CATZOC allocation practice, NORWAY

In many areas ENCs are based on old hydrographic data with inferior positional accuracy compared to that which is possible with modern technology. In digital charts the data quality in different areas is specified in terms of a Zones of Confidence (ZOC) value. Zones of Confidence are placed in ENCs according to accuracy demands and the type of survey used as provided in the ZOC Category Table.

Until autumn 2013, mainly category B and C were used for Norwegian coastal waters based on the following classifications:

- ENCs with source data from older surveying (pre 1960) were given ZOC value C
- ENCs with source data from surveying (post circa 1960) were given ZOC value B.

From January 2014 the areas measured with multibeam sonar and which otherwise met the requirements were assigned the categories A1 or A2.

Currently the Norwegian Hydrographic Service is working to update some of the Zones of Confidence based on the quality of bathymetric data and equipment used during survey. The following table is in use:

Survey/ Echo sounder type	Year survey was provided	Data Quality
Multibeam/EM100	1980 og 90s	B
Multibeam /EM100	End of 90s and newer	A2/B dependent on depth: B (areas shallower than 30m) A2 (areas deeper than 30 m)
Multibeam /EM1000	1990s – early 2000s	A2/B dependent on depth: B (areas shallower than 30m) A2 (areas deeper than 30 m)
EM 710	2000s	A2 (areas deeper than 30 m)
Multibeam/EM1002	1999 – early 2000	A2/B dependent on depth: B (areas shallower then 30m) A2 (areas deeper than 30 m)
Multibeam/EM3000	2000->	A2
EM 3002	2000->	A2
EM 2040	2014->	A2
Blom-survey	2002-2003	B

As can be seen from the table, areas that were surveyed with multibeam technology prior to the year 2000 were allocated A2 or B depending on depth. The type of echo sounder used is also taken in account. Some of them (EM100, EM1000/1002, EM710) provide higher quality in deeper areas, and lower quality for shallow areas.

In addition, in Hordaland and the northern part of Norway there are still charts partly based on surveys that are up to 100 years old. The production of modern charts of these areas based on new surveys has been given high priority.

Uncritical use of older charts in the waters around Svalbard and modern positioning systems (like GPS) can, because of discrepancies etc. related to the datum, lead to serious mistakes (several hundred meters) during navigation. This further means that the safety margin that sailors should always apply may not be in place as expected.

In some of the older charts, information is given showing the displacement between the graticule of the chart and the World Geodetic System (WGS-84). New charts for the area are produced in accordance to the World Geodetic System (WGS84), while new prints of the older charts retain the existing graticule. The Norwegian Hydrographic Service reminds the users that the paper charts in the area are on a scale of 1:100 000 or less, and that these charts often form the basis for electronic charts over these waters.

For general information about the quality of the charts around Svalbard, reference is made to The Norwegian Pilot guide, Volume 7 and the information given in each chart.

Users should be aware that all given corrections (shifts in datum) must be considered approximate. The coastline can have considerable discrepancies when compared to the graticule of the chart.

Furthermore, the lines of survey for these waters are spaced out to such a degree that the occurrence of undiscovered shoals and rocks cannot be excluded. Accordingly, navigation in these waters requires extra caution. The navigator should, in keeping with established navigational traditions, use all accessible navigation aids (including radar), continuously compare the observations from the different aids, remain vigilant and ensure that the navigation at all times is carried out applying a sufficient safety margin. Use of electronic charts does not relieve the navigator from these tasks, and will still require the same professional and critical attitude as with traditional navigation using paper charts.

Changes in glacier fronts and coastline – glaciers used in conjunction with leading lines. The glacier fronts seawards are continually changing. In general, the glacier fronts are receding. Observations exist where the glaciers have receded several hundred meters during the last decades. It is also usual that the glaciers have shorter periods when advancing considerably ("surging glaciers"). Large quantities of ice then move downward from the top of the glacier and collapse below. For this reason, contour lines and terrain close to the glacier can deviate from contour lines on the chart.

As an example, the Fridtjovbreen in van Mijenfjorden advanced about four kilometres from autumn 1995 and the next two and a half years. In the chart, the glacier fronts seawards can refer to a certain year, but such information does not always exist. Changes in the front of a glacier can cause a considerable difference between the existing front and the charted front. In areas where the glacier fronts have receded compared to fronts shown on the chart, no depth information exists.

In addition, the coastline can change, in particular close to large rivers. The user should bear this in mind and ensure that the utmost care is taken when navigating close to glacier fronts and river estuaries.

Glaciers are in some cases used as a reference in conjunction with leading lines. These can be old and well-known points that have been used for decades. Changes in the form and outline of glaciers may however have caused changes in the reference point. Where glaciers are used as reference points great care must be taken during the navigation, and it must always be done in conjunction with other navigational aids.

Surveys are incomplete in some areas of Svalbard. Large areas are not surveyed at all. These areas are presented as white areas limited by a red dashed line and the text "Unsurveyed". We will strongly advise against any navigation in these areas – even if some soundings and underwater rocks are shown. The areas should be referred to as unsurveyed. Areas inside the 50 meters depth contour in areas with old surveys are not safe. We advise against all navigation in such areas. In newly surveyed areas of Svalbard, the surveying is performed at depths deeper than 3 meters only. Shallow areas are not surveyed. Refer to the warnings and source diagram in the charts.

To ensure optimal use of resources, the Norwegian Hydrographic Service has conducted external market research in order to ascertain users' evaluation of how remaining areas should be prioritized. The recommendations are taken into account in the production plans. This means that there will be a mixture of old and new depth data within the same ENC or paper chart.