

## **Outcome of IHC XVII May 2007 – Submitted by the IHB**

The written report of the IHOTC to the XVIIth IHC is attached to this document at Annex A. The text of the verbal report given by Steve Shipman when he introduced the paper to the IHC is given at Annex B.

The Conference welcomed the report and several expressions of gratitude for the work of the IHOTC were made from the floor.

The Conference endorsed the report. The amendment to TR A6.8 has been made and will appear in the next edition of M-3. The development of standards for Digital Tide Tables should be done in conjunction with the Committee on Hydrographic Requirements for Information Systems (CHRIS).

**XVII<sup>th</sup> INTERNATIONAL HYDROGRAPHIC CONFERENCE**  
**7-11 May 2007**

REPORT OF THE TIDAL COMMITTEE

1. Chairperson: Commander J W Page, RN  
Vice-Chairperson: Not nominated
  
2. Membership: Australia, Canada, Chile, China, Denmark, France, Japan,  
New Zealand, Norway, Peru, Portugal, South Africa,  
United Kingdom, United States.
  
3. Meetings: Lima, Peru (April 2003)  
Lisbon, Portugal (October 2004)  
Sydney, Australia (June 2006)
  
4. Agenda Items: (only the principle ones)

**Migration activities to LAT/HAT datum:**

Opinion was canvassed on the status of LAT/HAT adoption for national vertical charting and heighting datums under CL55/2003. 31 MS responded, of which 12 confirmed they had already adopted LAT/HAT ; 8 were intending to convert in the near future ; but 11 had no intention of converting either because their tidal regime was so small as to negate the requirement or because the cost of chart re-compilation would be prohibitive in the short term.

**Standard Constituent List:**

The Standard Constituent List has been evolving for several years, but virtually reached its completed state in 2004 comprising over 400 Harmonic Constituents. At the TC Meeting in Lisbon it was agreed that the inclusion of Nodal Corrections would add considerable value to the list. Consequently, the French and UK delegates undertook to add the appropriate data together with comprehensive descriptions of the derivation of nodal corrections for primary constituents and detailed instructions on the fundamental principles of the construction of nodal corrections for compound constituents. The final revised list was approved at the TC Meeting in Sydney and then published on the IHB website. A draft amendment to TR A6.8 is attached to this report for consideration and approval by the Conference.

**Format for Exchange of Harmonic Constants:**

The UK proposed a standard digital exchange format for harmonic constants in order to improve the efficiency of data transfer between HOs and to eliminate the potential for human error inherent with importing data manually. The TC unanimously approved the proposed format, which is now being actively developed by a TSMAD Sub-Working Group and will be tabled for consideration at the next TSMAD Meeting in September 2006.

**Tides in ECDIS:**

The TC considers that that tides should be a mandatory requirement in an ECDIS, and recommends that ECDIS manufacturers should be encouraged to utilise official HO tidal prediction software which had been written to S-57 specifications. Although one such product has already been published by the UKHO, ECDIS manufacturers must be allowed the freedom to choose their own preferred tidal prediction software. The TC also considers that it would be beneficial to navigation if ENC's were capable of displaying dynamic soundings with the tidal reduction being produced by the ECDIS tidal prediction package. Furthermore, the tidal reduction elements should be developed in such a way that in an ideal situation real-time tidal data could be used to provide the tidal reduction when this facility becomes widely available.

**Digital Tide Tables:**

The TC wishes to encourage all MS to pursue the development of digital tide tables which have functionality and intelligence built in to them. MS need to embrace the new digital culture positively and actively as mariners are increasingly turning to a digital solution for tidal predictions as opposed to paper tidal tables. In the interests of safety of navigation at sea, the TC considers it essential that digital tide tables make use of the latest sets of harmonic constants from which HOs are publishing their national predictions. A proposed amendment to Technical Resolution A6.2 to invite HOs to exchange harmonic constants together with their national tidal predictions has been promulgated by CL 51/2006. The TC also considered that one possible future solution would be for MS to make available their harmonic constants, using the most efficient transfer protocol, to a central body which would then make available the National Standard Port predictions via the internet. However, this new concept would call for careful harmonisation, stewardship and governance in order to become accepted.

**Global Vertical Reference Surface:**

The TC considered that the most suitable ellipsoid for a global vertical reference surface was best addressed by the geodetic community because they have the technical expertise to make the best assessment necessary. The work of the FIG and IAG in this context is being carefully monitored on behalf of the TC by PAH at the IHB who attends their meetings. The preferred choice of ellipsoid would be a geocentric reference frame based on ITRF such as WGS84. Several MS are developing vertical reference frameworks to enable rapid and efficient transformations between the spheroid, Chart Datum and the entire range of tidal levels for data capture and charting purposes.

