UK P&I CLUB

L P Bulletin

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Bulletin 619 - 1/09 - Use of ECDIS - Worldwide

The UK Marine Accident Investigation Branch (MAIB) issued a report of its investigation into the grounding of a freighter on a sand bank on the UK East coast. The ship's Electronic Chart Display Information System (ECDIS) was the primary means of navigation but none of the ship's officers had been trained in its use.

Of the officers on board at the time of the grounding, neither the chief officer nor the second officer was trained in the operation of ECDIS, but both had used such equipment on previous ships. The master had no previous experience or training on ECDIS or any other form of electronic navigation system. Consequently, many of the system's features which could have prevented this accident were not utilised. Similar factors have been contributory to a number of recent groundings in UK waters.

During the watch, the second officer prepared files for security and safety management audits which had been arranged to take place during the vessel's stay in Grimsby. He also completed the passage plan from the pilot embarkation point to the anticipated berth. The OOW relied on ECDIS alarms to warn when the vessel was approaching an alteration of course or was more than 185m off the intended track. In effect, the monitoring of the vessel's progress was undertaken by the ECDIS, while the OOW spent much of his watch preparing for forthcoming audits and passage planning.

The officer presumed that the vessel would be safe providing she remained within the channel. Consequently, he paid little attention to where the vessel was heading, and did not: investigate the significance of the South Haisbro' cardinal mark and the Mid Haisbro' starboard conical buoy, which the vessel passed at a distance of about 1 mile; check the new course before making a course alteration; see the eddies or disturbed water which, given the height of tide, were probably visible directly ahead of the vessel before she grounded, or; ensure that the echo sounder was switched on. Such actions are fundamental to the duties of an OOW, and would have undoubtedly helped to identify the shallows ahead of the vessel in sufficient time for successful avoiding action to be taken.

ECDIS provides a potentially invaluable asset to passage planning. However, there is a danger that many bridge watchkeepers will increasingly trust what is displayed without question. As this case demonstrates, such trust can be misplaced. The need for bridge watchkeepers to remain vigilant and continuously monitor a vessel's position in relation to navigational hazards remains valid, regardless of the electronic aids available.

At the time of the grounding the master, who was in his cabin, felt a change in the vessel's vibrations. He called the second officer and instructed him to check the depth of water. The second officer looked at the ECDIS display and reported to the master that there was no cause for concern. The depth sounder was not switched on. When the vessel's speed reduced to 1.1 knots the watchkeeping officer realised something was wrong and put the propeller pitch to zero. He then changed the ECDIS display to a 1:50,000 (from 1:100,000) scale and saw that the

charted water depth was less than the vessel's draught. The grounding was confirmed when the depth sounder was switched on.

The reduction in the vessel's speed was detected by Yarmouth coastguard using the Automatic Identification System (AIS) The coastguard station called the vessel on VHF radio to establish if the vessel was aground and needed assistance. The master informed the coastguard that the vessel was aground but did not require assistance. He then put the propeller pitch to full astern, and the vessel refloated without difficulty.

When the vessel berthed at Grimsby the master informed the vessel's classification society and later the vessel's designated person ashore (DPA), of the grounding. No action was taken to save the information recorded on the vessel's voyage data recorder (VDR). Immediately following the grounding, the MAIB conducted a detailed examination of the vessel's ECDIS. It found the voyage plan in use at the time of the grounding had been deleted.

Port State Control

The Maritime and Coastguard Agency (MCA) carried out a Port State Control (PSC) inspection on board and detained the vessel for the following deficiencies:

- The routing of the vessel with a draught of 5.9m across Haisborough Sand where the charted depth was less than 2m
- The ship's navigating officers not being trained in the use of ECDIS
- Not reporting the incident to the vessel's DPA for 23 hours
- The chart support certificate had expired.
- A Flag State Certificate of Equivalent Competency (CEC) for the second officer was not made available for inspection
- A cadet was being used as a rating watchkeeper (lookout) without rating • watchkeeper certification.

