It is appropriate at the start of a New Year to turn our attention yet again to the Master’s responsibilities – a theme that has been a constant throughout the Institute’s life and will remain so. That these responsibilities are many, various and weighty is not in doubt and it can be argued that they have risen immeasurably in recent years as the burden of legislation has increased. A previous issue of our Human Element project bulletin ‘Alert!’ tackled this subject and included a cartoon of the Master being buried behind a desk overflowing with paperwork. It also proposed various solutions to this burdensome activity including greater use of integrated information technology (IT) to shift the work to clerical staff ashore.

Behind all this paperwork there are of course actual operations as the ship goes about its business. This month we look at two particular aspects in continuation of recent articles covering liquefaction and entry into enclosed spaces. Both topics have been the subject of excellent branch seminars this autumn and their high attendance figures show that there is very real concern to find and implement practical solutions to these unsafe practices.

To be effective in carrying out your responsibilities you have to know, firstly, what they are, and, secondly, that your superiors ashore are going to back you in your decisions. Too often one hears or suspects that the action or inaction of a Master was due to commercial pressure being brought to bear. So, in the case of cargo where there is a risk of liquefaction, ensuring that the BIMCO Clause is included in the charterparty is absolutely essential. Martyn Haines and James Addison set out the content of this clause and provide helpful advice for those faced with carrying such cargoes (see pp 6-7). There is also a report on the London Branch evening seminar on this subject which drew a record attendance to HQS Wellington, such that those enjoying the preceding networking opportunity to the last moment had to stand at the back and sides of the room (see pp 33). Once again, this showed the high value to be had from attending branch events. If you haven’t been to one, or not for some time, make a New Year resolution to take the time to do so. You will be made welcome and will gain professional development.

Entry into enclosed spaces is another focus of our attention at the moment as seafarers continue to die needlessly through lack of training and equipment on many ships. The Institute has been successful, with the help of a flag state, in influencing the IMO to add the carriage of oxygen meters as a work item of the Maritime Safety Committee but in the meantime much can be achieved by continuing to highlight the dangers and encourage voluntary training as well as the carriage of essential equipment. Captain Michael Lloyd looks at the different regulations in the UK covering ship and shore staff working on board and highlights the Master’s responsibilities in this confusing situation (see pp 14-15). Clearly, there is much to learn about the two sets of regulations governing these workers but ultimately the Master will remain responsible for their safety in most circumstances.

Similarly, woe betide the Master who has not kept up to date with changes to the International Convention for the Prevention of Pollution from Ships (MARPOL). Amendments to Annex V covering garbage came into force on the 1st January 2013 and effectively prohibits the discharge of the vast majority of garbage into the sea (see pp 10-11). Whilst this is welcome from an environmental point of view, the inadequacy of reception facilities in many ports continues to be a problem in urgent need of further attention and action from the authorities.

Finally, what all these matters highlight is the absolute need for effective education and training of all on board – but especially the Master. So it is good to have articles on ECDIS, computer based training (CBT), and preparation for command in the Royal Canadian Navy which concludes with the importance of mentoring – a continuing theme for this year. Of course, Seaways itself can form a key part of ongoing training and education. With this in mind, we are pleased to announce the launch of the online edition of the journal. This can be accessed through the Members’ area of the website and we hope it will prove a valuable resource.

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A structured training and assessment programme is vital for successfully preparing and selecting people for command, whether in the commercial or the military sector (see RCN article, p24).

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Crew injuries from oil heater explosion

Official report – edited from AMSA Investigation Number: 283-MO-2011-001

Over a period of two days at anchor, one of the two vertical thermal oil heaters of a product tanker was observed to be not firing reliably. The crew opened and cleaned the burner unit and also adjusted the igniter electrodes twice, but after the second attempt, the heater refused to fire. On the third day, the C/E discussed the remedial action plan with the crew. They opened up the burner unit and cleaned the burner lance and igniter electrodes again. This time, the heater operated for about 90 minutes (eight firing cycles), after which it again failed to ignite. Resuming work after lunch, the electrician re-inspected electrical systems while the 3/E and cadet dismantled and cleaned the burner lance and nozzle unit, reassembled it under the C/E’s supervision and refitted it to the heater one more time.

