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Seaways

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Creating a security culture

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Philip Wake MSc, FNI Chief Executive

Focus

Safety, Security & Leadership

> Leadership is for everybody, whatever their rank or position

Much has been written over the past two decades or more of the need for a safety culture. The modernity of this campaign may seem a little surprising in the centenary year of the sinking of *RMS Titanic*. Whilst that catastrophic event is rightly credited as the catalyst for the SOLAS Convention, which has done so much to improve the safety of shipping, the shift in emphasis from technical measures to the soft skills of the people at sea and ashore has been a long time in coming. The ISM Code rightly defined the responsibility of the management ashore for safety whilst leaving the ultimate responsibility with the Master and formalised the Safety Management System, but we have had to wait until the STCW 2010 Manila Amendments to bring Leadership and Management training into the regulated environment of merchant shipping. Yet any reading of the *Titanic* tragedy identifies lack of leadership on board and ashore as a contributory cause (see p 31 and John Lang's recent book – review next month) in addition to the technical shortcomings.

There has been good leadership and management training around for years, of course, in addition to the leadership element in Bridge Resource Management (BRM) courses, but the take up of these courses has generally been limited to some of the shipping companies at the better end of the market rather than widespread. The importance of the STCW amendments therefore is that all trainees will get at least some leadership and management instruction - but how good will it be? Dr Chris Haughton's research into the provision of this training for the leaders of the UK's maritime education and training (MET) establishments paints a bleak picture (see pp 13-16). Most arrived in their leadership positions somewhat unintentionally after sea service and few received any training for their role. It is to be hoped that the realisation of this shortfall will inspire them to ensure that their trainees fare better.

It is important to stress throughout this training that leadership is for everybody, whatever their rank or position in the ship or company. For the safety culture to really take hold this is essential and the Captain's Column (see p 4) illustrates this in terms of hazard identification under the ISM Code requirement for risk assessment. The same applies to the implementation of a security culture under the ISPS Code which has now been with us for 10 years (see pp 5-6 and 7-9). Neither Code should be relegated to mere lip service, a paper exercise of procedural manuals designed to protect the management with copious checklists filled in without thought or real checks. Leadership is required to convince all concerned of the benefits of the systems and their important roles in applying and improving them. The Institute's publications, written by knowledgeable practitioners for practitioners, are one of our contributions to providing leadership in these and many other areas of professional standards and best practice. Similarly, the activities of our Branch network are an essential service to members and potential members in providing continuing professional development, a forum for debating topical issues, and networking (see pp 26-27 and 29-34 for the diversity and importance of subjects covered). If you are not attending such meetings, please resolve to make the effort to do so. You will be richly rewarded with knowledge and useful contacts for the future.

The New Zealand Branch meeting on ECDIS showed that you do not necessarily have to be there in person as the virtual world of video conferencing has come to Institute meetings – some would say 'about time too'. At least this still involves real people rather than avatars and gaming technology which is beginning to be employed in simulation training. See pp 16-17 for an initial report on an EU project that the Institute is involved in to assess the benefits and effectiveness of such simulation training. A useful contrast is provided by the use of full mission simulators in the Royal Navy's structured command training and assessment process (see pp 22).

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Mariners' Alerting and Reporting Scheme

MARS Report No. 241 November 2012

MARS 201254

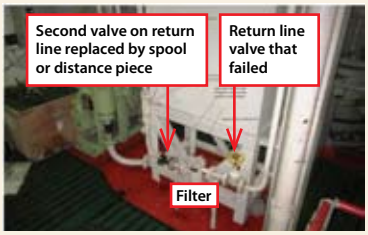
Injury from burst hydraulic valve

➔ On a cargo vessel in drydock, the crew was testing the operation of an electro-hydraulic mooring winch after completion of repairs. The team, led by the C/E, and comprising of the 3/E, J/E and an OS, entered the hydraulic machinery room and started the main pump motor. Without warning, the return line gate valve before the filter disintegrated and the detached bonnet flew through the air, hitting the J/E on his face and fracturing his skull and nose. He was immediately hospitalised ashore. Very fortunately, he narrowly escaped more serious injury that could have resulted in permanent damage to the eyes and brain and was able to recover fully from this accident.

