

Paper for Consideration by TSMAD

Discussion paper on the use of symbolization of ENC in ECDIS compared with paper charts

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| Submitted by: | Denmark |
| Executive Summary: | A discussion paper on the use of symbolization of ENC in ECDIS compared with paper charts |
| Related Documents: | IHO ECDIS PRESENTATION LIBRARY |
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Introduction / Background

The Danish Maritime Authority has informed the Danish National Survey and Cadastre (KMS) that some mariners could have problems with some of the symbols shown in ENC and ECDIS. To be more concrete, the symbolization used in relation to roundabouts have been identified as a possible cause of mariners' confusion and could potentially lead to accidents.

The Danish Maritime Authority has contributed an example of how the symbolization of a roundabout in ENC/ECDIS might have played a role in an accident in early 2011. Based on this example, KMS has investigated the problem.

From a Danish point of view and in relationship to the development of ENC and ECDIS to enhance safety, we find it important to investigate this further and to find a solution.

Analysis/Discussion

In early 2011 at a roundabout in the southern waters of Sound, two ships coming from the north in the same lane in the TSS encountered "problems" in the roundabout (see figure 1).

Subsequently, the following has been investigated:

- whether the symbolization in ENC/ECDIS could have had any influence on the incident
- whether KMS had made a failure in encoding the ENC
- whether the ships might have misunderstood the symbolization of ENC/ ECDIS in relation to the symbolization used in paper charts.

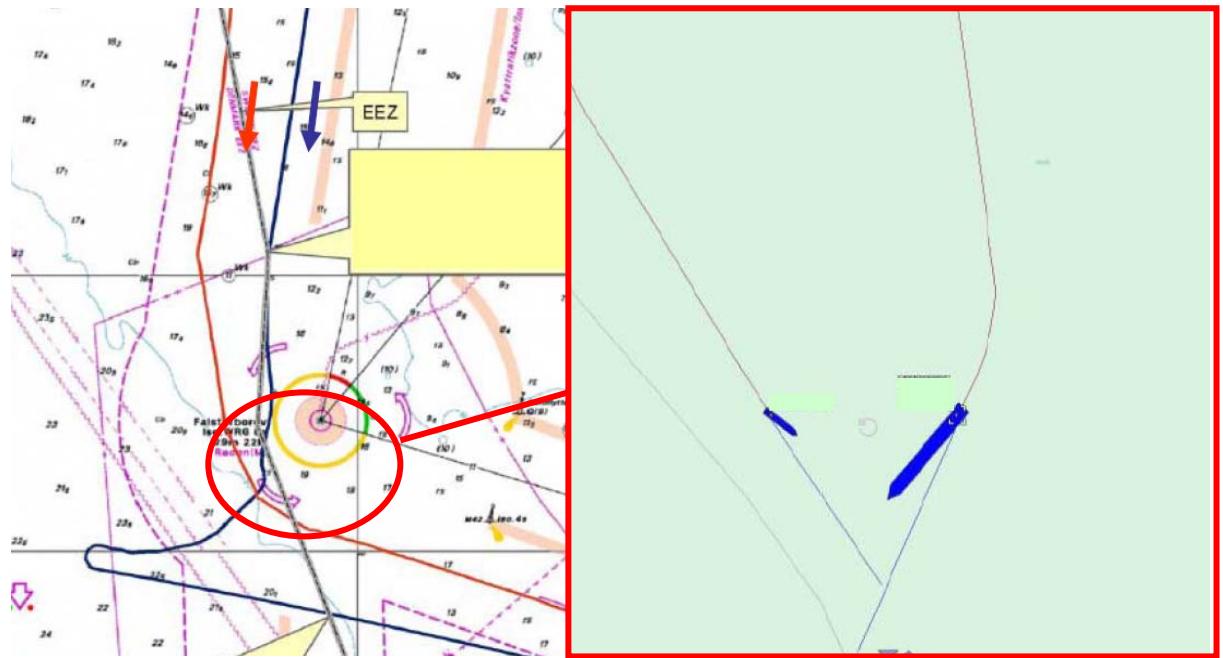


Figure 1.

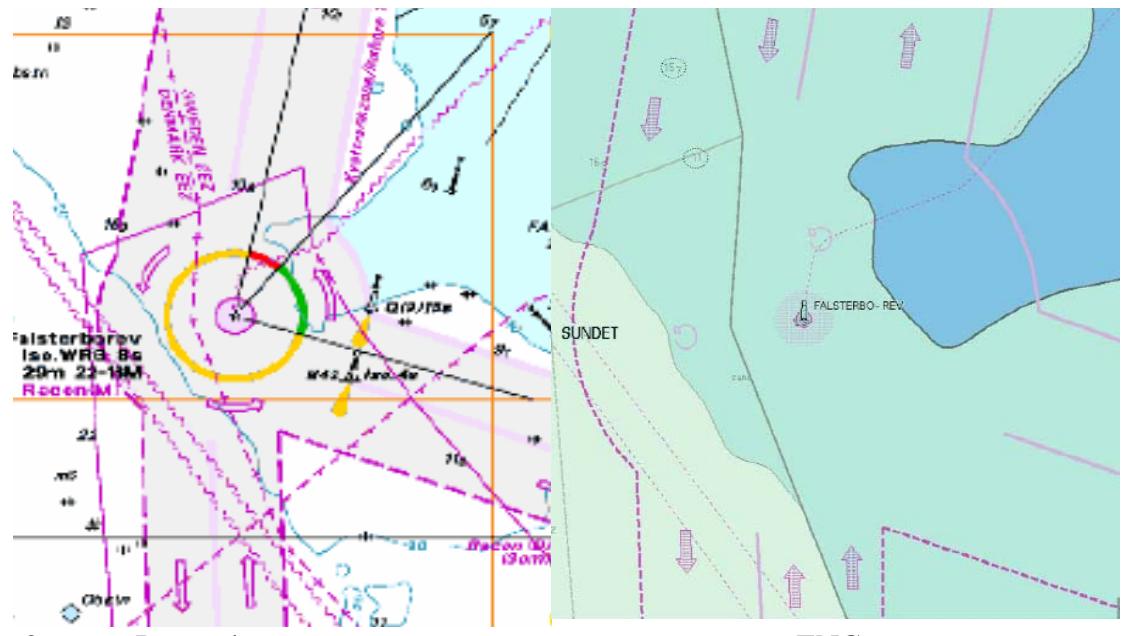


Figure 2. Paper chart

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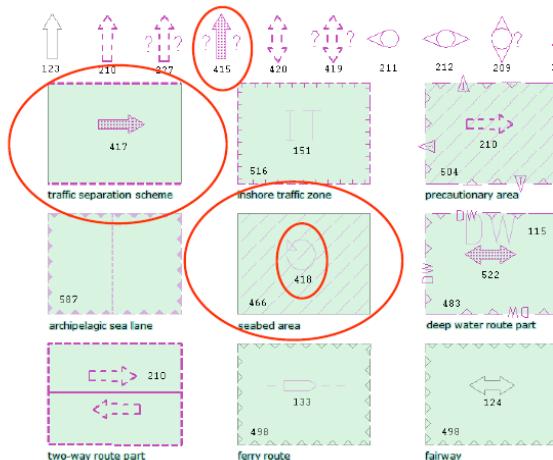
A comparison of the symbolization of the roundabout in the paper chart and ENC respectively has revealed some minor differences (see figure 2).

It is clear that KMS had encoded the information in ENC correctly and in accordance with the specifications of S-57.

The traffic roundabout was also displayed correctly in ECDIS, in accordance with the IHO publication IHO ECDIS PRESENTATION LIBRARY Edition 3.4, January 2008.

The symbol/icon in the ECDIS for a roundabout (the "pig tail") follows IHO standard 418. The roundabout also follows the IHO standard 466 (as shown in figure 3).

Symbols in ENC/ECDIS



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| 415. SY(TSLDEF51) | TRFCD CHMGD | one way lane of a traffic separation scheme, with the direction not defined in the data |
| 417. SY(TSSLPT51) | TRFCD | traffic direction in a one way lane of a traffic separation scheme |
| 418. SY(TSSRON51) | TRFCF | traffic roundabout |
| 466. AP(TSSJCT02) | TRFCF | precautionary area or a traffic separation scheme crossing or roundabout |

Figure 3.

If arrows as those shown in paper chart (figure 2) should have been presented in ENC/ECDIS, a look-alike curved arrow symbol with a counter-clockwise direction should have been used, as shown above in figure 3.

417. TRFCD traffic direction in a one-way lane of a traffic separation scheme

415. TRFCD CHMGD one way lane of a traffic separation scheme, with direction not defined in the data

The use of the "pig tail" symbolization indicates the presence of a roundabout and illustrates the direction of rotation in the roundabout. However, *it is not an indication of the centre of the roundabout*. The centre of a roundabout is shown as a "traffic separation area (TSEZNE).

The presentation of several "pig tails" in the roundabout, as symbolized in ECDIS, and several arrows in the associated TSS is caused by the fact that the ENC covering the roundabout is produced respectively by Denmark and Sweden (see figure 4).

Dynamic symbols shown in ENC/ECDIS:

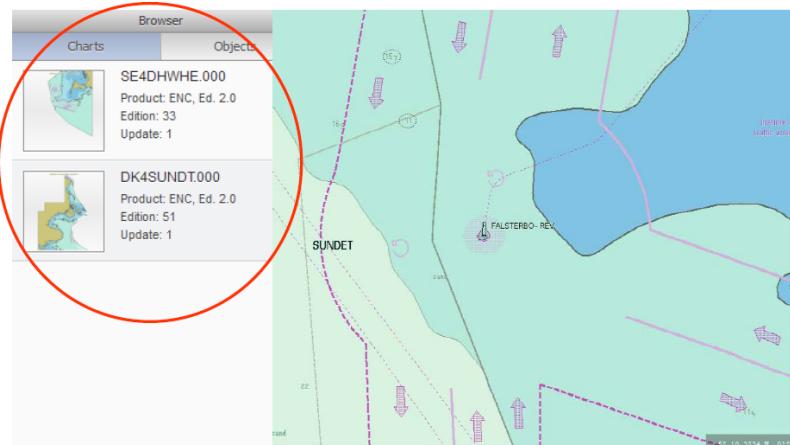


Figure 4.

KMS has not had direct contact with the vessels involved in the 2011 accident or access to other information about the incident. Consequently, it is not possible to determine how or whether symbolization was directly or indirectly a causal factor.

From a navigational point of view, it is important to emphasise that the Convention on the International Regulations for Preventing Collisions at Sea (COLREG) applies to both vessels in this area.

We have informed NHC members at the NHC 55th conference of this issue, and it was recommended to inform TSMAD in order to spur a further investigation of the problem and, if deemed appropriate, to inform the Digital Information Portrayal WG (DIPWG) to take necessary actions.

Conclusions

There is not enough information to determine from this single incident whether the symbolization of roundabouts in ENC/ECDIS creates confusion to the mariners. We find it important to study the use of symbolization in ENC and ECDIS compared with paper charts in general. Safety at sea can be enhanced through an investigation of this and possible further conflicts between symbolization in ENC/ECDIS and in paper charts.

Recommendations

In this context, and in order to enhance safety at sea, it is proposed that TSMAD consider taking the following actions:

- To investigate if other HO have experienced or foreseen similar problems and how they manage this challenge;
- To discuss whether there is a need to establish a principal approach on how to deal with this issue, and how IHO and national HOs can participate in finding an appropriate solution.
- To consider informing the Digital Information Portrayal WG (DIPWG) of this issue.

TSMAD is invited to:

- a. consider this proposal
- b. and to take appropriate actions.