When the test firing commenced, the 3/E, cadet and electrician positioned themselves on the top of the heater to monitor the automatic starting and firing sequence. The forced-draught fan went through a four-minute purge programme, but when the igniter sparked, there was a violent explosion.

The explosion lifted the thermal oil heater casing top, snapping most of the securing bolts. The burner arrangement was pushed out of alignment and the inspection cover was torn from its securing bolts. The ducting from the externally mounted forced-draught fan was torn apart at the flexible insert. Fuel lines running across the top of the thermal heater were deformed, and at least one began to leak from a weakened joint. The explosion triggered the engine room fire detection system, initiating a fire alarm on the panel at the fire control station, and also activated the local automatic water mist system. The three persons on top of the heater suffered burns over large portions of their bodies as the flame front engulfed them momentarily, but they were able to walk from the area to the accommodation. They were assisted by the mustered crew, who removed the remnants of the burnt coveralls and ill-advisedly pierced and drained (lanced) the blisters before placing dressings on the burns. The injured persons were also given painkillers and water to drink but remained seated in a cabin despite being in severe pain and trauma.

About half an hour after the explosion, the Master reported the incident to the port control and his local agents and requested medical assistance. Unfortunately, his request for helicopter evacuation (medevac) was initially denied due to the mistaken assumption ashore that helicopter operations over a tanker that had just suffered an explosion would be hazardous. Subsequent miscommunication between the response teams on shore added to this delay.

Paramedics boarded by launch about an hour after the accident and after rendering further medical treatment, they insisted on immediate evacuation of the casualties by helicopter. Eventually, after another hour, the men were winched off and conveyed to a shore hospital.

Result of investigation

1 The burner nozzle had been incorrectly assembled, probably during the several investigation and repair attempts. As a result, the needle valve stem became bent and due to an improper seal, the circulating fuel continued to spray into the furnace during the pre-ignition start sequence;
2 The crew, except the C/E, had very limited experience in servicing this equipment;
3 The manufacturer’s manual was poorly written, and lacked a clear drawing of the burner, details of spare parts, instructions for troubleshooting, servicing, inspection or testing;
4 In order to reduce maintenance costs, at some time prior to the incident, the company had approved a change of fuel from heavy fuel oil (HFO) to marine gas oil (MGO) for the heater, but the crew failed to make the necessary changes to the fuel pre-heating circuit and the auto-start programme;
5 Excessive diesel fuel entered the furnace which was probably at about the operating temperature (about 160 °C), and instantly vaporised (flash point ≈ 68 °C) and formed an explosive mixture with the charge air;
6 The crew failed to refer to the proper sources for advice on the treatment of burn injuries, resulting in the casualties being given inappropriate first aid (especially the deliberate puncturing of blisters);
7 The port’s contingency plan for responding to a vessel casualty and medical emergency in the anchorage lacked detailed documentation that would have ensured reliable information exchange among the concerned parties.

Corrective/preventative actions

1 The ship’s operator renewed the burner units for both oil-fired heaters and altered the control system to better suit the fuel being used and the load demands placed on the heaters;
2 The heater’s makers reviewed and amended relevant sections of the equipment’s service manual and relayed the incident details to ancillary equipment suppliers, including the burner equipment manufacturer;
3 The port reviewed the emergency contingency plan and implemented revised procedures, including training, drills and exercises for its staff.

Lessons learnt

1 Ship’s crew must remain vigilant to safety even when conducting repeated or seemingly simple tasks;
2 Manufacturers must provide comprehensive and accurate documentation for onboard service and maintenance and the crew must follow these along with the more generic procedures given in a ship’s SMS;
3 Manufacturers should conduct research and implement engineering solutions to resolve potential design weaknesses that may lead to failure or hazardous conditions in service;
4 It is desirable that critical items of equipment are serviced by specialist shore-based technicians, but if this is impracticable, ships’ crews must be given appropriate training arranged by the makers or suppliers of such equipment;
5 In case of illness or injury on board, ships’ crews must first refer to the approved publications carried onboard, if required, supplemented.
by correct radio medical advice obtained from shore. They must be capable of providing immediate and appropriate first aid. Burn injuries should always be immediately cooled, under clean, cold running water, for at least 10 minutes.