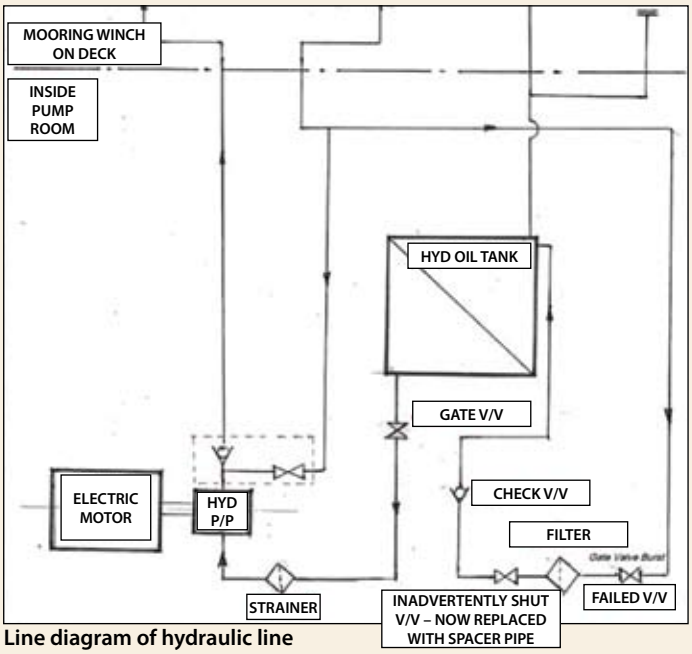
Result of investigation

During an earlier trial, it was noticed that one of the valve flanges next to the filter was leaking. After isolating the line, the crew renewed the gasket, and then opened the valve before the filter, but forgot to open the one after the filter. When the pump was subsequently started, the sudden build up of high pressure on the upstream side of the valve resulted in its violent disintegration.

View of broken valve



Corrective action completed – redundant valve replaced by spacer pipe



Line diagram of hydraulic line

Lessons learnt

1. It is extremely important that, before commissioning hydraulic systems, all line valves are verified to be fully open and the system is thoroughly purged of air and primed with the correct quantity/type/grade of hydraulic fluid;
2. Return lines are not designed to take high pressure in most hydraulic systems.

Corrective/preventative actions

1. The second valve (after the filter) was considered redundant. It was removed and replaced with a spool piece, reducing the risk of the inadvertent closure of the return line;
2. A sign was permanently installed next to the hydraulic pump motor starting switch warning personnel to 'Ensure all return line valves are fully open'.

MARS 201255

Hand injury in engine room

➔ After a routine overhaul, the engine crew was re-assembling an air compressor in the E/R workshop. In keeping with good engineering practice, the various components were cleaned and coated with lubricant prior to fitting. The 4/E was putting together and tightening the parts in the correct order but due to the oil coating, found that he was unable to grip the assembling tools firmly. For a better hold, he removed his gloves and proceeded to tighten the fasteners with an open spanner. While exerting force on a nut, his hand suddenly slipped off the spanner and struck a hose clamp (also referred to as a jubilee or worm drive clip) fitted on a pipe in the vicinity, resulting in a deep gash on his left palm.

Root cause/contributory factors

1. Failure to use correct personal protective equipment (PPE) – i.e. gloves;
2. Work place and tools were not wiped clean of the oil resulting in poor hand grip;
3. Restricted space around work area with sharp obstructions and fittings in close proximity.

Corrective/preventative actions

1. Injured crewmember was given first aid treatment and temporarily taken off work;
2. C/E and 2/E conducted a meeting with ship's staff to discuss the incident and stressed the importance of using appropriate PPE and adopting safe working practices;
1. C/O and 2/E were assigned responsibility for ensuring proper toolbox briefing is conducted prior to commencing any task within their departments;
3. The investigation report was shared within the fleet to focus attention on using appropriate PPE at all times and to prevent recurrence of similar incidents;
4. The incident will be featured in a forthcoming seminar and become part of senior officers' pre-boarding office briefing.

