

# Standard Safety

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**The Standard  
for service and security**



**Standard  
Club**



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## Introduction

It has been over 30 years since the *Herald of Free Enterprise* disaster. In that time, many of the safety issues faced on board ships have remained constant, some have improved, and some new risks have emerged. In this edition of Standard Safety we reflect on certain pressing issues faced by members of the club, reflecting the emerging risks or demonstrating a new way to tackle an old problem.

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The capsizing of the *Herald of Free Enterprise* is widely recognised as the driving force behind the implementation of the ISM code in 1998. In our first article, we look at the impact the ISM code has had on the safety of shipping and point out some shortfalls and areas where improvements could be made.

In the second article, Capt Nippin Anand provides his view on an essential ISM tool – near-miss reporting. He questions whether shipowners have been using this tool appropriately and argues that we should be focusing more on the quality of reporting, rather than the quantity of near-miss reports.

Another issue tackled by ISM is crew fatigue, which is now known to be a major contributing factor in the majority of shipping casualties. Andrew Russ explains the findings of various research projects that have been conducted around fatigue and the regulations and management systems designed to prevent it. He also touches on minimum safe manning requirements and what can be done to further reduce the risk of fatigue on board.

The IMDG code has been in existence since 1965 and has had a positive impact on safety in that time. However, the club frequently receives queries related to the carriage of IMDG

class 1 and class 7 cargoes, which suggests that work still needs to be done in this area. Capt Akshat Arora sets out the club cover for these two classes of cargo and provides guidance on their carriage.

ECDIS systems have been common on board ships since 2009. ECDIS has improved safety but has introduced new hazards which require consideration. Following our [previous article](#) on the use of ECDIS on board ships and the type of training which is required, Richard Bell and ChartWorld explain the problems encountered with the usage of temporary and preliminary updates, and the means to minimise these problems.

In our last article in this publication, we look at the very new issue of cyber-crime. In 2017, The Standard Club worked together with Fidra Films and various industry partners to produce the award-winning [Be Cyber Aware At Sea – Maritime Cyber Security](#) film. Richard Bell explains the new IMO resolution on cyber security and provides guidance for members.

The safety landscape has developed over the last 30 years, but The Standard Club loss prevention department aims to keep step with the latest issues and provide ongoing guidance to members.

# Twenty years of the ISM code

The International Maritime Organization (IMO)'s Guidelines on Management for the Safe Operation of Ships and for Pollution Prevention (ISM code) first became mandatory in 1998. Twenty years and five amendments later, we reflect on how the code is doing and what still needs to be done.



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## Background

The ISM code was born out of a series of serious shipping accidents in the 1980s, the worst of which was the roll-on roll-off ferry *Herald of Free Enterprise* which capsized at Zeebrugge in March 1987, killing 193 of its 539 passengers and crew. The cause of these accidents was a combination of human error on board and management failings on shore. The *Herald of Free Enterprise* public enquiry report concluded that 'From top to bottom the body corporate was infected with the disease of sloppiness'.

What followed was a much-needed change in maritime safety administration. In October 1989, the International Maritime Organization (IMO) adopted new *Guidelines on Management for the Safe Operation of Ships and for Pollution Prevention* giving operators a 'framework for the proper development, implementation and assessment of safety and pollution prevention management in accordance with good practice'. Following industry feedback, the guidelines became the ISM code in November 1993 and were incorporated in a new chapter IX of the IMO's 1974 International Convention for the Safety of Life at Sea (SOLAS) in May 1994, and became mandatory for companies operating certain types of ships from 1 July 1998.

Meeting the requirements of the code is evidenced by ships' flag states in five-year 'documents of compliance' for ship operators and five-year 'safety management certificates' for ships, both of which are subject to regular audits.

## Industry impact

The ISM code requires nearly all the world's ship operators to write and implement on-board safety management systems (SMS) for their ships and make a 'designated person ashore' responsible for every ship's safe operation. For many shipowners and operators, ISM was simply a new legal framework for the safety systems they already had, but for others, it led to major and much-needed changes in operating culture and organisation. It forced companies with poor or weak management systems to create a formal, structured safety management process for the first time – even if they saw it as just more 'red tape'.

Certainly, the ISM code has made shipping safer and cleaner over the past two decades. In 2005, the IMO maritime safety committee asked for a report on the impact of the code from an international group of experts. Based on the data collected, the group concluded that 'where the code is embraced as a positive step toward efficiency through a safety culture, tangible positive benefits are evident'.

The Standard Club has been assessing members' management systems since 1993 through our member risk review programme. Linked to our ship risk review programme, the review was formerly based on our 'minimum operating standards', but since 1998, it has focused (among other things) on how ISM requirements are being met from the perspective of a liability insurer.

As such, we have seen at first hand the many positive changes the ISM code has brought to the marine industry. Most of our members are now using ISM effectively to increase safety on board their ships. This includes creating safe working practices and working environments, making suitable safeguards against potential risks and continuously improving the safety management skills of personnel, as well as the development of emergency response plans for both safety and environmental protection.

#### Room for improvement

But despite its success to date, we believe there is still scope for our members to improve the effectiveness of ISM.

#### Producing more effective SMS documentation

One issue we have noticed is the tendency for SMS documentation to be too long. Making it bulky and difficult to read defeats its purpose – it should be short, simple and easily understood. In addressing this concern, we have witnessed a number of our larger members carrying out major reviews of their systems to reduce the volume of text and replace it with flow charts, diagrams and other visual signs to assist quick reference.

SMS documentation should also be unique to the ship, even if it starts life as a standard, 'off-the-shelf' manual. There is no point, for example, in having tanker procedures in an SMS for a dry bulk cargo ship or having pre-departure checks for bow thrusters where none exist.

A key point to note in drafting SMS checklists is that they should balance the need to remind crewmembers what to do and instruct them step-by-step on how to do it. This will help make ISM more than just a paper exercise. However, the longer the checklists, the less likely they are to be followed properly.

Furthermore, new procedures and checklists should not be added to an existing SMS without properly reviewing older procedures – and removing or consolidating them as necessary. This will ensure there is no duplication or contradiction.

Finally, the SMS documentation needs to be readily accessible to both office staff and crewmembers on board. Crewmembers should know exactly where the documentation is on a ship and how they can quickly find the procedures and checklists they need.

#### Take a sensible approach to near-miss reporting

We are aware that ISM has prompted some shipowners to encourage an over-the-top approach to reporting near misses and non-conformities in the mistaken belief this alone will improve safety. This method has also been encouraged by major charterers in the wet and dry trades.

As Capt Nippin Anand argues in the next article, there should be no minimum target set for the number of nearmiss reports. The focus should be on learning from genuine near misses and non-conformities. Creating paperwork for these incidents is of little value if the lessons learnt are not built into training programmes and new safety projects.

Near-miss reports should be analysed and categorised so they can be combined with reports from other ships in the fleet. They should also be cross-referenced with similar statistics and categories from port state control (PSC) inspections, oil major inspections (SIRE) and Rightship inspections.

Any category standing out in key performance indicators (KPIs) needs further analysis. Lessons learnt should be incorporated into the next quarterly or yearly training programme. A real incident is less likely if such steps are taken.

#### Value ISM review reports

We also believe shipowners and operators should pay more attention to their masters' SMS review reports.

The 2008 update to the ISM code made masters responsible for 'periodically reviewing the SMS and reporting deficiencies to shore-based management'. In our experience, these vital reports are very often incomplete (or say everything is satisfactory) and certainly are not dealt with properly.

Masters should be encouraged to discuss the SMS reviews with crewmembers as they are the key users of the documentation and should have the biggest input into any proposed changes. The reports should be a priority for senior management, as failure to act on what their masters tell them could lead to a major casualty or major ISM non-conformance.

Senior management should give similar attention to ship safety committee meeting reports (SCMR), which are a requirement under the International Labour Convention. These too are often not filled in properly, particularly if the meetings focus on welfare issues rather than safety.

#### Conclusion

In summary, masters and crew need to be educated in what the SMS reviews and SCMR are for, and how best to conduct discussions and meetings prior to writing their reports. Equally, shore-based managers and staff need to know how to review the reports properly and, more importantly, how to improve the safety of their ships as a result.



# Near miss reporting: a (mis)leading indicator of safety?

That reporting near misses will improve safety is an unquestioned belief in many companies. But why?



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The views expressed in this article are from the author and not from the organisation that the author is employed with currently or in the past.

## The origins of near miss

The idea of reporting near misses comes from Herbert William Heinrich, a technical superintendent in a travel insurance company whose contributions to industrial safety became extremely popular during the 1930s. In fact, Heinrich never used the term 'near miss' – to him it was about 'no injuries'. By studying travel insurance claims, Heinrich came up with the conclusion that for every 300 claims involving no injuries, there were 29 involving minor injuries and 1 involving serious injury. Heinrich was of the view that reducing the frequency of no injuries claims would lead to a reduction in severe injury claims. This correlation between no injuries and serious injuries claims is commonly referred to as the Pyramid model or the iceberg model of safety. So influential is this pyramid model that references to it can be found in almost all leading safety publications (including the IMO, International Chamber of Shipping and leading industry publications) and on at least one bulkhead of most seagoing vessels.

## A challenge to the model

In recent times, Fred Manuelle, the author of *Heinrich Revisited: Truism or Myth*, has questioned Heinrich's assertions at various levels and proved them baseless. Interestingly, Manuelle has rightly observed that Heinrich's data quality is questionable and his survey documents are not even accessible in the scientific domain. Hence, we are unsure how he arrived at his assertions. Put simply, there is no scientific evidence for believing in Heinrich's theory. The data is drawn from insurance claims as a quote from Heinrich's work illustrates:

*'In the accident group (330 cases), a major injury is any case that is reported to insurance carriers or to the state compensation commissioner. A minor injury is a scratch, bruise or laceration such as is commonly termed a first aid case. A no-injury accident is an unexplained event involving the movement of a person or an object, ray or substance (e.g. slip, fall, flying object, inhalation) having the probability of causing personal injury or property damage. The great majority of reported or major injuries are not fatalities or fractures or dismemberments; they are not all lost time cases, and even those that are do not involve payment of compensation.'*

There is no consistency between what qualifies as a major, minor and no injury in Heinrich's study and how it is interpreted today. Notice also from the quote that 'severity' of an injury was based on compensation and not so much on the seriousness of the injury. In the 1930s, on-site medical facilities were rare and hence insurance companies were expected to compensate workers for most on-site injuries. This is an important point to bear in mind: minimising the claims arising from less severe incidents should not be an indication that major accident risks are being managed effectively.

A further assumption is open to questioning. Must a near miss or unsafe event (ie no injuries and only minor injuries) occur at least 329 times before a serious injury takes place, when there is no scientific basis for this correlation? The keyword here is before. This is misleading. The potential for a serious injury does not wait for frequent recurrence of near misses.

