

**Paper for Consideration by HSSC
End users perspective on ENC and ECDIS**

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| Submitted by: | INTERTANKO |
| Executive Summary: | |
| Related Documents: | HSSC8 minutes final, IHO CIRCULAR LETTER 50/2017 |
| Related Projects: | S-57;S-52, S-10x |

1. Introduction / Background

In the work on INTERTANKO Navigation and ECDIS Guidelines, INTERTANKO highlights some issues with ECDIS and ENCs that require workarounds. None of the workarounds are actually fully acceptable seeing that the navigator always have to bypass important safety features of the ECDIS since the underlying ENCs do not provide enough information as it is today.

This paper seeks to point at issues with today's ENC and ECDIS system and seek for future improvement of both standards by IHO as well as adherence to IHO standards by national HO's.

Below we have laid out this paper first by listing a number of issues noted by INTERTANKO members and after that we are proposing way forward.

INTERTANKO are aware of that some issues raised in this paper probably belong to different work groups within IHO. However, the ambition to collect these is to look at the issue of how the end user see and use the ECDIS system with the available ENC charts.

There is currently an ongoing work on S-Mode. INTERTANKO is not convinced that S-Mode is the way forward for ECDIS. However, if we cannot assist the mariner using the ENC and ECDIS systems better than today, it is our belief that S-Mode will be the way forward. IHO can and probably should take the lead in the next generation of ECDIS equipment. However, IHO should strive to work much closer with the end users.

Analysis/Discussion

2. Safety Contour and Safety Depth

The safety contour was originally meant to separate safe from unsafe waters. Yet, it is a fact that there are only few occasions that the safety contour really coincides with the line separating safe from unsafe waters. As a matter of fact, this is an area where our members have numerous concerns.

In the era of paper charts, the colours defining different depth areas were permanently set. The navigator's only option to clearly distinguish between areas where he could or could not safely navigate was to manually plot the outline of the No Go Areas and clearly mark them. By doing that the Officer On Watch (OOW) had a clear picture which waters were safe to navigate through when monitoring the passage of the vessel.

The arrival of ECDIS has changed that. ENCs give the Navigator the option to change the colours of the various depth areas. He can affect this change by just inputting in meters the shallow contour, the safety contour and the deep contour .

The Navigator can further change how soundings are depicted by entering a safety depth in meters (all soundings with a shallower depth than the safety depth entered are shown in a bold font).

The choice of safety contour is of great importance as it is used to trigger alarms and is also used to decide how and where on the chart isolated dangers (small shoals, rocks, wrecks, obstructions) are shown. This is in accordance with IMO ECDIS Performance Standards and IHO S52 Ed 6.1.1. However, this is also still the same thing or close in the new S-101 draft standard where, it is defined that isolated dangers of depth equal to or less than the own-ship safety contour must always be displayed in 'safe waters' (waters deeper than the safety contour).

The Problem

In the best compiled ENC's, the available contours are 5-10-15-20 meters. It is a rare occurrence that the no go areas of a vessel coincides exactly with the currently available depth contours.

Taking into account the no go areas (as defined by the UKC policy of the company) and the available depth contours, there are the two (2) possible scenarios to highlight safe and unsafe waters on the ENC's:

Scenario 1; The no go area of the intended voyage is equal with one of the available depth contours. For example, the no go area of the intended voyage is 10.9 meters and the depth contours available in the ENC are 5.4-9.1-10.9-18.26 metres (charts based on fathoms soundings).

Scenario 2; The no go area of the intended voyage is not equal with any of the available depth contours. For example the no go area of the intended voyage is 13 meters and the depth contours available in the ENC are 5.4-9.1-10.9-18.26 meters.

For the scenario 1, the situation is clear. The navigator sets the safety contour equal to the no go area. Accordingly, the safety contour becomes the boundary that distinguishes 'safe' from 'unsafe' waters. It is yet very important to highlight that this distinction is clearer when the option of two (2) colour depths is selected in the ENC's menu. This is what ECDIS was supposed to do. We could guess that was the original idea when the "safety contour" was designed as a feature for the ECDIS units.

For scenario 2 the situation is complicated. ECDIS systems are designed in such a way that when the required safety contour does not coincide with an available depth contour, the ECDIS displays by default the next deeper depth contour. In the scenario 2 described above, the safety contour cannot function as the boundary between 'safe' and 'unsafe' waters.. The ECDIS unit selects by default the next available contour i.e. 18.26 meters and the image on the screen does not reflect the reality. If the picture on the screen is translated, every sounding less than 18,26 meters is unsafe for navigation. Yet, this is not the case since any depths less than 13 meters is really unsafe to navigate the vessel in. In other words, the vessel appears sailing over unsafe waters and during third parties inspections this practice may cause a problem.

INTERTANKO has identified three (3) different work arounds for scenario 2 above, and as said earlier none of these workarounds are really acceptable since all overrides important ECDIS safety features. But to our understanding, there are no other practical alternatives available to the navigator today.

