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Seaways

The International Journal of The Nautical Institute

Sea Traffic Management

Testing the concept **p08**

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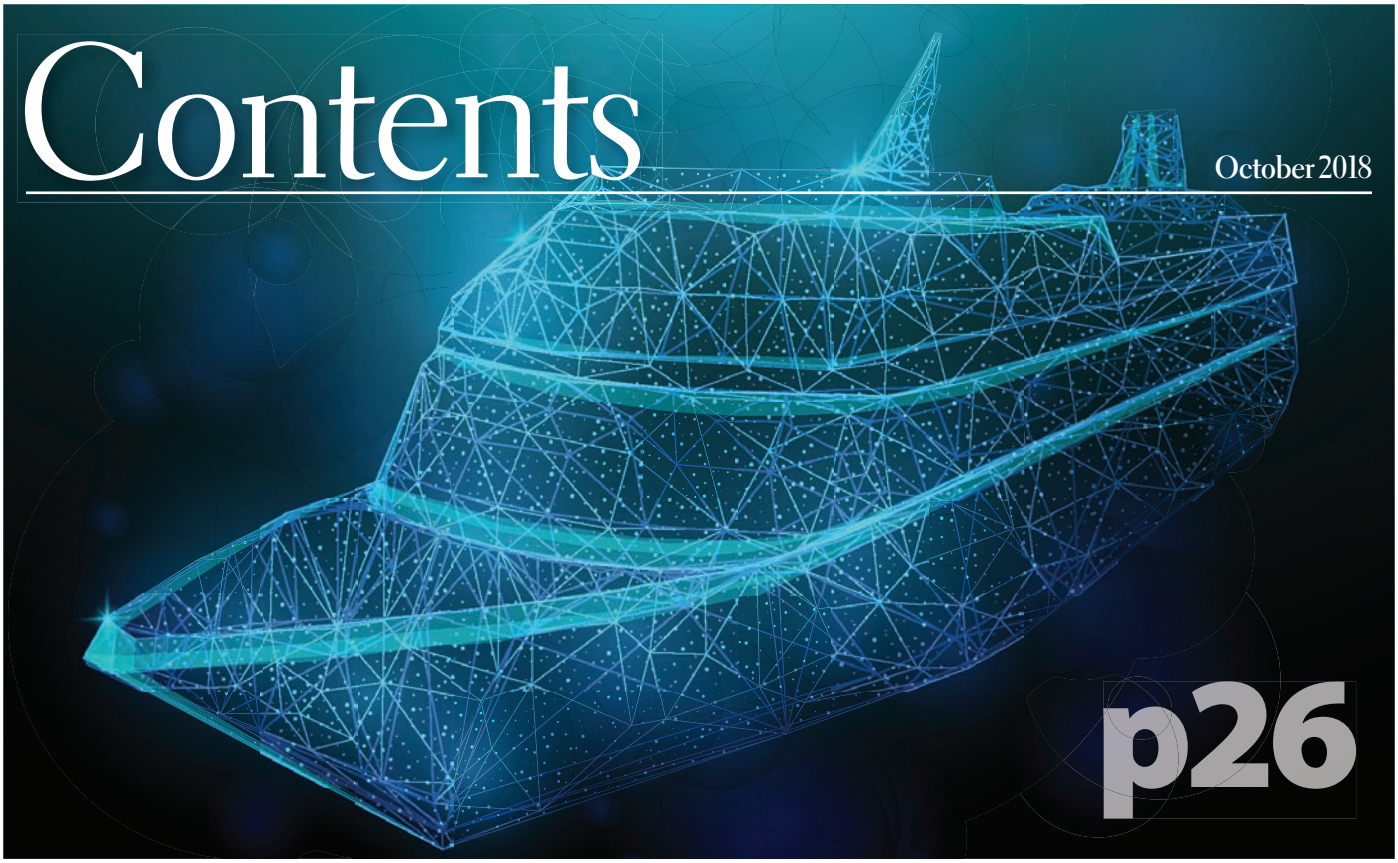

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The International Journal of The Nautical Institute

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Diary

What's on?

Modern Cruise Ship Bridge Operations
03 October
Ireland Branch

1900, National Maritime College of Ireland, Ringaskiddy, Cork

Please email nautinst.ireland@gmail.com to confirm attendance

Captain Nick Nash FNI, President of The Nautical Institute and Training Captain with Princess Cruises, offers insights into how modern cruise ship bridge operations make the most of people and technology to ensure safe passage and berthing

To take advantage of the discounts available for events listed in the Diary section, please log in to www.nautinst.org using your membership details and click on 'Event Discounts'

01 October

Flagships for the Future
London Branch

1730, HQS *Wellington*, London WC2R 2PN

www.nautinst.org/uk-london

01-05 October

Malta Maritime Summit 2018
Grand Hotel Excelsior, Valletta, Malta

02-05 October

International Bunkering Conference
Sentosa, Singapore

https://www.sibconsingapore.com

Discount for NI members

04 October

IALA
Solent Branch

1800, East Park Terrace, Southampton Solent University

Nisolentbranch.secretary@gmail.com

08-09 October

Navigation Assessors Course
NI HQ, London

Contact: courses@nautinst.org

Discount available for NI members

11-12 October

Navigation Assessors Course
Rotterdam, The Netherlands

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15-16 October

Navigation Assessors Course
Swire Maritime Training Centre, Singapore

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Marine Incident Investigation and Analysis
Mumbai, India

Contact: courses@nautinst.org

Discount available for NI members

16 October

Building of the FPSO *Catcher*
North of Scotland Branch

Woodbank House, Aberdeen AB15 9PN

Ni.northofscotland@yahoo.co.uk

17 October

Arctic Shipping Forum
St John's, Newfoundland, Canada

20% discount for NI members

18-19 October

Navigation Assessors Course
Hong Kong SAR, China

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Discount available for NI members

24 October

Maritime HR & Crew Management Summit
London, UK

15% discount for NI members

Captain John Lloyd FNI Chief Executive

Focus

Sharing experiences and representing professional interests

> If we can create shipowner funds to provide for responses to oil pollution, then it cannot be beyond the intellect of our industry leaders to make some similar provision for stranded seafarers

Incidents, accidents and welfare issues over the past few weeks remind us of the challenges faced by our mariners across the world.

In the middle of August a tanker explosion aboard a VLCC on passage off the coast of Oman resulted in crew members being injured, evacuated by helicopter for treatment and significant damage to the vessel. There was no reported pollution, but the incident reminds us of the dangers faced by crews every day in their work on board ship.

In a different maritime activity, this time off the east coast of England, two Belgian fishermen were lost after their vessel capsized in August. Three crew members were rescued from a liferaft by the crew of the cruise ship *Pacific Princess*. It was a timely reminder that fishing is a very hazardous industry and more needs to be done to improve safety and training to the crews and operators of these vessels.

Elsewhere the elements have also provided challenges to the mariner, with storms, cyclones and hurricanes creating great danger in the Atlantic and the China Sea.

The recent publication of the report into the fire aboard MV *Cheshire* in 2017 gave much food for thought. As with all accident reports, there is much to be learned from the incident. The Nautical Institute is grateful for the work of the Isle of Man ship registry for its detailed investigation into the circumstances of the loss of the *Cheshire* and for the work of Intercargo in highlighting the lessons learned.

Learning from accidents and near-misses is very important. If you are reading this and think a deeper understanding of incident investigation would be of value to you or your company, send me a message at sec@nautinst.org and I will be pleased to send you details of our Incident Investigation and Analysis programme.

For those who do survive the perils and dangers of the maritime workplace it is sad to reflect that sometimes their expectations of a reliable pay-cheque and decent food and accommodation can sometimes be misplaced. It is something of a relief to learn that the crew of OSV *Malaviya Twenty* may finally be about to head home after being stranded in Great Yarmouth for almost two years, with an owner unwilling or unable to pay the wages due. I think we all believed, or at least hoped, that with the introduction of the Maritime Labour Convention such issues would be a thing of the past.

It seems to me that if we can create shipowner funds to provide for responses to oil pollution, then it cannot be beyond the intellect of our industry leaders to make some similar provision for stranded seafarers. It is unimaginable that airline crews might have to occupy an airliner to secure their salaries. It is sad that some employers hold their sea staff in such disdain they will allow them to be away from home, unpaid, unfed and relying on charity to survive. Let us require a fund for those exposed in this way. If the owner cannot afford to contribute, then perhaps they should not be in the business of managing ships.

September also gave us the chance to commemorate Merchant Navy Day and I was honoured to lay a wreath on your behalf at the Merchant Navy memorial on Tower Hill in London on Sunday 9 September. The service remembered all those from the merchant and fishing fleets who have lost their lives in conflict around the world.

I wish all of our readers safe sailings. I hope you will continue to support our work of improving safety and representing your professional interests by sharing your experiences. Please do consider submitting an article that draws on your knowledge and observations or get in touch through our letters pages.

For more information about what The Nautical Institute is up to and how we are representing our members, follow me on twitter @NAUTINSTceo

With very best wishes

John

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Captain's column

Time Frame Management

Time is money, in the shipping business probably even more so than in other businesses. But how time really works 'for' or 'against' money is much better known to managers, brokers, operators and accountants than it is to the crew on board ship. Likewise, those ashore may not be aware exactly how time has to be divided up on board ship. If time is an asset, then we ought to handle it in the same way as we learn to handle other assets.

Looked at from the ship's perspective, time could be considered as an asset available to the crew in which to perform navigation and other tasks to keep the ship running, manage the cargo, and complete the voyage. The number of crew multiplied by the number of working hours available per crew member gives the total number of working hours available in any given period of time. Time, in other words is a fixed – and limited – asset. So how can this asset be best used?

Let's start by identifying all the things that need to have time allocated to them on a day to day basis – port calls, for example, will add considerably more tasks to the list.

In approximate order of priority:

- Watches have to be kept, both by navigation officers and lookouts. Despite ever-increasing automation, on some ships engine watches are kept as well.
- Safety rounds have to be carried out. Daily routines such as soundings, main and auxiliary machinery checks and set up and liquid transfers are vital to keep the ship running.
- The purpose of ships is (generally speaking) to carry cargo, so cargo operations are another 'must do' regardless of what else has to be done. This includes on-voyage cargo care such as lashing checks, temperature controls, ventilation, repair of reefer containers, cargo hold cleaning and tank washing and cleaning – and, during a port call, loading and discharging.
- Maintenance jobs, both scheduled and unplanned, must be carried out on engine and deck machinery, cargo equipment, life saving, fire fighting and other safety equipment.
- Statutory and flag state drills and training must be done, followed by updating the company training matrix, and in some cases charterer's training requirements.
- The whole scope of Safety Management System (SMS) procedures has to be implemented, including follow up through log books, forms, check lists, automatic printouts, electronic record keeping, and so on.
- Communications are going on around the clock between the ship and various parties ashore.
- In addition to all the items listed above, a prudent crew will keep the vessel clean and tidy in line with good seamanship.

All seafarers, regardless of rank, should take care of their own professional development, aiming to achieve knowledge and skills. Senior officers should take time to train and teach, providing mentoring to junior officers, cadets and ratings. Bridge team practice has to take place in the open waters before the things which have been practised become necessary within confined waters. Engineers should discuss on-board machinery and systems, and share their knowledge and experience. All of this requires time.

Crew output depends on the ration of available man-hours to required task-hours, port-hours and cargo-work-hours. There is an ever increasing number and volume of tasks to be carried out, while man-hours remain a limited asset. There is no perfect way of sharing tasks between time slots.

All stakeholders in the shipping industry have to be aware that tasks must be prioritised. The order of priority will be shaped by circumstance so that the most important tasks are completed – but this does mean that not all tasks and routines can be completed in a timely fashion.

Managing time slots can be even trickier than managing cargo slots

Putting PRO into practice

The practical use of PRO (Plan, Reason, Outcome) and the Reserve

Captain Nick Nash FNI
President, The Nautical Institute

The article 'Sharing mental models in confined waters' by Antonio Di Lieto and Hans Hederstrom (*Seaways*, June 2018) explored the concepts of the 'planned corridor' and the 'reserve' (see column, overleaf). Having attended Carnival Corporation's simulator training facility at CSMART, which teaches these concepts, and undergone the annual continuing development and BRM courses, I have put these concepts into practice on board the cruise ship *Royal Princess*.

Below are extracts from the ship's blind pilotage manoeuvring plans and my own personal 'diary notes' which cover a real example of the above techniques in practice.

ARRIVAL ST THOMAS, WICO MIDDLE BERTH

Use of reserve and PRO

The passage plan is displayed on the small laptop positioned between the navigator and co-navigator [see photo]. Critical safety lines are also marked on the electronic navigation chart (ENC).

This enables the co-navigator to easily monitor the navigator as both of them have full sight of the approved agreed plan.

The approach into St Thomas harbour is fairly straightforward:

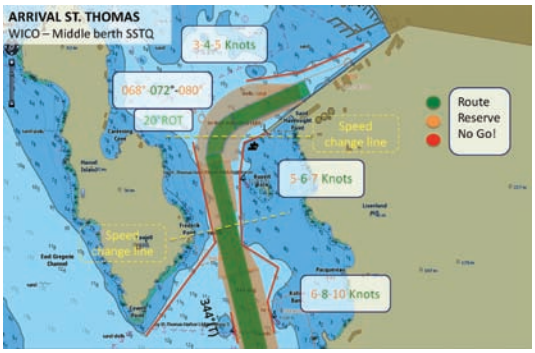
- A leading line of 344° for about two miles;
- A tight turn into the bay necessitating a 20° rate of turn (ROT) to starboard into the harbour;
- Rapid slow down to berth starboard side to on the middle West India Company (WICO) position;
- There is one 9m shallow patch very close to the east of the 344° track about 300m south of Rupert Rock buoy, and shallows to the west of the track north of Fredrick Point.

Ships have been making these turns successfully in St Thomas for years with the advice of the very professional pilots. However, with the increasing length of the ships calling, the use of corridors, PRO and the reserve gives an additional comfort zone and added reassurance through the turn.

Stage 1: The briefing

On this day, I was the navigator as wind on the approach was in excess of 35 knots and gusting 40. The first officer was the co-navigator, the staff captain was operations director, and the local pilot giving reassuring advice.

As navigator, I briefed the bridge team on the plan before we entered 'red' manning (ie all four bridge positions filled), using a PowerPoint presentation on the laptop. The briefing included a discussion on expected drift angles, and a decision to increase planned speeds by 1-2 knots to allow for the strong beam wind. It was confirmed that we would abort the manoeuvre at the commit point if the wind exceeded a sustained 40 knots on the approach or 25 knots inside.



The route (safety) corridor and 'reserve' areas had been marked on the passage plan along with the planned speed ranges and speed change lines.

The route corridor and no go area are clearly shown on the ENC and radar overlays. The whole team including the pilot can monitor the position of the stern position with reference to the 'reserve' and no go lines.

Stage 2: PRO

On the approach I kept the speed one knot above the planned speed – as announced during the briefing – and experienced a maximum drift angle between 4-6° at eight knots. After passing the commit position, I used the 'PRO' call out to brief the bridge team on the final approach.

I have used my diary notes and the VDR playback to reconstruct the PRO conversation as follows:

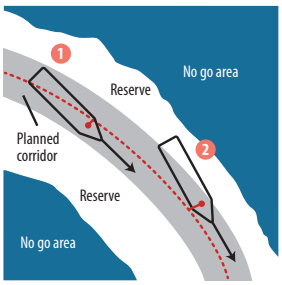
Navigator: *Team, it's PRO time*
Co-Navigator: *Ready*
Navigator: ***Plan*** *– After the buoys, I will alter course more to starboard, and come 10m right of track, passing close to the 9m patch and keeping speed at 7 knots -1 knot above plan speed. Then start the ROT to starboard early into the harbour at 7 knots. Planning an 18-20° ROT to starboard.*
Co-Navigator: *Yes.*
Navigator: ***Reason*** *– Strong beam wind, so need to hold right of track to ensure stern does not go into the reserve area on the swing.*
Co-Navigator: *Yes.*

TERMINOLOGY

Planned corridor
The previous article refers to a 'planned corridor'. On *Royal Princess* – and elsewhere in this article – we refer to this concept as the 'route corridor' or 'safety corridor', to match the naming protocol used by our navigation equipment.

PRO
The process of explaining your plan to the team. Always explain:
P – Plan
R – Reason
O – Outcome

Reserve (Safety Margin)
This is the area which the ship may enter outside the planned corridor, but which is still safe.



The planned corridor (aka route, or safety corridor) is shown in grey. The reserve is in white. The no go area is in blue.

When the ship is in the topmost position, the Cross Track Distance (measured from the conning position) is right of track and the entire ship is within the planned corridor. When the ship is in position 2, the Cross Track Distance is only slightly left of track, but the ship's port quarter is well within the reserve, with little space left before crossing the safety contour and entering the No Go Area with the stern. (ADiL &HH)

Navigator: ***Outcome*** *– Keeping ship upwind and ensuring stern keeps out of the reserve area and therefore well clear of the no go line.*
Co-Navigator: *Yes. Happy with your plan.*
Ops Director: *Confirm happy with your plan.*
Navigator: *OK.*

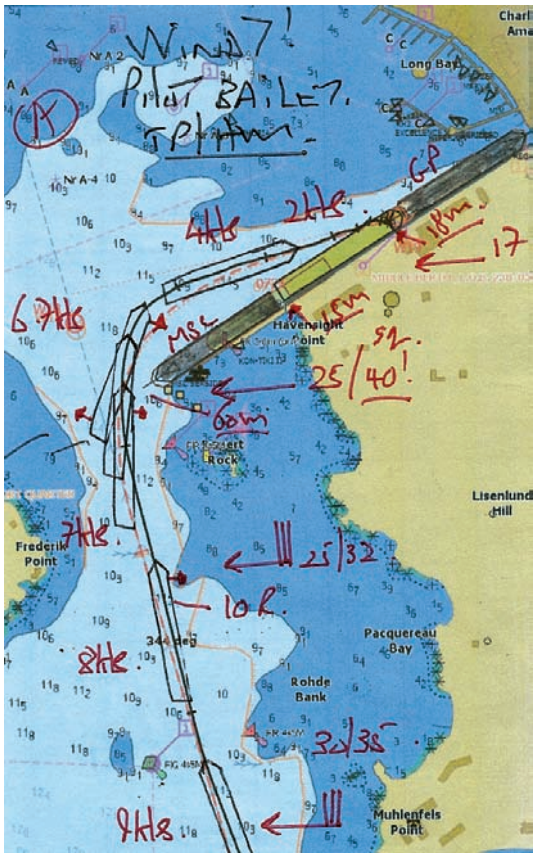
1 MINUTE

Navigator: *Changing course to 352°, Radius 0.3'*
Co-Navigator: *Changing course to 352°, radius 0.3'*
Navigator: *Yes!*
Ops Director: *Clear starboard. Wind 25, gusting 40 knots.*

2 MINUTES

Navigator: *Changing course to 070°, radius 0.15'*
Co-Navigator: *Changing course to 070°, radius 0.15'*
Navigator: *Yes!*
Navigator: *Execute 070, 0.15' radius with an 18-20°ROT to starboard.*
Co-Navigator: *Confirmed – OK. Stern passing close to reserve line and safe. Reduce speed soon?*
Ops Director: *ROT building. 20° and wind reducing to 25 knots. I'm happy with the turn.*

The wind was gusting 40 knots on the turn, but reduced to 17 knots inside the harbour. We also had to pass around another cruise ship on the outer berth, which we had been briefed on. The local pilot was very helpful on updating us on the inside winds and the final turn monitoring.



A snug fit on a windy day – safely docked due to PRO, the reserve and the pilot.

Route corridors and reserve

Why use a route corridor?

Using a route corridor setting enhances an OOW's authority to navigate the ship, knowing they are always within the Captain's comfort zone.

The OOW can get very close to the edge of the route corridor, but only needs to call me if they expect to exit it – my time for this is 15 minutes.

In pilotage the 'reserve' kicks into play, allowing the navigator and co-navigator to pilot the ship with little talking apart from the required thinking aloud, as long as the ship stays within the route corridor. It is the duty of the co-navigators to alert the navigator as the ship approaches the reserve, unless the navigator has used the PRO concept to explain their intended use of the reserve to the bridge team.

Using a 'Track Pilot' system combined with the route corridor makes for less communication clutter and provides a clear space for necessary thinking aloud, PRO and Alert challenges. It is to be recommended.

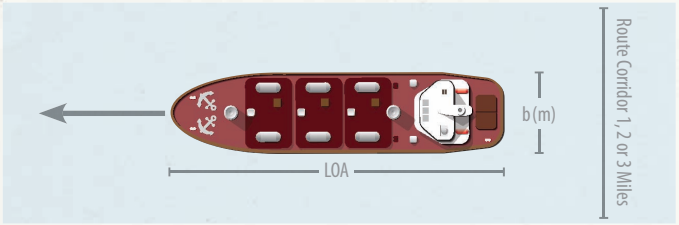
Choosing corridor and reserve settings

The exact settings for the route corridor and the reserve are of course difficult to specify as they depend on many variables – ship type, ship operation, location, company and Master's preference.

To give my navigator some idea of what I require, I have produced the following table, which of course is only a guide. Each leg of the passage will have to be individually agreed depending on circumstances, but it is a starting point!

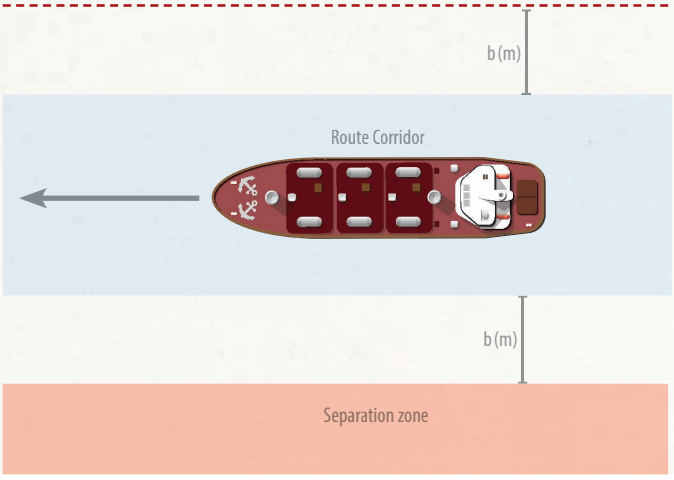
Open Sea

1, 2 or 3 miles depending upon traffic/obstructions/depth contours (Master's preference). No requirement for a 'reserve' when deep sea



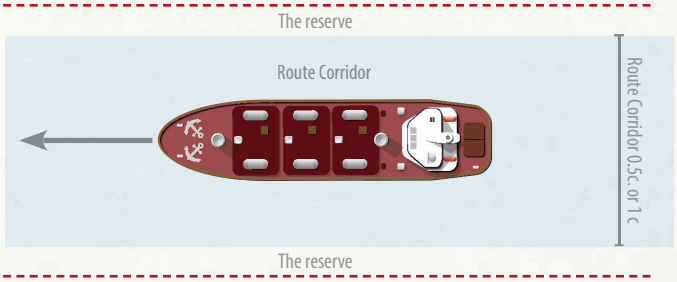
Traffic Separation Schemes

Width of scheme (assuming depth OK) with a reserve of the ship's beam (b) in metres (m)



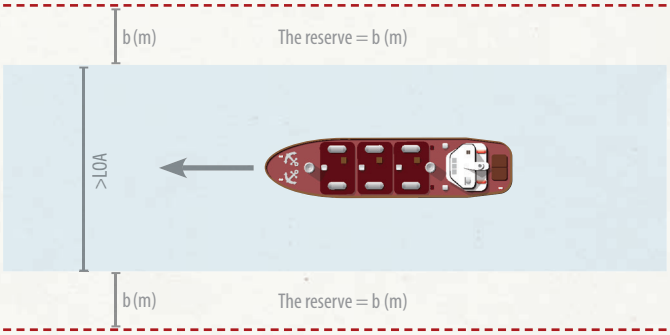
Narrow Channels

Route corridor = 0.5 cable (c) or 1c as appropriate
Reserve is the area up to the no go line

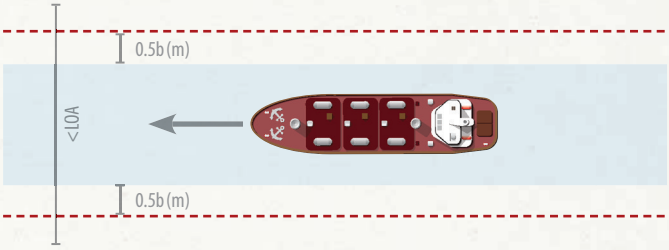


Very Narrow Channels/Rivers/Canals of equal width

Where channel of equal width > ship's LOA, reserve = ship's beam in metres

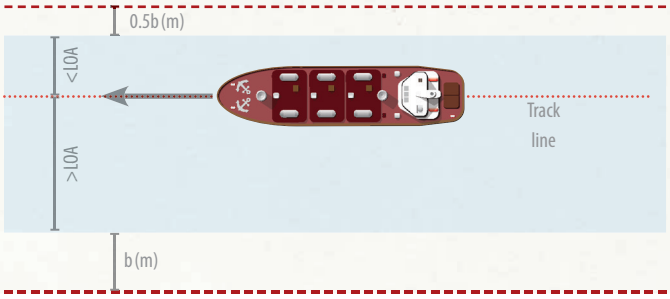


Where channel of equal width < ship's LOA, reserve = ½ ship's beam in metres



Channels of Unequal Width

Follow the above rules for each side of the narrow channel, using the track line (T/L) as the starting point, and measuring to the edge of the no go area. Where T/L→No Go >LOA, the reserve is the ship's beam. Where T/L→No Go <LOA, the reserve is ½ the ship's beam



Sea Traffic Management on trial

The Sea Traffic Management Validation Project made use of the European Maritime Simulation Network (EMSN) to trial complex concepts in a safe environment

Captain Zakirul Bhuiyan FNI & John Saunders
Warsash School of Maritime Science and Engineering,
Solent University, Southampton

The Sea Traffic Management (STM) Validation Project is a three-year project that aims to improve safety, operational efficiency and environmental performance in the maritime industry by proposing a standardised digital method of information sharing between all actors in the maritime chain.

It is a good example of the IMO's e-navigation policy, following on from the MONA LISA and MONA LISA 2.0 projects, which defined the concept of sea traffic management. STM sets out to validate the concepts in large-scale testbeds in the Nordic and Mediterranean regions. The project will encompass up to 300 vessels, 13 ports and five shore-based service centres, along with 13 simulation centres in the connected European Maritime Simulation Network (EMSN).

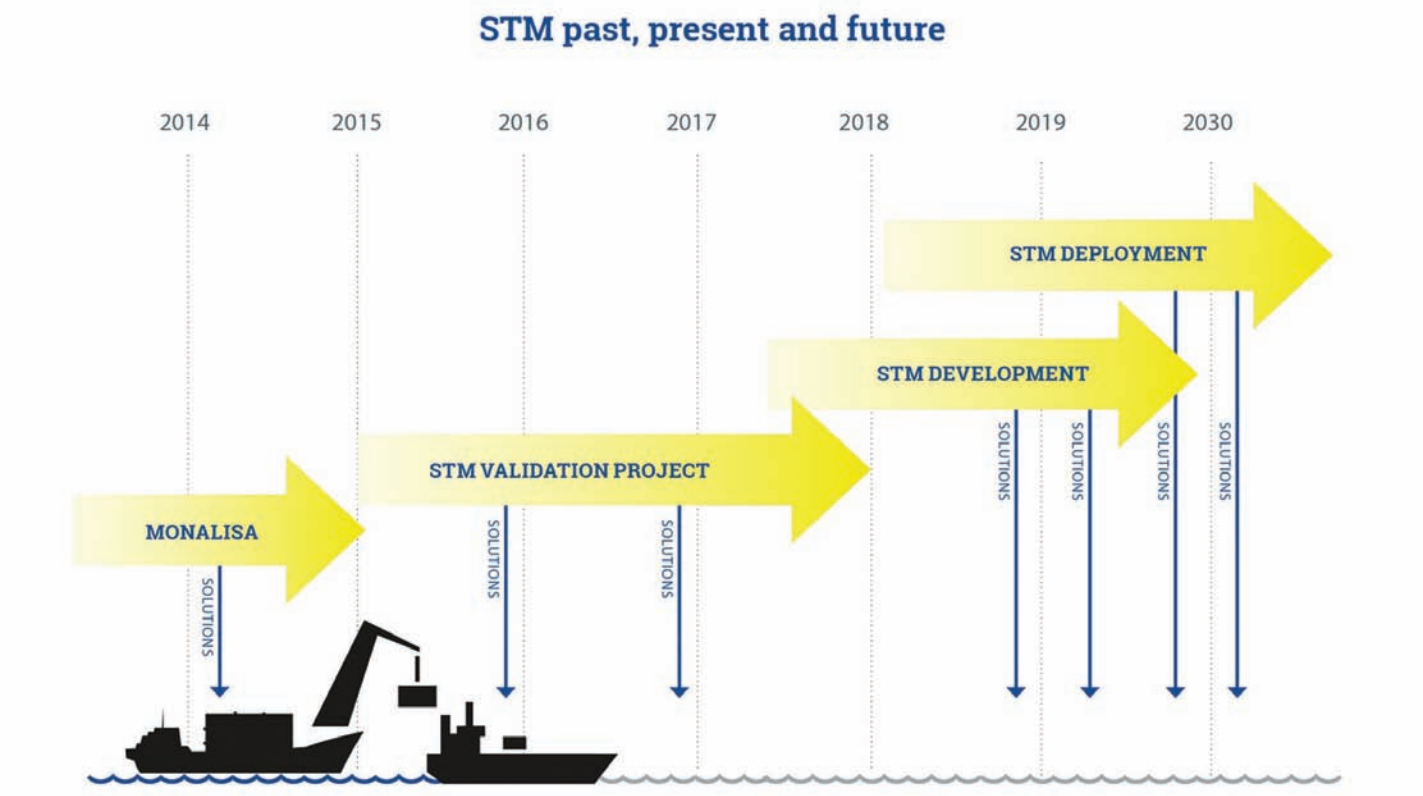
Using the EMSN for STM validation

To evaluate the STM concepts, a series of carefully crafted simulation exercises were created and run in a controlled environment using the EMSN (see box). The primary purpose of the EMSN is to gain experience with STM features and to understand how the people and institutions involved deal with its capabilities. Doing this in a simulated environment saves considerable time, cost and environmental impact. For certain situations, such as complex traffic situations, search and rescue and ice navigation, it offers a safer alternative to live testing.

The exercises included:

- Two 90-minute exercises in the English Channel and Southern Baltic regions; these were run both with and without STM tools in order to establish a baseline;
- Search and rescue exercises in the Gibraltar Strait area;
- Ice navigation in the Kvarken area of the Gulf of Bothnia;
- Six short controlled scenarios to explore the use of Ship to Ship Route Exchange to enhance situational awareness in anti-collision situations.

Participants manning the bridges were volunteers holding either



Master's, Chief Mate's or OOW certification depending on the role they were carrying out. They were given identical briefings at each simulation centre.

First EMSN simulator runs

Between 13 and 16 March 2018, Warsash Maritime Academy (WMA) welcomed 16 enthusiastic mariners from a variety of backgrounds to take part in the first week of EMSN simulation runs with the STM Tools enabled. Briefing each day started at 07.30. After an introduction to the bridge and a familiarisation exercise, participants adopted the role of either Master or OOW on one of the two WMA bridges in two main simulation exercises.

The scenarios have been carefully designed to test as many aspects of STM as possible both on the ship's bridges and at the simulated shore centres. One of these shore centres was located at WMA, simulating Sea Traffic Control Southampton for the English Channel Scenario.

WMA Staff taking part in the EMSN activities: from left, Terry Mills, John Saunders and Zakirul Bhuiyan

STM services tested include:

- Ship-to-shore route exchange
- Route cross-checking
- Shore centre sending suggested changes to routes as well as complete 'pilot routes'
- Enhanced monitoring
- Navigational assistance
- Use of chat
- Ship to Ship Route Exchange (S2SRX).

STM EMSN simulations analysis

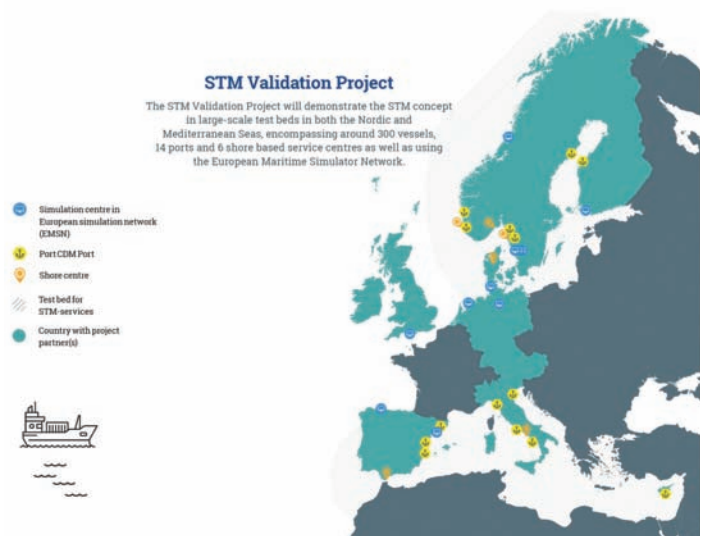
This was split into:

- Performance analysis: comparing the differences (if any) between the baseline exercises and those run with the STM Tools;
- Human factors analysis: use of a background questionnaire, in-scenario workload diary to assess mental workload and situational awareness, post-scenario questionnaires, human factors behavioural observations, and verbal debrief session.
- Safety analysis: using a safety index model developed by Chalmers University in Gothenburg.

There were some technical hurdles to overcome in the few short weeks leading up to the trials and although not everything worked as well as hoped, some excellent lessons were learned and much valuable feedback was obtained from the participants.

STM results

As the STM Validation Project is not due to complete until the end



of 2018, the full analysis and report writing is yet to take place. But it is the next step towards a safer, more efficient and more environment-friendly maritime sector. The STM will connect and update the maritime world in real time, with efficient information exchange. Through data exchange among selected parties such as ships, service providers and shipping companies, STM will create a new paradigm for maritime information sharing, offering tomorrow's digital infrastructure for shipping.

For more details on the 'Sea Traffic Management', project please see the Solent University's link: https://www.warsashacademy.co.uk/about/our-expertise/maritime-research-centre/project-sea-traffic-management/home.aspx

The STM Validation Project

The STM validation project is a three-year project with a €43 million budget, co-financed by the European Union, which will run from 2015 to the end of 2018. It was partly inspired by the European SESAR programme, which looked at the next generation of air traffic management. More than 50 partners are involved from 13 countries, including private, public and academic sectors. The Swedish Maritime Administration is acting as the lead authority. For more information, see the project web site http://stmvalidation.eu/

The European Maritime Simulation Network (EMSN)

The EMSN connects several simulator centres around Europe, involving three simulator manufacturers. It gives users a unique possibility to create scenarios with a large number of participating ships to test out STM scenarios.

The EMSN was set up during the MONA LISA projects in 2014 and has been enhanced for the STM Validation Project by the addition of more centres. It now offers more than 30 simulated own ships, and further organisations have expressed an interest in joining.

Information is shared between the simulation centres by the Distributed Interactive Simulation (DIS) protocol and all bridges are connected by Teamspeak VOIP to simulate VHF communications. Special ECDIS systems have been fitted to each 'bridge', and all bridges are equipped with prototype STM tools, including a facility for route sharing between other simulated ships and shore centres.

Just culture

How well is this concept understood and practised in the maritime industry?

Cdre Christopher Rynd
FNI

The term 'just culture' is widely used, but what this really means, how it is practised and the concept of 'just accountability' may not be well understood let alone implemented.

Sydney Dekker says it well in the third edition of *Just Culture* (see column on next page), as paraphrased here:

A just culture is a culture of trust, learning and accountability. A just culture is particularly important when an incident has occurred, when something has gone wrong. How do you respond to the people involved, minimise impact and maximise learning? The primary purpose is to give people confidence to report safety issues and learn from an incident and also to hold people accountable for undesirable behaviours or performance. The typical model adopted by many organisations today considers justice in retributive terms, what rule was broken, who was responsible, […] how bad is that violation and what should the consequences be. Such a culture is organised around shades of retribution and focused on a single individual. It asks what they have done and what they deserve […] It tends to favour those who already have power in the organisation. There is little evidence that such organisations learn much of value with such an approach.

Throughout this article I use the terms practitioners and operators to cover all shipboard roles. While the key theme is safety, the concept of a just culture applies to all maritime operations including health, environmental compliance and security.

How we view incidents

First, let's review how incidents may be viewed.

The traditional view assumes that things that happen are in principle predictable and are due to cause and effect. This would still seem to be the dominant way of thinking. Accident investigators use root cause analysis techniques to discover causes. Safety specialists perform risk assessments to try to avert any dangerous effects of work procedures. These, together with corporate due diligence, are enshrined in procedures, safety management systems and methodology statements that expand year on year.

This traditional view sees human error as a cause of incidents. To address this, we need to do something about the human involved: suspend, retrain, admonish or charge them. Or we need to do something about humans in general: marginalise them by putting in more automation, or rigidify their work by creating more rules and procedures. (Dekker 2007)

The systems view

The modern view is that things happen due to complex system behaviour. Events may emerge unpredictably from the behaviour of complex systems that involve humans and are constantly adapting to achieve outcomes. Examples of a complex system may be a bridge team in action or even a fire party. This approach focuses on the whole, not the parts, and recognises that there will always be ambiguity, uncertainty and moral choices to be made.

In this 'systems' view, people are not seen as sources of error but as the creators of safety. There will always be gaps in any system because designers and rule-makers cannot envisage all situations and contingencies. Human operators must be given some degree of freedom to cope with the unexpected, and this increases the need for the human operator to identify and manage the risks that arise. The airline industry view of this is that 'threats to the operation will occur and errors will be made', so cockpit relationship management (the equivalent of shipboard BRM) is necessary to manage these threats. Experience and expertise become valued assets to build upon. Humans are necessary to 'complete the design,' as Dekker says.

This view sees human error as a symptom, not a cause. Rather than change the humans involved, we need to do something about the system in which people work, the design of equipment, usefulness of procedures, the existence of goal conflicts and production pressures.

Accountability

The systems view is not incompatible with holding people accountable. However, it does emphasise that we should understand the relationships of individuals within the systems not *versus* the systems. Accountability must be assessed, but the line between acceptable and unacceptable behaviours is very difficult to draw and always involves judgement.

What matters in a just culture is not where to draw the line, but who draws it, and to ensure that there is clarity and agreement about it. Within an organisation this might be a group of operational peers, people of the same standing or rank. These people should be subject matter experts, not just those in management roles with a limited knowledge.

The UK's submission to IMO's '*Role of Human Element. Just Culture – Essential for Safety*,' explains this as 'organic accountability'. Accountability in a 'just culture' is assessed by investigating:

- How actions and decisions made sense to each involved person at all levels of the organisation at the time of the incident, and
- What changes the organisation could consider to prevent them from contributing to an incident again.

Reporting is supported by debriefing programmes to help cope with trauma.

Investigations are conducted by expert practitioners who have deep knowledge of the technical demands of the incident and are schooled in hindsight bias. The different perspectives may then be assembled into a 'mosaic' to form a rich picture of the incident. It should be noted, however, that no one had this picture at the time of the incident, and it is useful only in the consideration of what systemic changes might be necessary.

Most people welcome accountability. It gives their roles meaning. In the 'just' culture, after an incident it gives them a role addressing the prevention of future incidents, restoring trust and relationships that were harmed, and in restitution of harm.

Practitioners can punish themselves harshly, and in a just culture the ability to talk about an incident, to tell their story and do something

to make it right benefits both the organisation and the individual. They can take responsibility and be responsible for improvements. This approach aligns with the concept of forward accountability in that it allows people to learn and move forward.

You have to start with the assumption that a professional goes out with the intention of doing a good job in a safe manner, not to create an incident or make mistakes. Only after accountability is assessed in the way described above should the possibility of deliberate and avoidable ill intent, malpractice or malingering be considered.

Reporting

Reporting a safety-related incident may seem straightforward. It is easy to assume that reporting is always the practitioner's responsibility, and that if someone does not report there must be something wrong or they are covering something up. However, there may be many reasons that reports are not made, including:

- Reporting procedures were unclear;
- Comprehension of the incident was unclear;
- Uncertainty about how the supervisor, manager or organisation will respond;
- Uncertainty about how the information will be treated;
- Fear that information will be immediately and widely promulgated without explanation;
- Uncertainty about the rights and obligations of the reporter;
- Experience of previous unfair, disproportionate or insufficient responses.

Any occurrence can be open to interpretation, and judgements differ as to the line between what is reportable and not. This may be due to the way reporting is defined in the organisation's procedures. Even if this is clear, it may be that the practitioner does not see an incident as worth reporting. They may have seen the same incident before with no bad outcomes.

Another complication may be determining when the incident began and ended. The beginning may have been in the planning stage, or even at the design stage of technology. Likewise, the final details and outcomes may not be known until sometime later.

To quote Dekker again, 'Something that could have gone terribly wrong, but did not, is not necessarily a clear indication of reportworthiness either'. In many operations, the possibility for things to go terribly wrong is always there. Imagine a ship's Master taking a ship into a lock in a strong crosswind and current, close to the manoeuvring limits for power available – an evolution that requires expertise and fine judgement. The outcome is a little scratched paint on the hull when a gust caught them at a critical point. But what if some other element in this complex system had changed or was misjudged? The outcome might have been a heavy landing on the lock knuckle resulting in a hull breach in way of an occupied cabin at water level, which might in turn have resulted in the occupants becoming trapped in a flooded cabin from which they could not escape. Is that a reportworthy event?

Resources and further reading

When Sydney Dekker published his book *Just Culture* in 2007 it resonated with readers charged with operational roles in safety-critical industries. The book is now in its third edition. Sydney Dekker is a professor of human factors and safety, psychologist, the author of several bestselling books on safety and an airline pilot. Captain Sullenberger had a copy of *Just Culture* aboard US Airways flight 1549 when he ditched his A320 on the Hudson River.

Being Human in safety-critical organisations (2017), by organisational pyschologists Dik Gregory and Paul Shanahan, is a further resource for understanding and implementing a 'just culture'. This forms part of its key theme of resilience engineering constructed around human behaviour.

Gregory and Shanahan wrote the study *The Human Element* for the UK's Maritime and Coastguard Agency (MCA). This became the basis of the UK's submission to IMO in 2009/10 on *'Role of Human Element. Just Culture – Essential for Safety,'* which was intended to develop and embed an effective safety culture across the maritime industry.

Designing a successful reporting policy

The reporting policy must explain:

- What the reporting process looks like;
- Possible consequences;
- Rights, privileges and protections.

When these are clear it removes some uncertainty from the process. So does knowing that the information will be secure from outside interference.

A reporting system run by safety/quality staff seems to offer more benefits than one run by line managers. Consider also the advantage of having a trusted professional on call ashore, who the practitioner can contact to get guidance or another viewpoint in ambiguous cases.

Trust is built by how reports are dealt with. A safety culture depends upon keeping the reporting going. This is made better when there is interaction with the reporters.

The point of reporting is to contribute to learning. Anything that improves learning improves the safety culture.

(In)Appropriate investigations

A legal approach does little to create a just culture. In some cases, human resources departments, medical and psychological teams and/or public relations departments take on the role of investigators and recommend action under the disciplinary and legalistic process. In safety-critical areas, and in related areas of health, environmental compliance and security, they are not appropriate investigators.

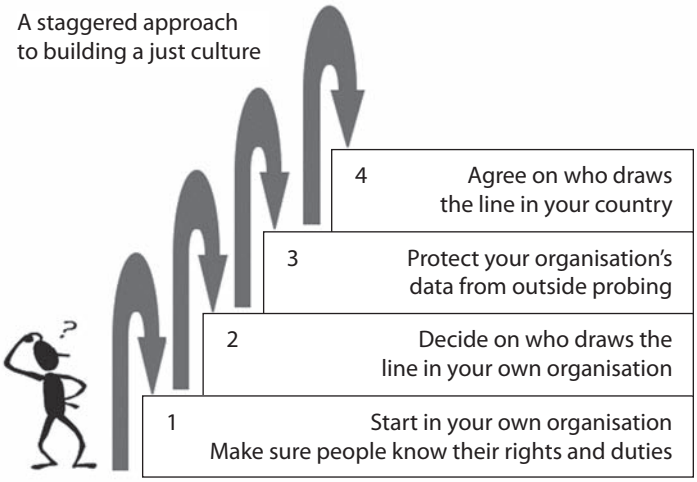
In a just culture, those who investigate post-incident should also practise what they teach. Good bridge resource management (BRM) is supposed to ensure open, honest and all-inclusive briefs and challenge interactions. In post-operation debriefs we speak freely about what went well and what did not. If an operator or practitioner finds they are being investigated in a quasi-legal environment, this is likely to result in behaviours contrary to those we promote aboard ship and an 'attitude' that BRM is supposed to eliminate. It encourages non-disclosure.

To quote from *Being Human*: *'When a legal approach is used to investigate "negligence" cases, the outcome is almost never "just", and safety usually suffers. The prosecution tends to fashion selected evidence into a simply understood story that is focused on the defendant, who ends up as an organisational scapegoat. This outcome produces fear and mistrust, discourages further safety reporting and drives unsafe behaviour underground. Criminalising honestly made professional error is entirely counter-productive.'* This is a retributive approach as compared to a restorative one.

Steps to building a just culture

Implementing a just culture requires the same commitment, planning and investment as any other organisational initiative. Achieving this can be very challenging but is necessary if the concept is not to be debased. It must start at the top with senior managers ashore and it is important that it is understood by all stake-holders within the organisation. New entrants must learn of it in basic training.

Dekker suggests a staggered approach starting in your own organisation. It begins with building relationships of trust between managers and practitioners or operators. That means not treating an incident as a failure or crisis. Dekker goes further: '*Abolish all financial and professional penalties in the wake of an occurrence. Suspending practitioners after an incident should be avoided at all cost. These measures serve no useful purpose and with them organisations can count on losing out on a lot of valuable information […] Empowering and involving the practitioner him- or herself in the aftermath of an incident is the best way to maintain morale, maximise learning, and reinforce the basis of a just culture.*'



More guidance that will enable organisations to build their own just culture step by step and examples can be found in the publications referred to in the box, which themselves include references to further helpful material. These show that it can be done – and indeed must be done if our industry in its many diverse forms, professional disciplines and nationalities is to improve.

The summary and conclusion from the IMO document states:

- Culture is the essential component underpinning safety and business success;
- Business success depends on managing risks effectively;
- To manage risks you need an effective safety culture;
- To have an effective safety culture you need an effective learning culture;
- For an effective learning culture you need an effective reporting culture;
- Which cannot exist without an effective Just Culture.

Remember, culture is what you do, not what you say.

To close I quote again from *Being Human* 'The real driving need for a "just" culture is not simply that it is a prerequisite for open incident reporting that is required for organisations to learn about their fragilities … it is that, most importantly of all, it plays to a need that is deeply embedded in the human psyche, irrespective of national culture or ethnicity: "being human" entails a shared and deeply felt sense of *fairness*'.

Digital evolution

The forces that are driving the transformation of the shipping industry

Captain Bally Duggal
MNI

The marine industry is considered a latecomer to the digitalisation revolution. We still deal manually with large amounts of paperwork at all levels, and most ships don't have even basic sensors to obtain digitalised data. A passenger aircraft generates several terabytes of data every day, whereas a cargo ship takes 50 days to generate just one terabyte of data.

'Digital evolution' and 'digital transformation' have become buzzwords across the maritime industry. The concept and process of digital transformation initiatives are expected to drive the transition of an organisation from a traditional to a 'smart' company. But what do they actually mean?

Digital evolution and transformation is not about replacing paper with technology, or even assigning new digital responsibilities to traditional roles. It is about moving beyond the concept of connectivity and data-gathering towards a more integrated future where the entire industry operates as a single 'digital ecosystem'.

Digitalisation is expected to lead to four major trends that will reshape the industry, improve rates and reduce cost:

- Data analytics
- Data flow
- Smart vessels and automated smart ports
- Shared capacity.

As the world around us evolves, a company needs to adopt an agile digital business model if it is to begin digital evolution and transformation. Digitalisation is no longer the future; it is present.

Digital transformation and operational excellence

Digital transformation requires the adoption of digital technologies such as cloud-based solutions, blockchain and the Internet of Things (IoT) to transform the way assets are managed at sea. An important part of digital transformation is the drive towards autonomous systems, with automation being an enabling technology.

Going hand in hand with digital transformation is 'operational excellence'. The phrase means aligning people, process and technology capabilities to create a culture of continuous improvement. This bridges the gap between strategic objectives and operational architecture, improving operational performance.

The maritime industry has not yet fully taken advantage of digital technologies. The extent of digital transformation varies from one organisation to another, largely because of different digital footprint and maturity levels. A digital maturity assessment (DMA) will reveal the current level of process digitalisation compared with the availability of digital process support options.

Operational excellence should pave the way for digital transformation, and this in turn drives further operational excellence by enhancing information flow and service operations.

The maritime industry needs to recognise that digital technologies offer powerful means of connecting processes and people efficiently and of using information effectively without connectivity gaps.

Big data for asset management and optimisation

'Big data' refers to the large volume of data that companies handle every day, both structured and unstructured. This data come from a variety of sources such as business transactions, sensors and machine-to-machine interactions. Formats range from structured, numeric data in traditional databases to unstructured text documents, emails and remotely monitored software systems.

It is not the amount of data that is important; it is what an organisation does with it that matters. Big data can be analysed for insights that lead to better decisions and strategic business moves. Data analytics bring a host of benefits to the merchant marine fleet and help the company turn those indications into fruitful reality.

The maritime industry generates massive amounts of data from vessel operations and other sources, but much of it is not being used efficiently. Retrieval of data from equipment is not new; the game-changers are the analysis tools now available that can manage the data. These tools can make use of the data to provide accurate insights into whether equipment and business processes are operating at their optimum level.

For example, engine-makers offer vessel-specific monitoring and diagnostics systems that are capable of monitoring the vessel's main engines, generators, thrusters and other systems around the clock, feeding the data to the engine-maker's analyst. The analyst scrubs and cleans this data and produces advisory reports for management. These reports include maintenance recommendations for each item of equipment. The analyst can suggest ways of lowering costs and increasing operational efficiencies. For example, mandatory inspection or replacement of a pump after a fixed number of hours is no longer required because performance data from the equipment sensors indicate when action is required.

Digital big data asset management and optimisation will bring a cultural shift in maintenance from a visual, calendar-driven approach to an analytical, data-driven process.

Digital data, connectivity and records

Port and terminal authorities around the world are recognising the industry's migration towards digitalisation. Port authorities are relying on big data analytics (BDA), the Internet of Things and cutting-edge technologies like blockchain to replace traditional person-to-person communication.

BDA is the process of examining large and varied data sets – ie big data – to uncover hidden patterns, previously unknown correlations, market trends, customer preferences and other useful information that can help organisations make better informed business decisions.

The IoT essentially uses satellite constellations to link data from devices, appliances, equipment and machinery. These have

the intelligence to seamlessly connect, communicate and control or manage each other to perform a set of tasks with minimum intervention.

The rapid development of the IoT means that enormous quantities of data from different sources will have to be processed, analysed and visualised in a timely manner. This is where big data analysis fits in. Big data analysis and the Internet of Things complement each other and develop together as a 'double helix'.

Information-sharing

Blockchain is an important part of secure data management. It consists of a continuously growing list of records, called blocks, which are linked and secured using cryptography. Blockchain is a public electronic ledger that can be openly shared among disparate users and that creates an unchangeable record of their transactions, each one time-stamped and linked to the previous one. It can only be updated by consensus between participants in the system, and when new data is entered it can never be erased.

The International Maritime Organization (IMO) supports the implementation of automated electronic data exchange from ship to ship and ship to shore to increase efficiency, safety and security of maritime navigation and communications.

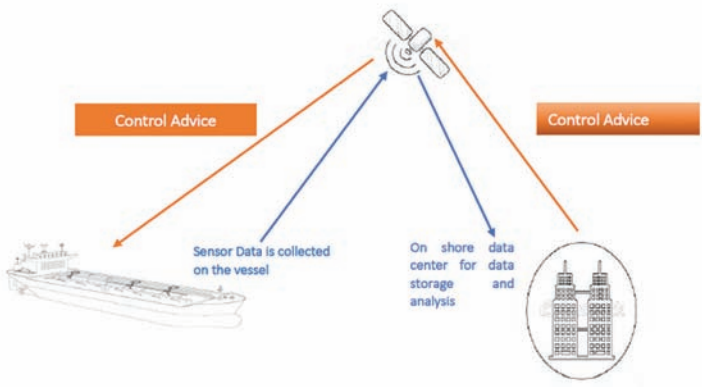
Shipping companies, charterers and equipment manufacturers are all striving to become the first to adopt digitalisation. This requires advanced IT and communications infrastructure and ship systems, updated software, ship-to-shore connectivity and, in many cases, cloud applications and new methods of online working.

GPS navigation, real-time weather data feeds and 'smart' containers are just some of the technologies redefining the movement of goods. In future, ships will inform ports about the goods in the containers on board long before docking, allowing better planning and faster unloading. Containers equipped with sensors and radio-frequency identification (RFID) transponders will be registered and tracked for optimised transport and distribution. Perishable goods, for example, will be monitored and delivered before spoilage can occur. Telematics systems and databases in freight trucks will help reduce waiting times and bottlenecks in ports, by keeping drivers informed of precisely when and where containers will be unloaded.

The oil and gas industry is beginning a transformation of its own, increasingly looking towards data-driven solutions to boost performance, enhance efficiency and, ultimately, to reduce costs.

Digitalisation and classification services

Classification societies are exploring the opportunities offered by digital technologies for operational optimisation, design optimisation and other applications. Digital applications rely on a vessel's operational data, incorporating vessels into the IoT. While this can include logistics data, administrative data, noon reports and other voyage-related data, classification societies tend to focus on the data that are received from the sensors on board the vessels.



Digital sensor data is collected on board from many different sources, such as navigation, machinery operations and safety systems. Once the sensor data is transferred ashore, it can be combined with other data and models to produce new knowledge and enables new applications.

Although shipping companies are increasingly willing to share information in order to reap the benefits of big data analysis, the approach to data capture remains very fragmented. Similar data are routinely sent to several vendors and analysis is still carried out almost entirely on a ship-by-ship basis, which is both time-consuming and inefficient.

By contrast, classification societies have established their own data centres, consisting of a secured shipping operations database serving as an independent information hub. Here data are collected from multiple vessels, regardless of class or company, but are accessible only by agreed permissions. Companies are free to choose what they want to share and to specify whether they want it shared with engine-makers, equipment manufacturers, shipyards or other stakeholders who might benefit.

In recent years, classification societies have developed their own software and services to advance specific digitisation-based systems:

- Hull maintenance information service to provide owners and managers with hull maintenance information for individual ships
- Condition-based maintenance, which requires analysis of ship data from onboard sensors using algorithms to monitor ship machinery conditions
- Onshore Digital Archive Centre complying with IMO Goal-Based Standards (GBS) and industry standards
- Online emission reports as required by EU Monitoring, Reporting, Verification (MRV) regulations
- Electronic certificates with secured electronic files
- Voyage optimisation with planning, monitoring and follow-up of ship operations and performance analysis.

Overcoming the challenges

The stream of data available to maritime operators is growing continuously. Worldwide, 2.5 quintillion bytes of data are being generated every day.

To gain valuable insights from all this data requires vast amounts of computation resource for storage, harmonisation and analysis. This in turn requires immense investment, software expertise and knowledge of the sector.

One crucial challenge that the industry must address before data analysis can reach its full potential is the segregation of data in silos. Currently, vessel operators and system developers all possess their own data. Reluctance to share data and ambiguity about who owns it have laid roadblocks on the digital journey. Initiatives such as the classification societies' data centres will go some way towards breaking down these silos, but these are only the beginning.

The benefits of consolidating data can be huge. Through data consolidation and assessment of all the different elements of vessel, voyage and company performance on one platform, vessel operators can gain the insight needed to inform all aspects of vessel management, from design and operational efficiency through to component or system stress and repair.

The maritime industry is only at the start of its digital journey, but the future is promising. Riding a wave of transformative innovation and change, digitalisation will help improve safety, reduce costs and streamline vessel and fleet performance, through data.

Turning apples into bananas

How big data undermines safety and what can be done about it

Nippin Anand
PhD

An able seaman has been 'reprimanded' for leaving the gangway hanging out while the vessel was shifting berth.
- Root cause: 'Lack of awareness';
- Corrective action: 'Risk assessment'.

A third officer has been served a warning letter for missing out on monthly checks on a fire extinguisher, resulting in non-conformance during a safety audit.
- Root cause: 'Complacency';
- Corrective action: 'Follow the procedures'.

A crew member trips over an obstruction on deck and hurts himself.
- Root cause: 'Lack of awareness';
- Corrective action: 'Risk assessment'.

A chief officer who submitted a near miss report stating that he came close to a fishing vessel during the coastal passage has been sent on a refresher training course.
- Root cause: 'Lack of planning';
- Corrective action 'Training and supervisory control'.

Go through any reporting system and you will find hundreds of such reports. With intense budget controls and an over-zealous commitment to safety, many organisations are turning towards software solutions, colloquially speaking 'Big Data', to measure and manage the state of safety.

Looking deeper

Listening to the other side of these reports is disturbing but gives valuable insights. The able seaman points out that moving the vessel alongside the berth with one crew member forward and aft during the night was not unusual. The captain had consciously made a decision not to wake up other crew members in the middle of the night. What was unusual, however, was that a crane swung out and obscured the captain's sight of the gangway from the bridge. When things went wrong, the able seaman was held to blame for not informing the captain that the gangway was hanging out.

The third officer has his own version of the story. As a safety officer he must ensure that each portable fire extinguisher is visually inspected and ticked off every month. With the best will in the world, there are instances when an odd fire extinguisher can be missed out when you have a list of 300 to check. 'But nobody is interested that I check the other 299. One mistake and I got a warning from the captain,' he says. It does not end there. He adds, 'Now every time we have inspection, I am worried, I cannot sleep for many days. Maybe I forgot something, I am going around at night after my watch to make sure I have not missed anything. It's not easy to find another job if I lose my job.' This is a watch officer who is on the bridge for at least eight hours a day on a vessel laden with hydrocarbons.

The chief officer became furious when I probed into the near miss. 'They make me do a three days course, I find it insulting. It is them who should do better planning. I tell them don't load six high containers on the forward hatches especially on the sides, it obstructs visibility from the bridge. But they don't care. And when I reported this, they are telling me I was not careful on my watch.'

The question is, can we ever get insights of this kind from purely data-based reporting systems or are we simply camouflaging them with technology?

Measuring safety

Attempting to measure safety is a key purpose of any reporting tool. Safety is defined as the condition of being protected from harm or injury to an acceptable level. But this definition is not without its problems. To the consumers, stakeholders and society at large (in a legal and media sensitive environment) the notion of an 'acceptable level' of safety can easily become arational (that is, outside the realm of reason) and unrealistic. Take an example of what is regarded as 'acceptable' – 'If it saves even one life, it is worth the effort'. More eloquent examples include 'all accidents are preventable' (AAAP), or the prospect of an accident free future.

On the face of it, there is nothing wrong with such virtuous statements, – but the thinking behind them is based on emotion. Our view of what is acceptable is not based on a calculated decision based on professional judgment. Rather, it is the unfortunate outcome of a society where expert decisions and professional judgment can easily come under attack in the press. For anyone tasked with measuring safety a natural response would be to say that everything is a risk, and nothing can be acceptable. Curiosity and questioning are out; orthodoxy and fear are instilled in people.

Businesses operating in fierce market competition often struggle with such arational responses. At times the costs can become unsustainable, and on other occasions the responses themselves make a mockery of safety. This is how we end up investing heavily in barriers and protective devices and implementing behavioural safety tools despite no evidence of injury or harm – and sometimes even in the face of evidence that the 'safety' measures are counterproductive.

A second and, in my view, bigger problem with measuring safety is that it relentlessly aims for perfection. There is a very specific language that underpins this thinking and quite often it has little or nothing to do with safety. For instance, compliance, conformance, all accidents are preventable, zero tolerance, and the zero-accident vision. A handful of unrealistic goals are established, and the focus turns towards petty mistakes rather than overall progress. It does not matter if you have checked hundreds of fire extinguishers, what matters is one that is left out. Any improvement that does not fit with those narrow set of goals means nothing. As we build sophisticated reporting tools to measure safety, we need to be aware that the end purpose can become trapped in arational thinking and unrealistic goals.

Big Data or Big Brother?

What about the actual reporting and analysis of data? As copious data is poured into software models, we are tempted to believe that this will help us predict what lies ahead, alleviate uncertainty and improve business performance. Technology will comb through petabytes of data and provide insights into individual behaviour. Software systems are already becoming capable of identifying patterns of human behaviour and correlating them with individuals and groups of workers. HR software tools can gather extensive data to assist organisations with hiring decisions and predicting employees' performance at work.

But imagine how spurious correlations can easily go wrong when it comes to measuring safety. Once a few 'unsafe' individuals are identified this can lead to detailed monitoring of those individuals, subsequently finding even more problems in their behaviour. The accident-prone workers will remain logged in the system for a long time. In the wake of an accident (or an unsatisfactory inspection outcome) the first thing would be to recall the history of the workers and take them to task. This may exacerbate the problem of accountability and blame.

Algorithmic injustice

At the organisational level, reporting accidents, defects or any shortcomings has long been considered a sign of failure in many safety critical industries. So why make so much fuss now that we are assigning the analysis to computers?

Data scientist Cathy O'Neil, author of the book *Weapons of Math Destruction: How Big Data Increases Inequality and Threatens Democracy*, tackles this issue through a series of case studies. O'Neil argues that while humans learn to adapt quickly when things don't seem to work, computers can get fixated on erroneous correlations that become difficult to break down. When this happens the scale of damage becomes inconceivable.

One such example was recounted by a ship manager writing on LinkedIn. One of their vessels developed a small oil leak in the main engine while transiting a busy shipping lane. The issue was reported, the vessel anchored, changed the part in question, and was back underway within an hour, problem solved. Later, the company saw that the vessel had been downgraded by a fully automated rating system from five stars to three. It took months to return to five star status, during which period several chartering opportunities were lost. There was no recourse, and the entry could not be changed, as the system was fully automated.

This is a telling example of algorithmic injustice in the digital era.

Turning apples into bananas

Data manipulation can affect the outcome in other ways. One operator states, 'Our client takes the risks of dropped objects very seriously, so we scan through our incident reports to check for terms such as 'dropped objects' and 'deck' to ensure we do not have issues there.' What if over a period of time the computers are trained to carefully ignore those buzzwords and catch-phrases that affect their performance indicators and market situation? You are not making those incidents disappear – but you are making them appear as something they are not. How?

Imagine a database full of pre-determined phrases like 'complacency'; 'procedures not followed'; 'lack of planning'; 'lack of situational awareness,' etc. Now get rid of 'dropped objects' from the database when they become a problem, and assign any 'dropped object' incidents to one of these categories instead. The same search engines that were once designed to identify problems could become a weapon to conceal them. Over a period of time computers will learn to figure out our affinities and aversions – and the 'dropped objects' issues could disappear without us intending them to do so.

Back in 2017 there was a CNN commercial showing a photograph of an apple. The commercial stated: 'This is an apple. Some people might try to tell you that it's a banana. They might scream 'Banana, banana, banana' over and over and over again. They might put BANANA in all caps. You might even start to believe that this is a banana. But it's not. This is an apple.' Data manipulation is very good at turning apples into bananas, even unintentionally.

Data without context

There is a further problem with the phrases discussed above. Rich and vivid human stories are stripped of their context and simplified into standard phrases of 'human error'. The thinking behind all this is that for every accident or non-compliance there is a cause, and generally a bad one. Bad causes precede bad consequences and those bad causes can be traced back if we searched far enough (hence the term root cause analysis). This is what Erik Hollnagel refers to as the 'causality credo'.

But causation is flawed. Causes can be imaginary and fabricated to serve certain purposes, as in the case of the chief officer who was enrolled for a training course. Similarly, the quest for the cause will typically end with the last man or woman in the chain, as in the case of the able seaman who 'forgot to secure the gangway'.

And then there are instances when causes are mistaken for consequences and vice versa. Consider the crewmember who tripped on deck. Was it *because* he did not pay enough attention to the obstruction on deck? Or could it be that a bad design *caused* the crew to stumble? The former puts the blame on the worker, while the latter aims to find ways to design out the obstruction. Could algorithms ever expose the flaws of causation and get to the human stories behind the reports? That depends on the data we chose to collect (and ignore) and the questions that we ask of that data.

Rethinking safety in the digital era

Data analysts would tell us that software tools can work with massive volumes of data to 'automatically discover trends and patterns' or find 'non-obvious causal relationships' in the data. This should mean that the entire process, from data collection, to reporting and analysis, is exploratory and driven by curiosity and science. This cannot be true at least for safety where the purpose itself is ill-defined, convoluted (to serve multiple interests of which protecting people from harm and injury is just one purpose) and driven by a pre-determined set of narrow goals.

The examples cited here highlight that there is more to safety data than just observing patterns of individual behaviour or actions. As the educational psychologist Jerome Bruner pointed out, 'It is practically impossible to understand a thought, an act, a move of any sort from the situation in which it occurs.' We can think of safety as an individual's problem or we could think of it as the capacity of our people to succeed despite some very common patterns mirrored across organisations and work-sites – poor technological designs, poorly written instructions and procedures, conflicting demands, resource constraints.

If we can combine big data with deeper stories, we can rebuild trust in reporting, demystify the flaws of causation and build richer understanding and analysis. Technology offers us two choices (not necessarily binary but co-existing). We could continue with the same old concepts of safety in the hope that by using software tools we may get better results, or we could genuinely transform safety into a business and performance tool.

Disclaimer: The views expressed by the author may not represent the views of the organisation that the author represents.

Mariners' Alerting and Reporting Scheme

MARS Report No. 312 October 2018

MARS 201862

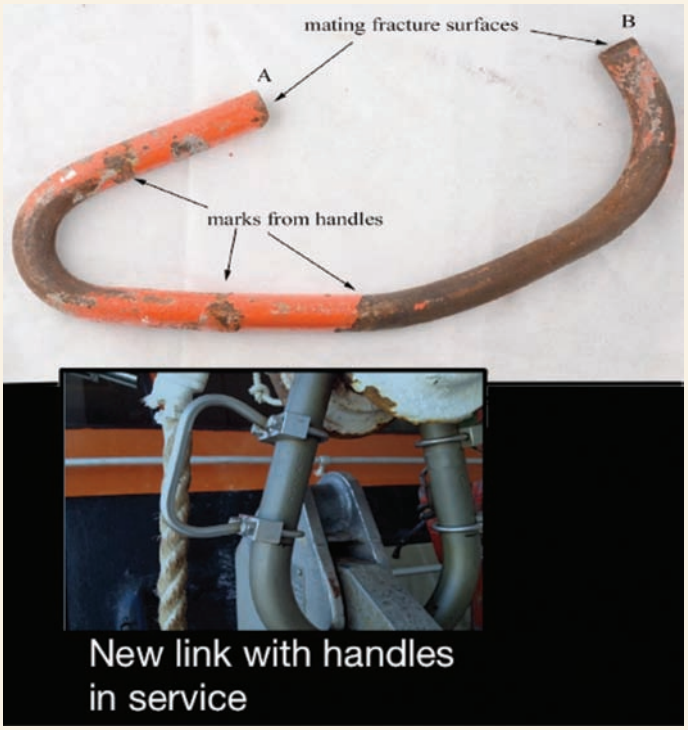
Inspection failure precedes link failure

As edited from the Bahamas Maritime Authority Safety Alert 17-07

➔ A tender boat on a passenger ship fell from its stowed position into the water, without warning and without any intervention by the crew. No one was injured, but the tender itself was a total loss.

The fall was caused by the catastrophic failure of the link that connects the fall block to the release gear hook. The investigation found that, among other things, the actual measured safety factor of the link was less than 5:1. This was well below the required minimum safety factor of 6:1 as specified by the LSA Code. Notwithstanding this less than adequate condition, the immediate cause of the failure was found to be a fatigue fracture.

The initiation of the fracture was attributed to the location of the stainless steel handle which was attached to the straight part of the link. The likely mechanism for the fracture was either corrosion fatigue (galvanic corrosion) or fatigue initiated from a minor indent at the surface.



Lessons learned

- Non-destructive testing should be carried out regularly to verify the condition of gear such as links.
- Items such as bolted-on handles should be removed to ensure links can be given a full visual inspection.
- During inspections the dimensions of the connecting links should be measured to ascertain whether there has been any reduction in diameter as a result of corrosion.
- When possible, avoid connecting two metal parts that have different galvanic (sea water environment) values.

MARS 201863

Inattention leads to own goal

As edited from Marine Safety Forum Safety Alert 18-07

➔ A bulk hose was being transferred between a production platform and a platform supply vessel (PSV). The platform crane landed the hose on the PSV's deck and one of the ABs approached to release the hook from the lifting sling. As the AB released the hook it slid inside the bight formed by the crotch strap on his lifejacket. Once he stood up the hook was caught, but the AB did not notice, and he signalled to the crane operator to 'hoist'.

The AB was lifted above the deck and out over the side of the vessel. His immediate, intuitive reaction was to hold on to the pennant wire to relieve the crotch strap tension. The crane operator and a second deck crew member quickly became aware of the situation and were able to land the AB safely back on deck. The duration of the incident, from the AB being lifted and then returned to deck, was about 11 seconds.

Lessons learned

- Ensure your garments and personal protective equipment (PPE) are not a hazard in and of themselves.
- Keep your situational awareness about equipment, yourself and your workmates sharp.
- Never signal to hoist unless you are sure all is clear.

MARS 201864

Grounding while attempting to anchor

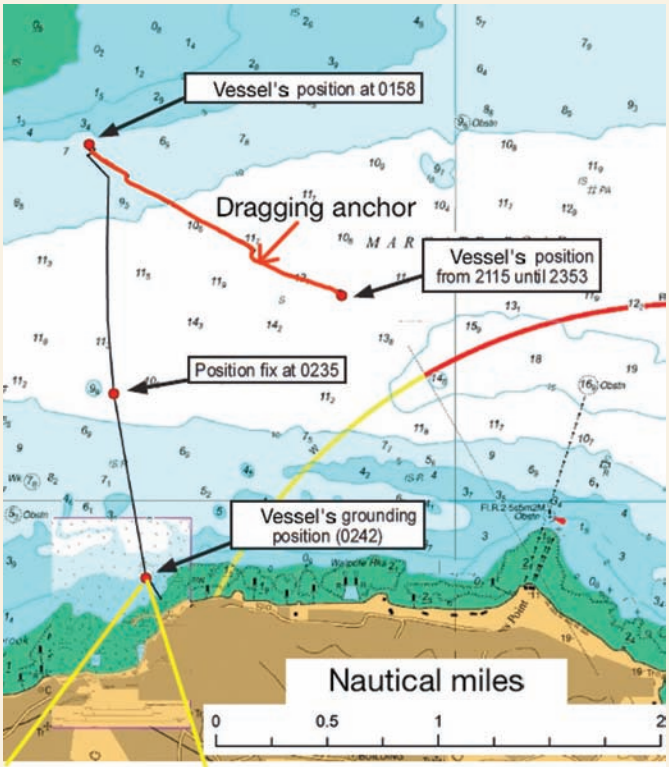
Edited from official MAIB report 9-2018

➔ A small coastal trader had loaded and left port, but the Master decided to anchor for the night before continuing to the destination. The starboard anchor was let go with three shackles in the water at 21.15. At 23.00 the Master handed the anchor watch over to the OOW and retired for the night. During his watch the OOW did some chart corrections and worked on the passage plan for the voyage the next day.

About three hours after the OOW had taken the watch a vessel traffic services officer (VTSO) called the vessel as he suspected it was dragging anchor. The OOW checked the position and confirmed they were off station, so he decided to move the vessel farther south. Two crew were sent to lift the anchor and the OOW manoeuvred the vessel south. At one point the VTSO called again because he was concerned that the vessel was now too far south and close to land.

The OOW was navigating visually, apparently without using the radar although at 02.35 he did put a position on the chart using GPS. When the OOW ordered the anchor dropped the vessel was already in trouble. At 02.42, the vessel grounded as it crossed the 0m depth contour. The vessel's Master was woken up by changes in engine noise and vibration. When the Master arrived on the bridge, he attempted to refloat the vessel by using astern propulsion, but his attempts were unsuccessful.

The wind was from the north-west at Beaufort force 6. While the vessel was at anchor, the predicted tidal stream set to the west and decreased from approximately 1.8kt at 23.50 to 0.8kt at 02.00 the following morning.



Lessons learned

- When anchoring, enough scope must be given to accommodate a rising tide.
- Anchor watch is just as important as a navigation watch. An OOW's primary duty is to keep a sharp lookout, monitor the vessel's position and maintain situational awareness.
- If your vessel is dragging anchor, call the Master.

MARS 201865

Collision claims 18 lives

Edited from the official Hong Kong SAR Marine Department Marine Accident Investigation Section

➔ A loaded bulk carrier was inbound to its destination port with a bridge team consisting of the Master, an OOW, a helmsman and two pilots. There was a light westerly breeze and a smooth sea with visibility at about 2nm and a light drizzle. Pilot A had the con. Pilot B reported to Pilot A that he had observed a radar target fine on the starboard bow at a range of about 2.5nm. The target was a seagoing tug on a course of about 090° and was making near 10kt. The bulk carrier was heading 260° at about 13.5kt.

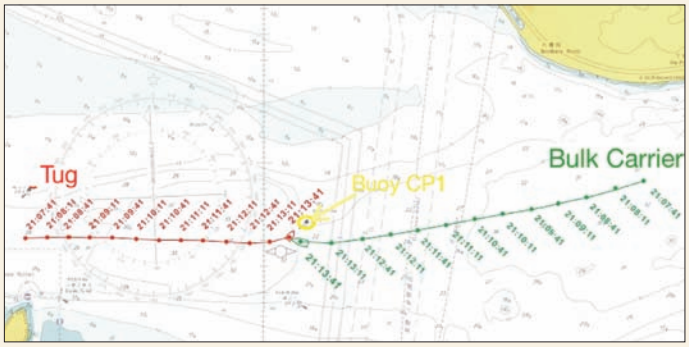
A few minutes later, pilot B tried to attract the attention of the tug by flashing the Aldis lamp in its direction. The tug was still very fine on the starboard bow and now at a range of about 1.6nm, showing a red sidelight. The pilots expected the tug to alter course to starboard, but instead it maintained course and speed.

Shortly after this, pilot A asked pilot B to contact the vessel traffic centre (VTC) to provide information on the target and to advise the tug that the two vessels should pass port to port to avoid collision. VTC called the tug and instructed them to take action to avoid collision. Although the tug responded, it was impossible to understand the response. A few minutes later pilot A instructed the helmsman to alter course slowly to starboard to 265° in order to enter the deep water channel with the CP1 buoy close on the starboard side.

A few minutes later, the tug was very fine on the port bow of the bulk carrier and at a range of about 0.5nm. Pilot A gave a helm order of starboard 10 with a view to keeping the tug on the port bow and giving it as much room as possible to pass on the port side. Pilot B gave one short blast on the whistle. Within seconds, the tug was observed to alter course rapidly to port. Pilot A ordered the helmsman to put the wheel to starboard 20, and followed by hard to starboard. Pilot B sounded five short and rapid blasts on the whistle.

As the tug continued to alter her course to port and her masthead lights opened more widely. Pilot B again sounded five short and rapid blasts on the whistle. Pilot A then gave a port 10 helm order in order to the reduce rate of turn of the bulk carrier to starboard and to allow the tug to pass clear ahead.

Pilot A then gave a helm order of starboard 10, but the bow of the bulk carrier struck the starboard quarter of the tug. The collision impact was heavy and the bulk carrier was brought to a stop. Shortly after the collision the tug listed to starboard and sank. Seven persons were rescued from the tug, but 18 crew were trapped and drowned inside the vessel.



Lessons learned

- Never make small course alterations when faced with an ambiguous meeting or crossing situation.
- Make your intentions known by using a large course alteration, preferably to starboard as per the collision regulations.
- When in doubt, slow down.

MARS 201866

A challenge too little too late

As edited from official ATSB report 325-MO-2016-003

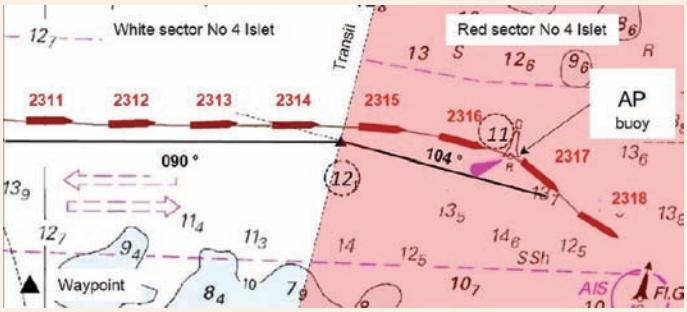
➔ A pilot and trainee pilot boarded a bulk carrier in darkness. Courses and positions had previously been sent to the ship for the express purpose of planning the passage. The pilots completed the Master/pilot exchange with the bridge team, establishing that the OOW would inform the pilot when the ship was 7 cables from each course alteration position (waypoint). They proceeded through the reef-infested passage at about 8kt. The electronic navigational chart (ENC) was continuously displayed on the pilot's portable pilotage unit (PPU), which had been set up near the bridge front windows on the port side.

The OOW was plotting the vessel's position on the paper navigational chart at five-minute intervals. He also followed the pilot's standing instruction by informing him when the ship was 7 cables from the next waypoint.

The pilot was positioned by the S-band radar, near the ship's centreline and was using the radar to determine the distance to the AP buoy. The OOW then advised 7 cables to go to the next waypoint and the pilot acknowledged the information.

The pilot ordered 10° starboard rudder. The bridge of ship was now a little more than 6 cables from the AP buoy. Shortly afterwards, the pilot ordered 5° starboard rudder, but he was unable to find the buoy's echo return on the radar's display. His usual practice was to use a 7 cable distance from the buoy as his wheel-over position. He became fixated on regaining the lost echo. For the next two minutes the rudder angle remained at starboard 5°.

The position plotted on the chart indicated that ship was about half a cable (100m) north of the charted track and the Master observed aloud that the AP buoy was right ahead. About 10 seconds later, the Master asked how the buoy was, followed 11 seconds later with 'will we touch the buoy?' The pilot said 'no' and shortly after ordered starboard 10°, followed 16 seconds later by starboard 20° and then 'hard a starboard'. In spite of some more helm applications the port quarter of the ship's hull contacted the buoy.



Lessons learned

- Even though the OOW was somewhat integrated into the pilot's operations by informing him at 7 cables to each waypoint, neither he nor the rest of the bridge team possessed the same mental model as the pilot for the transit.
- There was a PPU on the bridge showing the vessel's position in real time, but the bridge team were not using this tool and were preoccupied with other aspects of the pilotage.
- In darkness a person's visual perception is not the same as in daylight, so objects may appear closer than they actually are. Because accurate depth perception is very difficult, especially at night, it is important that human abilities are always supplemented by the use of all other navigational and electronic aids.
- The Master's comments were too little too late. He was not in a position to challenge the pilot properly as he was using only his visual acuity to sight the buoy.

MARS 201867

Near accident caught by 'the challenge'

➔ A tanker was mooring to a single-point buoy mooring (SPM). A line had been secured forward and the current started moving the vessel ahead, approaching very close to the SPM. The aft tug was not yet made fast, so the vessel was using its own engine to remain in position.

As the vessel was moving forward and was getting closer to the SPM, the Mooring Master ordered dead slow ahead. If the order had been followed the vessel would have collided with the SPM. The OOW, being aware of the situation, did not immediately follow the order and asked the Mooring Master about the appropriateness of his order. The Mooring Master apologised as his order was meant to be dead slow *astern*.

Lessons learned

- Unintentional errors of this kind, classified as 'slips', are common. The principal of BRM, where each member of the team is actively involved and has the same mental model of the operation, is a good defence against slips of this nature.
- Keep your situational awareness about a process as keen as possible, even if you are not in charge. You may save the day.

MARS 201868

Keep your lines tight and balanced

➔ This photograph was sent to us by a mariner. Is this an accident waiting to happen? The mooring lines visible in the photo are quite slack and of unequal tension.

Lessons learned

- Keep an eye on your lines and, when securing, equalise the tension in all lines.

Visit www.nautinst.org/MARS for online database

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www.maersktraining.com

Marine Society & Sea Cadets
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North of England P&I Club
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NorthLink Ferries
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New Zealand Maritime School
www.manukau.ac.nz

Norwegian Hull Club
www.norclub.no

The Port of London Authority
www.pla.co.uk

The PTC Group
http://ptc.com.ph/

IHS Safety at Sea
http://magazines.ihs.com

SAIMI
saimi.co.za

SDT
www.sdtultrasound.com

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DP Operator's Handbook, second edition

In the last two issues of *Seaways* we have looked at some of the basics of DP operation and at the many uses of the technology – although more uses will certainly be found as the technology continues to develop. These articles were based on the content of The Nautical Institute's *DP Operator's Handbook*. While this is designed primarily for those working in the dynamic positioning sector or working towards their DP qualification, it is a useful introduction for anyone interested in this rapidly developing technology. Chapters are straightforward and well illustrated, aimed at creating a practical understanding of the technology. Topics covered include:

- Dynamic positioning principles and systems;
- Redundancy and equipment class;
- DP vessel operations;
- Operational planning and watchkeeping;
- Position reference;
- Propulsion and thrusters;
- Power plant;
- Operator training and the human element.

An appendix offers guidance for Masters of DP vessels in assessing the competency of DP candidates. The book concludes with a comprehensive glossary of terms and acronyms in common use in the DP industry.

Written by Capt David Bray, with co-authors Capt John Daniels MNI, Capt Glenn Fiander MNI and Capt Dane Foster MNI, the second edition brings the handbook up to date with the latest technologies and standards. It may be thought that DP is now a fully mature technology, but a visit to any of the conferences regularly held on the subject will soon dispel that myth. The technology is changing rapidly in every area – including propulsion, control systems, position reference and operations, and the learning curve can be very steep. For vessel operators and DPOs the challenge is even greater.

As the number of personnel involved in DP operations has increased, a huge base of expertise and experience has built up. Nevertheless, many personnel are new to DP techniques, so training is a major requirement within the DP vessel industry. The handbook introduces some of the themes they will encounter. It is aimed in particular at those who may be entering the DP sector after serving on more conventional vessels and it highlights some of the pitfalls and problems that they may experience.

As activity in the oil and gas sector gradually picks up after a slow couple of years and DP vessels are brought back into operation after a period in layup, the book is also likely to be of value for those with some experience who are returning to the sector after working on conventional vessels.

Fighting corruption in the maritime sector

Collective action is having an effect – but we need input from mariners around the world to make sure it continues

Graeme Somerville-Ryan
For the Maritime Anti-Corruption Network

Seafarers and those working in maritime business operations continue to face demands for payments, goods or favours to carry out business-as-usual operations. These demands are unethical and illegal, and they endanger the men and women on board our vessels. But we know that if we work together – and involve a range of stakeholders around the world – we can reduce and eliminate these demands.

The private sector has a critical role to play in combatting corruption. Companies recognise that there is a pressing need to take a firm stance against corruption. However, it has become clear that only by working collectively will the private sector be able to bring about the systemic changes in the operating environment that are required to eliminate corruption.

This is particularly true in the global maritime industry, where corruption occurs as a result of the interplay of a multitude of public and private-sector stakeholders. That is the mandate of the Maritime Anti-Corruption Network (MACN). Collectively, MACN can have a game-changing effect on corruption and bribery around the world.

The Maritime Anti-Corruption Network (MACN)

MACN is a global business network working towards a goal of a maritime industry free of corruption that enables fair trade to the benefit of society at large. Established in 2011, MACN comprises vessel-owning companies, ship managers, cargo owners and service providers from all the main sectors of the maritime industry.

MACN and its members work towards the elimination of all forms of maritime corruption by:

- Raising awareness of the challenges faced
- Implementing the seven MACN Anti-Corruption Principles (see box)
- Developing and sharing best practices
- Collaborating with government and non-governmental organisations
- Working with civil society to identify and mitigate the root causes of corruption
- Creating a culture of integrity within the maritime community.

Fighting corruption through collective action

MACN seeks to improve the operating environment by encouraging and enabling collective action. With nearly 100 member companies, representing a substantial percentage of global tonnage, the network wields considerable commercial influence in the fight against corruption and bribery.

For change to occur, key maritime sector stakeholders need to be involved in both assessing the challenges and devising the solutions. This collective approach also stresses the importance of transparency throughout. Stakeholder inclusiveness, local ownership and transparency are fundamental to the collective action approach taken by MACN.

Through our collective actions, we have:

- Inspired and delivered increased participation in the Suez Canal 'Say No' campaign
- Developed a new regulatory framework for the dry-bulk vessel clearance process in Argentina, training over 400 stakeholders and providing open-sourced guidance to support implementation
- Enhanced container tracking in Indonesia
- Delivered ethics training for close to 600 government officials in Nigeria.

The importance of data

The information MACN collects on corruption and bribery plays a key role in its collective action projects, providing industry expertise in identifying the highly specific drivers of corruption in individual ports or countries.

For example, MACN's 'Say No' Suez campaign assessed the impact of the campaign by surveying members and collecting incident data. The situation has improved every year, and feedback in 2017 shows that companies taking part in the campaign are transiting Suez without any delays. Demands for cigarettes have decreased dramatically, or have been eliminated, while threats to the safety of both crew and vessel have also decreased significantly.

In Nigeria, MACN's root cause analysis of the Nigerian port sector showed that it typically takes over 140 signatures to get a vessel and cargo cleared by the local authorities, with port officials having wide discretionary powers over the speed of this process. These challenges lead to an unpredictable operating environment for the private sector, and it means costly business disruptions and delays.

How you can help: incident reporting

MACN's anonymous incident reporting system enables shipping companies and seafarers to submit reports about corrupt demands they have faced during port operations. These anonymous incident reports provide MACN with a strong platform to better understand the challenges and to engage with stakeholders, including governments, on shared solutions. It also allows MACN members to learn from each other about ways of avoiding similar incidents in their own operations. The use of this reporting platform has significantly increased over the years. To date, MACN has collected more than 19,000 reports of corrupt demands globally.

MACN uses this data to analyse trends in frequency of incidents, allowing MACN to target collective action efforts and engage with governments. It has been a highly effective way to facilitate a constructive dialogue in meetings with governments and other stakeholders. Reporting is anonymous and non-attributable: It is not possible to identify who has submitted a report, and the report does not include details that would identify specific dates, ships, or individuals.

MACN invites both members and non-members, seafarers and companies, to share details of corrupt demands or threats. Every report helps the overall fight against corruption.

Those wishing to share anonymous data on incidents can use the following link:
https://www.surveymonkey.com/r/MACN

Seven anti-corruption principles

Compliance programme requirements

Members should create and maintain an anti-corruption compliance programme that reflects and is designed to address the risks pertinent to the company's business.

Senior management and/or the Board of each Member should give explicit and visible support to the anti-corruption compliance programme. Members should confer responsibility for the anti-corruption compliance programme on trustworthy officers who are sufficiently independent and empowered to fully implement the programme.

Proportionate procedures

Members should have clearly articulated policies and procedures that comply in full with applicable laws and, as a minimum, prohibit all forms of corruption and give specific guidance on facilitation payments with the ultimate aim of their elimination.

The policies and procedures should be proportionate to the risks faced by the various parts of each Member, as well as the nature, scale and complexity of the organisation's activities, and should apply to all employees and to third parties that act on behalf of the Member.

Risk assessment

Members should assess external and internal corruption risks on a regular basis and document their findings.

Training and communications

Awareness of policies and procedures should be reinforced through communications and training to employees and, where appropriate, third parties. A record should be kept of all training provided.

Monitoring and internal controls

The anti-corruption compliance programme should include features designed to prevent and detect incidents of bribery, facilitation payments and other forms of corruption through appropriate monitoring and auditing protocols.

Internal controls should be implemented to protect the integrity of financial and accounting procedures such that the company keeps fair and accurate books, records and accounts.

The programme itself should be audited regularly and improved or updated as necessary.

Reporting, discipline and incentives

Members should provide employees with access to methods for asking questions and/or reporting concerns. Those asking questions or reporting concerns in good faith should be able to do so without fear of retribution.

Members should investigate credible reports of improper behaviour and should implement appropriate corrective actions when necessary.

Compliance with the anti-corruption compliance programme should be encouraged through incentives for proper behaviour and, where necessary and appropriate, enforced through discipline for improper behaviour.

Due diligence

Members should conduct risk-based due diligence on counterparties as well as in respect of the hiring and oversight of third parties and business partners. The due diligence should include an anti-bribery commitment from third parties.

David Patraiko FNI rounds up the latest news, releases and events affecting the maritime professional throughout the world

Rotor sails

Two 30-metre tall rotor sails have been installed on board the product tanker vessel *Maersk Pelican*, with the aim of reducing fuel cost and associated emissions by up to 10%.

The rotor sails are large, cylindrical mechanical sails that spin to create a pressure differential – called the Magnus effect – that propels the vessel forward. The rotor sails will provide auxiliary wind propulsion to the vessel, optimising efficiency by reducing fuel consumption and associated emissions by an expected 7–10% on typical global shipping routes. When wind conditions are favourable the main engines can be throttled back, saving fuel and cutting emissions, while maintaining speed and voyage time.

The sails are made using lightweight composite sandwich materials, which, it is claimed, ensure they remain well-balanced and so offer a high-tech, low-maintenance solution.

Andrew Scott, programme manager HDV marine and offshore renewable energy at ETI, explained: 'We commissioned this project to provide a unique opportunity to demonstrate the untapped potential of rotor sails. Auxiliary wind propulsion is one of the few fuel-saving technologies that is expected to offer double-digit percentage improvements.

'The technology is projected to be particularly suitable for tankers and dry bulk carriers, and this test will assist in determining the further potential for rotor sails in the product tanker industry.

'With this installation on the *Maersk Pelican*, there are now three vessels in daily commercial operation using Norsepower's rotor sails. Each of these cases represents a very different vessel type and operational profile, demonstrating the widespread opportunity to harness the wind through Flettner rotors across the maritime industry.'

Reactivation of DP ships

The International Marine Contractors Association (IMCA) has recognised that member companies may now be considering reactivating DP vessels following a period of layup, and has issued a focused information note on this.

IMCA's technical adviser – marine, Captain Andy Goldsmith, said: 'In the right circumstances there is no reason why a reactivated DP vessel should not re-enter service in a better condition than when it was laid up, and with increased cyber security measures implemented. There are also safety and efficiency benefits to be gained from rethinking the manning aspect by re-educating, re-familiarising and improving crew skills, through to improving vessel and shore management interaction.'

IMCA's working group has produced a 15-page information note designed for use by vessel owners and operators and their marine superintendents.

The information note features 10 main headings, under which are over 200 memory-jogging bullet points. It is a useful *aide memoire* for professionals engaged both in preparing for, and during, the reactivation of DP vessels.

'Reactivation of DP Vessels after Layup' is available to all members on the IMCA website.

Bulk carrier casualties

Intercargo's latest bulk carrier casualty report analyses casualties from 2008 to 2017. Fifty-three bulk carriers over 10,000dwt were identified as total losses over this period. Cargo shift and liquefaction remain major safety concerns.

In 2017, the tragic losses of *Stellar Daisy*, carrying an iron ore cargo, and *Emerald Star*, with a nickel ore cargo, raised questions of structural integrity and safety condition of high-density cargoes carried on board. These two bulk carrier casualties resulted in the loss of 32 seafarers' lives, the highest toll in a single year since 2011.

Intercargo also stresses the importance of the timely submission of casualty investigation reports to IMO, as a means for identifying the cause of incidents and enabling corrective actions to be taken. The IMO GISIS database showed that as at the end of January 2018, out of 53 losses, 29 investigation reports had yet to be submitted to IMO.

Bad fuel

Intertanko has released a critical review of the damage caused through the supply of contaminated bunkers over the past five months, which has affected hundreds of ships. It concludes that government authorities must take the appropriate action to stop fuel oil suppliers providing unsafe bunkers.

Based on reports from Intertanko members, ships have received, and continue to receive, contaminated fuels in ports located in the Houston area from as early as January 2018. In addition, members' reports indicate that contaminated fuels were delivered to their ships at some Caribbean ports later in 2018. Contaminated fuel deliveries in Malaysia and Singapore were noted at about the same time.

Instead of considering the gravity and risk associated with these events, some authorities are questioning whether the events are being used by shipping as an attempt to delay the enforcement of the 2020 sulphur regulations. Intertanko believes that it is not the deadline of January 2020 that is the issue but the lack of interest and action by relevant authorities to stop contaminated fuels being sold and exported from ports under their jurisdiction. What is required is firm and quick action, not a discussion of important but unrelated subjects.

On behalf of its entire membership, Intertanko's Critical Review demands that 'fuel blenders and fuel suppliers should be required to fully warrant the quality of their fuels'.

Intertanko concludes: 'Until the fuel supply industry and the authorities accept their share of responsibility, there is an obvious need for more public awareness in the media. A purely legal approach will not change the mindset of those who might deliberately put our crews, the environment, the ships and their cargoes in serious danger.' The report is available from www.intertanko.com

THE NAUTICAL INSTITUTE'S

MARINE INCIDENT INVESTIGATION & ANALYSIS COURSE

Based on IMO Model Course 3.11, this course introduces the processes and procedures to support a marine casualty investigation in accordance with IMO Assembly Resolution A.849(20) and the Code for the Investigation of Marine Casualties and Incidents.

Content includes:

- How and why to carry out an investigation
- How to collect evidence
- Essential interview techniques
- Causes of incidents and accidents
- Human failure and human error
- Analyses, root cause, tools and techniques
- Evaluation

The course is suitable for:

- Ship safety officers
- Company safety officers
- Designated persons ashore (DPA)
- Captains and senior ship officers
- Operational ship managers
- Technical and marine superintendents

Fees: NI member: £750 (+VAT) Non-member: £900 (+VAT)

PAKISTAN: 10-11 OCT 2018 (FULLY BOOKED)

INDIA: 15-16 OCT 2018

ANTWERP: 13-14 NOV 2018

The Nautical Institute

Register your interest by emailing: courses@nautinst.org
or, find out more at: www.nautinst.org/cpd

Reporting back from conferences, seminars and discussions across the maritime world. Join the discussion at LinkedIn, or email **editor@nautinst.org**

SMM CONFERENCE ROUNDUP

➔ The biannual SMM trade show in Hamburg, Germany, is always a showcase for the latest technology in the maritime sector. The products on display and the concerns addressed in the press conferences and seminars are often a good indication of where the maritime industry is likely to be headed over the next couple of years. This year's event strongly reflected the trends of automation, digitalisation and big data, and how they will affect the lives of both ship operators and those who use the technology on board.

An ongoing transition

The transition to automated vessels will require major changes to the competencies required of those on board, particularly navigating officers, said Class NK President and CEO Koichi Fujiwara. However, there is no doubt that human involvement will still be needed, as some tasks on vessels are too broad or complex to be entirely automated at the moment. Fujiwara said: 'We don't know how far in the future this will continue, but for now we have to deal with a mix of people and autonomy.'

In its report on autonomous operation of vessels, the classification society said it was important to establish procedures for handling this transition between human and machine control. Humans will always be needed to take control from the machine, and procedures and workflows for non-automated tasks may also need to be updated to take into account any newly introduced automation.

Class NK concludes that tasks will be split into sub-tasks to allow for greater automation – the report cites navigation as an example. Watchkeeping would continue to be a task undertaken by people.

Class and surveys

Digitalisation is changing the way class undertakes surveys. In the future, Fujiwara suggested, class surveyors may not be needed on ships because of the use of sensors and drones. 'It will depend on the degree of automation available on vessels, but we have to be prepared for the new future,' he added.

Although the internet of things (IOT) may change the format of surveys, class duty will continue, Fujiwara insisted.

'Condition-based monitoring will be very important in the future. Operators will be able to analyse a lot of data from ships.'

Fujiwara pointed out that the trend was for shore-based monitoring. Although he feels this will be good for the safety of vessels he pointed out that at the moment it is not reasonable to collect big data from ships because of limited communications capacity.

Looking further ahead, he welcomed the development of robots for some tasks. 'I'm looking forward to introducing them when the time comes,' he said. 'Once they are ready we will apply them in our work.'

Connectivity and innovation

Knut Orbeck Nilsson, CEO of DNV GL – Maritime, said there were efficiency gains in prospect for the industry and that connectivity was driving innovation which will transform the industry. He acknowledged increased threats too, not least in terms of cyber security.

Nilsson said: 'The role of class remains instrumental for the maritime industry. Its deep technical expertise helps reduce complexity and helps to find pragmatic solutions. We will have to find new ways of delivering services and bring familiar assurance processes to unfamiliar automated processes. Never has it been more relevant to define safety standards at sea. But growing levels of autonomy and cost-efficiency have to be achieved without any loss of safety and operational performance.'

He stressed that a regulatory climate needed to be in place and that DNV GL had devised rules for autonomous ships.

Surveying would increasingly be carried out remotely, which would provide valuable time and cost savings, especially in busy ports. The competencies needed to assess surveys in remote centres would have to be considered, he pointed out.

These technological advances also delivered safer working conditions for surveyors and he looked forward to the 'great potential' of improved drone technology to carry out more inspections on board.

Making the most of data

Inmarsat Maritime's Stefano Poli, Vice-President of Business Development, also highlighted the growing use of information from vessels. 'So much data is being generated that the sky is the limit if we put the right technology on board,' he said. The maritime industry does not necessarily have the experience to make the most of this data yet. Hans Ottosen, CEO of Inmarsat's partner Danelec Marine, pointed to the way that Maersk had looked outside the maritime industry for a chairman of its board in a bid to speed up digitalisation of that group.

Poli drew attention to a research report this year that calculated shipping companies were already intending to spend an average

Bridget Hogan and WISTA representative Despina Panayiotou Theodosiou at SMM

of $2.5 million on IOT. He saw the main drivers of this investment as fuel savings and safety improvements. Other savings could be made, for instance through insurance premiums, which he estimated could be reduced by as much as 14%.

'Lots of ships have sensors; the challenge now is how to get data from ship to shore in a scaleable way,' he said. Most products, like Inmarsat's, are now cloud-based so operators will be able to share data with anyone they want. Other challenges include different vessel designs and different communication protocols.

Ottosen said that the proactive use of voyage data recorders would help improve safety. 'In the maritime industry there are 20 near misses for every accident. The data will record this and if operators use that data proactively then all can learn from those lessons.'

Both Polo and Ottosen feel this sort of data recording will be part of measures such as the Tanker Management Self Assessment (TMSA) scheme within five years. 'Ship operators do not have to wait, however,' Poli continued. If the data collected now is analysed, incidents when vessels flout rules could be picked up early to stop potentially hazardous incidents.

Ultimately, regulation will catch up and operators will have to share this information, concluded Mr Poli.

According to Remi Eriksen, Group President and CEO DNV GL, digitalisation will drive ship operating costs down. 'This will cover lots of things from going paperless to autonomous shipping,' he said.

All the information collected will provide insights and bring relevant information for decision-makers, he continued. 'This will have an impact on safety and the environment.'

Digitalisation and social change

A seminar hosted by WISTA Germany examined digitalisation and whether the changes it will bring in the working environment will offer new chances for women in the maritime workplace.

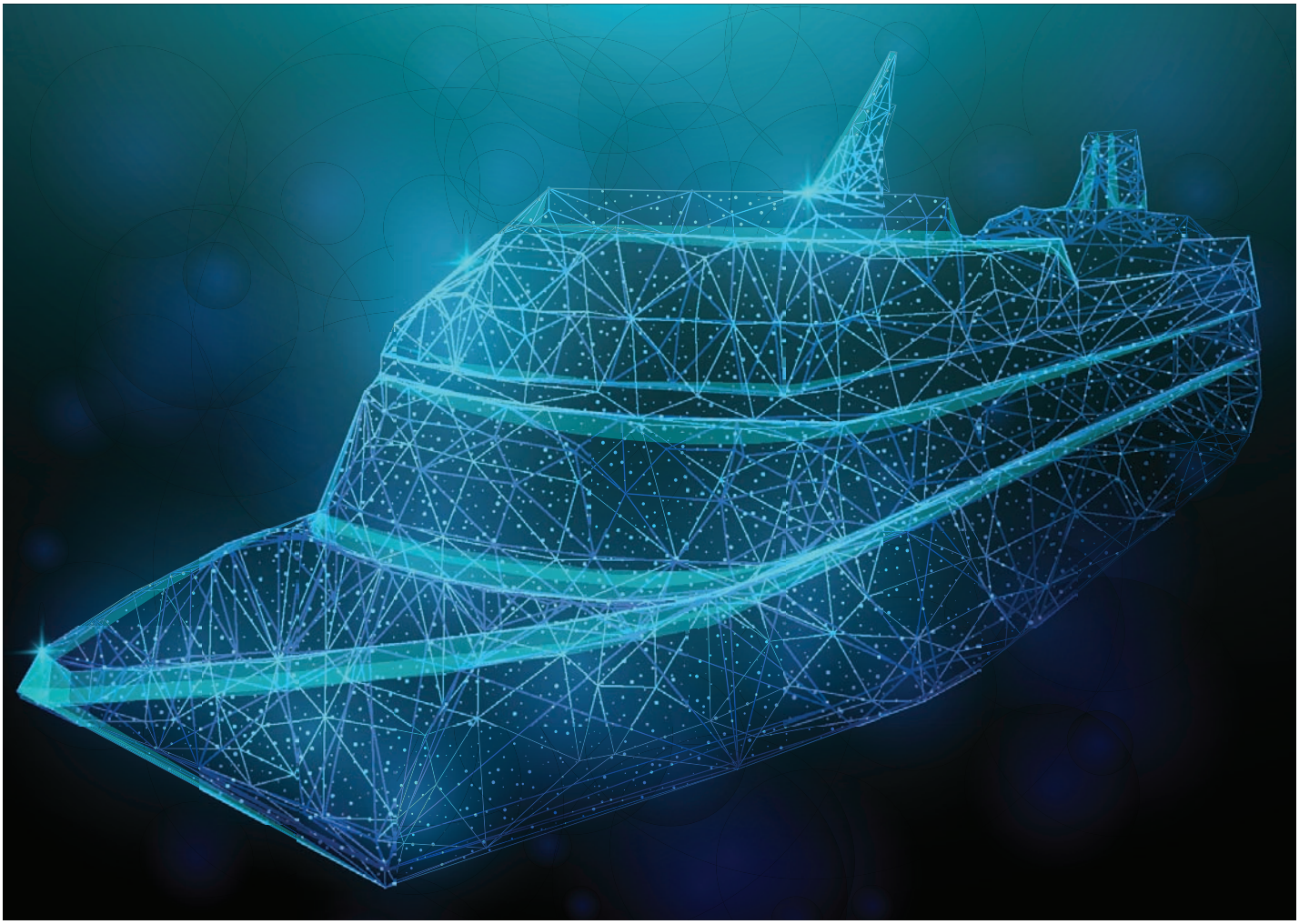
Dr Phanthian Zuesongdham, Head of Digital and Business Transformation at Hamburg Port Authority, said digitalisation encouraged disruption in the workplace and prompted the workforce to do things that had not been tried before. Organisations were being transformed. It was not only the technical process that was changing, but the people involved as well.

Businesses undergoing this transformation were no longer hierarchical, she said, though leadership was important. 'You have to allow people to grow. Leadership is not being about the boss. It's about enabling people to change.' It was important to note that digitalisation was not just a case of replacing a manual process with a digital one. There was scope for improvement. 'If you have a bad process and digitise it then you have a bad digital process.'

Hubert Hoffman CIO/CEO of MSC Germany agreed that people had to be clear about what problem they wanted to solve with digitalisation. 'This is a traditional industry and we have to change the mindset of all partners,' He emphasised that Innovation was not dependent on gender or age.

Andreas Bodmann, DNV GL – Maritime's Director of Communications, said that the world is getting more complex. 'Digital advances can help us to overcome complexity,' he maintained. They can also offer opportunities for more flexible working: 'Family-friendly working is attractive to men too.'

Bridget Hogan
Director of Publishing, The Nautical Institute



Digitalisation is transforming the shipping industry

In this feature we take a close-up look at a NI branch. If you'd like your branch to be featured in this section email **editor@nautinst.org**

South West England

Tell us about the history of your branch?
The South West England Branch of The Nautical Institute was one of the first three branches of the Institute formed in the United Kingdom and was formally recognised in 1972. Those three original branches were North West Branch (Liverpool), the North East Coast Branch (South Shields) and the South West Branch (Plymouth). Forty-six years on The Nautical Institute has 87 branches worldwide!

The South West Branch held its inaugural meeting at RAF Mount Batten in 1972. The meeting was attended by Captain Sir George Barnard (Founder President) and Captain 'Ticky' Malins (Founder Secretary). The meeting covered the subject of Modern Sea Survival Techniques.

The South West was very much involved in the founding of The Nautical Institute, with Captains Roy Hughes, Len Fifield and Paul Willerton playing key roles. Members of the South West Branch have also contributed positively to the development of the Institute, for example by representing the members on various committees, at Council and in specialist working groups. It is with pride that we note that the Institute's President, Captain Nick Nash, is a member of the South West of England Branch – the second member of this branch to hold this prestigious position.

Branch fact file

Email: robert.hone@plymouth.ac.uk
Web: http://glang.me.uk/nisw.html

Founded: 1972
Members: 223

Chairman: Richard Walker
Secretary: Capt Bob Hone

Meetings:
10 October 2018
1900, Royal Plymouth Corinthian Yacht Club
(joint meeting with IMarEST)
Mr Matt Hunt: 'Thales Autonomous/ Remote Controlled Vessels'
14 November 2018
1900, Royal Plymouth Corinthian Yacht Club
(joint meeting with IMarEST)
Mr Cody Lister: 'Future Warships. Green and Mission Capable'

Are there any topics of particular interest to your members?
An important aspect of the branch is the sharing of ideas, concerns and issues. National seminars and conferences have been held in the South West covering a great variety of topics including Dual Command (1991), Safety at Sea – Watchkeeping and Ship Routeing in Coastal Waters (1993), Navigating the Future, Bridge Need (1997) and Celebrating Navigation, Glancing Back, Looking Forward (2012).

Members share their interests and concerns through letters and articles published in the pages of *Seaways*. Indeed, one of our branch members, Alston Kennerley, produced the annual index for *Seaways* for more than 30 years. Among the elements that distinguish The Nautical Institute from other maritime membership organisations are the contributions many of its members make through *Seaways* and the branch network. These contributions help to advance understanding and professional awareness of a wide range of nautical issues.

How often does your branch meet and what sort of activities do you organise?
Regular monthly branch meetings are the glue that holds members of the branch together. The South West Branch has been fortunate to be able to make use of excellent facilities, most recently at the University of Plymouth and Royal Plymouth Corinthian Yacht Club. A bar or refreshments helps provide a convivial atmosphere and gives opportunity for networking and informal discussion. The opportunity to use these high-quality facilities encourages members and friends to turn out even in heavy weather.

Our membership is spread across the South West peninsula, so we make efforts to hold occasional visits or meetings at places beyond Plymouth. These have included visits to the Admiralty Hydrographic Office in Taunton, HMS Bulwark, FOST and IMarEST/RINA meetings held at Falmouth.

The creation of an annual calendar and monthly meeting notices sent with *Seaways* and published on the website are of great help in reminding members about the branch's forthcoming activities. Topics covered are mainly aligned with the strategic Plan of The Nautical Institute, and we attempt to include members who are involved with the Royal Navy.

The role of the Branch Committee and particularly the efforts of the Honorary Secretary are critical to the smooth running of branch meetings. Not all members can attend meetings – some will be away at sea – and reports in *Seaways* help ensure that those unable to attend can be involved in the branch activity. The work of the publications team at Headquarters is much appreciated.

How do you engage with your local maritime community?
After the deliberate grounding of the container ship *MSC Napoli* in 2008, Devon County Council held a local inquiry to '*look at the circumstances leading to the beaching of the* MSC Napoli *and subsequent events to determine what lessons could be learned*'. Although written evidence was provided by the Maritime and Coastguard Agency there was disappointment that no one from the agency attended in person. However the chairman of the inquiry commented that *'a number of maritime experts assisted the Inquiry in public hearing'.* Among these experts were three members of the South West Branch of The Nautical Institute. There were at least two other branch members who represented other key areas of interest.

Each year members of The Nautical Institute are invited to attend, listen and comment on final-year dissertation presentations made by University of Plymouth students completing their BSc (Hons) in Navigation and Maritime Science/OOW Certificate programmes. A future opportunity for branch members to help students in developing their final-year dissertations has been identified.

GOT AN EVENT TO PROMOTE?
Let us know at
gh@nautinst.org

A round-up of news and events from NI branches across the world. Send your updates to **gh@nautinst.org**

BALTIC STATES/CASPIAN SEA

The NI goes to the Volga

As the only NI branch that extends across three countries, the Baltic States branch was founded on international co-operation. Since two of our members have become candidates for the IMO Ambassador's Programme, we have been even more inspired to look for international links, expanding the NI's influence into Russia.

After a great deal of research and discussion of our members' experience, we decided to approach the Volga State University of Water Transport as a potential Nautical Affiliate and development partner. This is the oldest maritime transport university in Russia, founded in 1930, with six branches and two river colleges located along the Volga river from Rybinsk to Astrakhan on the Caspian Sea.

The connection was strengthened through a three-day visit to the university this spring.

Volga State University of Water Transport main building in Nizhny Novgorod

Nizhny Novgorod is the third capital of Russia, and sits at the point where the Oka flows into the Volga, the longest river in Europe. Although the city was established in 1221, it still feels young.

The two main vice-rectors, Professor Dr Nick Otdelkin, in charge of Convention training,

Capt Boris Dunaevksy presents the Certificate of Affiliation, NI flag and tie to Rector Prof Igor Kuzhmichev

Presenting AFNI certificate and tie to Capt Mikhail Churin PhD, Dean of the Navigation Faculty

and Assistant Professor Andrey Kornev PhD, in charge of scientific and international co-operation, joined by Rector Professor Dr Igor Kuzmichev, paid full attention to my introduction of The Nautical Institute and introduced me to the university, which takes full part in local research and industrial developments.

The spirit of our negotiations was serious and friendly, with open interest on both sides, and it was agreed that future co-operation between the university and The Nautical Institute would be mutually beneficial.

I was invited to visit the university again

Introducing *Seaways* and *The Navigator*

Lecturers, parents and students at The Nautical Institute's introduction ceremony See Branch website for more photos

at the beginning of September to present the certificates of affiliation and associate fellowship, and to introduce The Nautical Institute to the newly joined students and their parents.

I also had the opportunity to present an award from The Nautical Institute to the best third-year cadet of the Nizhny River College Navigation department, Darya Faliciva.

Wishing The Nautical Institute a smooth voyage across the Volga to the Caspian Sea!
Capt Boris Dunaevksy FNI

VIRTUAL BRANCH

Get up to speed on MASS

Branch meetings are a key part of the Institute's offering, and we hope you enjoy seeing what is going on around the world through these branch reports. But what about members who have no active branch in their region, or who cannot reach meetings, or are away at sea? The Virtual Branch hosts technical seminars of the same high standard that you would find at a Nautical Institute meeting anywhere around the world and makes them accessible online.

This is a new initiative designed to help members in remote parts of the world stay abreast of key maritime topics – although those who can reach established branch meetings are also very welcome! We hope people will be able to take part in the live discussions, but they are also available to view after the event.

On 26 July the Institute hosted its first Virtual Branch Webinar. In this case the presentation was on Maritime Autonomous Surface Ships, referred to by IMO as MASS. The presentation was given by Capt Ghulam Hussain FNI, Head of the NI Delegation at the IMO. He was joined for Q&A by David Patraiko, FNI, NI Director of Projects, and Prof Andy Norris FNI, a technical adviser.

The presentation outlined the extent to which autonomous vessels are already in use. Most of them are small and operate within national boundaries, so they do not have to comply with SOLAS and other instruments.

The presentation explained that IMO is just starting a 'regulatory scoping exercise' to examine how MASS might fit in with instruments such as SOLAS, Colregs, Loadline, and even STCW.

Capt Hussain summarised the Institute's contribution to the MASS debate both at IMO and in other forums. He also covered key legal considerations and the organisations that are already working with autonomous vessels and their operations.

NI members can watch a recording of the webinar by logging in at www.nautinst.org and clicking on the 'Presentations' tab.

The next Virtual Branch webinar will take place in November. Keep an eye on *Seaways* and the website for information about the date and topic. We hope to see you there!

BELGIAN BRANCH

AGM and Hydroville – reducing CO_2 emissions at sea

➔ We gathered for our AGM at the restaurant Marcel, close to the old Antwerp docks. It was a particularly appropriate venue as it was one of the first missions to seamen, as the entrance still states.

We invited Roy Campe, R&D manager of CMB Group, to update the audience on the achievements and future endeavours of this major Belgian shipping company, particularly with respect to the decarbonisation of their fleet. Roy started by providing us an overview of the CMB fleet, which consists mainly of dry bulk vessels (Bocimar), container vessels (Delphis) and chemical tankers (Bochem). In total CMB operates a fleet of 95 ships and 140 aircraft.

Roy heads CMB Technologies, the research and development section of the group. Its primary aim is to develop new technologies to operate the fleet more cost-efficiently and in an environmentally sustainable fashion. They are also looking at shore-based technological developments to consider whether this technology can be applied on seagoing vessels. The main focus is on the use of hydrogen, as the only 'clean' fuel.

The 2016 UNFCCC Paris Agreement (COP 21) laid down an internationally agreed goal to limit the global temperature increase this century to no more than 2°C above pre-industrial levels. Although the Paris Agreement does not specifically target the maritime industry, the IMO aims to achieve a reduction of 50% of CO_2 emissions from ships by 2050.

CO_2 reduction measures

A number of potential solutions have been put forward to reduce air pollution, including batteries, PV (solar) panels and wind energy. All of these have limitations. Batteries have limited capacity and would not provide sufficient power to run, say, a capesize bulkcarrier for more than one day. Solar panels and wind energy may not be suitable for all types of ships or routes. LNG is a step in the right direction, and is a good option to reduce NOx/SOx and particulate matter emissions . However, it is still a greenhouse gas and will only achieve a negligible reduction in greehouse gas (GHG) emissions (estimated at between 3% and 6% compared with fuel oil).

Switching to a hydrogen-based fuel therefore appears to be logical, as it produces virtually no GHG emissions at all, though this depends on the means by which the hydrogen itself is produced. Moreover, hydrogen can be considerably more efficient than diesel oil.

Nevertheless, some challenges and obstacles still have to be overcome, not least economic ones. For the time being, hydrogen is significantly more expensive than classic fossil fuels, although this is expected to change. The construction of vessels running on H_2 is costly and takes more time than building traditional ships, and as yet there are no class rules that properly deal with hydrogen-powered vessels. Nonetheless, someone needed to take the lead.

Building the *Hydroville*

CMB's concept of a hydrogen-powered passenger shuttle started to take shape in June 2016. The shuttle was designed to operate as a passenger ferry to shuttle employees from one bank of the River Scheldt to another. The vessel carries 16 passengers, and can occasionally also be deployed for excursions on the river and even off the Belgian coast.

By December, a building contract had been signed with the shipyard BWSeaCat. Plan

UK SOLENT BRANCH

AGM and UK SOSREP update

➔ John Noble stepped down as chairman of the branch after three years. Martin Phipps was elected as the new chairman. In his closing speech, John said that it had been a great privilege to serve as chairman during the revival of the branch. That it has survived was not a solo job, but due to the support of all branch members over the past three years.

Role and responsibility of SOSREP

Following the AGM, the branch heard a presentation from Stephan Hennig, who has spent 13 years at the UK Maritime and Coast Guard Agency, and is currently Acting Secretary of State's Representative (SOSREP).

Trigger points determine whether and when the government intervenes in incidents that pose a threat of significant pollution. The trigger point differs according to the incident. However, ministerial involvement in operational decisions is not a practical option, as there is not enough time for them to understand emergency response. This is where SOSREP comes in. SOSREP represents all the secretaries of state involved, and is free to work without recourse to higher authority. There is no need to go to the minister or government in order to make a decision.

A number of countries have adopted similar systems, but potentially they need permission from a politician before making a decision. The UK system has the advantage of being entirely free from political interference, and everyone receives and shares the same information.

Offshore installations must have the same response levels in place to prevent environmental threat as does the shipping industry. A deputy SOSREP looks after the offshore sector.

Once involved in an operation, SOSREP gives tacit and formal approval for all actions – for example, they must sign off all salvage plans. SOSREP has all-encompassing powers, including the destruction of the vessel if necessary, though powers may not be used in anticipation of an incident. They can claim ultimate control, but this is rarely required, as people work together. SOSREP must receive either full support from the minister, or none at all – they must either be backed or sacked. In 10 years, these powers have never been needed.

Places of refuge

IMO guidelines on places of refuge are non-binding. If a vessel is regarded as particularly hazardous it effectively becomes a 'leper of the sea' that no port will accept. Perhaps the best known case is that of the *Prestige*, where structural failure resulted in the vessel breaking its back and sinking after six days during which a number of countries refused to give it refuge.

SOSREP has powers to prevent this kind of incident by assigning a place of refuge if one is required – including the power to override a port's own decision on the matter. In this case, both SOSREP and the port must be fully briefed on the incident. Potentially, anywhere may be considered a potential place or refuge. The main considerations are whether the casualty poses a threat to life and pollution.

When choosing a place of refuge, MCA investigates and compiles a list of places to recommend to SOSREP, seeking advice on environmental sensitivity and public health if close to shore. SOSREP would be responsible for the final decision unless it presented no risk involved.

To date, at least one incident requiring a port

approval from Lloyd's Register took another 10 months. The ship was finally delivered in November 2017 and christened *Hydroville* – the first classed ship running on hydrogen combustion.

Propulsion choices

CMB decided to go for a dual-fuel diesel engine built to run on both MGO and H_2, rather than rely on fuel cells running on hydrogen. Fuel cells are not only more expensive, but also are not really suitable for use in a salty environment aboard seagoing vessels – generally, they do not last longer than a year or two. Another advantage is that the quality of the H_2 used in diesel engines does not need to be of the same high standard as that used in fuel cells. It can be sourced as a by-product of the chemical industry, for example from the production of propylene or chlorine. Overall, when measured against fuel cells, the dual-fuel diesel engine option is cheaper by a factor of about three and is 10 times more durable.

Ships' crews are generally familiar with operating diesel engines. Nevertheless, adapted expertise and familiarisation will be required

to ensure the H_2 engines are run safely and properly to avoid problems such as knocking or unstable combustion.

The ship needs to refuel daily, which takes about 35 minutes. It is carried out at a special H_2 bunkering station built in Zwijndrecht on the river Scheldt. Further details on the ship can be found on the website www.hydroville.be

To make the operation of larger hydrogen-powered vessels economically and environmentally sustainable, several aspects will have to be addressed:

- Provision of hydrogen storage (compressed or liquefied) and suitable bunkering facilities
- Engines with sufficient power output (hydrogen only and dual-fuel options)
- Cost of the hydrogen itself.

Ports with chemical industry plants have the possibility to make hydrogen available to shipping. All Belgian ports can supply H_2, albeit on a relatively small scale until the proper infrastructure is in place.

The future

Hydroville is a pilot project that will provide experience in the use of hydrogen as a clean fuel, with a view to scaling up for larger marine applications in future. The company is already engaged in the development of the next H_2 engine. Feasibility studies are being conducted in collaboration with a number of universities, research institutes, shore-based power generation plants etc.

CMB is also working on a pilot project using compressed H_2 to power reefers on container vessels, with both the compressed H_2 and the combustion engine running on it in containers on deck.

The story is definitely to be continued.

W Justers AFNI
W Vervloesem FNI

of refuge has occurred every year since 1999.

Stephan went on to outline one of the most high-profile cases, the *MSC Flaminia*. In July 2012, the container ship caught fire in mid-Atlantic, well outside any EEZ or pollution zone. The salvage team was unable to board the vessel for six days because of the intense heat. SOSREP was asked if a port of refuge could be given, but advice on public health was that the vessel should be allowed no closer than 10 miles to shore, because of the risk posed by various hazardous substances on board. While the advice was not binding, no suitable ports of refuge were available in the UK, and the ship was eventually towed to Jade Weser Port in Germany.

In the aftermath, it was decided that a better structure was needed to make international decisions on places of refuge. Guidelines were developed stating that clear lines of communication must be in place. Ships must clearly identify why a port of refuge is needed, and coastal states must give clear reasons for their refusal. No rejection is allowed without inspection by experts. These new guidelines were successfully used to arrange shelter for the *Modern Express*. There has been global interest in these guidelines, which are to be officially adopted by the IMO.

Emergency tugs

One of the most controversial issues of recent years has been the reduction in the number of government-sponsored emergency tugs around the UK. A further review this year will consider whether this service should continue to exist. It is essential that plans are in place to ensure an effective and timely response to incidents. These are the national contingency plans, which are tested at regular intervals – including exercises on the use of places of refuge. The next test is scheduled to take place in February 2019.

Q&A

During a lively Q&A session, attendees asked about the role of the Queen's Harbourmaster (QHM) – a role unique to Navy ports – and whether there is any conflict between this role the responsibilities of the SOSREP. Stephan said that the QHM is mostly concerned with terrorism. In case of conflict, it is likely that the minister would say SOSREP overrules the QHM.

Another question was how frequently SOSREP's powers are invoked. Stephan said that nine times out of 10, salvage is resolved between commercial parties and there is no need for the state to become involved. In his view, this gives great confidence that the system works well.

Bridget Hogan

CYPRUS BRANCH

ECDIS, decision support and audit tools – improving safety?

➔ There was a very high turnout for The Nautical Institute Cyprus Branch in July at the Marlow Navigation conference facilities.

An audience of more than 90 guests, including about 15 cadets from the Mediterranean Maritime Academy, listened to Captain Azriel Rahav, CEO and founder of Totem Plus ECDIS system, who briefed us on the interesting developments built into the company's ECDIS units.

If a collision situation seems to be developing, the decision support tools (DST) 'suggest' a range of possible solutions to the OOW (see below). Any solution offered is in full compliance with Colregs, but the OOW is always in charge. The DST can also assist in the case where own ship is the stand-on vessel. A simple set of parameters is offered to the OOW and then the tool computes the best action for all vessels presenting a collision risk. Give-way and stand-on situations are clearly highlighted.

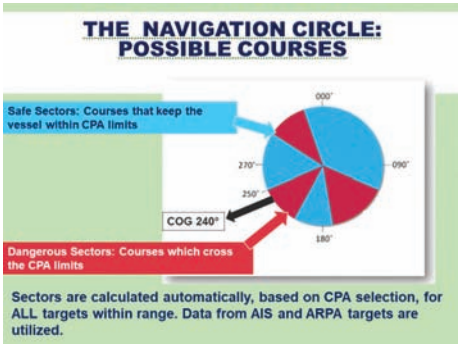
A set of parameters established by the Master and/or the company can be programmed in, to include warning distances, action distances and chart dangers. The DST also has a function mode for restricted visibility.

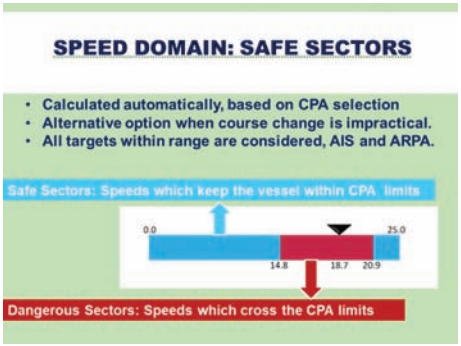
Serving mariners were initially sceptical, expressing concern that the role of the OOW is being replaced by computers and that the tool could not replace human analysis. However, the general feeling was that such a tool could be useful as an aid, especially in highly complex collision avoidance cases.

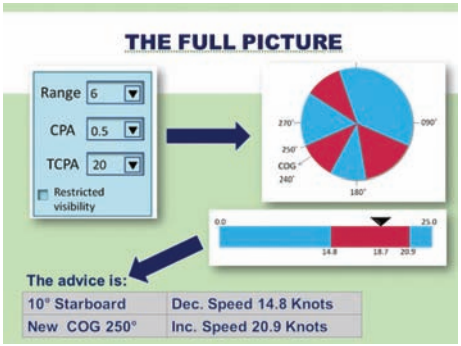
The speaker then presented the data audit tool. The system can quickly and effectively audit the performance of the ship with respect to collision avoidance action and underkeel clearance policy compliance.

The data from a defined voyage (ideally a full month, or perhaps the Singapore Strait or English Channel) is downloaded and sent to the maker, who runs a programme to analyse all the recorded data from the vessel. The purpose of the software is navigation improvement and efficiency, helping both the ship and the office to understand if further training is needed with respect to passage planning or collision avoidance.

Graham Cowling FNI







SRI LANKA BRANCH

AGM and annual award 2018

➔ The branch held its second annual awards ceremony at the Colombo Lighthouse Galley on 29 June. The awards are presented to the three officers of the Merchant Navy who have obtained the highest aggregate marks for the professional subjects in the CoC examinations, along with the two best midshipmen – one from the Sri Lanka Navy and one from Sir John Kotelawala Defence University. Each award winner receives a plaque, a certificate and NI membership for one year sponsored by the branch.

The BAA was well supported by NI HQ who offered a special discount on the membership fees to the branch for the award winners.

This year's award winners were:

- **Master:** Rajitha D Semage
- **Chief Mate:** K K Maduranga
- **NWKO:** A P P Rajakaruna
- **Best Midshipman** from the Sri Lanka Navy (Executive Branch): H V Kotelawala
- **Best Midshipman** from the Sir John Kotelawela Defence University: H A I D Hettiarachchi

Most of the awards were accepted by family members, as the recipients were out of the country.

The award presentations were followed by the 25th AGM of The Nautical Institute Sri Lanka Branch. The branch was founded in October 1992, with the first AGM held on 4 June 1994 at the Hotel Ceylon Intercontinental. The branch has gone through a few ups and downs over the years but remains strong, with more than 75 members and a growing younger membership.

Outgoing chairman Captain Harindra Perera is presented with a memento by new chairman Professor Captain Nalaka Jayakody

Branch members at the AGM

Letters

JOIN THE CONVERSATION

Send your views and opinions to us at **editor@nautinst.org**, write to us at **202 Lambeth Road, London SE1 7LQ, UK** or become part of our online community:

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www.twitter.com/NauticalInst
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Give us a mention on social media #NautInst

Are you really where you think?

➔ Over a quarter of a century has elapsed since my seagoing and watchkeeping days came to an end and I enter the discussion in the excellent September 2018 edition of *Seaways* with considerable diffidence.

Since we carried and employed gyro compasses and their slave repeaters long before satellite navigation equipment was ever conceived, why can their reliance on GPS inputs ('Position verification', p 9) not be reversed?

All the sensible verification checks on the performance of GPS and ECDIS which Captain Chapman recommends direct the 'Mark 1 eyeball' out of the bridge windows or towards equipment that helps in the prime responsibility of maintaining a good lookout. Hence, from what other activities would the OOW be 'distracted' by the remarkably leisurely 'regime' of a check fix at 15-minute intervals in congested waters (LinkedIn forum, p 34)?

Captain M K Barritt RN FNI

ECDIS and position verification

➔ Has the author of a comment in the LinkedIn forum summary in respect of the Intertanko Guidelines on ECDIS Position Verification in the September 2018 issue of *Seaways* solved the problems of verification of GPS positions and PNT resilience addressed in other articles in the same issue? I refer to the positional accuracy achieved during a navigation assessment when running an ECDIS in dead reckoning (DR) mode and sensor inputs from just a gyro compass and twin-axis Doppler log.

Use of ECDIS to integrate sensor inputs as described effectively creates an alternative to inertial navigation systems, the accuracy of which is easily verified by the position-fixing techniques advocated in the articles concerning verification of GPS positions and PNT resilience. Hence a positioning system is available that is not subject to external influences, which begs the question: who needs GPS, Loran (even eLoran) or any other external positioning system capable of being switched off, degraded or otherwise interfered with by political, military or criminal elements?

To pick up on another comment in the LinkedIn summary, I would not consider fixing the ship's position every 15 minutes on a coastal passage to be a distraction but instead a necessary task to engage with the navigation of the ship. A MARS report in the same issue amply demonstrates what can happen when no attempt is made to engage with the navigation of the ship. In any event, by employing real time position verification methods such as radar overlays and parallel indexing there is not the same need to fix the position at short time intervals in congested waters.

Equipment requiring position, course and speed inputs, such as GMDSS DSC radios, AIS etc, can be fed from the ECDIS-derived output, even the gyro compass if no one can be bothered to manually adjust for latitude and speed – or has that fail-safe function been removed in the interests of costs?

Terrestrial broadcast radio time signals are also still available to independently verify the accuracy of timing equipment. (As can be seen, I am firmly back in the camp with Capt Brian Evans RN – see his letter in the same issue of *Seaways*.)

Position verification and PNT resilience solved? Probably not as far as MASS are concerned.

Bert Kunze MNI

All the sensible verification checks which Captain Chapman recommends direct the 'Mark 1 eyeball' out of the bridge windows or towards equipment that helps in the prime responsibility of maintaining a good lookout

Photo credit: Lord Greenway

The Nautical Institute LinkedIn forum

JOIN THE CONVERSATION

The Nautical Institute has a lively discussion group on LinkedIn
http://www.linkedin.com/groups/Nautical-Institute-1107227

THIS MONTH WE LOOK AT: SCRUBBERS OR SWITCHING TO COMPLIANT FUELS?

Captain Ghulam Hussain FNI wrote: 'IMO's 0.5% sulphur cap on bunker fuels is expected to come into force from 1 January 2020. The industry has less than 18 months to comply with the requirements. Shipowners will soon need to choose between using high-sulphur fuel oil in conjunction with scrubbers or exhaust gas cleaning systems or switching to low-sulphur fuel options, including distillates, or virtually sulphur-free LNG fuel. Global bunker fuel costs could rise by billions in a full compliance scenario.

'The pros and cons of a scrubber installation is a topic which merits our attention. What are your views and choices?'

THE INSTITUTE'S LINKEDIN COMMUNITY RESPONDED:

➔ I'm not sure how the industry is going to respond! 1 January 2020 is not too far away. With low-sulphur fuel, calorific value will go down, resulting in a two-prong effect – both higher bunker cost and a need for increased adaptability of engines. Scrubbers will cost. How long before a ship will get its money back from a scrubber installation, as opposed to using low-sulphur fuel? Engine manufacturers are able to come up with designs that will make low-sulphur fuel cost-effective, but this again will cost the shipowners – and will they be willing to pay for those engines? For new ships, are low-flashpoint fuels the answer? There is no easy solution.

➔ Low-sulphur fuels can be problematic if the power plant was not designed for it, leading to possible engine failures.

➔ Major cruise line companies started scrubber retrofit projects in 2015, using different manufacturers like Wärtsilä and Alfa Laval, and all newbuilds in the sector are now coming with scrubbers. So both options are available, depending on local port rules.

➔ Predictably, there is a flurry of orders from many large companies to install scrubbers on their fleets. It appears to me to make good sense. The industry has committed to a zero carbon operation from 2050. That is 32 years away. By fitting scrubbers, ships that are currently in operation and those being constructed will have reached end of life before 2050 without incurring the unknown/unpredictable very high cost of low-sulphur fuel. It gives owners 30+ years of thinking time and time for technology to develop economic zero/very very low carbon alternatives.

➔ Wash water must be included in the subject since it's clear that contaminants are not fully removed by hydro-cyclones.

➔ Open-loop scrubbers are not a solution for a better environment, they just move the problem to the water instead of in the air…!

➔ Will the refineries be ready to supply compliant fuels? Dealing with the problems at their base seems to me to be the most wise way to reach a cleaner planet.

➔ How is non-compliance going to be controlled and measures enforced worldwide?

➔ LNG has been called the fuel for the future. Generally, I agree – with one important difference: climate-*friendly* LNG must be seen as a pioneer for climate-*neutral* gases such as biomethane and e-fuels. LNG (methane) is a fossil fuel, and contributes to global warming. Methane (CH_4) itself is a greenhouse gas and has to be reduced – but on the positive side it emits zero SOx and less NOx, soot and particulates compared with MGO.

Climate-neutral fuels can be generated in biogas plants and by power-to-gas technologies (electrolysis). The concept of PtG is to use superfluous energy from fluctuating energy sources such as wind and photovoltaic and turn it into hydrogen. Methanation (with CO_2 from biomass) turns it into CH_4. After compression or liquefaction it is readily accessible for the gas-powered industry as compressed biogas (CBG) or liquefied biogas (LBG).

➔ For LPG carriers, retrofitting to LPGI engines is also an option.

➔ It's not looking good is it? For a better environment we need to stop burning any fossil fuels. Even using LPG produces CO_2.

➔ Why in this modern age of technology are we still dependent on fossil fuel? Is there no alternative to fossil fuel? Really?

➔ LNG is going to be the fuel of future given the sulphur cap, energy density, prediction of crude oil sources depleting and problems associated with marine gas oils. As far as scrubber installation is concerned, a major factor will be whether the ship's construction can support scrubbers.

Will LNG be the fuel of the future?

This report attempts to give a representative summary of the discussion – it is not possible to include all comments. To see the discussion in full, please visit LinkedIn.

Representing The Nautical Institute to the maritime industry and beyond

Merchant Navy Medal

Congratulations to three members of The Nautical Institute who have been honoured with the award of the UK's Merchant Navy Medal for meritorious service this year. The award recognises exemplary service and devotion to duty by those who are serving, or who have served, in the Merchant Navy and fishing fleets of the UK, Isle of Man or Channel Islands.

Captain Nick Nash FNI, President of The Nautical Institute, was awarded the Merchant Navy Medal for his services to maritime training.

Captain Timothy Charlesworth FNI receives the MNM for services to UK ports and the maritime sector, and Captain John Rankin FNI for services to the merchant navy.

L to R: Captain Nick Nash, Capt John Rankin

UK Women in Maritime

The UK has launched its Women in Maritime Charter – devised by the Women in Maritime Taskforce - in which signatories to pledge to deliver change. UK Shipping Minister Ms Nusrat Ghani said at the launch that gender equality 'creates opportunities for businesses large and small.' Urging others to join the 60 which have already signed she said: 'I want shipping to be even more successful than it is now.' The Nautical Institute is participating in two ways – Bridget Hogan, Director of Publishing and Membership, is a member of the Taskforce and the Institute was one of the first organisations to sign the pledge.

Pictured at the official launch of the Charter are, left to right, Tereasa Peacock of Spinnaker and WISTA UK, Bridget Hogan, Captain Helene Peter-Davies AFNI, of MFB Solicitors and Rachel Lawton of Mazzards and WISTA UK.

WMU visit

A group of students from the World Maritime University visited The Nautical Institute Headquarters in London to hear about the work of the NI.

Safe mooring guidelines

John Lloyd and other members of HQ at the launch of the fourth edition of OCIMF's Mooring Equipment Guidelines aboard *HMS Belfast*.

IHMA presentation

Captain Maneesh Varma AFNI, The Nautical Institute's Training and Accreditation Development Manager, attended the 11th International Harbour Masters' Association Congress in London.

Drawing on years of experience within the maritime training industry, Captain Varma delivered a presentation on professional membership organisations and the development and sharing of best practices in the maritime community.

Photo credit: Lord Greenway

New members

The Nominations Committee has nominated the following for election by Council:

Associate Fellow

Balaskas, R C Captain/Master Mariner (GRC/Hellenic)
Borg, R L I Captain/Captain (Sweden)
Esquer Lugo, J V Captain/Master (Mexico)
Hammond, J F Captain/Retired (UK/Bristol Channel)
Jimenez, M A Captain/Master (Mexico)
Magoulas, K Captain/Master (GRC/Hellenic)
O'Ceidigh, M P Dr/Director (Ireland)
Selvaratnam, Y Captain/Master (Malaysia)
Singh, A K Captain/Captain (India (North))
Tate, K A Captain/Salvage Master (South Africa)
Uddin, A Z M J Cdre/Register (Bangladesh (Dhaka))
Wolfe, S Mr/Chief Engineer (UK/NE England)
Yadav, R Captain/Master (India (North))

Upgrade To Associate Fellow

Kahlon, J Captain/Master (India (North West)
Matthews, S Mr/Marine Supervisor (UK/Central Scotland)
Vine, J P Mr/Marine Manager (UK/Humber)

Member

Arazi, M A Mr/Second Mate (Nigeria)
Arias Funez, C A Captain/Master (Honduras)
Barane, Mr/Third Officer (Norway)
Bernard, D Mr/Master (Indonesia)
Bissi, J W Mr/Second Officer/DPO (Ghana)
Dcunha, K A Mr/Chief Mate (India (West))
Essuman, E K Mr/Tugmaster (Ghana)
Freddie Jr., S E Mr/Second Officer (Phillipines)
Funningsstovu, B H Ì Mr/N/A (Faroe Islands)
Grabovskis, J Mr/Master/DPO (Latvia)
Hamid, N Mr/Master (Indonesia)
Illum, C T Captain/Project Manager (Singapore)
Keane, D Mr/Chief Officer (Ireland)
Keeping, S C Captain/Marine Advisor (CAN/Maritime Provinces)
Klæhaug, Mr/Master (Norway)
Kurach, Mr/Chief Mate (Poland)
Mairuhu, F W Mr/Chief Officer (Indonesia)
Mamun, A A Mr/Master (Bangladesh)
Mummina, S K Captain/Second Officer (India (South))
Murphy, D S Captain/Master (Ireland)
Pearce, J G Mr/Second Mate (U.S. Pacific Coast (N))
Pons Roca, M Captain/Master (Brazil)
Prasad, A Mr/Chief Officer (India)
Richardson, P M Captain/Offshore Operations Supervisor (Brunei)
Rodriguez, E A M Mr/Third Officer (Mexico)
Siggervåg, F Mr/First Officer (Norway)
Singh, A P Mr/Chief Mate (India (North West))
Timchuk, R Mr/Master (Russia)
Wyles, S R Mr/Second Officer (UK/London)

Associate Member

Nair, B Mr/Deck Cadet (UK/Central Scotland)

*Signifies members who have rejoined

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