### Impact on safety

A final thought on near misses is the disproportionate focus on low frequency events in the hunt for a diamond at the tip of the pyramid. In so doing, safety departments are kept extremely busy capturing data of marginal value. Quality is sacrificed for quantity. This leads to all sorts of problems of fabricated safety where workers have no choice but to make up near-miss reports to fulfil organisational KPIs. When the data bank starts to overflow, the analysis suffers because resources are limited. There is no serious thought given to the relationship between what is reported (and, importantly, what is not reported) and how this may relate to the potential for a serious accident. Temporary improvements in low consequence incidents (based on questionable quality of data) paint the impression that safety risks are being managed effectively, until a major accident happens and the retrospective data bank exposes the futility of the entire system.

### A suggested approach

The idea of counting the number of near-miss reports as a tool for managing safety could be misleading and distract organisational focus from the core issues of managing safety and reputational risks. Rather than counting numbers, much could be learnt by examining the vivid details of a single event and understanding systemic problems. In doing so, accountability should be shared evenly across the organisation. Workers at the front end would be far keener to report near misses if the top management took accountability for their actions. Furthermore, research has shown that the true value of near-miss reporting comes from encouraging voluntary reporting and not necessarily by generating numbers to feed the insatiable KPIs.

It causes a great deal of anxiety to realise that for nearly a century we have been misled into believing something that simply does not exist. But closing our eyes and walking in darkness is not an option either.



# The human element – the effects of fatigue on ship safety part 1 – practical advice to shipowners

The human element is consistently found to be a root cause of incidents, and fatigue is a major contributing factor. In this article, we look at some of the research and the measures put in place to resolve this issue. In a future article, we will look at the ways in which crew can manage their own fatigue.



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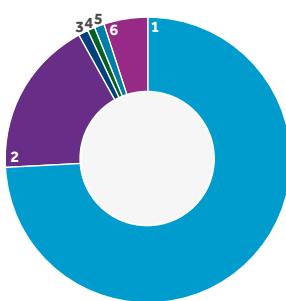
## Introduction

Investigations into human element incidents, such as the UK Marine Accident Investigation Branch (MAIB) investigation in 2004 (using data from 1989 to 1999), identified fatigue to be the major contributing factor in 82% of the 66 recorded groundings and collisions occurring between 0000 and 0600 hours.<sup>1</sup>



IMO, MSC/Circ.813, defines fatigue as 'A reduction in physical and/or mental capability as the result of physical, mental or emotional exertion which may impair nearly all physical abilities including: strength; speed; reaction time; co-ordination; decision making; or balance.'<sup>2</sup>

## Top causes of liability loss: Marine (by value of claims)



1 Human error	75%
2 Accidental nature/damage	18%
3 Natural hazards	1%
4 Negligence/poor maintenance	<1%
5 Failure to provide service	<1%
6 Other	5%

Human error has long been regarded as contributing to the majority of incidents in the shipping sector. It is estimated that **75% to 96%** of marine accidents can be attributed to human error. In addition AGCS analysis of almost 15,000 marine liability insurance claims between 2011 and 2016 shows that human error is behind 75% of the value of all claims analysed, equivalent to over **\$1.6bn**.<sup>3</sup>

Source: 14,828 liability insurance claims analyzed between 2011 and 2016 (September 13)  
Global Claims Review: Liability In Focus, Allianz Global Corporate & Specialty

The Karolinska Institute developed the 'Brief Fatigue Syndrome Scale' to measure levels of fatigue. This is now used as the industry standard.

Research projects such as Horizon (2012) and Martha (2013-2016) made the most significant advancements in understanding fatigue. In project Horizon, 90 experienced seafarers used simulations of common on-board scenarios. The results clearly showed links between performance degradation and certain work patterns.

Project Martha spanned three years and involved 1,000 seafarers from four shipping companies, both European and Asian. Fatigue and stress levels were found to vary considerably between companies despite their operating similar vessels and trading patterns. This indicated the significance of organisational set-up and cultural considerations as well as workload.

Horizon acknowledged that 'fatigue' was often used interchangeably with 'sleepiness', 'tiredness' and 'drowsiness', and was considered a generic term.<sup>4</sup>

Martha was able to define 'sleepiness' and 'fatigue' separately:

'Sleepiness – Resulting in short term effects only on daily activities, identified by a rapid onset, short in duration and resultant from a single cause.'<sup>5</sup>

'Fatigue – Resulting in long term effects that may cause health disorders, both physical and mental,

*has an insidious onset and can persist over time, as a result of multi-factor causes. It is considered to have significant effect on both behaviour and a person's wellbeing.'*<sup>5</sup>

### Legislation

Legislation has been introduced to improve the working/living conditions of seafarers, including measures to address fatigue-related issues. International Labour Organization (ILO) Convention No.180 adopted in 1996 was an important development in improving safety at sea and implementing limitations on hours of work and rest for vessels whose flag states ratified it. The 2010 Manila amendments to STCW harmonised the requirements of ILO Convention No. 180. STCW allows for 'overriding operational conditions' under Regulation VIII/1 – Section B as being defined as 'essential shipboard work which cannot be delayed for safety or environmental reasons or which could not reasonably have been anticipated at the commencement of the voyage'.<sup>6</sup> It is paramount that this section of the STCW code is not misused. Unfortunately, this is not always the case.

The convention holds the shipowner responsible for compliance, to ensure necessary resources are provided, including appropriate manning levels; however, final responsibility has remained 'firmly upon the shoulders of the ship's master'.

MLC 2006, which entered into force in 2013, has continued to

focus on improving seafarers' welfare. It implements a limit of 12 months' service prior to repatriation 'entitlement', which after deducting annual paid leave, equates to a maximum continuous period of 11 months. However, it should be noted that seafarers do not actually have to be repatriated at that time, but are legally entitled to be.<sup>7</sup>

### The impact of legislation

Current legislation has only addressed some of the main factors leading to fatigue. Further amendments are required for it to be truly effective. The main causes of fatigue are:<sup>5</sup>

- **Prolonged work periods and insufficient rest between work periods**

Legislation has imposed limitations on hours of work and rest, which addresses these issues but only if there is compliance on board. Certain watchkeeping patterns remain an issue and minimum safe manning levels across the industry should be reviewed and increased so that a move away from the '6 on 6 off' watch system is possible.

- **Working at times of low alertness**

The time at which an operation occurs is an important consideration. An operation which occurs at a time of low alertness is potentially less safe than one conducted during the normal working day. So far, it has proved impractical to alter the routines of terminals or ships to take this into account.



- Stress and excessive workloads**  
Legislation has imposed limitations on workloads; however, strict compliance is required by seafarers supported by ship managers to ensure commercial interests are not permitted to influence or pressurise crew into flouting legislation.
- Noise, vibration and motion**  
Stricter legislation is required. In 2012, IMO Resolution MSC.337(91) was adopted to make noise level limits mandatory on all new vessels of 1,600GRT or over. This was brought into force on 1 July 2014. The 'Code on Noise Levels Onboard Ships' was also included into the International Convention for the Safety of Life at Sea (SOLAS). For new builds, noise limits were imposed of 110 dB(A) for machinery spaces, 85 dB(A) for other work spaces, 75 dB(A) for galleys & serveries, between 60 to 70 dB(A) for the various navigating areas, between 55 to 65 dB(A) for various accommodation areas, with zoning introduced to ensure seafarers were protected from prolonged exposure to excessive noise levels. These are now tested and confirmed during sea trials prior to delivery. An absolute maximum of 120 dB(A) (even when wearing hearing protection) is also stipulated. However, new builds of under 1,600GRT, certain ship designs and existing tonnage (pre-1 July 2014) are exempt. The code states that the measures are to be taken 'as far as reasonable and practical, to the satisfaction of the Administration'.
- Duration of crew contracts**  
Limitations imposed by MLC 2006 have substantially improved this situation, although seafarers' contract lengths vary within the 11 months' limitation, dependent on a variety of factors. Research has indicated an optimum tour length of between three and six months, dependent on service, rank and ship type.
- Pre-existing medical conditions**  
Current legislation requires seafarers to obtain a certificate of medical fitness prior to joining ship, but the standard of examinations is not consistent. Enhanced PEME schemes have been introduced by P&I clubs and shipping companies to try to supplement the mandatory requirements and ensure the standard of medical examinations.

### Fatigue Risk Management Systems<sup>5</sup>

The introduction of Fatigue Risk Management Systems (FRMS) into the marine industry is anticipated to greatly assist in identifying shortfalls in existing regulations and what amendments could be made to address them. These systems have already had considerable success in other safety-critical industries such as aviation, road and rail transportation.

FRMS uses a comprehensive, systematic approach, reviewing all aspects of the workplace including operational requirements/restrictions, quality assurance as well as company procedures. The standard core elements being implemented across the industry are:

- fatigue awareness training and cultural change programmes
- a fatigue reporting system within a just culture
- data-driven analysis for operational fatigue risk assessment, workload management and monitoring of adequate sleep for seafarers.

For FRMS to be truly effective, it will require full commitment from shipowners, shore-side personnel as well as seafarers to report issues and develop tailored approaches for the company.

### Potential for improvement

**Amendments to operational schedules**  
Operational schedules should be developed taking into consideration seafarers' and shore personnel's work and rest hours. This will require shipowners or technical managers to collaborate with charterers and terminal operators. Operations requiring additional crew, whenever practical, should be arranged during times of highest alertness (ideally 1400 to 1800 according to studies) and especially avoiding the 0000 to 0600 period.

**Review of ship designs and equipment to further address outstanding issues relating to noise, vibration and motion**  
Unfortunately, as certain clauses/appendix of the 'Code on Noise Levels Onboard Ships' are considered as recommendations on exempted ships (new builds of under 1,600GRT, certain ship designs and tonnage existing pre-1 July 2014), seafarers' wellbeing is potentially being compromised for economic considerations. Considering that 87% of the world fleet is older than 1 July 2014<sup>6</sup> and therefore does not have to comply, it is important that viable economic options for reducing noise levels on

older tonnage are found, as well as developments and innovations for new builds. Continual improvements in ship design and operation to reduce levels of vibration and motion on ships are also key elements in improving the overall wellbeing of seafarers and close review of the FRMS results will greatly assist in not only identifying areas in need of improvement but also prioritising them.

### Review of safe manning levels

Manning levels on many ships often only meet the flag state minimum for that size and type of ship. Often, this fails to allow for additional watchkeeping requirements whilst sailing through restricted waterways, port operations, non-routine maintenance requirements and/or off-duty/overtime work performed by seafarers in order to satisfy commercial pressures, particularly on busy, short-haul trading routes.

It is of paramount importance for shipowners to take the initiative and review their current manning levels. Whilst the minimum manning level is considered the safe lower limit to sail from point A to point B, organisations should consider whether these arrangements are truly adequate in the face of the pressures of the modern maritime industry.

### Conclusions

The importance of the human element in shipping must be acknowledged and addressed as it is the major factor in marine incidents, with fatigue as the main root cause. The legislation brought into force to address the factors leading to fatigue have fallen short in reducing/removing these and significant changes in operational practices, ship design as well as manning levels are still required. Research studies and proactive work systems such as FRMS must be embraced and welcomed into the industry and their results acted upon. To move forward will require industry-wide recognition of the issues involved with the human element in incidents and considerable changes in shipowners'/seafarers' reaction to commercial pressures.

- 1 UK Marine Accident Investigation Branch (MAIB), Investigation report 2004
- 2 International Maritime Organization, MSC/Circ 813
- 3 AGCS Safety Shipping Review 2017
- 4 Project Horizon 2012
- 5 Project Martha 2013–2016
- 6 STCW 2010
- 7 MLC 2006
- 8 Clarksons Research

# Carriage of IMDG cargoes

The club regularly receives member queries on the carriage of dangerous cargoes in packaged form. As of 1 January 2018, the 2016 edition of the IMDG code is mandatory. This article provides a reminder of the requirements.



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## The regulation

The carriage of dangerous cargoes in packaged form is covered under the provisions of the IMO's International Maritime Dangerous Goods code (IMDG code), as required by SOLAS Chapter VII regulations.

As of 1 January 2018, the 2016 edition of the [IMDG code](#) (incorporating [amendment 38-16](#)) is mandatory. Some of the Contracting Governments were already applying the revised requirements, in part or in whole, on a voluntary basis from 1 January 2017.

Specifically, the IMDG code states requirements and standards for the following:

- Limited quantities
- Excepted quantities
- Stowage/segregation categories
- Packing instructions/provisions
- Labels/signs and markings.

In December 2017, IMO released [corrigenda](#) which makes editorial corrections to the English version of the IMDG code amendment 38-16.

## Explosives (IMDG class 1)

For explosives, extra care should be taken as there have been several incidents due to unstable compounds reacting and resulting in explosion. When presented with shipments of fireworks, shipping lines are advised to take steps to satisfy themselves that the fireworks originate from a legitimate and trustworthy manufacturer.

For ammunitions, it is recommended to ensure that they are not capable of firing during carriage.

The club has also received several queries regarding carriage of expired explosives (ammunitions, pyrotechnics or fireworks) for decommissioning/disposal. In these cases, there is a deterioration risk as these explosives have gone beyond stated expiry date(s), making them unstable/unpredictable. As such, it is recommended that the volatility and stability of the expired explosives is carefully evaluated by an expert as it is possible that there could be a higher risk.



### Radioactive substances (IMDG class 7)

Nuclear/radioactive cargoes (IMDG class 7) are not included in the ship's document of compliance (DOC) for dangerous cargo. Even in the clubs' Pooling Agreement, under Appendix IV (Excluded Risks Clause 4), nuclear risks are excluded. However, there

is an exception whereby cover can remain in place for carriage of 'excepted matter' (as defined in the Nuclear Installations Act 1965 of the United Kingdom). Members are recommended to refer to the [club's publication on carriage of radioactive cargoes](#) for further guidance.

### Conclusion

From the club's perspective, the carriage of dangerous cargoes in packaged form can be undertaken without prejudice to cover, provided that the arrangements for its stowage, segregation, packing, labelling and marking fall within the guidelines specified by the IMDG code, and copies of the Safety Data Sheets are provided to the vessel for use in emergency response to accidents and incidents involving dangerous goods in transport (IMDG 5.4.3.2.1).

The vessel has a document of compliance (DOC) for dangerous cargo which states the specific cargoes allowed for carriage on board, together with the precautionary notes. It is recommended to check this document and verify prior to accepting the cargo for carriage.

To ensure full compliance during a particular voyage, the classification, packaging, stowage and segregation of dangerous goods is governed by legislation enforced in the country of origin, the country of destination, any country which it enters while in transit and the country under whose flag the carrying vessel operates.



# T&Ps and ECDIS: considerations for deck officers

ECDIS was designed to improve safety and ease the workload of navigators. One activity which has burdened navigators since the invention of paper charts is that of chart corrections. ECDIS could have eliminated this task entirely because updates to Electronic Navigation Charts (ENCs) are applied automatically and can be date dependent. Standard ENC updates are applied easily via digital media, but the situation regarding Temporary and Preliminary Notices (T&Ps) is more complex.



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## What are Temporary and Preliminary Notices?

Temporary and Preliminary Notices are issued by Hydrographic Offices when the information will only be valid for a short period of time or needs to be promulgated quickly and a normal chart correction would take too long to prepare and distribute.

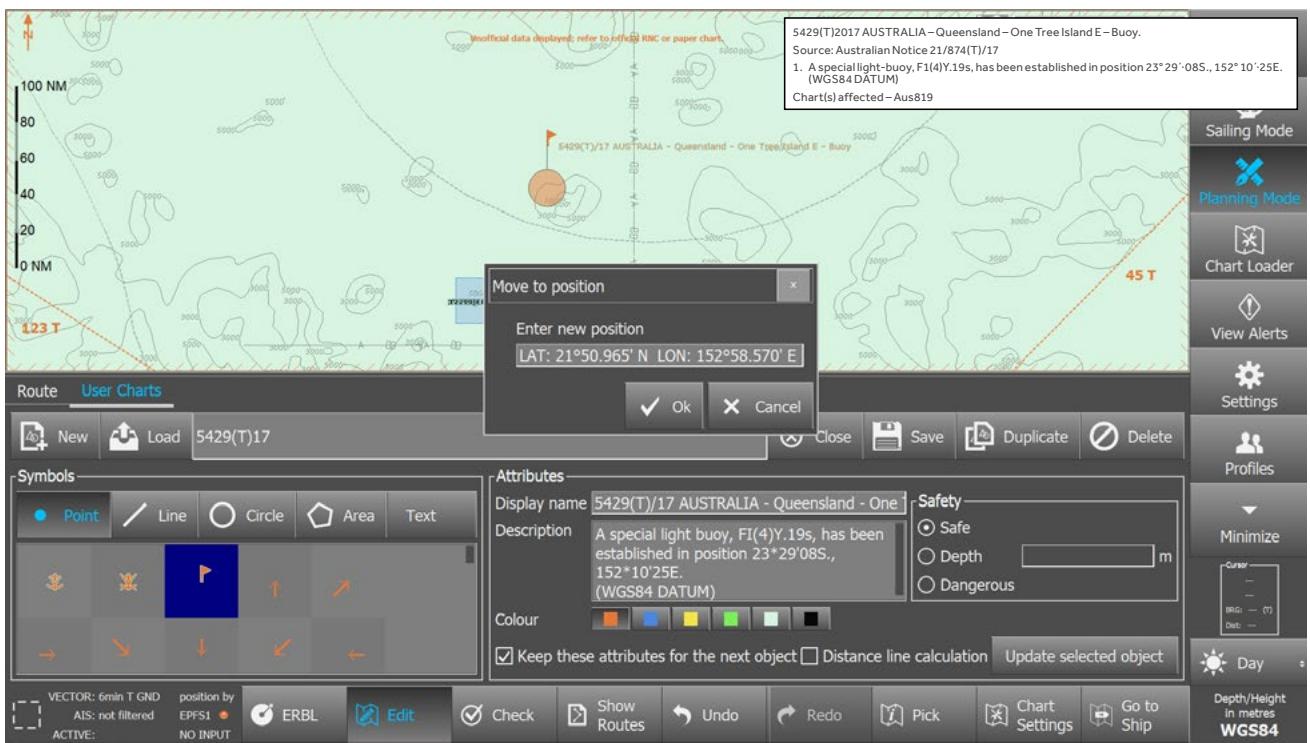
- the differing approaches of the various Hydrographic Offices (HOs) to T&Ps for ENCs.

This article looks at each of these issues.

**Relative lack of visibility of T&Ps**  
Officers correcting paper charts were free to use bold annotations to ensure the visibility of T&Ps and draw the OOW's attention to them. When T&Ps are included in ENC data, they are applied as a standard update, but with a date dependent attribute (a valid to/from date). Unfortunately, T&P updates are not always obvious to the user. An ECDIS route scan will only detect the presence of a T&P (within the cross-track corridor) if it has a danger attribute. If there is no danger attribute, the T&P will not appear in the route scan report.

**Differing stances of the HOs**  
Different HOs have different approaches to the production and distribution of T&P notices; thus, dependent on each national HO, they may:

- produce T&Ps for their ENCs and paper charts
- not produce T&Ps at all
- produce T&Ps for their paper charts but not for their ENCs.



Users may individually apply T&P notices to their ECDIS. In this example, a buoy is being added by the user. The applicable notice is provided in the top right of the image for reference.

The third approach is the most troublesome for the digital navigator, ie T&Ps produced for their paper charts but not for their ENCs.

A ship's response to these will depend on which HO has produced the ENCs in use on board the vessel. The United Kingdom Hydrographic Office (UKHO) publishes a [helpful list](#) of HOs and their stance in relation to T&Ps/ECDIS.

These variations of approach from the different HOs have created understandable confusion amongst officers. In fact, many officers are unaware that they may be using ENCs which do not contain T&P notices.

Officers should determine whether the HO which produced their ENCs also produces and distributes T&P notices. If so, they should confirm that they produce T&P notices for ENCs in addition to paper charts. If T&P notices are not produced for ENCs, they will need to be inputted manually using the information contained in the paper T&P notices to mariners.

To facilitate this, each brand of ECDIS is designed to allow users to input ENC objects and text. This process needs to be approached in a similar manner to that of paper chart corrections. The individual T&Ps need to be applied accurately to the

appropriate cells and records kept. Expired T&Ps will need to be deleted.

The ease with which objects can be applied to an ENC varies between ECDIS brands. Regardless, applying manual corrections to an ENC is a retrograde step, which will hopefully be eliminated over time.

#### Options to simplify ECDIS T&P issues

The problems associated with T&Ps (and ECDIS) have not gone unaddressed. The UKHO has responded with a product for Admiralty Vector Chart Service (AVCS) customers called the Admiralty Information Overlay (AIO). The AIO comes in the form of an additional display layer, which when selected by the user, indicates the areas affected by Admiralty T&Ps. Details of the T&P notice can be obtained via pick report by interrogating the affected areas, which are marked with hatched areas known as 'polygons'.

Before using AIO, users need to be aware of its various characteristics and any considerations which need to be taken into account. AIO considerations:

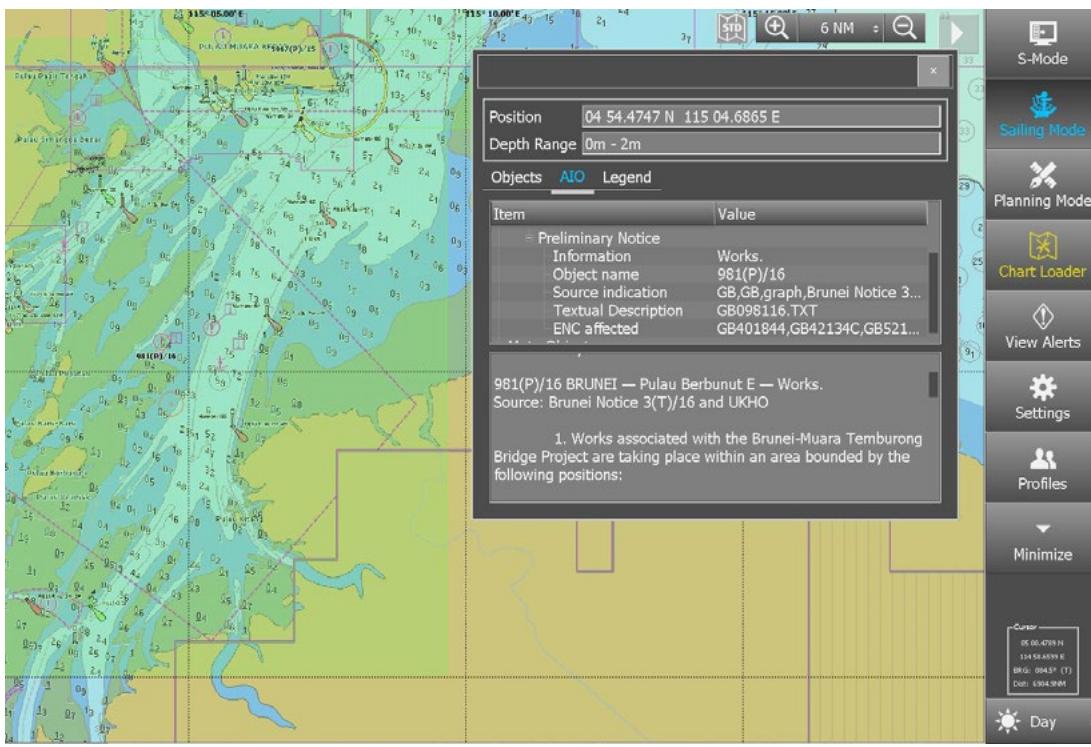
- AIO is designed to support passage planning and demonstrations of compliance, rather than be used during the navigation phase.

- The exact changes relating to the T&P are not displayed by the AIO overlay. The polygons indicate only the area affected. The details must be gathered by pick report.

- AIO reproduces the data contained in the UKHO's weekly notices to mariners.
- Where a HO does not distribute its T&Ps as part of the normal ENC update, AIO can be used to help plot the T&Ps directly onto an ENC using a manual update.
- AIO is free to AVCS customers.
- Some ECDISs are unable to display AIO.
- A small number of ECDISs are able to detect the presence of an AIO polygon in a route scan.
- AIO utilises intelligent zoom functions to ensure that the polygons appear on appropriate ENCs.

#### No Overlay

Where conflicts of scale occur between UKHO products and the areas covered by T&Ps, AIO will display 'No Overlay'. In such circumstances, AIO users should gather information from other sources, such as local Notices to Mariners to determine whether there are any relevant T&P notices.



ECDIS displaying an area covered by a green AIO polygon. The polygon has been interrogated by pick report for details of the notice.

### ENC Preliminary Notices to Mariners

AIO also includes ENC P (EP) notices. Unlike the traditional NTMs and T&Ps, this type of notice is unique to ECDIS and is not carried over from paper charts. EP notices concern navigationally significant differences between paper charts of the BA chart series and the related AVCS ENCs. EP notices, whilst relatively new, are an important consideration for digital navigators.

In addition to the UKHO's efforts, other, commercial organisations have addressed the issue.

One such service, ChartWorld Information Overlay+ (CIO+), provides navigators with T&P information in a user chart layer.

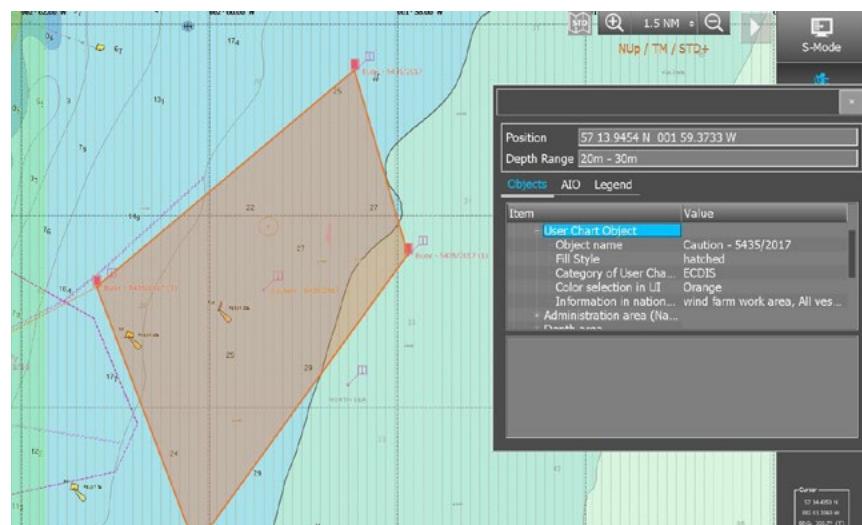
- It is suitable for use during the navigation phase.
- It is not a free service.
- The detail of each T&P is visually depicted on the ENC (in a similar manner to traditional chart corrections) without having to resort to a pick report, although the pick report is available for full details.
- Objects included in this layer will be picked up during route scans by all ECDIS models. This is because all objects are given a danger attribute which ensures their detection.
- The data displayed is time dependent and subject to weekly updates.

One important feature to note is that the overlay does not include ENC P (EP) notices to mariners.

- CIO+ is not designed to replace Admiralty Information Overlay, but to complement it and reduce the workload of the user.
- CIO+ also includes the T&Ps from HOs that produce them for their paper chart products but not their ENCs.
- T&Ps presented on screen appear different from the surrounding chart objects. This contrast enables the user to easily identify what has changed as a result of the T&P.

### Conclusion

Until all HOs include T&P data in their ENCs, it will be necessary for mariners to keep a close eye on their ENCs and apply manual updates where necessary. Admiralty Information Overlay and ChartWorld Information Overlay+ (CIO+) offer digital navigators greater visibility of T&Ps, but each system has its own unique set of user considerations. Companies should ensure that their personnel are sufficiently knowledgeable on the subject of ENC updates/T&Ps and the particulars of any product they use.



A ChartWorld Information Overlay+ (CIO+) T&P notice, as it appears on an ECDIS display. The notice is depicted with 'user chart objects' and has been interrogated by pick report.

# Cyber security

Modern technology has changed the way ships are operated. Whilst this technology has generally improved the efficiency and safety of ships, these improvements come at a price in the form of an increased vulnerability to cyber attack.



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## Introduction

The Standard Club, like many other maritime stakeholders, has paid close attention to cyber-related incidents in the industry in the past year and 2017 proved to be a significant year for cyber-related issues.



One of The Standard Club's recent initiatives was its joint sponsorship of FIDRA's [Be Cyber Aware At Sea – Maritime Cyber Security](#) film. This free film is designed to educate seafarers about the dangers associated with internet usage on board. At the time of writing, the Fidra film had received well over 100,000 views on Facebook and YouTube.

Probably the most famous maritime cyber event in 2017 was the 'NotPetya' ransomware attack. NotPetya caused disruption to many companies including AP Moller-Maersk. AP Moller-Maersk's commercial operations were interrupted, revenue was lost and the company was forced to overhaul its existing cyber security infrastructure. Another well-publicised event was the apparent Global Navigation Satellite System (GNSS) spoofing, which occurred in the Black Sea. The Standard Club has previously [discussed](#) this issue, whereby a GNSS is made to display false information deliberately without the knowledge of the user.

Fortunately, in this case, the GNSS position discrepancies were so large as to be obvious to the user.

## Legislative developments

The International Maritime Organization's (IMO) Maritime Safety Committee has produced [resolution MSC. 428\(98\)](#) which was adopted on 16 June 2017. This resolution contains a recommendation for cyber risks to be addressed within safety management systems (SMS) no later than the first annual verification of the company's Document of Compliance after 1 January 2021. It encourages flag states to ensure that this is the case.

Key points of the resolution are:

- the need to raise awareness of cyber risk threats
- the need for stakeholders to expedite work towards safeguarding shipping for current and emerging threats
- a reference to the 'Guidelines on maritime cyber risk management' as providing high-level recommendations for maritime cyber risk management.

The IMO has released [MSC FAL.1/Circ.3](#) 'Guidelines on maritime cyber risk management'. These guidelines are intended to provide high-level recommendations to help safeguard shipping from existing and emerging cyber threats. The recommendations are designed to complement existing IMO safety and security management practices. Further information can be obtained from the 'maritime cyber risk' [page](#) of the IMO's website. In addition to the IMO's guidelines, [Cyber Security on board Ships](#) is another resource which is available for use. This publication was produced by a group of organisations, including BIMCO, CLIA, ICS, INTERCARGO, INTERTANKO, OCIMF and IUMI.

### Conclusion

2021 is still far away and shipowners/managers may think they have plenty of time to address cyber risks and comply with the new IMO resolution, but there is no room for complacency. Ship owners/managers should act now to develop and establish their cyber security infrastructure. This should not be just for compliance purposes but to protect their crews and assets from the very real threat of cyber interference. Effective action now could prevent an organisation from becoming another high-profile victim of a future cyber attack.

```
        }
        if (!isIdentityAssertion) {
            String passwordWant = null;
        } try {
            passwordWant = database.getUserPassword(userName);
        } catch (NotFoundException shouldNotHappen) {}
        String passwordHave = getPasswordHave(userName, callbacks);
        if (passwordWant == null || !passwordWant.equals(passwordHave)) {
            throwFailedLoginException(
                "Authentication Failed: User " + userName + " bad password."
                "Have " + passwordHave + ". Want " + passwordWant);
        };
    }
}
} else {
    // anonymous login - let it through?
    System.out.println("\tempty userName");
    loginSucceeded = true;
    principalsForSubject.add(new MLSUserImpl(userName));
    addGroupsForSubject(userName);
    return loginSucceeded;
}
// leave(String userName, Callback<User> callbacks) would
// do all the work here
```

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