Eradicating the invisible killer on all our vessels

How can shipping cut the terrible toll of seafarer deaths in enclosed spaces? The UK Maritime & Coastguard Agency invited industry experts to discuss ways of reducing the dangers. ANDREW LININGTON reports on the meeting...

Roger Towner, head of seafarer services

Steve Clinch, head of the UK Marine Accident Investigation Branch (MAIB)

Donal Burke, Stena Association of Maritime Institutes

Marc Williams, MCA human element manager

There's barely an issue of the Telegraph that doesn't have a report on an enclosed space accident — and many seafarers have shocking stories to tell about their experiences.

Opening the special Maritime & Coastguard Agency (MCA) seminar last month, head of seafarer services Roger Towner spoke of his time at sea in the 1970s. 'Between 1970 and 1976, I personally knew five people who died in three different incidents in enclosed spaces,' he said.

'We are still losing people today,' he added. 'This has been an ongoing issue for seafarers over the last 50 or 60 years, and we don't seem to be getting any nearer to the answers.'

Steve Clinch, head of the UK Marine Accident Investigation Branch (MAIB), told how the death of three officers onboard the P&O Bulk Shipping vessel Garmula in 1974 had left a lasting impression on him. 'They died in the bottom of a tank that had been contaminated with gas,' he explained. 'It was a very nasty accident and it sent repercussions throughout the P&O Group.'

Donal Burke, from the Stena Association of Maritime Institutes, presented the workshop with the results of an experiment he had devised to illustrate the risks of oxygen depletion. 'I thought there was something missing in the enclosed space course and this provides a shock tactic to guard against a false sense of security,' he explained.

He used nails and water in a manometer to replicate a cargo of scrap metal — and described the 'absolutely frightening' speed at which the oxygen content declined. In one of the 16 different tests, the atmosphere fell to a dangerous level in just 15 minutes and, on average, the oxygen content had dropped below the safe point in under two hours.

Mr Clinch said the MAIB had developed recommendations for the International Maritime Organisation in 2009 following a series of enclosed space accidents in the previous two years. These included:

- the emergency response and rescue vessel Viking Islay, in which three crew members died after entering an oxygen-deficient chain locker
- the asphyxiation of two seafarers onboard the general cargoship Sava Lake, after they entered a store room where the oxygen level may have fallen to just 6%
- the death of a seafarer in an almost empty ballast tank onboard the cruiseship Saga Rose

These accidents also resulted in a special MAIB safety bulletin which highlighted data showing that accidents in enclosed/confined spaces continue to be one of the most common causes of work-related fatalities onboard ships today. Mr Clinch said investigators had raised concerns about complacency leading to lapses in procedure, a lack of knowledge and potentially dangerous spaces not being identified, as well as would-be rescuers acting on instinct and emotion rather than knowledge and training.

Around this time, research by the Marine Accident Investigators International Forum (MAIIF) identified a total of 120 fatalities and 123 injuries resulting from entry into confined spaces between 1991 and 2007.

Mr Clinch said MAIB data showed 101 enclosed space accidents between March 1998 and May 2009, resulting in 93 fatalities and 96 injuries. 'However, we are concerned that this is just the tip of iceberg and fear that there are a lot more,' he added. 'The UK database alone shows a further 14 accidents, 14 deaths and nine injuries since May 2009 reported to the MAIB.'

> "It's natural to want to rescue a colleague, but the first thing to do is not to become the second casualty"

The statistics show that most enclosed space accidents occur on tankers, followed by fishing vessels, general cargoships and bulkers, Mr Clinch said. However, he stressed, no ship type is immune.

The MAIB database also shows that most enclosed space accidents occur in cargo holds, oil cargo tanks, enginerooms and fish cargo holds. But, Mr Clinch pointed out, there are many other locations — including cable lockers, store rooms, ballast tanks, duct keels, freezers and funnels.

