



New ECDIS mandatory requirements Part 1: Introduction

Latest SOLAS Convention amendments now clearly include ECDIS within the definition of nautical charts and publications



The background

This introduction to ECDIS is the first in a series of three short articles which attempts to provide a user friendly guide to the mystery surrounding electronic chart display and information systems (ECDIS).

With the amendments to SOLAS Chapter V Regulation 19 governing the statutory introduction of ECDIS now being adopted from the 1 January 2011, the 'ticking time bomb' associated with ECDIS mandating process has now taken on a level of greater urgency with the shipping fraternity ultimately coming to the end of its breath holding exercise.

As with the introduction of previous mandatory requirements to fit equipment such as Radar, VDR or AIS systems onboard commercially operated vessels, many technical managers will now be faced with the task of acquiring full compliance with the ECDIS carriage regulations at the lowest possible capital expenditure.

Although this approach may undoubtedly resolve the short term issues it may be prudent on this occasion to adopt a more proactive approach towards the implementation of ECDIS systems especially when

taking into account that the primary function of ECDIS forms in many ways the foundation and cornerstones upon which safe navigation practices are formed.

With this in mind we now consider the legislation surrounding the mandatory introduction of ECDIS equipment and peer under the veil of technical magic and mystery which has enshrouded this subject over the last decade.

SOLAS Chapter V

The amendments to SOLAS Chapter V Regulation 19 – Carriage Requirements for Shipborne Navigational Systems and Equipment came into effect on 1 January 2011.

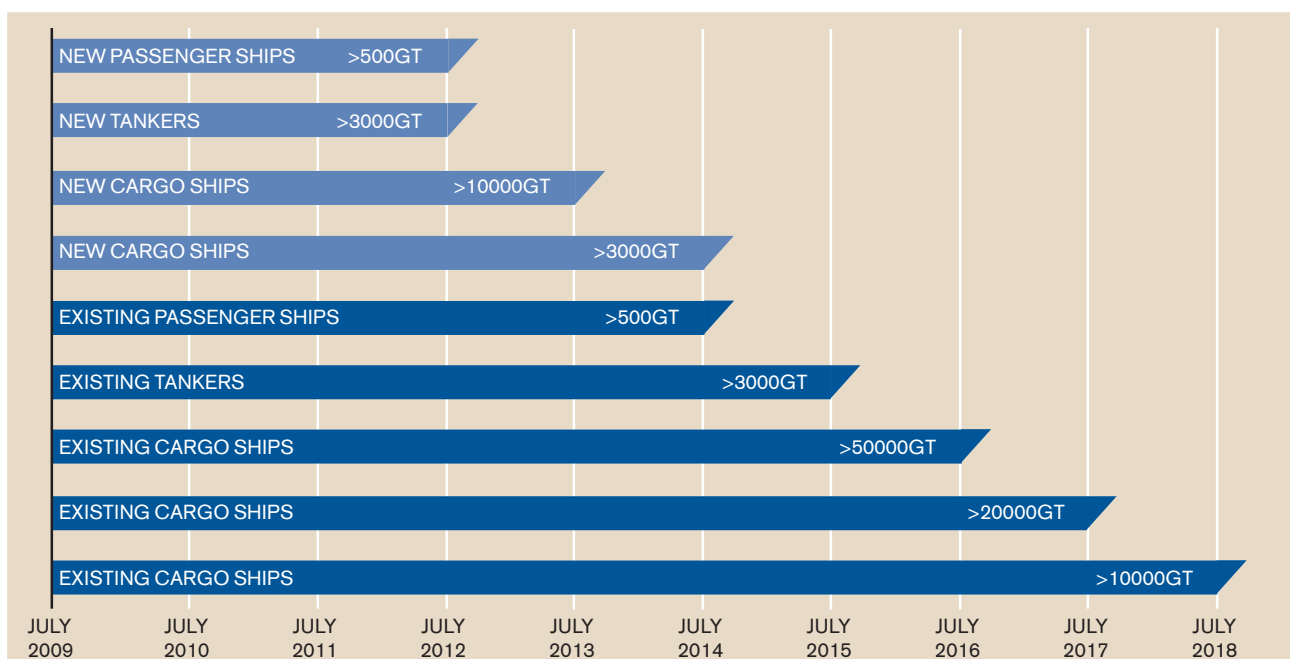
The amendments to the SOLAS Convention now clearly include ECDIS systems within the definition of nautical charts and publications with section 2.4 stating that “An *Electronic Chart Display and Information System (ECDIS)* is also accepted as meeting the chart carriage requirements of this subparagraph.”

