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Seaways

The International Journal of The Nautical Institute

Plotting the Institute's course

Annual report p5

The Nautical Institute

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Focus

Information Overload?

“It is to be hoped that effective use of simulator training in conjunction with other forms of decision-making exercises and experience will prepare officers for their complex and responsible role on board”

'Data, information and efficiency' is the title of a thoughtful article by Captain Simicic this month (see pp 22) that explores the management of information and correctly identifies this as an essential skill for today's seafarers. He uses the DIKAR Model (Data, Information, Knowledge, Action, Result) in some common operational situations to explain the process of decision making and explores the two most common behavioural patterns in this area – satisfying and maximising. There is no doubt that the quantity and complexity of information in our daily lives is inexorably increasing and has been for decades, if not centuries. Modern communications systems with 24/7 connectivity for those fortunate to have it – or more likely unfortunate – are merely adding to the processing load, and we are frequently told that shipboard systems are merely designed to produce data. What would be more useful is for that data to be processed to the point where a solution or solutions are offered for a decision to be made by the officer. The IMO's eNavigation policy is intended to address the improvement and integration of navigation systems to enhance the safety of navigation and the Institute has been fully engaged in this work programme from the start to try and ensure that the mariner's (end user's) needs are at the centre of the design process.

It is reasonable to conclude that the equipment and procedural aspects of eNavigation, and information processing generally, will eventually be properly designed, particularly if the Institute's S-Mode standardisation concept is implemented. However, a big question mark continues to hang over the training element. The general model is courses on individual pieces of equipment (ECDIS, ARPA, etc) at facilities ashore with some familiarisation time on board, if you are lucky. A few hours may be spent on an integrated system in a ship simulator, which is getting closer to the complex information processing training that is needed. It is to be hoped that effective use of simulator training in conjunction with other forms of decision making exercises and experience will prepare the officers of today and the future for their complex and responsible role on board, but it would seem from members' input to the Strategic Plan that the demand on them for more information and administration is not being eased by improved systems or training in their use. We should all make it our mission to address this area, ease the load and improve safety by doing so.

Trustees' Report

The first quarter of the year is a particularly busy time at the Institute with a succession of committee meetings building up to the Executive Board and Council, in addition to all the regular work of the departments handling membership, publications, accreditation and projects. The aim is to assure the good governance of the Institute to meet the members' needs and it is hoped that the Annual Report and Accounts (see pp 4-16) sets out clearly that this is being done. Given the title of this Focus column and the number of pages taken up by these reports, there is a risk of information overload but hopefully you will see that the DIKAR Model has been applied effectively to produce beneficial results. The Institute is financially secure and the range of work undertaken is extensive. This includes the activities of the branches which continue to be a useful source of Continuing Professional Development (CPD) and career enhancing networking. Our members writing for our publications are an equally important contribution to their own CPD and that of the readers, which also includes the MARS reports. It may be a function of the administration burden alluded to already but MARS, and CHIRP (Confidential Hazardous Incident Reporting Programme) which we support, are concerned at the reduction in reports from individuals and companies. Is our industry so safe now that there is less to report and learn from? We doubt that. Is there fear of reporting because of a blame culture? Probably – but the great advantage of MARS and CHIRP is that confidentiality is guaranteed so you will be blameless. As Captain Maudsley recommends on finding and fixing holes in the HSE system (see pp26-27), take a walk around your ship and look at everything (design, equipment, operations) with fresh HSE eyes, if you are not already fatigued by long hours and crew reductions. If anything looks like it is an accident waiting to happen, report it to MARS/CHIRP, and hopefully to your company as well. The aim is to learn from each other, a form of mentoring, as well as getting problem areas rectified before damage to the ship or her people occurs with far more serious consequences to lives and finances. Report and Fear Not, we are here to help.

p5

p30

p35

p35

Mariners' Alerting and Reporting Scheme

MARS Report No. 283 May 2016

MARS 201623

Gyro out of step

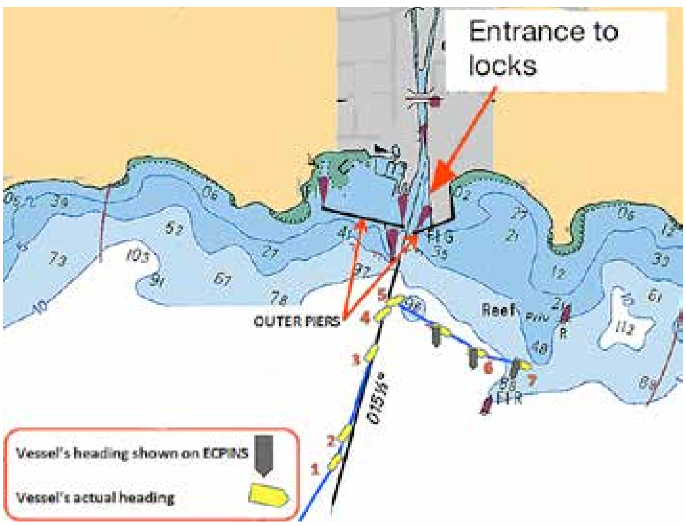
Edited from official Canadian TSB report M14C106