**Leg severed by towline**

A tug and tow arrived at the outer roads of a port and was preparing to embark a pilot. Due to restricted sea room, the tow wire had to be shortened in order to enter the port. As the tug began to heave in the tow wire, the towing winch suffered a burst hydraulic oil line which could not be immediately repaired. In order not to abort the port entry, the crew quickly stoppered off the wire, and after turning the slack around the capstan on the port quarter, resumed the shortening operation. As the capstan heaved in the wire, the crew manually flaked about 75 metres of it on the deck to achieve the desired length of tow. Intending to belay the wire around a pair of bitts, the crew re-applied the chain stopper. However, due to the relative movement of the vessels, the towline came under sudden tension. The chain stopper was unable to hold the wire, which began running uncontrollably off the deck and over the stern roller. Unfortunately, the C/O was standing to seaward of the rapidly escaping wire and his right leg was caught in a bight and severed. The casualty was quickly air lifted to a hospital along with the severed limb packed in ice. Although his leg could not be saved, he was extremely lucky that he was not killed.
Lesson learnt
A hasty change to a planned task or operation in progress is very likely to lead to an accident, especially if a new risk assessment is not conducted.

MARS 201303
Collision with jack-up barge in TSS
A VLCC in ballast was anchored off a major oil exporting port. As per instructions from the loading terminal, she weighed her anchor at about 2330 hrs and proceeded from the waiting area to the berthing pilot at the boarding area at 0130 hrs, which was about 20 miles to the south. Pre-departure procedures and checklists were duly completed and, as per the passage plan, the tanker initially steered due south in order to join the SW-bound traffic lane from the side. Positions were being plotted on the approach (paper) chart at intervals of about six minutes.

At 2345 hrs, while proceeding on a course of 180 degrees at about 12 knots, the OOW acquired a target located in the NE-bound lane, bearing a few degrees to the starboard bow at about 5.5 nm distance. A single white light was seen along the bearing of the target, and the bridge team presumed it to be a small, local craft. The plot indicated that the target was proceeding slowly in a NW’ly direction, and it was assumed that it was intending to cross the traffic lanes.

At 0005 hrs, the tanker entered the SW-bound lane from the west side and altered her course to 226°, aligning herself with the general direction for that lane. By this time, the other vessel was located within the separation zone, bearing about two points on the tanker’s port bow and about 2 miles off. Based on the target’s low speed vector, it was again assumed that the small craft would keep clear of the VLCC navigating along the traffic lane.

At this time, the OOW suddenly saw that the target was actually a self-propelled jack-up barge and was showing the starboard (green) sidelight and was intending to cross ahead of the tanker. In the absence of signals to indicate restricted manoeuvrability, the bridge team of the VLCC treated the barge as a normal power-driven vessel underway and expected it to manoeuvre as the give way vessel in a crossing situation (Rule 15). With the distance rapidly closing, the tanker’s Master began an alteration to starboard, away from the barge, but the two vessels collided at about 0015 hrs.

Port control was informed of the incident. Acting on their instructions, the tanker continued the passage to the pilot station, embarked the pilot and proceeded to the holding anchorage, where she anchored at 0405 hrs, pending an investigation into the incident.

Consequences of collision
1. The large crude oil consignment that was assigned to the tanker had to be shipped on another vessel;
2. The shipowner and manager suffered severe financial loss (loss of charter income, costs for directing the vessel to the nearest repair facility, cost of repairs and other associated costs);
3. Huge liability claims were filed against the tanker’s owners from the company owning the jack-up barge for damage, repairs, loss of hire and other charges;
4. The ship’s speed of about 12 knots was considered to be excessive and was not reduced promptly when a close quarter situation was developing and there was doubt as to the intentions of the crossing vessel (Rules 6, 7 & 8);
5. Failure to communicate doubt by means of prescribed sound/light signals (Rule 34 d);
6. Actions to avoid collision were not implemented in sufficient time and were not substantial enough (Rule 8);
7. The navigation lights of the jack-up barge were not seen earlier by the tanker’s bridge team due to the many obstructions on its deck;
8. There was a loss of situational awareness – the bridge team wrongly assumed that there was a charted shoal close to the west of the vessel, when, in fact, it was about 1.5 miles SW.

