pressures rose significantly probably as a result of the unsaturated ullage space containing mainly inert gas;

7. After some time, No 2P COT pressure vacuum valve (PVV) lifted at between 1200-1400 mm WG as per the design parameters of the valve;

8. The Master immediately requested permission from shore to cool the tank deck with sea water from deck monitors. This was partially successful in reducing pressure by 80 mm WG;

9. All personnel were properly briefed and trained and were wearing personal multi gas detectors. Breathing apparatus sets were distributed on the main deck;

10. As no H_2S alarm was activated, it is highly probable that the released vapour was mainly inert gas.

Root cause/contributory factors

1. Lack of planning – Given the prevailing heat wave conditions, the known properties of Maya Crude, and the lack of shore tank space, the terminal should have planned the berthing better, so that immediate and continuous discharge could take place and avoid over-pressure in ship's tanks;

2. The vessel should have both anticipated and more closely observed the rise in cargo tank pressure and should have notified the terminal immediately on the developing hazardous condition.

Lessons learnt

1. In circumstances such as those described above, terminals should plan berthing only when there is sufficient space available to receive the cargo at the tanker's optimum discharge rate;

2. Terminals (and charterer's agents where appropriate) should freely provide vessels with timely and complete information on anticipated operational delays, to allow contingency planning;

3. Vessels must monitor cargo tank conditions continuously, with due regard for prevailing and expected ambient conditions. Company operating procedures and C/O's standing orders for deck watchkeepers should reflect this requirement;

Concerns about cargo/vessel conditions should be communicated to the terminal promptly and updated as necessary. Countermeasures should be discussed and agreed with terminals. As far as possible, such countermeasures should not lead to breaches of regulations, and practical legitimate alternatives should be considered first, e.g. Vapour Return Line. Under the **Vessel General Permit for Discharges (VGP)** regulations in the USA, deck washdown in US ports is an action of last resort, to be avoided except in emergency;

4. Where pressure reduction by deck cooling is unavoidable, it should be started as soon as possible, and the necessary permissions must be obtained. If appropriate, a VGP Non-compliance Report must be submitted to the authorities, explaining the reasons. The best practices listed in VGP Section 2.2.1 should be complied with to the extent possible.

Corrective/preventative actions

A fleet circular on this incident was issued for information, discussion and compliance.

MARS 201216

Cable reel deck cargo broke loose

An offshore support vessel sailed from her shore base on a routine supply run to her designated oilfield. Her deck was loaded with a variety of tubing, casings, pallets, tool boxes, food containers and one large unpacked wooden cable reel, weighing about 11 tonnes. The reel was stowed with its axis fore-and-aft and was pre-slung with an extra-long 12 mm steel wire sling passed through the very narrow central hole, which precluded threading any other securing rope or chain through the coil. The sling was unsuitable for securing, so the ship's crew secured the reel by pushing wooden wedges under it and tightening a chain around its girth. Additionally, the vessel's tugger wire was tensioned at the reel's mid-height.

Soon after sailing, the ship rolled and pitched heavily in a gale, and the accelerations imposed large forces on the lashings. Suddenly, a link in the chain parted and the tugger wire instantly became slack. Subsequent movements displaced the wedges and the bridge watch observed the reel moving freely on the deck. The Master was called, speed reduced to minimum and heading altered into the sea and swell. With the ship now pitching gently, the crew managed to throw some square timber (4x4's) across the path of the runaway reel path and gradually regained control over the hazardous situation. A dunnage 'grid' was quickly nailed around the base and the reel remained safely inside this

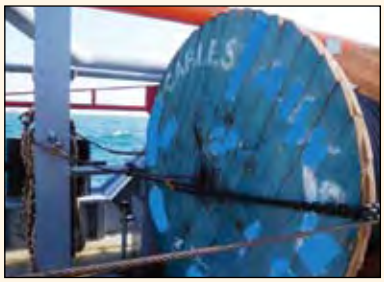
while the crew re-tightened additional wires and chains. About an hour later, the reel was safely lifted off by the offshore installation to which it was consigned.

Lessons learnt

1. Unpacked wooden cable reels, especially those with a very narrow central hole, cannot be effectively secured and must be shipped only in containers or skids;

2. Cable reels made of steel with exposed cross-members or spokes may be shipped unpacked, but must be secured with sufficient number of lashings (chains or wires) and wooden wedges as determined from the vessel's approved Cargo Securing Manual (CSM) or as per the guidelines contained in the IMO publication Code of Safe Practice for Cargo Stowage and Securing (CSS Code);

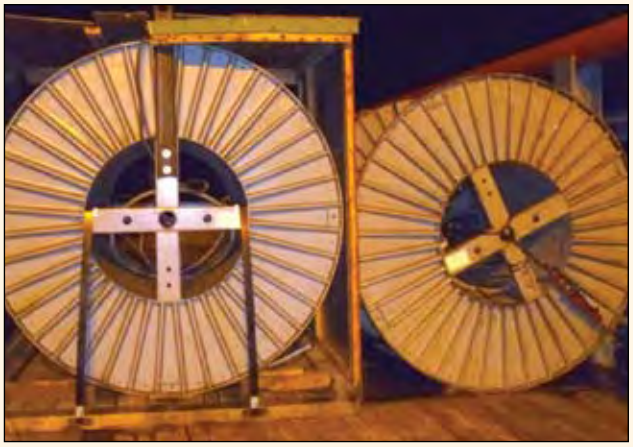
3. Packing a cable reel inside a timber and plywood skid before shipping on a vessel offers an effective and economical method for safer carriage by sea.



▲ View of unpacked wooden cable reel – note very narrow central hole with lifting wire sling rove through, chain and tugger wire tightened at mid-height.

▲ Broken link of chain later recovered from deck

▲ Cable reels made of steel can be more effectively secured



▲ Unpacked cable reel blocked by another cable reel packed on a wooden skid

MARS 201217

Hot work causes fire in workshop

A deck workshop/store on a survey vessel was a compact, stand-alone structure, located abaft the wheelhouse. It was originally designed as a store, but over the years, the crew had also installed a wooden tool board and a work bench against one of the bulkheads. Portable welding and other equipment was also stored in this space. Adjacent to the store was a designated storage arrangement for chemicals and flammable liquids.

In order to re-arrange items inside the cramped space, the boatswain (bosun) planned to weld two hooks on the internal bulkhead frames directly above the tool board and work bench for stowing a crowbar.

The bosun completed a permit for hot work form, which was approved by the OOW (2/O), who failed to detect several factual and procedural errors and did not conduct a proper discussion or risk assessment. Working alone, the bosun welded one of the hooks to the bulkhead and attended briefly to another errand. The second hook was then welded adjacent to the first one, this time with a seaman also present. Neither of the men paid attention to the cardboard box containing harnesses (made of flammable synthetic fibre) that was lying on the workbench directly under the weld site. They then left the area for a short break. Some minutes later, as the master exited the wheelhouse, he found thick black smoke billowing from the open door of the workshop. He shut the door, returned to the wheelhouse and informed the bosun on the radio that there was a fire in the deck workshop. While the bosun rushed to the site with the other ratings, the master sounded the fire alarm and ordered the 2/O to take the nearest fire extinguisher to the location. Upon arrival at the scene, the bosun opened the door and could see flames on the work bench through the dense smoke. He briefly entered the space and rapidly discharged a portable CO_2 and a foam extinguisher. This was followed by a water jet from a charged fire hose and the fire was soon extinguished.

■ **Editor's note:** Given the cramped space, a well-established fire and flammable materials located nearby, the bosun's action was unsafe due to the hazards of toxic smoke, oxygen deficiency, burn injury, electrocution from damaged electrical circuits and fire spreading to outside the confines of the space. Only the designated fire-fighting team wearing approved fireman's outfits and SCBA should approach and tackle a shipboard fire.

Immediate causes

1. No proper risk assessment was conducted;

2. Combustible materials were not removed from the worksite prior to the commencement of hot work;

3. No dedicated fire watch was in place either during the hot work or after it was completed.

Root cause/contributory factors (as per findings of investigator):

1. Lessons learnt from previous fire incidents arising from hot work had not been effectively implemented (fires

resulting from failure to clear combustible materials from the vicinity of hot work sites had occurred on four past occasions);

2. Personnel responsible for hazardous work not adequately trained in use of the permit-to-work system and risk assessment methods;

3. The company did not adequately monitor the quality of risk assessments performed, permits completed onboard and compliance with procedures related to the management of hazardous work;

4. The risk assessment and toolbox meeting documents and records were all maintained within a computer based (paperless) system. It was felt that printed material would have improved workforce understanding of safety issues, promoted more effective risk assessments and job execution at the work site.

Recommended action

Ensure that:

1. A system for the delivery of training in use of the permit-to-work system, risk assessment methods, and the general management of hazardous tasks is developed and implemented. The system shall include a review of training in general to determine if training is also required in other areas;

2. Management of hazardous work on board vessels is adequately monitored. Enforce compliance with the risk assessment procedures as stated in the SMS;

3. The definition of hot work (previously only gas-cutting and welding) is expanded to include burning, brazing, grinding, soldering, thermal resistance heating, etc;

4. It is clearly stated which activities are to be preceded by a risk assessment and management procedure for each department on board;

5. A fleet circular is issued informing all employees of the lessons learned from this incident, and these are also shared with the industry.

▲ View of interior of deck workshop cum store showing fire damage

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 Shridhar Nivas FNI

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, DNV, Gard, IHS Fairplay *Safety at Sea International*, International Institute of Marine Surveying, Lairdside Maritime Centre, London Offshore Consultants, MOL Tankship Management (Europe) Ltd, Noble Denton, 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.