Following the vessel's detention the vessel's Flag State instructed the Classification Society to conduct an 'additional' ISM audit on board the vessel. The audit identified two major non conformities: the first related to the failure of the master to report the grounding to the DPA for 23 hours, and the second to the navigating officers' lack of familiarity with, and incorrect use of, the ECDIS system on board.

ECDIS

Watch vector

It is disturbing that, although the safety contour was set at 30m, its associated alarm did not activate because a watch vector, which defines the predicted movement of a vessel, had not been set. The setting of a watch vector is therefore an extremely important feature without which many of the chart alarms cannot operate. The use, or misuse of a watch vector in this, and other accidents, indicates that the significance of this function requires emphasising to all ECDIS users.

Contours and depths

A number of settings related to the charted depth are applied on the ECDIS: the safety contour, the safety depth and the shallow and deep contours. The safety contour provides a visible boundary between "safe" and "unsafe" water with respect to depth, and is highlighted on the display to enable easy identification. It is selected by the navigator to reflect a ship's draught, adjusted for the required under keel clearance and for the height of tide, if required. As depth contours on an ENC are normally only drawn at 5m intervals, the system automatically uses the deeper contour when the selected safety contour depth lies between contours.

The safety depth applies to spot soundings, the depth of which is insufficient for a vessel to safely pass over. Spot soundings less than the safety depth are displayed in bold type to provide a more accurate representation of a vessel's 'no-go' line than the safety contour.

The shallow and deep contours are utilised when the multi-colour depth display is selected. The deep contour is normally set at twice a vessel's draught to indicate when squat is likely to be experienced. The area between the 0m contour and the shallow contour is coloured dark blue, the area between the shallow and safety contour is coloured light blue, and the area between the safety contour and the deep contour is coloured grey. This allows the gradient of the seabed to be graphically displayed. All of the area between the 0m contour and the safety contour is also hatched.

Route planning

When route planning, the ECDIS calculates chart alarms using user defined off track or channel limits for the route selected. Danger areas within the channel limits are shaded red if the safety contour or selected danger areas are crossed. The default setting for the channel limit is 185m either side of a planned track, and the default setting for the safety contour alarm is 30m. Once a plan has been completed, it can be verified using the system's 'check page', which helps the user to identify legs of a plan where the safety contour has been crossed and where defined danger areas are located. A plan does not have to be free of warnings or alarms to allow it to be saved and monitored.

Route monitoring

Route monitoring is divided into two categories: monitored route, and predicted movement. In the first category, an audible alarm activates to warn the user when a vessel moves outside the channel limits and when nearing a waypoint. In the second, an audible alarm sounds when a ship is going to cross the safety contour set on the display, which can differ from the safety contour alarm setting used when planning. To enable this alarm, a watch vector (time and angle) must be defined by the user. If a watch vector is not defined, the safety contour alarm will not activate. When an un-checked plan is monitored, the name of the plan at the top of the ECDIS screen is displayed in red, as are the areas within the channel limits where the safety contour is crossed.

Carriage of ECDIS will be mandatory on High Speed Craft (HSC) built after 2008, and existing HSC are to be retrofitted by 2010. Proposed amendments to SOLAS, Chapter V Safety of Navigation, Regulation 19 Carriage requirements for shipborne navigational systems and equipment require the mandatory carriage of ECDIS on new passenger vessels of 500GT and above, and new tankers and cargo ships of 3000GT and above starting 2012 and proceeding in phases over the following two years. The proposal also requires existing ships to be retrofitted with ECDIS by 2018.

The MAIB is aware of a number of accidents in recent years in which the use or misuse of ECDIS or ECS has been identified as a contributing factor. Members are encouraged to read the full text of MAIB accident investigation report No. 21/2008 and take steps to prevent similar incidents.

Source of information: Marine Accident Investigation Branch (MAIN)
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