



ECDIS

NAVIGATION IN 2018

Captain Paul Whyte, Associate Master Mariner, LOC, London, UK



The International Maritime Organization (IMO) has made the carriage of ECDIS (Electronic Chart Display and Information System) mandatory under SOLAS V (Safety of Navigation) for most large vessels, with the deadline for entry into force, fast approaching on July 1, 2018. This regulatory requirement should not be interpreted as a sign that ECDIS should simply meet the carriage of charts requirement, or indeed that any mariner should be over reliant on global navigation satellite systems (GNSS).

The introduction of ECDIS has led to an increasing debate about the importance of 'active' navigation as opposed to 'passive' navigation. The mandatory use of ECDIS is seen to promote increasingly passive navigation and complacency, with paper charts being relegated to just 'reference use' with infrequent plotting of the ship's position onto paper. As a result, too often GNSS is being relied on as the sole means of navigation.

Groundings or collisions are usually caused by a failure of situational awareness (alongside other contributory factors) and we at LOC seek to establish the causes by analyzing electronic data alongside

traditional 'contemporaneous' evidence using the latest technology to examine the incident.

ACCIDENTS

Analysis of marine accidents shows that despite modern precision navigation and anti-collision systems, the art of navigation is less about knowing where you are, than knowing where you should not be, and that collisions are usually a result of not complying with the Regulations for Preventing Collisions at Sea (COLREGS) through a loss of situational awareness, or worse still, an ignorance of the provisions of the COLREGS.

Every master and/or Officer of the Watch (OOW) should know what is happening around them, where they are and where they are going.

With LOC, I investigate a wide range of incidents and accidents using a valuable tool - MADAS (Marine Accident Data Analysis Suite) – which was originally created for the MAIB (Marine Accident Investigation Branch) and NSTB (the National Transportation Safety Board).

MADAS allows LOC's marine investigators

to examine a realistic reconstruction of the events relating to an accident or incident, fully integrated with the vessel's instrumentation, audio, radar images and video (CCTV where appropriate) giving a reliable and comprehensive understanding of the chain of causation.

This enables LOC's experts to provide fast and accurate advice to customers needing a clear presentation of any collision, allision, stranding, or grounding overlaid onto a chart, site plan or another geo-referenced image using a single source of data from AIS, VDR or ECDIS and VTS, or a combination of one or more.

CULPABILITY

Using this technology, I have identified numerous examples of cases where the master or the Officer on Watch (OOW) has failed to maintain situational awareness, which directly led to an incident or accident. For example, an investigation into a vessel grounding on the Sound of Mull, UK, found that the ship had grounded on charted rocks, resulting in considerable hull damage, port propeller and rudder damage.

The investigation revealed that the passage plan had not been re-evaluated after delays in strong winds. Poor bridge team management and inadequate navigational practices meant that the bridge team did not initiate the post-grounding checklist or musters, and the vessel's managers and shore authorities were not notified.

In another case, a different grounding in the same year and in the same area, the investigation analysis revealed that the OOW had lost situational awareness under the influence of alcohol. There was no other member of the crew acting as lookout on the bridge to alert the OOW. The bridge navigational watch alarm system had been switched off, and the passage plan had not been entered into the Electronic Charting System (ECS), the resulting grounding was so severe that the ship was a total constructive loss.

COAST

I recommend the useful acronym COAST to help promote situational awareness and safe speed when approaching shore. COAST stands for "concentration, observation, anticipation, space and time" and it helps to maintain situational awareness through all phases of navigation, to safely complete a voyage 'berth-to-berth'.

The individual terms stand for:

Concentration: Maintaining a continuous presence on the bridge, with vigilant and well-motivated watch-keepers showing courtesy and good seamanship toward other vessels

Observation: Maintaining a proper lookout by all available means, the foremost of which is looking out of the window to correlate visual and electronic detection. Keeping a good lookout also means systematically scanning the horizon, and moving position to open arcs of visibility and overcome blind spots, as well as to maintain alertness

Anticipation: Making good observations and to foresee the point of no return before committing to a course of action

Space: Allowing sufficient sea room to maintain freedom of movement, as well as allowing space for alternative courses of action

Time: With sufficient space, the ship has the time to safely execute its plan with room to react to any changes that might demand alternative courses of action

ECDIS

ECDIS is undoubtedly a valuable addition to any ship's bridge, but it's not a replacement for navigational skills. It is essential that bridge crews double check the information against other sources, for example, the 'radar image overlay'



and the radar parallel indexing. 'How many pixels wide is the track?' is a key question, as too frequently, the ECDIS safety depth and contour matched to the dynamic under keel clearance has not been properly considered, which will determine the 'No-Go' line and width of safe water.

In many cases where there's casualties when the vessel was off-track, there was a pre-occupation with the displayed electronic 'thin line' track without knowing the relative proximity of shallow water defined by the 'No-Go' line.

CONCLUSION

One way to overcome the over-reliance on ECDIS and GNSS would be for port state inspecting officers to be more robust when checking that ECDIS equipped ships are fully applying the ISM code and best practice. He suggests that they should look beyond the familiarisation training, and check that the company SMS properly regulates the ECDIS manufacturers prescribed bridge procedures and checklists. ECDIS is, he emphasizes, just a chart, albeit an electronic one that will continue to function without a continuous satellite derived position and so it is essential that users learn how to manually dead reckon in case of a GNSS failure.

In the end, it is only by correlating the ship's position and its movement with all the available visual cues and different means of navigation that the professional navigator can keep the ship safe from grounding and collision.

ABOUT THE AUTHOR

Captain Whyte joined LOC in 2012 as Master Mariner and Associate. He has 37 years' seagoing experience and 12 years' sea command. His practical and theoretical knowledge of ship handling, bridge resource management, regulations for preventing collisions at sea, and bridge navigation systems, compliments his experience with both traditional and electronic 'paperless' navigation. He has conducted navigation audits and prepared expert reports for groundings, ice damage, accident investigation, speed and performance disputes, salvage dangers, fixed object damage and unsafe port claims.

ABOUT THE ORGANIZATION

LOC is an independent marine and engineering consultancy and survey organisation, providing high quality services to the shipping and offshore energy industries. An international multi-disciplinary organisation, LOC advises on all aspects of transportation and construction in the marine environment and upon the accidents and disputes that sometimes arise.

ENQUIRIES

Email: p.whyte@loc-group.com
Tel: (+44) 20 7264 3250
Tel: (+44) 7801 920 645