A new paragraph 2.10 further identifies a requirement for ships engaged on international voyages to be fitted with an ECDIS system under the implementation schedule shown in the chart below.

ECDIS performance standards

An area which often leads to confusion is the simple question of what makes one system an ECDIS and the other an ECS (Electronic Chart System). The answer to this question is simply that one system complies fully with the IMO ECDIS performance standards and can be accepted as meeting the requirements of SOLAS

ECDIS system implementation schedule



Chapter V regulation 19 and the other does not. These requirements are identified as follows:

- The ECDIS equipment must be type approved to the performance standards as outlined in IMO Resolution A. 817 (19) as amended by MSC 64(67) & MSC 86(70) relating to back up arrangements for ECDIS systems and operation in RCDS mode.



Illustrations by C Smart

- The system must use official ENC data (Vectorised Electronic Navigational Charts) to IHO S57 standard, which must be supplied by or authorised by a National Hydrographic Office. Such ENC data must be corrected weekly.
- The vessel must have an adequate back-up system. This may be another ECDIS system or paper charts.
- IMO has ruled that ECDIS equipment having Raster Chart Display System (RCDS) capability may operate as a primary aid to navigation in the RCDS

mode. Such charts must also be corrected on a weekly basis.

- When ECDIS equipment is used in RCDS mode, it must be used in conjunction with an appropriate folio of paper charts. The definition of 'appropriate' is to be decided by national administrations.

STCW – Statutory training

Under the provisions of the STCW 95 Code, general training obligations relating to the use of ECDIS exist. This is indicated by Table A-II-1 of the Code where it is stated “*ECDIS systems are considered to be included in the word charts.*”

The degree of knowledge and competency concerning the use of charts is explicitly defined within Table A-II-1 as requiring the navigational officer to possess “*a thorough knowledge of and ability to use navigational charts and publications*”. He must additionally show “*evidence of skill and ability to prepare for and conduct a passage, including interpretation and applying information from charts*”.

The IMO Model Course 1.27 *The Operational Use of Electronic Chart Display and Information System (ECDIS)* is regarded as setting minimum requirements a candidate should have gone through to receive an ECDIS certificate and covers all relevant safety aspects and overall system knowledge expected under a generic ECDIS training course.

An element of confusion has however developed relating to the need for training where an ECDIS system has been fitted but is to be operated as an aid to navigation only. Under the forthcoming Manila amendments to the STCW Code which are scheduled to enter into force on the 1 January 2012, generic and type specific training will be required even if the ECDIS equipment is to be used as an aid to navigation only.

ISM Code

In addition to the generic training identified under the provisions of IMO model course 1.27 type specific training is required where the equipment used during the generic training course differs from that to be actually used onboard.

This requirement is identified under the provisions of section 6.3 & 6.5 of the ISM Code which requires not only effective training but familiarisation of new equipment and regulations with respect to safety and emergency related duties.

Although this requirement may be viewed as a relatively simple task, the wide range of equipment manufacturers in the market may present a daunting proposition for the ship operator with a diverse fleet



equipped with several models of ECDIS systems operating varying generations of system software.

The position of effective type specific training is further complicated by the various views adopted by different Flag States. An example of this is with reference to Computer Based Training Systems (CBT) which requires Flag State approval on a case by case basis. Additionally a CBT system approved by one Flag State may be rejected by another.

Port State Control

With marine casualty investigators continuing to identify ineffective ECDIS operation and substandard levels of training as a key link in the chain of causation leading to marine incidents, an increased focus on ECDIS has been observed during routine inspections completed by Port State Control officers. The following list highlights key inspection areas which are the subject of particular focus:

- Documentation indicating that the ship's navigation system complies with IMO Performance Standards for ECDIS
- Written procedures on board the vessel for using the ECDIS system
- The master and watch-keeping officers are able to produce appropriate documentation that generic and type-specific ECDIS familiarisation has been undertaken
- The ship is equipped with the latest updates and new editions of ENCs
- The ship is equipped with additional nautical publications, as defined by the national carriage requirements
- There is agreement between sensor data and its presentation on the ECDIS system.

- The ship is equipped with an approved back-up arrangement to ensure safe navigation for the entire voyage, in the event of an ECDIS failure
- The ship is equipped with an appropriate updated collection of paper charts, if the ECDIS system is being used in RCDS mode.