Lessons learnt
1. Every member of the bridge team must pro-actively contribute to safe navigation – in this case, after initially informing the Master about the presence of a small coastal vessel ahead, none of the bridge team members took an active part in the conduct of the vessel or challenged the Master’s actions;
2. Information on existing and expected vessel movements and other operations in the port and approaches must be obtained from the VTS / port control / pilot station (as appropriate) prior to transiting these areas;
3. Assumptions should never be made on basis of scanty information;
4. Despite its limitations, the AIS can potentially provide reliable data on a target’s identity and movement, if both vessels are equipped and the system is correctly configured;
5. Although not advisable, prudent bridge-to-bridge VHF communications at an early stage can assist safe passing between vessels, provided both are sure of each other’s identity and location;
6. Crew tend to become complacent when they call frequently at a port or region and are more likely to overlook basic precautions;
7. All passages should be properly planned and discussed among the bridge team members ensuring that vital parameters are defined and adhered to for each leg during execution and monitoring;
8. Risk assessments for all critical movements (eg arrival/departure port, narrow channels, restricted waterways, TSS etc.) must include the possibility of encountering ‘rogue’ give way vessels that may not comply with Colregs, and appropriate contingencies and escape routes should be included in the passage plan;

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The bridge team must assess the relative movement of traffic in the area before making an alteration of course (eg trial manoeuvre function on the ARPA), and they must not hesitate to slow down or stop the vessel to avoid a collision.

**Corrective/preventative actions**

1. An urgent alert was sent to the fleet, highlighting the incident with the instruction to hold a special meeting at the earliest to discuss the report and review all aspects of bridge procedures on board;
2. A campaign on safety of navigation with special emphasis on bridge team management, maintaining situational awareness and collision regulations will be initiated by the company, comprising of:
   a) A video on safe navigation and bridge team work;
   b) Onboard navigational audits to be carried out by Masters and visiting superintendents;
   c) Training sessions conducted on board addressing human element factors including procedures, communications, stress, operational environment, fatigue and culture issues;
3. The company’s Bridge Procedures Manual has been amended requiring vessels to obtain all relevant information from port control/VTS/local authorities before transiting within port limits;
4. Officers will be trained in bridge team management at reputed training institutes and the course will be monitored/reviewed to ensure its effectiveness.

**Feedback to MARS 201236**

**BA Air Compressor Explosion**

I was quite taken aback to discover and still cannot understand why any company would feel the need to supply oxygen SCBA sets to supplement the normal CABA sets for fire-fighting. Even a portable O2 resuscitator is not to be used in a hazardous environment and I recall that, in response to criticism from vetting inspectors, we relocated it from the ship’s emergency control station or EHQ to the ship’s sickbay/hospital.

The WHO publication, *International Medical Guide for Ships Edition 3*, recognises the need for carrying additional O2 for therapeutic use. It permits the use of the ship’s industrial oxygen on a casualty with lung damage caused by smoke inhalation, gassing or any other condition where breathing is ineffective or difficult. All the ship needs is a suitable pressure reducer, flow controller, masks and tubing etc.

It is general practice for the ship’s CABA sets to be ‘serviced’ annually by an accredited shore-based agency or contractor licensed to work on specified makes and models. My experience is that they generally carry out only a function test and visual inspection and fail to carry out any maintenance, including the replacement of ‘O’ rings and sintered filters. In general, this critical job must not be assigned to ship’s crews unless the ship operator can arrange for proper spares and equipment-specific training on board.

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

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The Nautical Institute gratefully acknowledges sponsorship provided by: