

**4th IHO HSSC Meeting  
UKHO, Taunton 25-28 September 2012**

**Paper for Consideration by HSSC**

**Comments by Finland  
to the Report of the Tidal and Water Level Working Group (HSSC4-05.8A)**

*Submitted by:* Finland

*Executive Summary:* The document includes comments and proposals to the Report of the Tidal and Water Level Working Group.

*Related Documents:* 1. HSSC4-05.8A

*Related Projects:* None

### **Introduction / Background**

a. TWLWG4 meeting in May 2012 drafted amendments to the IHO Resolution 3/1919. After the meeting the TWLWG Chair has forwarded the draft resolution for TWLWG members for comments by end of June 2012. Brasilia has forwarded their quite extensive comments and proposals to the draft. Finland has supported these. However, not all of these proposed amendments are included in the draft.

b. The BSHC ChartDatumWG at its meeting on 28-29 August 2012 discussed the draft and found that some specifications are not satisfactory, especially to those issues which are related to non-tidal or inland waters. The ChartDatumWG proposes the following amendments to the draft into Paragraphs 1, 6, 7 and 8.

c. The Paragraph 1 needs a clarification to include also non-tidal waters and water level observations. The Paragraph 1 is proposed to be amended as

1 It is resolved that chart datums (datums for sounding reduction), the datums of tide/**water level** prediction and other tidal datums, **as well as all water level observations**, shall always be connected with the general land survey datum, and, in addition, with a prominent and permanent fixed mark in the neighbourhood of the tide gauge, station, observatory etc.

d. The Paragraph 6 seems to miss the depths and vertical clearances which are important to navigation. For vertical clearances see the explanation in paragraph e). The Paragraph 6 is proposed to be amended as

6 It is resolved that **depths**, heights on shore, including elevations of lights, **and vertical clearances**, should be referred to Mean Sea Level (MSL) or other level as closely equivalent to this as is practically acceptable to Hydrographic Offices. The datum used should be clearly stated on charts.

*Note: The adopted level may be a well-defined geodetic datum as used for heights in land survey applications or an observed local Mean Water Level (MWL) based on long series of water level observations.*

e. The Paragraph 7 is proposed to be modified so that the requirement related to vertical clearances in non-tidal waters is moved to the Paragraph 6. The requirement to

use HW datum for vertical clearances is proposed to be cancelled and the Paragraph 6 should be based on the principle that all depths and heights are all counted from the one and only MSL (or equivalent) chart datum. When navigating on non-tidal water the mariners should be aware that water level may be lower or higher than the chart datum. The marine should be able to define both underkeel and vertical clearances with uniform principles. The last sentence is proposed to be more wide and more clearly. The Paragraph 7 is proposed to be amended as

7 ~~It is further resolved that a HW datum be used for vertical clearances.~~ In order to support other applications ~~allow the development of regional solutions,~~ it is recommended to adopt the mean of yearly lowest/highest water levels observed over a long time period. ~~that an appropriate long term range of low/high water definitions of the lower/upper 94-100 percentile be adopted.~~

f. The Paragraph 8 needs to be clarified so that it allows also other datum or datums than LW datum. Paragraph 7 is valid also for inland waters and a sentence on that is proposed to be added. The Paragraph 8 is proposed to be amended as

8 It is resolved that data shown on charts and publications should be referred to ~~an~~ appropriate ~~low water~~ datum. The selection of the datum(s) to be used is a difficult issue which can only be determined locally and which will be largely dependent on seasonal hydrological conditions. ~~Paragraph 7 applies also for inland waters.~~

g. A clean copy of the proposed amended Resolution 3/1919 is attached in Annex 1.

h. The BSHC has its 17<sup>th</sup> Conference on 18-20 September 2012 and the BSHC ChartDatumWG has invited the Conference to endorse these proposed amendments.

i. If these amendments are approved, these changes may have also implications to IHO S-4 specifications (e.g. B-405.3) and likely also in other IHO documents. A review of the IHO specifications may be needed.

### **Action Required of HSSC**

7. The HSSC4 meeting is invited to

- **endorse** the proposed amendments
- **take** actions as seen appropriate

Annex 1: Clean copy of proposed amended Resolution 3/1919.

**Annex 1: A Clean copy of proposed amended Resolution 3/1919.**

TITLE	Reference	Last amendment (CL or IHC)	1 <sup>st</sup> Edition Reference
<b>DATUMS AND BENCH MARKS</b>	<b>3/1919 as amended</b>	<b>19/2008</b>	<b>A2.5</b>

1 It is resolved that chart datums (datums for sounding reduction), the datums of tide/water level prediction and other tidal datums, as well as all water level observations, shall always be connected with the general land survey datum, and, in addition, with a prominent and permanent fixed mark in the neighbourhood of the tide gauge, station, observatory etc.

2 It is resolved that ellipsoidal height determinations of the vertical reference marks used for tidal observations should be made, in order to support the production of seamless data sets; i.e. to allow the translation between data sets with differing vertical datums. It is further resolved that such observations should relate to a geocentric reference system, preferably the International Terrestrial Reference System (ITRS) or one of its realizations e.g. the World Geodetic System 1984 (WGS84).

Where the tidal range is appreciable (>30cm)

3 It is resolved that heights on shore, including elevations of lights, should be referred to a HW datum. The datum used should be clearly stated on charts.

4 It is resolved that the datum for tide predictions shall be the same as chart datum (datum for sounding reduction). It is further resolved that the Lowest Astronomical Tide (LAT), or as closely equivalent to this level as is practically acceptable to Hydrographic Offices, be adopted as chart datum. Alternatively the differences between LAT and national chart datums may be specified in nautical documents. If low water levels in a specific area frequently deviate from LAT, chart datum may be adapted accordingly.

5 It is resolved that Highest Astronomical Tide (HAT) be adopted as the datum for vertical clearances. Alternatively the differences between HAT and national datums for vertical clearances may be specified in nautical documents. If high water levels in a specific area frequently deviate from HAT, the datum for vertical clearances may be adapted accordingly.

*Note: LAT (HAT) is defined as the lowest (highest) tide level which can be predicted to occur under average meteorological conditions and under any combination of astronomical conditions. It is recommended that LAT and HAT be calculated either over a minimum period of 19 years using harmonic constants derived from a minimum of one year's observations or by other proven methods known to give reliable results. Tide levels should, if possible, reflect the estimated error values obtained during the determination of these levels.*

Where the tidal range is negligible (<30cm)

6 It is resolved that depths, heights on shore, including elevations of lights, and vertical clearances, should be referred to Mean Sea Level (MSL) or other level as closely equivalent to this as is practically acceptable to Hydrographic Offices. The datum used should be clearly stated on charts.

*Note: The adopted level may be a well-defined geodetic datum as used for heights in land survey applications or an observed local Mean Water Level (MWL) based on long series of water level observations.*

7 In order to support other applications, it is recommended to adopt the mean of yearly lowest/highest water levels observed over a long time period.

Inland Waters

8 It is resolved that data shown on charts and publications should be referred to appropriate datum. The selection of the datum(s) to be used is a difficult issue which can only be determined locally and which will be largely dependent on seasonal hydrological conditions. Paragraph 7 applies also for inland waters.