ECDIS acronyms

The use of Acronyms in the Shipping Industry has always been present and part of shipping's fast pace philosophy. However this system of abbreviation does cause great confusion especially between similar acronyms. Examples of these are where care in application and interpretation is needed are:

| | |
|-------|---|
| ECDIS | Electronic Chart Display and Information System |
| ECS | Electronic Chart System |
| ENC | Electronic Navigational Chart |
| RNC | Raster Navigational Chart |
| RCDS | Raster Chart Display System |
| IBS | Integrated Bridge System |
| NACOS | Navigation and Control System |

Conclusion

With just a brief introduction into the legislative guidelines relating to ECDIS and its operation it is quite easy to see why this subject is causing so much consternation within the shipping industry.

Continuing our review into ECDIS, the second article (of a series of three) focuses further on the critical change in skill set that is required by the navigational officer when changing from paper to electronic navigation and the requirements of generic and type specific ECDIS training and familiarization.

The STCW 95 Manila amendments relating to ECDIS training will also be discussed with an assessment of possible training needs required to operate ships of the future reviewed as the present technical revolution continues to gain momentum.

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New ECDIS mandatory requirements Part 2: A key to safe operation

The mandatory requirement and introduction of electronic chart display and information systems is seen as a major step forward in safe ship operation and protection of the environment



Photo ECDIS Ltd

Introduction

This is the second in a series of three short articles which considers the operational aspects of ECDIS and the intrinsic function that electronic chart and navigation systems have to play in the commercially operated ship of the future.

The mandatory requirement and introduction of ECDIS is seen by the regulatory bodies guiding the shipping industry as a major step forward in safe ship operation and protection of the environment. The transition to electronic navigation and the operation of a paperless bridge is however initially viewed differently by the shipping community with increased operational costs of new equipment and additional training requirements.

It is also becoming increasingly evident that far from reducing risk, ineffective operation of complex ECDIS systems resulting from poor management practices or training can actually increase the risk of incidents such as collision and grounding with the interface between

computers extenuating the so called 'human element' reported as causative in almost every marine casualty.

Automation of traditional manual navigational tasks has been observed as delaying the opportunity for error detection and recovery allowing a navigational single point failure to develop undetected into a single point catastrophic failure ultimately resulting in an incident.

With the key to reducing management costs and navigational risk intrinsically linked with effective ECDIS practices and procedures we now consider ECDIS and its fundamental operational requirements.

The modern ECDIS system

Electronic chart display and information systems (ECDIS) in their simplest forms are single 'stand alone' units with basic sensor inputs such as course and speed displaying the ship's 'real time' position on an

electronic navigational chart (ENC) that complies with the performance standards outlined under the provisions of IMO Resolution A.817(19).

The ENC chart must further comply with the IHO chart data transfer standard S-57 (S-100 in the future) issued by an authorized hydrographic office. The system must have an adequate back up arrangement comprising of a second independent ECDIS or an adequate up to date folio of paper charts before the system can be considered as meeting the SOLAS Chapter V Regulation 19 chart carriage requirements.

Although the basic ECDIS system may be the equipment introduced during the 'retro fit' period for vessels presently in operation, the ship of the future will undoubtedly incorporate the electronic chart display and information system into the heart of the integrated bridge system (IBS) combining navigational equipment such as radar, differential global positioning systems, automated information systems, propulsion control and system alarms into a single monitoring station or navigation control module.

Although this combination of navigational systems into a single control panel is undoubtedly the way forward, the change in navigational methodology does present new challenges in relation to the requirements of safe navigation of the modern vessel.

Electronic charts

The subject of electronic charts in relation to ECDIS operation is probably an area which generates an element of confusion. This is primarily due to the fact that ECDIS can operate under the amendments to the IMO ECDIS performance standards in what is referred to as RCDS (raster chart display systems) mode utilizing raster charts when vector chart coverage of the navigational area is not available. In order to fully analyze this provision and mode of operation a clear distinction between raster and vector charts must be made.

ENCs or vector charts are compiled from a database of individual items (objects) of digitized chart data and displayed as a seamless chart. When used in an electronic navigation system, the data can then be re-assembled to display either the entire chart image or a user selected combination of data. ENCs are intelligent in that systems using them can be programmed to give warning of impending danger in relation to the vessel's position and movement.

RNCs or raster charts on the other hand are produced by digitally scanning a paper chart image. The resulting digital file may then be displayed in an electronic navigation system where the vessels position can be shown.

Since the raster chart display is merely a digital photocopy of the original paper chart, the image has no intelligence and other than visually, cannot be interrogated. The fundamental differences between vector and raster charts are identified below:

- Vector charts have no defined boundaries and provide a seamless visual display where raster charts operate similar to paper charts.
- Raster chart data cannot itself trigger automatic alarms although some alarms may be entered manual by the user.
- Horizontal datum and chart projection may differ between raster charts.
- Chart features cannot be simplified or removed to suit particular navigational circumstances.
- Without selecting different scale charts the 'look ahead' capability of raster charts may be somewhat restricted.
- Orientation of the raster display to other than chart up display may affect the readability of the chart.
- Display of a ship specific safety contour or safety depth cannot be highlighted on a raster chart unless manually entered by the user during passage planning.
- Excessive zooming in or out from the natural scale of the raster chart can seriously degrade capability.