**Vertical Datum Management and Naming Convention:**

The TC recognises the importance of establishing a unified vertical datum which needs to be defined without ambiguity. Hydrographic datums will always require adjustment due to crustal motion and sea level changes. Furthermore, climate change may well accelerate the rate of change. Dynamic ENC's and real-time water levels will require explicit datum transforms to be readily available and thus complex datum relationships will need to be articulated in order to take advantage of new technologies such as kinematic DGPS. The TC concluded that using a designated epoch for Chart Datum (such as CD2000) would be the preferred methodology to adopt. The chosen epoch would be at the discretion of each MS based on national requirements. The individual designations would then become metadata providing an unambiguous reference in digital systems (e.g. ECDIS) using data based on an IHO Standard (e.g. S-100). Chart Datum would continue to be accurately defined in relation to the Land Levelling System. The Chairman and PAH undertook to prepare a draft Technical Resolution on a naming convention for discussion at the next TC meeting due to be held in November 2007.

**Global Sea Level Rise effects:**

Global sea level rises of 1-2mm per year are still being quoted as the average annual values by the Permanent Service for Mean Sea Level (PSMSL) in spite of exaggerations attributed to global warming. The UK has detected a reduction in tidal ranges over the past 10 years for Standard Ports around UK which are being routinely analysed each year. This would indicate that with the expansion of the Atlantic Ocean under the influences of global warming this body of water is becoming more sluggish and, therefore responding less vigorously to the tide raising forces. Although other MS had observed similar effects with the Pacific the TC concluded that a time span longer than 10 years would be necessary to eliminate potential cyclical variations in the M2 tide before any definite proclamation could be made.

#### **Tidegauge Networks for Tsunami Warnings:**

This issue is attracting an increasing intensity of interest in light of recent major incidents, and so it became necessary for the TC to discuss this topic. At the TC Meeting in Sydney MS were given substantial presentations by both Canada and Australia detailing the active programmes of tidegauge networks being developed in North America and Australasia for tsunami warnings. The IOC is the primary body concerned with tsunami warning services and they have initiated such activity for the Mediterranean and set up a Working Group for the North Atlantic, with PSMSL building a UK tsunami warning service. The TC recommends that MS be encouraged to provide, wherever possible, real time tidal information to Tsunami Warning Systems.

#### **Rationalisation of relevant Technical Resolutions and Charting Specifications:**

It had become apparent that several significant discrepancies existed between Technical Resolutions and Charting Specifications, particularly with regard to datums and tidal levels. Consequently, at the TC Meetings in Lisbon and Sydney action was taken to rationalise both sets of instructions by reviewing all relevant Technical Resolutions (A2.8, 2.9, 6.1, 6.2, 6.7, 6.8 and 6.9 ; G2.1, 2.2 and 2.3) and Charting Specifications M-4 (B-302.2, B-380.1 and B-405.3) for mutual compatibility. Appropriate amendments to the Technical Resolutions have already been promulgated by CL and proposed amendments to the Charting Specifications (M-4) have already been forwarded to the Chairman of the Chart Standardization and Paper Chart Working Group (CSPCWG). It is the intention of the TC to continue to review all relevant Technical Resolutions and Charting Specifications for validity and compatibility at each subsequent TC Meeting.

#### **French Manual of Tides:**

The French Manual of Tides, written by TC Member, Bernard Simon, is intended to provide advice aimed at the practical needs of hydrographic surveyors. Volume 1 of the Manual, "Coastal Tides" has been commissioned and edited by the Institut Océanographique in Paris and will be printed by SHOM. The IHO has arranged for the translation of the French text into English. PAH will act as the technical adviser to the translator and will also oversee the proof reading of the completed text. Australia, Norway and UK have volunteered their services to proof read individual chapters, which should be available before the end of 2006. The Institut Océanographique has put together a team to prepare Volume 2, "Ocean Tides" in French and the IHO will facilitate the translation into English which should be completed by the end of 2007. Once the English text of each volume is available the IHB will seek support of Spanish speaking countries to prepare a Spanish text.

#### **IOC/GLOSS mutual activity:**

At the TC Meeting in Lima a GLOSS Representative for the first time gave a comprehensive presentation on the latest activity being undertaken by the IOC in order that the TC could be made aware of any of their work which complemented anything being considered by MS on the TC. At both the subsequent TC Meetings in Lisbon and Sydney GLOSS has designated a delegate to report on GLOSS activities. The TC has also been represented at meetings of the GLOSS Group of Experts meetings.