➔ A bulk carrier was approaching a lock entrance in daytime and with good visibility. Two persons were in the wheelhouse: the Master was at the con and a helmsman was at the wheel. The Master had previously instructed the Officer of the Watch (OOW) to go on deck in preparation for the lock transit. As they approached the lock outer piers, at a speed of about nine knots, the Master called the engine room (ER) and requested the bow thruster. Once the power to the bow thruster was transferred to the bridge, it ran for approximately one minute without being used, at which point its circuit breaker tripped.

The circuit breaker was reset and closed by ER staff and the bow thruster restarted; the voltage in the electric distribution system dropped and the No.3 generator main circuit breaker tripped. However, the No.1 generator continued powering the main switchboard. The main engine continued to operate and the lights remained on throughout the vessel.

The drop in voltage set off a number of power failure alarms on the bridge, including both gyrocompasses. The radars defaulted to standby mode and two of the three rudder angle indicators on the bridge were disabled. The Master put the engine astern and initiated a starboard turn to abort entry to the lock canal entrance.

For five minutes, while engine room staff repeatedly undertook the blackout procedure, the power failure alarms on the bridge sounded three more times following their initial activation. The bridge team did not know why the alarms were repeatedly activating. The second officer arrived on the bridge and began silencing and resetting the alarms, as per the Master's orders. Meanwhile, the Master took measures to increase the vessel's rate of turn to starboard. He was monitoring the vessel's turn on the Electronic Chart Precise Integrated Navigation System (ECPINS), but without confirming through visual navigation. He then ordered the helmsman to steer 180 degrees gyro (°G) so that the vessel would proceed on a southerly course, away from land.



A few minutes later, the Master looked at the ECPINS slave monitor and noticed that the vessel's course made good was easterly, but that the vessel-shaped marker that indicates the heading was pointing southerly. He requested the magnetic heading from the helmsman, who reported it to be 111° magnetic (M). The Master looked outside and saw that the shoreline was on the vessel's port side, instead of on its stern. He immediately ordered the helm hard to starboard to correct the vessel's course and increased the propeller pitch to get more power ahead. The vessel began turning to starboard but, moments later, the hull touched bottom and the vessel ran aground 1.5nm southeast of the lock outer piers (number 7 in diagram).

The official report found, among other things:

- A number of power failure alarms on the bridge created a situation that resembled a blackout and was interpreted as such.
- Engineers responded to the developing situation by applying the vessel's blackout procedure twice, which caused additional power interruptions to the bridge; however, the engineers were unaware that these actions were having this effect.
- The power interruptions on the bridge, combined with the vessel's turn to starboard, caused the gyrocompass to become misaligned.
- Following the power interruptions the Master was (unknowingly) using inaccurate data from the ECPINS. Additionally, he was not using all available bridge resources to monitor the vessel's progress for nearly 15 minutes before the grounding.

Lessons learned

- Electronic charts are a wonderful navigation tool that give real-time situational awareness. But these instruments can also be a trap that is easy to fall into. Use all means at your disposal, especially visual means if possible, to confirm that what you are seeing on the screen is in fact reality.
- The gyro compass is one of your best friends. Always check on its accuracy, especially after a blackout or electrical interruption.

MARS 201624

Grinding disc cuts deep

➔ The vessel was *en route* to a European port. Deck maintenance was in progress, including repairs to a stand located at the cargo hold hatch covers. During the cutting of a steel bar using a portable grinder, the cutting disc suddenly broke into pieces. Part of the cutting disc (or possibly the steel bar) hit a nearby crew member near his right knee area. The wound was about 5cm long and 2cm deep and pieces of loose bone (or cartilage) were observed in the wound.

First aid was given immediately and medical advice was requested via radio. Treatment of victim was advised and it was decided to evacuate the victim by helicopter to a shore hospital for further treatment.

Some of the findings of the company report were as follows:

- A grinding disc had been used instead of a cutting disc.
- The grinder did not appear to have its protective cover attached.
- Grinding wheels are subject to deterioration if stored in damp or humid conditions. The effects are a reduction in bond strength caused by the ingress of moisture; this affects the balance and causes surface growth, which reduces the bursting speed.