Under the present IMO legislation, navigational areas not covered by ENC charts must be identified at the planning stage with an 'appropriate' portfolio of up-to-date paper charts available onboard to be used in conjunction with the ECDIS equipment when operated in RCDS mode.

Although the wording 'appropriate' used under the provisions of the IMO Resolution has been defined differently by the various authorities of sovereign states, specific guidance can be now be found on the IHO website www.iho-ohi.net/english/encs-ecdis/enc-available/backup-paper-charts.html.

With only a brief review of the requirements of electronic charts and their mode of operation in conjunction with ECDIS systems it is apparent that this is an area which requires careful review by competent well trained and familiarised officers at all stages of the navigational passage.

Generic training

Effective training and familiarisation of the master and officers in relation to ECDIS operation has been identified by the International Maritime Organization

(IMO) as an area of increased concern prompting a revision of the training requirements at the STCW 95 conference held in Manila on 21 June 2010.

Under the revised STCW 95 training requirements entering into force on 1 January 2012 under the tacit acceptance procedure, the Master and those in charge of a navigational watch are required to complete a generic ECDIS training course which meets the new standards laid down under the Manila amendments. This requirement pertains to all vessels fitted with ECDIS equipment irrespective of the fact that the primary form of navigation identified under the provisions of the company management system may be paper.

In the UK the present situation has recently been clarified to some extent by Marine Information Notice (MIN) 405 entitled "Training for ECDIS as Primary Means of Navigation" which was published January 2011. The notice clarifies what training is acceptable for masters and deck officers of UK-flagged vessels which have ECDIS as their primary means of navigation.

MIN 405 presently does not however make any reference to training requirements for vessels fitted with ECDIS systems identified under the company operating procedures to be used as an 'aid to navigation only' with paper charts still identified as the primary means of navigation. As MIN 405 expires on 31 December 2011 it is assumed that a further instruction will be issued reflecting the Manila amendments prior to the 1 January 2012.



Photo CSMART

Type specific training

In general terms the requirement for type specific training for ECDIS has been identified under Section 6 of the ISM Code which establishes a clear requirement for not only effective training but familiarisation with respect to safety and emergency related duties.

In addition to the ISM Code requirements, Marine Information Notice (MIN) 405 paragraph 3 now identifies a clear requirement for ship specific ECDIS training relating to the make and model of the equipment fitted on the ship on which the master or navigation officer is expected to operate. Marine Information Notice 405 further clarifies that this training should build on the MCA approved generic training format and be delivered by the manufacturer; the manufacturer's approved agent or a trainer who has attended such a programme.

The present requirement relating to type specific training for UK-flagged vessel is now partially clarified under the provisions of MIN 405. The use of the words 'and be delivered' does however suggest that the present solution adopted by many leading manufacturers providing computer based training programs may not on their own merits be considered suitable under the new guidelines.

With the dilemma relating to type specific training now clearly identified, many shipping operators may be faced with the logistical headache of either training all their operational staff in every ECDIS system within the fleet or be required to provide an onboard certified 'trainer' having previously completed a suitable 'train the trainer' course.

With many shipping operators encountering difficulties finding a solution to their type specific training requirements two alternatives have been identified below;

At the centre for training excellence at CSMART Almeria, Amsterdam (www.csmartalmeria.com) developed in conjunction with a market leading cruise ship operator, ECDIS equipment has been standardised throughout the fleet with the bridge layout replicated at the training centre. This standardisation effectively circumventing the additional requirement for type specific training as all the systems operated within the fleet is the same.

This training has been further advanced by the introduction of a revolutionary bridge team management approach moving away from the traditional rank structure adopting a function based airline style 'navigator / co-navigator' system which has been proven to effectively reduce the risk of navigational hazards.

An alternative solution to the issue of the training requirements of a multi functional and diverse shipping organisation operating many different ECDIS systems of various generations has been developed by ECDIS Ltd Southampton (www.ecdis.org).

Focusing on the needs of the modern ship manager and their respective requirements, ECDIS Ltd has

developed a centre of learning excellence providing generic training course utilising many different types of ECDIS system in a single training location. This provides increased system knowledge of ECDIS system operation, as well as complying with UK regulations and issuing MCA / STCW ECDIS certification.

