

Paper for Consideration by Data Quality Working Group

How Italian Hydrographic Institute (I.I.M.) allocates CATZOC values

Submitted by:	Italian Hydrographic Institute (I.I.M.)
Executive Summary:	Description how I.I.M. allocates CATZOC values to own ENC portfolio.
Related Documents:	S-57
Related Projects:	//

Introduction / Background

The purpose of this paper is to provide a contribution about guide lines on CATZOC values to assign to ENCs and to get a feedback in order to improve our internal procedures.

Analysis/Discussion

Italian ENC portfolio consists of about 260 cells covering the six navigational purposes according to IHO S-57 Appendix B.1 "ENC Product Specification".

During the years, Italian ENC production process has changed. At the beginning ENCs were digitalized from paper charts. Later, this method was replaced by other production processes that use digital data or raw data. However, although the digitalization process from paper charts is not in use anymore, about 50% of our issued ENC portfolio includes ENCs produced by digitalization from paper charts.

During the years, due to the change in the production process, the Italian general rules about the value of CATZOC on ENCs were changed, based on several factors:

1. The ENC production process:

- ENCs derived by digitalization from paper charts (production workflow not in use anymore): only one M_QUAL object with CATZOC= B or C covers the bathymetric data. We calculated the CATZOC value in accordance with survey date and characteristics. Moreover, we downgraded the value to include errors introduced in the ENC production process (change of datum and digitalization process);
- ENCs produced from digital data or raw data: bathymetric data are covered by one or more adjoining M_QUAL objects with CATZOC = A1, A2, B, or C in accordance with the parameters described in the ZOC table included in S-57 Supplement No. 3 June 2014. We do not downgrade the CATZOC value due to generalization process (also when the same data are used for smaller ENC scales).

2. The S-57 Feature object used to encode the sea area:

- UNSARE object: we use this feature object to encode completely unsurveyed areas. Italian current policy is to cover UNSARE objects by M_QUAL objects with CATZOC = U. This encoding method has been forced by our ENC validation software and by RENC IC_ENC validation policy. However, we would like to change this rule, because it is meaningless to assess the quality (ZOC) of an unsurveyed area, encoded as UNSARE, when no data are available at all. In this particular situation, no M_QUAL object should cover the UNSARE object. On the contrary, if the UNSARE object includes or crosses/overlaps bathymetric features (i.e. DEPCNT, OBSTRN, SOUNDG, UWTRC or WRECKS), it is mandatory to cover it completely with a M_QUAL object, and the CATZOC value should be equal to D.
- DEPARE object is used when:
 - o bathymetric data are available. In this case the DEPARE objects are covered by one or more adjoining M_QUAL objects with CATZOC equal to A1, A2, B or C in accordance with the parameters described in the ZOC table included in S-57 Supplement No. 3 June 2014;
 - o there is a blank area covered by larger scale ENCs (including details on the quality of bathymetric data). In this case, the blank area is encoded by a DEPARE without details in bathymetry and it is covered by a M_QUAL object with CATZOC equal to D and by a CTNARE object;

- no survey data are available and the sea area is included between the coastline and the outer limit of the surveyed area (this DEPARE may be either 0-2m or 0-5m)¹. We do not encode this kind of sea areas shallower than 2 or 5 metres as UNSURVEYED and we apply the following rules:
 - ✓ If the adjoining survey is covered by M_QUAL with CATZOC equal to A1 or A2, this DEPARE 0-2m or 0-5m is covered by a M_QUAL object with CATZOC equal to D.
 - ✓ If the adjoining survey is covered by M_QUAL with CATZOC equal to B or C, this DEPARE 0-2m or 0-5m is covered by the same M_QUAL with CATZOC equal to B or C.

However, the rules described above are applied when the width of the DEPARE is larger than 1 cm at the compilation scale.

- DRGARE object:
 - if the dredged area is regularly maintained, it is covered by M_QUAL object with CATZOC = A1;
 - if the dredged area is not regularly maintained, it is covered by a M_QUAL object with CATZOC=D;

3. The usage band:

- ENCs of usage band 1 (overview) and 2 (general): only one M_QUAL object with CATZOC=D is used, except for UNSARE, covered by M_QUAL object with CATZOC = U²;
- ENCs of usage band 3 (coastal), 4 (approach), 5 (harbour) and 6 (berthing): the ZOC value is assessed in accordance with the ZOC table included in S-57 Supplement No. 3 June 2014. We do not downgrade the CATZOC value due to generalization process (also when the same data are used for smaller ENC scales).

Generally speaking, it is worth noting that:

1. Degradation of CATZOC value due to the passage of time:
CATZOC values are not downgraded due to the passage of time
2. Degradation of CATZOC value due to the instability of bathymetry:
CATZOC values are sometime downgraded due to the instability of bathymetry.
3. Degradation of CATZOC value due to the generalization to smaller scale:
CATZOC values are not downgraded due to the generalization to a smaller scale.

Conclusions

Common rules on CATZOC value assessment have to be defined.

In particular, it is important to define a common operational approach on the following situations:

- ZOC values in UNSARE;
- How to downgrade CATZOC values due to the passage of time and the instability of bathymetry;
- How to downgrade CATZOC value due to the generalization to smaller scales;
- How to use CATZOC=D to assess the DEPARE included between the coastline and the outer limit of the surveyed area (described in the para above).

Recommendations

Please provide feedback, comments and recommendations.

Justification and Impacts

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Actions Required of DQWG

The DQWG Members are invited to:

- a. note and discuss this paper;
- b. provide feedback.

¹ IT general RoPs imply that surveyors shall survey sea bottom up to 2 metres depth (5 metres in the case of rocky areas). We seldom receive data shallower than 2 metres.

² This encoding method has been forced by our ENC validation software and by RENC IC_ENC validation policy. However, we would like to change this rule as described in the document.