5. Proposals for adoption by XVIIth I.H. Conference:

The Conference is requested to:

- Approve the amended text of IHO TR A6.8 as included at the Annex to this report.
- Task the IHOTC to develop standards for digital tide tables.
- Endorse the continuing liaison with IOC/ GLOSS
- Adopt this report

A 6.8 NATIONAL TIDAL CONSTITUENT BANKS

*It is resolved that the National Tidal Constituent Banks should store the following information for each location:*

- i) Location identification by number, name, country, body of water, and geographic coordinates;*
- ii) Source, date, time zone, and duration of data used in analysis;*
- iii) Identification of geodetic levelling datum, and date of reference to this datum, elevation of mean sea level and, where applicable, the connection to and identification of the appropriate bench mark(s);*
- iv) Listing of values for tidal constituents giving amplitudes in metres and Greenwich phase lags in degrees and designation of organization responsible for analysis. (Tidal constituents used should form part of those in the Standard List prepared by the IHOTC and published on the IHO website.)*

*See also A 6.1, A 6.2*

----End----

Proposed new text is shaded.

Thank you Mr President

Steve Shipman, Professional Assistant Hydrography at the IHB speaking as the secretary of the IHO Tidal Committee and speaking in English.

The Tidal Committee has met 3 times since the 16<sup>th</sup> Conference, in Lima, Peru; Lisbon, Portugal; and Sydney, Australia. The next meeting is planned for October 2007 in Halifax, Canada. The Tidal Committee would like to thank Peru, Portugal, Australia and Canada for supporting the Tidal Committee and hosting meetings.

The first meeting was chaired by Commander Alejandro Cabezas from Chile who then handed over the Chair to Commander John Page from the UKHO.

I do not intend to go through the written report in full but rather to highlight a few matters and provide some updated information.

#### Standard Constituent List:

The Tidal Committee has prepared an comprehensive list of Tidal Constituents; the work in developing this list was largely undertaken by the representatives from the UKHO and SHOM and were approved by the Tidal Committee at its meeting in Sydney, Australia in 2006. Following the completion of this list the Tidal Committee wishes to propose an amendment to IHO TR A6.8 and this amendment is shown at the end of the written report. TR A6.8 concerns National Tidal Constituent Banks and the Tidal Committee proposes the addition of a final sentence to sub section iv which would say: "Tidal Constituents used should form part of the those in the Standard List prepared by the IHO Tidal Committee and published on the IHO web site."

#### Digital Tide Tables

The Tidal Committee wishes to encourage all Member States to pursue the development of digital tide tables which have functionality and intelligence built into them. Consequently the Tidal Committee proposes that it should be tasked to prepare standards for digital tide tables. The written report mentions the proposed amendment to TR A6.2 which was circulated in

CL 51/2006. This has subsequently been approved by the requisite number of Member States as reported in CL 75/2006.

### French Manual on Tides

An update to the information provided. Printed copies of Volume 1, Coastal Tides, in French were received by the IHB shortly before this Conference. These will be distributed to French speaking countries in the near future. The English translation has not yet been received by the IHB for proof reading by volunteers from the Tidal Committee.

### IOC - GLOSS

The Tidal Committee has established an excellent working relationship with the Intergovernmental Oceanographic Commission's "Global Sea Level Observing System (GLOSS) Group of Experts. GLOSS has sent observers to attend all the Tidal Committee meetings included in this report. I as the secretary to the Tidal Committee have represented the Tidal Committee at the GLOSS Group of Experts meetings which are held at the IOC in Paris every two years. It is also pleasing to note that Dr Thorkild Aarup, the Secretary of GLOSS, has attended this Conference as an IOC Observer, although unfortunately he had to leave yesterday, before this report was presented.

Before listing the conclusions of the report and the requests to the Conference, may I just make a few comments / observations on the Tidal Committee?

The Chairman, Cdr John Page, has informed me that, at the next meeting in Halifax, Canada in October this year, he will be resigning as chairman of the Tidal Committee. This is due to his impending retirement from the UKHO in 2008.

I am sure that the members of the Tidal Committee will excuse me for making the observation that several, if not most, of the active members of the Committee are also approaching retirement age and that therefore the Committee and its successor, the Tides and Vertical Datums Working Group is very much in need of an injection of fresh blood. On behalf of the Tidal Committee could I therefore ask Member States to consider nominating members to join this group.

So to conclude Mr President, the Tidal Committee requests the Conference to:

Approve the amended text of IHO TR A6.8 as included in the report.

Task the Tidal Committee to develop standards for digital tide tables

Endorse the continuing liaison with IOC/GLOSS and to

Adopt this report in general.

Thank you Mr President