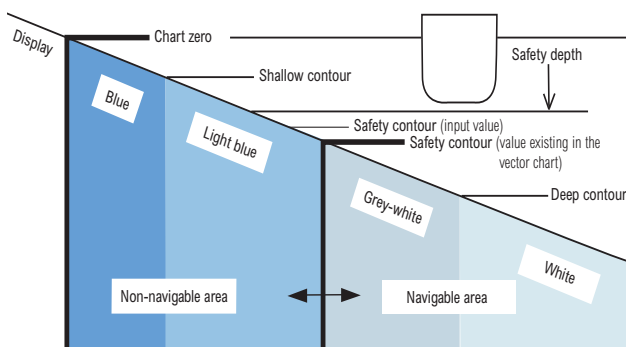
Passage planning

Effective passage planning completed by paper chart or by electronic systems is essentially the process of defining the safest navigational route in conjunction with established safety margins under which the voyage will be executed.

The passage plan should be comprehensive, detailed and easy to interpret and effectively reduce navigational risks and aid the ship and its officers to safely navigating from berth to berth. Electronic navigational planning consists of three stages namely Appraisal, Planning and Control. Although this section does not attempt to offer a guide to electronic planning the key elements will be discussed.

Appraisal – This stage of the plan should identify that the required electronic charts are available and corrected up to date. Areas where ECDIS would be operated in RCDS mode should be identified with appropriate paper charts available. The requirements of sovereign states during periods of coastal passage must be considered (IHO Website) with all relevant publications and sailing directions reviewed. Safety contours should be established and information relating to weather, current, tides, chart datum, draft, speed, environmental limits, air draft, squat and general hazards such as high traffic concentrations should be prepared and made available.

The concept of safety contours is a key function specific to electronic charts and further outlined in the diagram below.

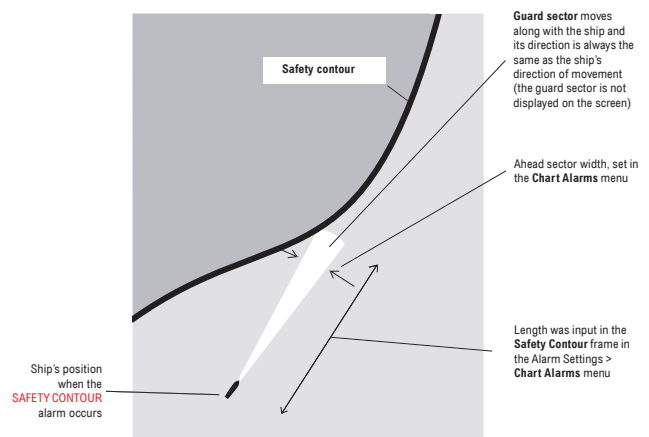


Planning– After the appraisal stage, the planning officer now begins the track planning. The planning stage can be divided into three different sub-stages or ‘cuts’.

During the cuts, the planning officer will move through a quality control process from a general plan to the refined final track which will be used for navigation and approved by the master.

It is essential that the built in automatic check function is used throughout the planning stages however it must be remembered that the effectiveness of the automatic check system relies on the accuracy of the safety parameters set by the user.

The final track is then often displayed with associated waypoint information and navigational notes at the central conning station or chart table for reference by the navigational officer during the Control stage of the passage planning process.



Control – The control stage of the plan establishes how the vessel's progress and the navigational systems will be monitored throughout the passage. This will include an effective analysis identifying all risks of operation. When official ENC (vector charts) are used, systems of automatic and manual checks must be established if the danger of over reliance on automated systems is to be avoided.

Traditional track monitoring methods such as parallel index and visual bearings should be included at the control stage in addition to modern techniques such as radar overlay of the electronic chart. This should however not obscure the radar picture to the level where acquired targets may be lost or the navigation officer may be affected by information overload.

Risk analysis

On review of the increased technology available to the modern navigator one of the conundrums must be why increased computerisation and automation has not removed, and perhaps not even reduced the potential for failure in the systems in which they were introduced.

In fact new pathways to failure seem to have developed centered on an initial miscommunication between man and machinery resulting in a misalignment in the reality

of where the navigator thinks he is and where the automated system has actually taken him.

Research has shown that humans are poor monitors of automated systems and tend to rely more on system alarms than manual checks especially in relation to those systems which have proven themselves as highly reliable.

In several casualty investigations it has been determined that automation has resulted in the navigator developing an 'operational bias' relying on the automated systems rather than the salient cues provided visually through the bridge window.

In this respect an extensive risk assessment of ECDIS operation combined with a clear requirement of manual system checks of critical automated operations must be established within the company Safety Management System effectively identifying operational risk and introducing control measures to reduce the effect of single point failures.

Before we consider the assessment process, the term risk must be defined. Risk in relation to ECDIS operation can be considered as a hazard or source of navigational error with the potential to cause loss or harm to personnel, the environment or the ship (or other ships) itself.

The main areas of risk when considering ECDIS operation can be identified under three main categories:

- 1. The equipment** itself may suffer from failure (both hardware and software) including power outages sensor input failure and potential virus infection.
- 2. The charts** are operated under permit which may expire, charts in use not corrected up-to-date, updates not correctly applied, ENC chart coverage unavailable requiring the system to be used in RCDS mode without the appropriate paper chart folio being available.
- 3. The operation** of the ECDIS system onboard carried out by poorly trained crew following poor navigational practices and operational procedures such as excessive zooming or operating the chart for navigation with base information only displayed.

Effective risk assessment as a critical function of implementation of electronic navigation is rarely emphasised when the transfer from paper to digital navigation is considered.

As our short review of this subject has hopefully highlighted a full and comprehensive risk assessment clearly identifying the hazards relating to the operation of ECDIS systems should not only assist those associated with the task of transfer between the two methods of navigation but also accelerated the migration process and the positive aspects of electronic chart operation relating to increased crew efficiency whilst reducing operational costs.

Conclusion

From this short review of ECDIS operation and the functions to consider when transferring navigational practices from paper to electronic format, it is clear that the process, although complex, can if effectively completed, reduce operational cost whilst increasing levels of safety.

The effect of poor management and training in relation to ECDIS operation can however result in increased navigational risk and operational costs including detention during port state inspections and increased navigational related incidents.

In conclusion of our review of ECDIS, the third and final in this series of short articles considers the legal implications of inefficient ECDIS operation and the effect increased playback and recording facilities of modern bridge equipment may have on the casualty investigation and claims handling process.

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The key to safe ECDIS operation Part 3: Legal implications

The legal effect of failure to meet the statutory ECDIS requirements and the effect on claims where levels of operation or knowledge of ECDIS are considered to be a factor or fundamental link in the chain of causation leading to an incident



Photo Neumayer Channel - Antarctica

Introduction

This article entitled 'Legal implications' is the third in a series of three short articles that consider the effect of the new mandatory requirements of ECDIS. The first article in the series provided the reader with a general introduction to ECDIS and the legislation that governed its operation. The second article focused on the operational aspects of ECDIS considering the requirements of generic and type specific training in further detail.

This final article in the series now considers the legal effect of failure to meet the statutory ECDIS requirements and the effect on claims where levels of operation or knowledge of ECDIS are considered to be a factor or fundamental link in the chain of causation leading to an incident.

This review into the legal implications of ECDIS will commence with a closer look at the legislation relating to ECDIS operation and the effect on the vessel's ability to operate in the event of a failure to comply with provisions of SOLAS, STCW 95 or indeed ISM Code statutory legislation.

The consequences of claims in tort, and under contracts of carriage will also be considered with the consequent change relating to how casualties of the future will be approached from a marine inspector's viewpoint also considered.

New ECDIS mandatory requirements

Statutory compliance

As previously discussed in the first article of this series relating to the new ECDIS mandatory requirements, the international legislation governing ECDIS and its operation is provided under:

- SOLAS Chapter V Regulation 19, which identifies the chart carriage requirements.
- IMO Resolution A.817 (19), which establishes ECDIS performance standards.
- STCW 95 (shortly to be amended by the Manila amendments) that identifies the training requirements relating to ECDIS operation.
- MIN 405 training for ECDIS as a primary means of navigation for UK flagged vessels that further clarify the familiarisation requirements relating to ECDIS operation.
- ISM Code Section 6, which identifies clear requirements for training and familiarisation with respect to safety and emergency, related duties.

With Port State Control inspectors operating under the Paris and Tokyo MOUs now becoming more familiar with ECDIS related compliance and operational issues, an increased focus during random port state inspection is now evident. The effect of failing to meet the established legislation governing ECDIS operation can have severe ramifications including:

- Detention of the vessel under the provisions of Port State control conventions.
- Suspension of Class.
- Evidence leading to the issue of a major non-conformance under the ISM Code resulting in suspension of the ISM DOC / SMC.
- Automatic termination or alternatively excluding the insurer for liability for any breach associated with the failure to comply with the requirements under hull and machinery insurances.

Admiralty damage claims

Claims arise in many forms resulting from loss during a marine adventure. Incidents such as collision, grounding, machinery failure, heavy weather and contact damage to docks and jetties are all matters where the advent of sophisticated electronic aids to navigation and permanent recording facilities available to investigators, will inevitably lead to closer scrutiny and the identification of fault.

