5. ECDIS CASE STUDY – ilginozgul.academy

According to Human Errors in ECDIS Related Accidents study, the results of investigation on 'ECDIS assisted accidents' undoubtedly show that of all ECDIS associated errors that deck officers committed in these accidents, the most common ones are related to the incorrect setting of voyage safety parameters, ignorance of alarm systems and their adjustment, and the lack of checks and route corrections. Knowledge of the limitations of the equipment and detection of misrepresentation of information is essential for the safe use of ECDIS. Improving the accuracy of navigation by ECDIS will have a significant effect on avoiding grounding. But due to losing of situational awareness and misunderstanding the system, grounding cases will still occur (The Error Chain in Using Electronic Chart Display and Information Systems, 2008).

1. A vessel was scheduled for a laden voyage from South America to Northern Europe. The paper charts had recently been replaced by a dual ECDIS system – in preparation for the coming IMO ECDIS requirement. The chief officer started to place the different waypoints. The charts used had a scale of 1:100,000. The Chief Officer visually checked each leg of the plan to ensure they were clear of any hazards. In doing so, he noticed that several of the course lines were indicated in RED. The Chief Officer had identified a similar RED indication last time; he believed it was because the water depth in the English Channel was below 30 meters in several places but still sufficient for their ship. He accepted the "RED condition" because the vessel had followed the same route for the last three years, although previously on paper charts as official chart source. The default settings for safety contours were identified as 30 meters and were used throughout the voyage. Fifteen days after departing the loading port in South America, the vessel entered the English Channel from the south. During the watch, the 2nd officer adjusted one of the waypoints in order to avoid a close quarter. He visually checked the new leg and did not see any unsafe passing distances on the leg. However, he was not aware that the turning point in the previous waypoint was adjusted automatically by the system. Shortly afterward, the Master, who was in his cabin, felt a change in the vessel's vibrations. He called the Chief Officer and instructed him to check the depth of water. The Chief Officer looked at the ECDIS display and reported to the Master that there was no cause for concern. The Chief Officer, following the intended course line – on a route that had been ground checked – believed that there were no dangers present at the moment. The vibrations increased, and the vessel began to slow down. The Chief Officer realized that something was wrong and put the propeller pitch to zero. He then changed the ECDIS display to a 1:50,000 scale and saw that the charted water depth was less than the vessel's draught. He realized that the vessel was aground on a charted sandbank – now visible in the 1:50,000 scale ENC, but not on the 1: 100 000 scale. However, the chart was "cluttered" by the wrong settings related to safety contours and depths and did not present the danger very clearly (Gard AS).

   In this case, two errors appear: operational error and human error. Insufficient planning and inadequate control of the passage plan is an operational error. It is human error that the limits of the ECDIS device are not known to the officer and therefore sailing at the wrong scale.

2. A loaded dry cargo ship ran aground on Haisborough Sand off the east coast of England. The vessel quickly refloated without assistance and continued passage to Grimsby, River Humber, where she arrived the following morning. There were no injuries or damage to the vessel, and there was no pollution. The ship grounded 29 minutes after the OOW had adjusted course to follow an amended passage plan shown on the vessel's ECDIS. The route was hastily revised to ensure arrival at high water. This route took the vessel across Haisborough Sand, where the charted depth of water was considerably less than the vessel's draught.

   Similar to the previous case, there are two errors: operational error and human error. The deck officers had not been trained in using ECDIS, and no procedures on the system's use were included in the vessel's SMS (Safety Management System). They were, therefore, ignorant of many of the system requirements

and features, operating the system in a very basic and inherently dangerous manner (The Nautical Institute, 2009).

3. On 9 July, 2018, the LPG tanker Pazifik ran aground on a shoal between the islands of Komodo and Banta. The ship was loaded with 18,000t of ammonia. Since only the forepeak and ballast tanks were damaged, no cargo escaped. After the incident, the vessel sailed to a shipyard in Singapore under its own steam escorted by a tug that had arrived in the meantime. During the vessel's repair, about 50m of the double bottom was renewed, and the rudder was repaired. The latter was damaged when the ship refloated from the rocks during a minor collision with the tug. The investigators found the ship to be in good condition and sufficiently manned with a qualified crew. Work hours and rest periods were adhered to, and no human error was detected. Culminating in the PAZIFIC running aground, this accident is due to the not fully engineered ECDIS, which is approved as a primary means of navigation and displaces other important sources of information, such as sailing directions, without the establishment of a consistent replacement for them. The Master and the second officer did not consider the plotted isolated danger, which is near the place of grounding, a threat to safe passage when they planned the passage. The information in the explanatory note about this isolated danger in the ECDIS/ENC did not cause the crew to conclude that it would pose a hazard to them or their ship. The Master and the second officer stated that the lack of depth information for the isolated danger or area surrounding it prompted the assumption that the water depth corresponded to the surrounding area. There was no appropriate designation around the isolated danger, nor was there any highlighting by a safety contour or the like for lack of depth contours. This accident would probably not have happened with paper charts, as more accurate surveys are available, and given their very nature, unsound surveys result in more distance being kept from shoals (Federal Bureau of Maritime Casualty Investigation, 2020).

   In this case, one error appears: equipment error. There was no problem with the crew and operation, but the ENC used during the voyage was insufficient. To prevent equipment problems, cross-checking should be applied during the voyage. In this case, if the location and route had been checked, an accident would not happen. Since it is not mandatory to have paper charts if the ship has two independent ECDIS, it is not possible in every situation. No matter how careful and preventive measures are taken, an accident can be inevitable. At this stage, the action taken after the accident is of vital importance. Therefore, the precautions to be taken after the accident are as important as the precautions to prevent the accident.