MARS 201256

Excess chemical cargo discharged

➔ A chemical tanker was loaded with three parcels for multiple ports. At one of the discharge ports, as per manifest, the vessel was to discharge a major portion of Di-ethyl glycol (DEG) – a total of 2,408 tonnes from two tanks, along with small quantities of the other two cargoes. After discharge, ullages and tank calculations showed that the vessel had inadvertently discharged a quantity of 2,606 tonnes, an excess cargo quantity of 198 tonnes.

Result of investigation

1. In the original discharge plan, the stopping ullages of the DEG cargo tanks were found to be correct, but when recalculating prior to discharge, the C/O had obtained different figures due to a clerical error. Believing the original plan to be incorrect, he amended the ullages in the discharge plan;
2. The C/O did not discuss the discrepancy and revised stopping ullages with the OOW and Master, resulting in a one-man error.

Corrective/preventative actions

1. The management office and the charterer were immediately informed of the error;
2. P&I Club surveyor was urgently summoned to attend;
3. Master and C/O independently re-calculated the cargo quantities for the remaining discharge ports and relayed the figures to the charterer;
4. Shipboard procedures were amended to include the instruction that the Master shall personally verify the C/O's pre-loading and pre-discharge cargo calculations, supervise cargo operations at critical stages and that all cargo and tank cleaning plans, and any revisions shall be verified / approved / signed by the Master and OOW;
5. Investigation report shared within the fleet and to form part of pre-boarding briefing for all senior officers;
6. Future crew changes to allow for sufficient overlap of deck officers when vessel is scheduled to call at multiple load or discharge ports;

MARS 201257

Improper bridge procedures and ECDIS use caused grounding

Official report – edited from MAIB Accident Investigation Report No 2/2012

➔ A self-unloading bulk carrier sailed in the morning after loading a cargo of aggregates. The pilot disembarked soon after unberthing, and the vessel proceeded at Full Ahead (about 12 knots) with the Master, 3/O and a helmsman manning the bridge. Visibility was good with a moderate breeze.

Besides the two radars, the bridge team was using an ECDIS, on which, a safety contour of 10 metres *(inappropriate, considering a sailing draught of 10.63 metres)*, a cross-track deviation limit of 0.2 mile and an anti-grounding warning zone that covered a narrow arc ahead to a range of about ten minutes' steaming had been set.

About an hour after departure, the vessel entered a narrow strait, where the Master instructed the helmsman to engage the autopilot on a heading of 290° and handed over the con to the 3/O. He then proceeded to the communications desk on the after port side of the bridge, increased the volume of a portable music system and busied himself with sending routine departure messages.

A few minutes later, the vessel was approaching a planned waypoint requiring an alteration of 24° to starboard to 314°. At this time, the 3/O visually sighted an inbound sailing vessel about 3 NM on the starboard bow. After coming on to the new course on the autopilot, he decided to pass the sailing vessel to port and adjusted the course to 321°. Simultaneously, he observed another small vessel about a mile away, right ahead and coming head on, and altered more to starboard to 324°. The ECDIS anti-grounding warning zone alarm then activated on the display, but no audible alarm sounded, a deficiency not known at the time. As a result, the 3/O, who was monitoring the situation from the forward console, did not realise that the vessel was heading towards shoal ground. He also sounded two long blasts on the ship's whistle to alert the nearest vessel, which soon passed clear to port. Thereafter, the 3/O focussed his attention on the sailing vessel ahead, which was now about a mile away. Two minutes later, the vessel ran onto a charted shoal at full speed. The severe vibrations lasted several seconds. The Master ran to the ECDIS display and, recognising that his vessel had run aground, instructed the helmsman to switch to manual steering and ordered the wheel to hard-a-port. The sailing vessel also altered course to port and the vessels narrowly avoided colliding.