Collision

Regulations relating to collision avoidance are contained in the provisions of S.I 1996 No. 0075 (The Merchant Shipping Distress Signals and Prevention of Collisions Regulations 1996). Non-compliance with these regulations is potentially a criminal offence and will be evidence of potential negligence in a civil case for damages.

Electronic record keeping will make it easier to prosecute (or defend) cases where breach of the Collision Regulations is alleged.

Grounding / Stranding

The introduction of ECDIS equipment operated in conjunction with approved ENC charts should make the accidental grounding of competently operated vessels a thing of the past. Automatic route checking, monitoring and alarm systems effectively operated in conjunction with electronic chart safety contours should not only avoid human errors during planning stages but also effectively monitor the ship's position whilst on passage.

Safeguards against accidental changes to the approved passage plan, position inputs, speed inputs, position monitoring and cross reference should be established under the company SMS. However, in the event of grounding incident the effective operation of the ECDIS system will be carefully examined.

With ECDIS systems having many complex features of operation, a failure by the operator to navigate in the correct format with only base chart information selected

for example could result in critical information contained in the chart database being missed or undetected.

Where a failure of the requirements relating to training or familiarisation in ECDIS operation is established, claims arising from the alleged unseaworthiness of the ship are likely to arise and will be of major concern to owners, H&M and P&I insurers.

Limitation of liability

Section 185 of the Merchant Shipping Act 1995 incorporates the Convention on Limitation of Liability for Maritime Claims 1976 into English Law. Article 4 of the convention states that "A person liable shall not be entitled to limit his liability if it is proven the loss resulted from his personal act or omission, committed with the intent to cause such loss or recklessly and with the knowledge that such loss would probably result."

Although this test imposes a significant burden on the party attempting to break the right to limitation it will enable creative claimants the opportunity to probe new areas of investigation where clear breaches in training and operation of electronic aids to navigation can be established.



Claims under contracts of carriage

The provisions of the Hague-Visby Rules are enacted within English Law by the Carriage of Goods by Sea Act 1971 (COGSA 1971), Article III identifies a requirement for the carrier to exercise due diligence before and at the beginning of the voyage to make the vessel seaworthy and to properly man, equip and supply the ship.

Article IV of COGSA 1971 subsequently allows the carrier to be indemnified against cargo claims providing that; "the carrier nor the ship shall be liable for loss or damage arising or resulting from unseaworthiness



unless caused by want of due diligence on the part of the carrier to make the vessel seaworthy, and to secure that the ship is properly manned, equipped and supplied."

With the competence and ability of the master and crew to effectively operate electronic navigational systems established as a critical element in the vessel's ability to encounter the 'ordinary perils of the sea', the cause of cargo damage will now be closely reviewed in relation to ECDIS certification and operation.

Where the carrier attempts to rely on the provisions of article IV of COGSA 1971 to avoid claims relating to cargo damage, the burden of proof rests firmly with the carrier to prove that he exercised due diligence.

In this respect if it is proven that there was a failure to comply with the statutory requirements of ECDIS operation or installation and this failure was considered causative in relation to the incident, the presumption of a lack of due diligence on the part of the carrier may be unavoidable.

Marine insurance claims

The effect of increasing levels of technology on board modern ships and the ability to electronically document the events leading to a marine casualty have created a tendency within the insurance sector to investigate claims against perils insured against with defences such as seaworthiness and lack of due diligence on the part of the assured featuring more often.

Insurance policies covering H&M, and P&I may now be reviewed closely by the insurer especially with the provisions of the ISM Code now linking operational aspects onboard to the 'highest level of management' through the designated person.

The lack or efficiency of equipment, navigational aids or charts has been clearly established as affecting the vessel's seaworthiness both in relation to contracts of

carriage and under insurance policies. Additionally, sufficiency and competency of crew and their levels of training with regard to on board technology can also impinge upon the vessel's seaworthiness.

With the continuing advancements in technology making the question of the dynamics of an incident resulting in loss an item of fact rather than speculation, combined with the link established between the actions of those on board to the 'highest level of management' through the ISM Code, defences to claims relying on traditional navigational perils insured against and negligence of the master and crew may become more difficult to sustain.

Casualty investigation

Casualties and incidents of one kind or another are bound to occur from time to time during the navigation and operation of ships. When they do, legal disputes are likely to arise especially when large sums are involved.

The principle aim of the commercially minded shipowner, charterer and cargo owner is of course to settle any disputes quickly and cheaply. If however a dispute cannot be resolved between the parties then the matter may refer to arbitration or the courts for determination.