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- Grinding and cutting discs should be discarded after three years storage as physical deterioration during this period may render the disc unsatisfactory.

Lessons learned

- Always use the right tool for the task. In this case, a grinding disc was being used for cutting.
- Never detach or render ineffective safety devices such as protective covers – they are there to protect you.
- Grinding and cutting discs, among other power tools, operate at very high speeds. Make sure the various parts and consumables are in top-notch condition and of reliable quality.

MARS 201625

Hot and bothered coal

Edited from UK P&I Club checklist 'How To Monitor Coal Cargoes From Indonesia'

Self-heating incidents involving coal cargoes loaded at Indonesian ports have become more frequent in recent years. The problem appears to be related principally to the nature of the coals, and it may be exacerbated by the way they are handled before and during loading. Recommendations for the safe carriage of coal are contained in Appendix 1 of the IMSBC Code (the Code), which became mandatory worldwide on 1 January 2011.

The extensive lessons learned and best practices from recent experience are set out below.

Prior to loading	**Documentation**
	Coal must be declared either as Group B or as Group A and B. Check that the shipper has not used outdated classifications such as 'Category A' when describing the cargo.
	If the shipper declares a value for the TML (Group A cargo) check that additional certification as required by the Code is supplied including recent (less than seven days) representative cargo moisture content analysis.

Prior to loading (continued)	Consider all coal loaded in Indonesia as having the potential to self-heat, irrespective of the wording of the shipper's declaration.
	Hold preparation
	All cargo spaces and bilge wells should be clean and dry.
	All residues of waste material or previous cargo should be removed.
	All electrical cables and components in cargo spaces and adjacent enclosed spaces to be free from defects.
	Such cables and components mentioned above to be safe for use in an explosive atmosphere or positively isolated.
	Vessel instrumentation
	Equipment to measure methane, oxygen and carbon monoxide in the hold atmospheres without entering the cargo space.
	Equipment to measure pH value of cargo space bilge samples.
	It is recommended that there should be a means of measuring the temperature of the cargo while it is being loaded and during the voyage.
	Temperature monitoring
	Temperature of the cargo to be monitored prior to loading. Look for 'hot spots'.
	Any cargo at a temperature in excess of 55°C should not be loaded.
	Coal cargoes delivered to anchorage in barges may be particularly susceptible to self-heating as they are exposed to the wind.
	Shippers and surveyors may quote an 'average temperature' measurement in relation to a barge cargo in order to establish a value below 55°C. The Code does not recognise this methodology.

During loading	**Temperature monitoring**
	Monitor the temperature of the cargo regularly during loading, not just when the first barge arrives. The cargo is likely to be hotter towards the bottom of the stow in the barge.
	Reject any cargo at a temperature in excess of 55°C.
	Do not stow cargo adjacent to hot areas.
	Ingress of air
	Employ 'soft loading' as much as possible.
	As cargo in partially filled holds will be exposed to ingress of air, avoid undue delays when loading.
	If delays occur, close partially filled holds and **do not** ventilate.

After loading	**Trimming**
	Trim the cargo as level as possible to the boundaries of the cargo spaces.
	Shippers may resist requests to trim properly, but insist that they do so.
	Cargo monitoring
	Close and seal the holds immediately after loading in accordance with the Code recommendations for self-heating coals.
	Begin monitoring of the hold atmospheres for methane, carbon monoxide and oxygen immediately, recording the results and the time they were obtained.
	Gas monitoring to be done through proper fittings in the holds as described in the Code, not through open accesses or covers.

During the voyage	**Cargo monitoring**
	Monitor the hold atmospheres for methane, carbon monoxide and oxygen at least once a day; more frequently if the carbon monoxide and/or methane concentrations begin to rise steadily. Maintain a record of these measurements.
	A reduction of the oxygen concentration in a well-sealed hold is to be expected.
	Below an oxygen concentration of about 10%, most instruments in common use will not provide reliable readings of the methane % lower explosive limit (LEL). (Check your instrument manufacturer's recommendations on the use of a 'splitter' at low oxygen levels and/or seek expert advice if there is cause for concern.)
	Temperatures measured by lowering thermometers into sounding pipes should not be relied upon, as this method will only detect heating coal in the immediate vicinity and will not provide information on the bulk of the cargo.
	If methane in excess of 20% of the LEL is detected use surface ventilation in accordance with the Code, but only for the minimum time necessary to remove the methane. If this concentration of methane is detected after the oxygen has fallen below 10% seek expert advice before ventilating.
	If carbon monoxide concentration in a closed cargo hold exceeds 30ppm the Code recommends that the frequency of measurement be increased to twice daily. If the carbon monoxide exceeds 50ppm the Code recommends notifying the owner, who should call for expert advice. With Indonesian coal the carbon monoxide level can be much higher than these values without indicating the presence of self-heating, but the owner should still be notified (in accordance with the Code) particularly if the gas concentration continues to rise steadily for three consecutive days.