Oxygen depletion is the most common cause of death and injury, followed by carbon monoxide, hydrocarbons and refrigerant. Other causes include fumigants, hydrogen sulphide, ammonia, ozone, and carbon dioxide.

Mr Clinch said the MAIB was also concerned by cases where seafarers had died — or nearly become another casualty — after going in to rescue a colleague without taking any precautions. In the 2014 accident onboard the German cargoship Suntis in Goole Docks — in which three seafarers died — the death toll could easily have risen to six as a consequence of instinctive rescue attempts, he added.

Nautilus senior national secretary Allan Graveson commented: 'As a Union, we have made significant progress with the adoption of mandatory pre-entry drills and remote oxygen testing equipment. However, further progress needs to be made with respect to the carriage of enclosed space entry and evacuation equipment that is fit for both male and female personnel.'

Captain Mike Lloyd said the Suntis case had illustrated the problem caused by the different safety regimes in place on ships and in ports. 'The shared responsibilities mean that no one knows what the other is doing, and ports assume that ships have taken all the necessary measures,' he pointed out.

John Murray, from the International Chamber of Shipping, argued that there is no shortage of advice about the risks. 'There is good industry guidance, but the problem is that it is not universally supported or applied,' he added.

Marc Williams, MCA human element manager, described the work that has been carried out to address the underlying factors behind enclosed space accidents.

This has included consideration of ways to 'design out' the problems and to produce equipment and fittings that are safer and easier to work with. It has also examined issues such as training and drills, human performance and behaviour, and safety cultures.

'Well-intentioned rescue attempts are perfectly natural,' he pointed out. 'But there is a need to have the mentality of thinking about the danger first. If you see someone collapsed in an enclosed space, the first thing to do is not to become the second casualty.'

Mr Williams said there is a need to raise situational awareness and to highlight the fact that enclosed spaces are not always clear, even though they all present various risks. 'We also need to habituate training so that the first thought is not to jump in and become another casualty,' he added.

'Effective risk management needs an effective safety culture, which in turn requires an effective learning culture, and a good reporting culture that requires a "just" culture,' he told the meeting.

Experts consider how to improve safety guidance

What are the key messages that should be given to seafarers about enclosed spaces? Why do so many not recognise enclosed spaces? Do training and drills have enough impact? And can the international requirements be improved?

These were just some of the questions considered by speakers and industry representatives at the MCA's enclosed spaces workshop. The MCA is planning to review and reissue its guidance on entry into enclosed spaces and is seeking feedback on what needs to change, as well as whether the advice in the Code of Safe Working Practices could be improved.

MAIB chief inspector Steve Clinch told the meeting that his organisation had drawn from investigations to set out the need for robust procedures to be in place. Seafarers should never enter enclosed spaces if safer alternatives for carrying out the work are available, he stressed.

Proper identification of enclosed spaces — including risk assessments — should be undertaken by owners and awareness of the hazards should be maximised with training, drills, posters, videos and improved guidance.

Julie Carlton, head of the MCA's seafarer health and safety branch

Julie Carlton, head of the MCA's seafarer health and safety branch, said the UK had strengthened its advice in the latest version of the Code of Safe Working Practices, and new SOLAS requirements for mandatory drills every two months had sought to increase awareness and preparedness.

Roger Towner, head of seafarer services at the MCA, described the International Maritime Organisation's slow progress on improving regulations as 'disgraceful', and Nautilus senior national secretary Allan Graveson said there had been considerable opposition to moves to require the carriage of oxygen meters and pre-entry drills.

Captain Mike Lloyd said there should be clear standards for the alarms on oxygen meters. 'There is a need to consider the settings, as there are different national requirements and some go off at 18% and others at 19.5%,' he pointed out. 'We need to determine what is acceptable, otherwise the alarms will go off constantly and then they will be switched off or ignored.'