In hearing disputes between two parties, arbitrators and judges rely upon the evidence presented to them to establish the facts of the case. This evidence traditionally presented by the parties in the form of both oral and written statements of witnesses and contemporary log entries and documentation has in the past provided the basis on which to decisions have been made.

This evidence sometimes required the courts to determine conflicting statements on a particular issue in dispute. In such situations the judge or arbitrator to establish the facts of the case has heavily relied on contemporaneous evidence such as photographic, video or electronic information.

In this respect electronic equipment designed with a recording facility such as ECDIS, voyage data recorders, AIS data and even GPS have become a crucial part of legal proceedings often used to determine disputed facts.

With literally hundreds of different types of electronic systems with recording facilities operating different generations of software, the recovery of this information can however be a difficult task in itself.

As this critical and at times complex procedure of electronic data recovery has been clearly identified it may be questioned why many ship managers, owners

and operators have failed to provide clear instructions relating to the preservation of such data in the event of an incident.

Additionally, critical information may be lost due to lack of knowledge in relation to the storage space or memory of the equipment in question or by the data being simply overwritten if action has not been taken for its preservation.

With this in mind it seems sensible for the ship manager or owner to establish not only what electronic equipment installed on board each vessel has recording facilities, but also provide clear instructions to the master, which identifies the actions to download the data and safeguard this critical evidence. Failure to preserve evidence may be viewed with suspicion and adverse inferences drawn.



The design of a simple checklist (next page) could be used to establish the equipment onboard with recording facilities and identify the process to be followed in the case of an incident.

It is important to understand that ECDIS systems are capable of recording not only the log of events but the parameters of operation set up by the operator at the time of the incident.

This electronic data may play a crucial part in the litigation process especially during the transition period from paper to electronic navigation where questions relating to the effective operation of ECDIS systems may be raised.

This will mean that in the case of a collision for example where vector charts are selected and overlaid on radars having a primary collision avoidance designation, it may be possible for the officer charged with the navigation duties to reach information overload especially if layers in excess of chart base levels are selected.

Bridge data recording equipment checklist

| | |
|-------------|--|
| Ship | |
| Flag | |
| Date | |

| Equipment | ECDIS/ECS |
|--------------------|------------------|
| Type | |
| Recording facility | |
| Storage capacity | |
| Storage medium | |
| Download method | |

| Equipment | Voyage data recorder |
|--------------------|-----------------------------|
| Type | |
| Recording facility | |
| Storage capacity | |
| Storage medium | |
| Download method | |

| Equipment | GPS |
|--------------------|------------|
| Type | |
| Recording facility | |
| Storage capacity | |
| Storage medium | |
| Download method | |

| Equipment | CCTV |
|--------------------|-------------|
| Type | |
| Recording facility | |
| Storage capacity | |
| Storage medium | |
| Download method | |

| Equipment | AIS |
|--------------------|------------|
| Type | |
| Recording facility | |
| Storage capacity | |
| Storage medium | |
| Download method | |

| Equipment | System alarm equipment |
|--------------------|-------------------------------|
| Type | |
| Recording facility | |
| Storage capacity | |
| Storage medium | |
| Download method | |

If this ineffective mode of ECDIS operation resulted in a target going undetected, ultimately resulting in a collision, the failure of the navigator to act in accordance with the Collision Regulations in this mode of operation may not only result in criminal charges and civil negligence actions, but may render the vessel unseaworthy with questions as to the exercise of due diligence on the part of those responsible for the management of the ship raised by cargo interests or insurers.

This new technological age also places a greater responsibility on the casualty investigator who is tasked to attend incidents and collect evidence. The next generation of casualty investigators now undoubtedly require and extensive understanding in relation to the operation of equipment such as ECDIS and a practical knowledge relating to the principles of electronic navigation.

Conclusion

The ECDIS revolution and the rapid introduction of complex computerised systems and automation on board ocean going vessels is perceived by the industry as a positive change and an improvement in general

standards of operation, levels of safety and protection of the environment.

The technological age has also brought with it new legislation and operational guidance requiring strict compliance. The additional introduction of voyage data recorders (VDR) and ECDIS recording systems now effectively provide the suitably qualified marine investigator with a clear picture of events leading to a marine casualty. Combine this with the requirements of documentation under the provisions of the ISM Code and the preamble and conclusion to a marine casualty investigation is complete.

With the requirement for effective training, familiarisation and operation now receiving increased focus, with traditional damage defences of navigational error, heavy weather and crew negligence now being subjected to additional scrutiny, the ECDIS revolution may be the catalyst which sparks a new cycle in the claims sector and one which may be even more costly than the introduction of the technology itself...

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