MARS 201626

Enclosed space fatality

Edited from official Isle of Man casualty investigation report CA118

➔ While discharging an oil cargo from a tanker, an oil sampler (similar to that shown in the photograph) was lost to the bottom of tank 3P. It was decided that once the discharge was finished and crude oil washing completed, the sampler would be retrieved before loading the next cargo into 3P to avoid any potential damage to the ship's equipment from the sample bucket or tape.

Once empty, the tank was ventilated. Over several days the tank atmosphere of tank 3P was measured using an explosimeter and sample hose. Although oxygen was near normal levels, HC was at 57% of LEL on day one of ventilation and 38% of LEL on day two. After discussion, it was agreed that entry into 3P tank would start the next morning (day three) if the gas levels were 'less'.

The next morning, the tank atmosphere of 3P tank was found to be 20.6% oxygen, with HC at 26% of LEL. Tank entry equipment was prepared and placed near the tank access hatch; breathing apparatus (BA) sets, emergency escape breathing devices (EEBDs), stretcher and heaving lines. The Master was shown the risk assessment and work permit for enclosed space entry and although the HC LEL was indicated at 26% he stated that the oxygen content was good. It was decided that two crew should go in, each wearing an EEBD.

Two crew members entered the cargo oil tank via the tank access hatch each with an EEBD worn over the shoulder, a torch and a personal gas meter. Several other crew members and the Master were in attendance at the tank access hatch. The lead crew member proceeded down to the first platform and checked the atmosphere across the platform with his gas meter. The second crew member then proceeded down the stairs to meet him. This was repeated for the remaining platforms until they reached the tank bottom almost 20 metres below the main deck. The lead crew member then reported feeling dizzy and heard his personal gas meter alarming. The second crew member reached the tank bottom and instantly felt the effects of the gas inhalation; he also heard his personal gas meter alarming. The lead crew member shouted and gestured to the second to wear his EEBD and leave the tank. The lead crew member felt dizzy and immediately proceeded to exit the tank. The second attempted to don his EEBD and activate it but collapsed soon afterward. Meanwhile, on deck, the Master entered the tank with an EEBD worn over his shoulder. Although another crew member warned the Master not to enter the tank the Master nonetheless proceeded into the tank. Two crew members on deck donned the BA sets already available at the entrance.

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The lead crew member exited the tank and had passed the Master heading down to retrieve the second crew member, now collapsed on the tank bottom. Upon arrival at the tank bottom the Master also collapsed. Within 10 minutes, three crew members descended into the tank with BA gear in order to evacuate the two victims. The Master, secured in a Neil Robertson stretcher, was raised to the main deck by all available crew pulling the gantline to the main deck through the tank access hatch. The second victim was subsequently retrieved in the same manner.

Oxygen was administered to the victims; one victim did recover but the Master did not and was later pronounced dead.

Some of the findings of the official report were:

- Normally, inert gas is introduced into the tank to drive out the hydrocarbon content (purging) to below a level out of the flammable range before replacing the inert gas with fresh air (gas freeing – ie HC to be at 2% or less). It is not known why this procedure was not carried out in this instance.
- With a HC level of 26% LEL the atmosphere was too rich to allow an explosive condition, but was also too high to support a tank entry without BA gear.
- The rescue tripod was not made ready at the tank access hatch. Consequently, the casualties were raised from the tank bottom with all available crew on the main deck heaving on the gantline, which was rubbing against the lip of that tank access hatch during heaving. This gave the potential for excessive and accelerated wear. Had the line parted the victim may have fallen and suffered significant additional injury.
- The responsible person at the tank access hatch was not aware of the tank atmosphere and only advised that 'Everything is completed and is OK'. Neither did he sight the enclosed space entry permit. Had he known the tank atmosphere measurements he could have been in a position to stop tank entry proceeding.

Lessons learned

- An emergency escape breathing device (EEBD) should be used only for escape from a compartment that has a hazardous atmosphere and should not be used for fighting fires, entering oxygen-deficient voids or tanks, or worn by fire-fighters.
- Always follow procedures, as not doing so could have deadly consequences.
- Never shrink from politely questioning a colleague or even a superior about a work practice if you think it is unsafe.