Recommendations

In the advent of ECDIS and ENC's, it was said that they would give the same information as the charts and above that give more safety layers. Given the above, INTERTANKO would like the future ENC's and ECDIS systems that ability that it was aimed at initially. However, in order to achieve this we must first leave the 1:1 paper chart and ENC comparison and do something new with ENC's and information.

An example, today the navigator is given (in ENC's and Paper Charts) depths and contours that are seen as suitable for a paper chart and how that will look, avoiding overlaps of depth figures and readability. This is not an issue for ENC's as its data and can be manipulated as such.

It is suggested that this should be targeted in two phases.

Phase one:

On the one hand, the navigator plots manually the no-go areas on the ENC's. This is time consuming and difficult task since the navigator has to scan visually all depths in order to connect those concerned and produce in this manner the no go area. It is obvious as well that the task is subject to lots of mistakes since the navigator has to almost constantly interpolates among the existing depths in order to pick the desired one.

On the other hand, the ECDIS unit should be able to plot automatically the no-go area based on the company's

policy. Indeed, the unit may also have to interpolate among the existing values in order to get the proper one, yet it will not be time consuming. In addition, a no go area generated by the unit will certainly be able to generate alarms in case the navigator is about to violate it.

It would further be appropriate if IHO issue a guidance on how to address the problem with safety contours aimed at mariners. INTERTANKO can assist in producing such guidance.

Phase two:

Almost all HOs have today available databases with soundings that goes beyond what is shown in the charts (not to be mistaken with high density bathymetric information, that's another thing). For the future our ECDIS charts and systems must leave the paper chart thinking and go fully digital. We must have smarter ECDIS systems that are provided with much more data. In the example above, an ENC should have as high as there is available density bathymetric data (Such systems are available today for pilots, but off the shelf systems cannot use them), then use the safety contour thinking as it was intended namely safety contour=safe draft. We will only have one way to do this and its GO areas created with higher density bathymetric data (not to be mistaken by the high density bathymetric data as laid out in S-102 that is needed for precision navigation).

3. Quality of ENC data

Members of INTERTANKO have raised concerns on the quality and the speed in which new and updated terminals, fairways, light boys, dredging, CATZOC values etc find their way into charts and ENC's.

Mariners rely on the data contained in charts and related publications to safely navigate from A to B, when we time after time find inaccurate information in our charts and ENC's, it affects the safety of navigation.

We have below listed some of the reports from members of the concerns listed above to reflect the problem in general. But, the committee should note that the below issues may or may not have been corrected, and are only here to list a general issue with the quality and the speed in which corrections find their way into charts and ENC's. We have not named where these findings are from, but we know that exist in all parts of the world.

CASE A:

While anchoring the ship observed, 5 sets of Buoys which were sighted Visually and by Radar were missing on the ENC at an entrance to a large port. This has then been observed later with the same company without updates to chart/ENC.

CASE B:

INTERTANKO have had two reports of two different large new terminals where the terminals have been open for more than 6 months and the terminals, fairways or entrances does not exist on charts. In one of the cases the ship moors on land in the existing chart. This means that the construction has been going on for years, and still no charts at all for these terminals.

Case C:

The member's Vessel observed that one of the North boundaries of TSS was not displayed on the ENC.

Case D: CATZOC

After HSSC8 INTERTANKO has been notified that US authorities NOAA and UACE will start to cooperate on CATZOC values and hopefully US fairways will be populated with CATZOC values soon. However, this issue was not isolated to US fairways, INTERTANKO are aware of a number of places around the world where CATZOC is set to "U" when there indeed exist good bathymetric data. We are also aware of instances where a lower than reality CATZOC value is set by HO's.

This year there was grounding by a member vessel on an uncharted shoal. The incident report says:

"...the large tanker was on its planned route, in waters far exceeding the draft of the vessel with a charted depth had a ZOC on the ECDIS chart that was category "B". ECDIS play back as well as VDR data confirmed

that vessel was within planned route."

The above highlights the issues for mariners today where there is a requirement from the industry to take CATZOC into account when calculating UKC and where the CATZOC values may or may not be correct.

INTERTANKO thanks IHO for circular letter CIRCULAR LETTER 50/2017, and with this we would like the importance of that circular and also point on the fact that it's not only CATZOC value U that is a problem.

Recommendations

The Hydrographic Organisations around the world must be aware of the huge the trust mariners have in the publicised charts. The hydrographic offices around the world should make all efforts to have the correct and most updated information on charts and ENC's in a timely manner.

Our main concerns:

- i. to minimise the "unassessed" areas particularly in
- ii. If the "depth accuracy" figure should be taken into account in doing UKC calculations (since this was not a practice when paper charts were in use). an IHO guideline on this would be very helpful.

Lastly, the above brings a question; if there should be any enforcement mechanisms made available this purpose, and if so how could that be done.

4. Marking in ECDISs and charts

An incident was reported by an INTERTANKO member where a vessel had anchored on a wreck and caused a disruption. In looking in to the causes the incident it was noticed that the officers on this vessel had not clicked on the depth in the chart and thus seen that this specific depth was depicting a wreck. On the paper chart the below was shown.

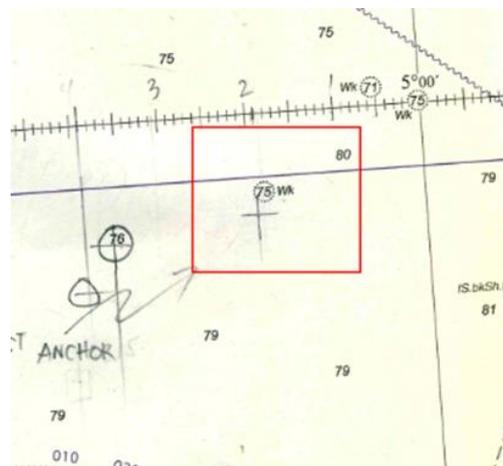


Figure5 the wreck clearly marked on a paper chart.

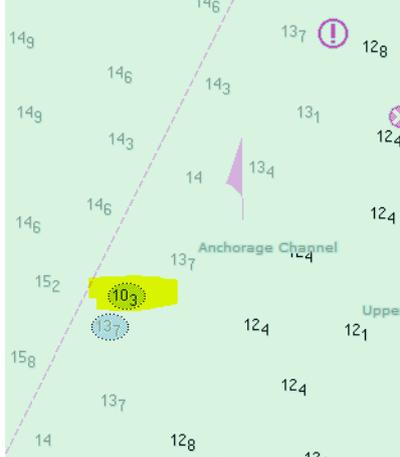
This kind of issue is one of many where an operator of an ECDIS does not have all the information immediately available, but have to go in and ask the ECDIS for more information. We are aware of the new mouse over function, but this could be further enhanced and made more user friendly.

Spot Soundings in pres. Lib 4.0

In new PL 4.0 systems object will ONLY be shown as an isolated danger  (part of Base display) and give an alert in case of planning/monitoring IF its depth is EQUAL OR SHALLOWER than the set Safety Contour.

If they are DEEPER than the set Safety Contour then they will be displayed as a regular object e.g.  -

part of All Other (not Base or Standard) display and will NOT produce any alert in the planning or the monitoring mode. The below table demonstrates the combination of settings suggested by the a Workaround to the safety contour issue raised above where the dangerous object (10.3m – shallower than 13m of declared safety draft) may not be visible on the screen and therefore may be missed in both the route planning and the monitoring modes:

| Safety contour set = 10m All Other | Safety contour set = 10m Standard + spot sounding | Safety contour set = 13m Standard + Spot sounding |
|--|---|---|
|  |  |  |
| <p>Dangerous object of 10.3m is shown on the chart but not as an isolated danger</p> | <p>Dangerous object of 10.3m is NOT shown on the chart at all</p> | <p>Dangerous object of 10.3m is shown on the chart as an isolated danger and will produce relevant alerts –</p> |

Safety depth is set to 13 m to highlight soundings less than 13 m.

Its very difficult to understand how it has been made selectable for obstructions with soundings in the ECDIS charts. This can prove to cause groundings if this has been unticked by mistake.

5. T & P notices

INTERTANKO notes the IHO progress on recognizing that T&P notices in general do not have a role in ENC production and that the weekly updates should include T&P notices. INTERTANKO also recognizes that the new Presentation library allows for timed entries in ENC updates.

However, INTERTANKO do despite the fact that this has been recognised by HSSC and IHO, there is still not a finalised solution and UKHO is still issuing AIO because there is a need to do so. For the benefit of the end users

Recommendations

INTERTANKO asks HSSC to clarify where this issue is right now and asks HSSC and IHO for guidance on how to apply T&P notices onboard ships going forward.

6. README.TXT file

README.TXT file - consist of disclaimer and specific information from the countries that deliver ENCs. This information sometimes could be navigationally significant and required to be reviewed for changes when the ECDIS is updated.

Example of Readme Text files:

UK Admiralty:

<https://www.admiralty.co.uk/AdmiraltyDownloadMedia/AVCS/README.txt>

ENCs for New Zealand:

<http://www.linz.govt.nz/sea/charts/electronic-navigational-charts-encs#encreadme>

A lot of the information in readme text file is repeated in every update and navigator may miss the important information

Recommendations

INTERTANKO Suggest having an Initial (base) readme file which may contain the standard information which currently repeated in every update.

In addition to this create a new file to contain only the changed or amended information. IHO may consider to include with fixed categories and only contents the key information for navigators (eg. ENC DATA APPEARANCE, UPDATES/ CHANGES, WITHDRAWN ENCs.). All countries that produces ENC should follow such standard format to simplify for the end users.

Action Required of HSSC

The HSSC is invited to note the issues raised in this paper and take action as appropriate, specifically those highlighted in 2 to 6 above.