Other speakers highlighted the wide range of locations onboard which can present an atmospheric hazard and the need for more effective identification of dangerous areas — perhaps even compulsory 'audits' — and to ensure that 'transient' spaces whose atmospheres may change from safe to unsafe are not missed. Work should also be carried out to increase awareness of what is meant by an 'enclosed' or 'confined' space.

Seafarers should question the need to enter enclosed spaces — and there were some suggestions that entry should even be prohibited at sea (especially on small vessels) or only permitted if the safety of the ship is at risk or operationally essential.

There were also calls for improved use of the Permit to Work (PTW) system — with no entry to a tank/enclosed space allowed without it being properly tested and a PTW issued.

Some speakers argued for improved equipment and design, with shipowners, builders and architects cooperating to change the criteria for access hatches to deal with such problems as the difficulties of entry while wearing breathing apparatus.

There was strong support for the increased use of monitoring devices — including the mandatory carriage of remote and personal devices — and remote sensing of the space before entry is made. However, there were some concerns about the difficulties of providing effective monitoring of all spaces.

Delegates also spoke in favour of more mandatory STCW training requirements — both for enclosed space entry and shipboard familiarisation. There should be effective analysis of drills, using the outcomes of training and entries as a basis for debriefing and continuous learning and improvement.

While some speakers pointed to the many existing leaflets, posters and other guidance material, the meeting was told of the need to improve training and education — using films, e-training, interactive training, blended learning systems and social media to increase awareness.

Some delegates suggested that lessons could be learned from the procedures followed in shore-based industries, and there was also a call to audit the effectiveness of the various guides and procedures.

The meeting also heard that the safety messages may need to be tailored to different audiences, and that a one-size-fits-all approach may not be appropriate in the era of multinational crews. Concerns over the time pressures that may tempt seafarers to cut corners were also raised and, with 70% of casualties occurring during rescue attempts, the need to focus on emergencies was emphasised.

Michael Speers, head of school at South Tyneside's marine and offshore safety training section

Pat Dolby, port state control inspections manager with the MCA

College to build enclosed spaces training centre

Training in enclosed space entry and rescue is expanding so much that South Tyneside College is investing in a new purpose-built centre to deliver courses.

Michael Speers, head of school at the college's marine and offshore safety training section, told the MCA seminar that demand for training courses is increasing in response to regulatory requirements.

'We started enclosed space training in 2007,' he said. 'Formal enclosed space training was introduced in 2013 and we now put every single cadet through it on the first phase of their training to give them an introduction and to make sure they are fully aware of what an enclosed space is, as well as the precautions they should take.'

The one-day course takes about seven hours, Mr Speers said, and includes theoretical and practical elements. South Tyneside College is confident that training levels will increase — and that the course can be delivered to other sectors — and its purpose-built training facility incorporates a range of features based on feedback from students.

Steve Cuggy, from Tyne & Wear Fire & Rescue Service's training department, stressed the need for high quality training. 'Under pressure, you don't rise to the occasion — you sink to the level of your training,' he added.

Pat Dolby, port state control inspections manager with the MCA, told the meeting about the results of the recent concentrated inspection campaign (CIC) run by authorities around the world.

Mr Dolby said common themes in accidents include the lack of recognition of enclosed spaces, lack of preparation for entry, and a lack of training in rescue procedures. The campaign sought to raise awareness of the requirements for enclosed space entry and rescue drills, which came into effect in January 2015.

During the three-month campaign, inspectors checked the levels of awareness of the new rules and to verify whether ships were in compliance. As well as completing checklists, they also observed drills and had the power to detain ships if significant problems were found.

In the Paris MOU region, a total of 3,776 checks were carried out in line with the campaign and 54 ships were detained as a result of related deficiencies — just over 1.4% of the total — with the most common problems being record books and crew familiarity. Inspectors also found that drills conducted on 239 ships were unsatisfactory.

'In general, the results indicate that the subject of enclosed spaces is taken seriously by the industry,' Mr Dolby said.

Steve Cuggy, from Tyne & Wear Fire & Rescue Service's training department