After he steadied the vessel on a heading to return her to the planned track, the Master discovered that there was water ingress in No 3(P) ballast deep tank. Further checks revealed no other damage, and a preliminary report was sent to the office. Proceeding at reduced speed, tank soundings confirmed that the ship's pumps were able to cope with water ingress. Nevertheless, the Master ordered the breached compartment to be opened at sea and for a party consisting of the C/O, C/E and a seaman to internally inspect the damage.

After they identified a 3-metre longitudinal fracture in the hull bottom plating, the inspection team safely vacated the tank and re-secured its access. With company's and class approval, the vessel continued on its short passage towards the discharge port, where, after unloading, she entered drydock to effect permanent repairs

Findings of investigation

1. The vessel was fitted with two ECDIS units that were used as the primary means of navigation, thus removing the need for paper charts to be carried. All bridge officers, including the Master, had completed a generic ECDIS training course in their home country, but no training or familiarisation on the type of ECDIS fitted on board had been provided by the ship's management company;
2. Before reaching the waypoint, the 3/O wrongly assumed that risk of collision existed with the sailing vessel on the next planned heading and prematurely initiated a turn to starboard and then continued to alter course to starboard, illogically intending to pass between the sailing vessel and the steep-to shore;
3. After initiating the course alteration, the 3/O did not monitor the vessel's position and projected track on the ECDIS display, for over 15 minutes, and failed to notice that the visual grounding warning alarm had been activated;
4. Both the present and past crews were unaware that the ECDIS anti-grounding audible alarm had been disconnected in the past for unknown reasons;
5. The vessel's ECDIS display was located some distance abaft the bridge front and orientated so that the OOW had to face to starboard to look at the screen. Had the ECDIS display been located on the forward console, the OOW would have been more likely to routinely consult it when monitoring the navigational situation and also been alerted by the visual grounding warning alarm;
6. A safety contour setting of 10 metres was inappropriate for the voyage as the sailing draft of 10.63 metres meant that the vessel would have grounded at a charted depth of 10.13 metres, before crossing the safety contour;
7. Despite having attended approved ECDIS training courses, the bridge watchkeepers lacked an understanding of the ECDIS equipment's safety features;
8. The 3/O remained confident in functioning as the sole navigator in restricted waters, but soon after the multiple small alterations of

course, he became sufficiently concerned about the intentions of the nearest vessel ahead to sound two long blasts on the ship's whistle. The Master failed to react to this inappropriate signal and did not leave the communications console at the rear of the bridge to assess the situation or challenge the 3/O's actions;

9 Following the grounding, the bridge team failed to follow the company's emergency checklist or maintain a proper record of follow-up actions taken, as a result of which, some important responses were missed;

10 No risk assessment or consideration of potential consequences was undertaken prior to opening up and ordering entry into the breached ballast tank with the ship at sea and proceeding at near full speed.

Lessons learnt

1 ECDIS provides the bridge team with an efficient and effective means of navigation. However, its ability to continuously provide the vessel's current position and projected track, and to warn of approaching dangers, can lead to over-reliance and complacency.

2 It is imperative that navigators be given equipment-specific training and onboard instructions and guidance to monitor the vessel's position and projected track at regular intervals and to fully understand the equipment's safety features in order to make best use of them;

3 The area where the accident occurred required careful navigation in view of the vessel's size, speed, restricted sea room and the likelihood of her encountering other traffic;

4 The Master placed undue trust in the 3/O's abilities, offering him no support despite the navigational demands of the passage;

5 The Master should have delayed sending the routine departure messages until the vessel was clear of the narrow passage;

6 Loud music can impair the keeping of a proper lookout as required by Rule 5 of the Colregs. Had the ECDIS audible alarm been functioning, it might still not have been heard by the 3/O due to the background noise pollution provided by the loud music;

7 As it was established that the ballast pump was capable of stemming the inflow of water, the opening of a breached compartment and entry by personnel constituted an unacceptable and unnecessary risk.

Corrective/preventative actions

1 The ship operator implemented the following corrective actions in the drydock:

i. Repositioned the main ECDIS unit adjacent to the starboard radar, enabling its viewing while facing forward;

ii. Reconnected the ECDIS unit to the bridge alarm monitoring unit to provide a functioning audible alarm;

iii. Arranged for the vessel's bridge officers, and company's Designated Person (DPA) and marine / nautical superintendent to attend an equipment-specific training course on the ECDIS type fitted on board;

2 Arranged for the fleet's bridge officers to attend a bridge resource management course;

3 Arranged for the marine / nautical superintendent to provide on board ECDIS training to the fleet's other vessels fitted with ECDIS or electronic charts.

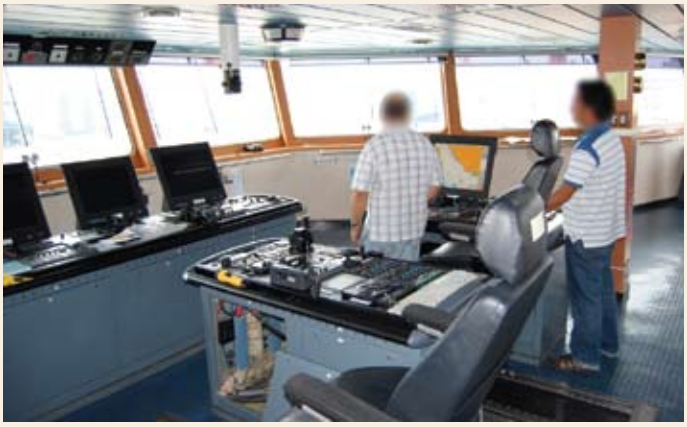
MAIB's recommendations

The ship operator was advised to issue written instructions and guidance to the fleet and carry out regular verification visits to its vessels to ensure that ship's staff:

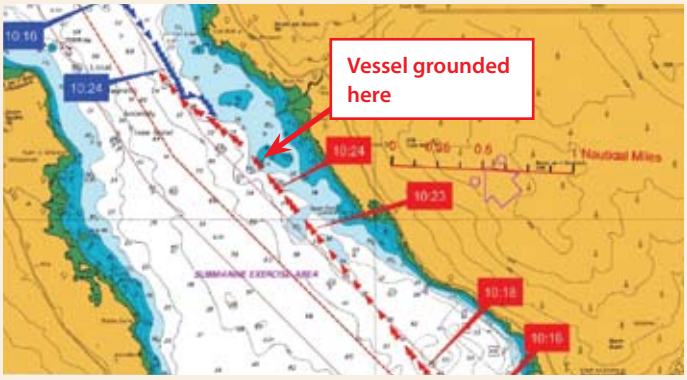
1 Have a clear understanding of how ECDIS should be used;

2 Understand the vessel's emergency procedures,

3 Understand the need to properly evaluate routine operations after an accident to ensure that any new risks are identified and mitigated as appropriate.



View of bridge showing the offset location and athwartship orientation of ECDIS display.



Track of vessel (in red) showing planned track, unchecked deviation to starboard, site of grounding, subsequent track recovery and near-miss with incoming sailing vessel (in blue).

MARS 201258

Dangers of malaria and dengue

(Edited from Gard Loss Prevention Circular 04-12)

➔ Many of the world's mosquito species can transmit a number of diseases, of which malaria and dengue are the most common today and the ones most likely to affect seafarers, sometimes with fatal consequences. Falling ill at sea or at a port far away from home can be a very difficult situation for the seafarer and his/her family and a challenge for the remaining crew and the ship operator.

Besides the guidelines and advice on preventive measures available in the International Medical Guide for Ships, published by WHO, the United States Centers for Disease Control and Prevention (CDC, www.cdc.gov), provides general health information to the public. Dedicated pages on malaria and dengue also include links to interactive "health maps" that can be used as a guide for the assessment of malaria and dengue risk throughout the world (malaria: www.cdc.gov/malaria/; dengue: www.cdc.gov/dengue/).

Recommended precautions

Although the best protection against mosquito-transmitted diseases is to avoid being bitten during a stay in malaria and dengue affected areas, measures implemented prior to and after a stay in such areas can also contribute to reducing the risk of contracting the illnesses.

Prior to a stay in malaria and dengue affected areas:

1 Evaluate risk in the ports to be visited and remember that the risk of being infected with malaria or dengue varies even between different regions of the same country;

2 Assess the length of stay in known risk areas, time spent at sea, in port, on rivers and approved shore leave to be granted to the crew;

3 Obtain latest information from the WHO website and similar sources

as the types of diseases expected within certain areas may change with the seasons. Contact a local medical practitioner if in doubt;

4 Inform the crew about the risks and the precautions to be taken as well as actions to be taken if illness occurs at sea. Stress that a slight headache, fever and flu-like symptoms are always reasons for contacting the ship's medical officer;

5 Evaluate, well in advance of arrival, in close co-operation with a medical doctor and based on the vessel's expected exposure time in a risk area, if the crew should take an antimalarial drug.

During a stay in malaria and dengue affected areas:

1 Implement measures to avoid mosquito bites by ensuring that the crew:

i. wear protective clothing when outdoors, e.g. long-sleeved shirts, long trousers tucked into socks and a hat if thin-haired, and bear in mind that dengue-carrying mosquitoes are active during daytime;

ii. use effective insect repellents on skin and on clothing and reapply at regular intervals as prescribed;

iii. stay inside air-conditioned or screened areas when indoors or sleep within impregnated bed-nets in sleeping areas not properly screened or air-conditioned;

2 If crew members are taking anti-malarial drugs, implement a method of control to ensure they take the medication at the prescribed times, e.g., a log book maintained by a responsible officer.

After sailing from malaria and dengue affected areas

1 Seek medical advice over the radio if malaria or dengue is suspected on board;

2 Generally, for a ship on normal service, the symptoms will be noticed only at sea due to an incubation period of several days;

3 Place the patient under close observation and administer the specified on-board treatment;

4 Evacuation may be the only option if the patient's condition does not improve despite the available care and treatment on board.

The table below summarises the specific features of these two diseases:

	Malaria *Source: WHO Fact sheet No 04, April 2012*	**Dengue/Severe/Dengue** *Source: WHO Fact sheet No 117, January 2012*
Cause	Caused by a parasite. There are four sub-types of parasites and the most dangerous sub-type (Plasmodium Falciparum) is found mainly in tropical Africa.	Caused by a viral infection.
Transmission	Transmitted to humans by the bite of the 'malaria mosquito' (Anopheles) which is active mainly between dusk and drawn.	Transmitted to humans by the bite of the Aedes mosquito which, in contrast to the malaria mosquito, is active also during daytime.
Incidence	Most malaria cases and deaths occur in sub-Saharan Africa; however, Asia, Latin America and to a lesser extent the Middle East and parts of Europe are also affected.	Dengue is found in tropical and sub-tropical climates worldwide, mostly in urban and semi-urban areas. Dengue is endemic in more than 100 countries in Africa, the Americas, the Eastern Mediterranean, South-east Asia and the Western Pacific, the latter two regions being the most seriously affected.
Symptoms	Like regular influenza: fever, headache, chills and vomiting. If not treated within 24 hours, the most serious form of malaria (Falciparum) can progress to severe illness often leading to death.	Like serious influenza or malaria: high fever, headache, muscle pain and possible rash. 'Severe dengue' is a potentially deadly complication due to plasma leaking, fluid accumulation, respiratory distress, severe bleeding, or organ impairment.
Incubation period	Symptoms typically appear 7 days or more, usually 10-15 days, after the infective mosquito bite.	Symptoms typically appear 4-10 days after the infective mosquito bite. Signs of severe dengue typically appear some 3-7 days after the first symptoms.
Prevention	Avoid mosquito bites. In high risk areas, antimalarial drugs should be taken. No vaccine is available.	Avoid mosquito bites. No vaccine is available.