

### **3<sup>rd</sup> Tidal and Water Level Working Group Meeting**

5 - 7 April 2011, Hanwha Resort, Jeju Island, Republic of Korea

#### **Report to the 3<sup>rd</sup> meeting of the Hydrographic Services and Standards Committee**

*(Paragraph numbering is the same as the Agenda Item numbering and does not necessarily reflect the order in which matters were discussed.)*

#### **1 Opening**

- 1.1 Mr Stephen Gill, Chairman (USA-NOAA) opened the meeting at 0900 and thanked all participants for coming. He also thanked Korea for hosting the meeting and providing excellent support and facilities.
- 1.2 All participants introduced themselves and Mr Ok-soo Kim, Korea, welcomed all participants and wished them a successful meeting.
- 1.3 Stephen Shipman (IHB), on behalf of the Directing Committee thanked Korea for hosting the meeting and providing a high level of support and excellent facilities. He reported that apologies for non-attendance had been received from Denmark, Estonia, Germany, New Zealand, Portugal, Spain and Mr Dan Pillich (Expert Contributor). He also reported that China had to cancel their attendance at the last minute.

#### **2 Administrative Arrangements**

- 2.1 The Chair introduced the Agenda. The Secretary informed the meeting that Mme Lucia Pineau, the Vice-Chair had informed him that on return from maternity leave she would be moving to a new position and would no longer be able to participate in the work of the TWLWG. There was a need therefore to elect a new Vice Chair and proposed that this be considered under Any Other Business. The Agenda was adopted. See Annex B.
- 2.2 The draft timetable was introduced, it was explained that this was intended for guidance only and was not intended to be a rigid structure. Where necessary time spent on individual topics would be amended to allow an appropriate discussion.
- 2.3 The Chair reported on the 2<sup>nd</sup> meeting of the Hydrographic Services and Standards Committee (HSSC) which he attended as the TWLWG Chairman.
- 2.4 IHB reported on the action items from TWLWG2. Actions were either complete or were being considered further within the Agenda. A new list of Action Items would be prepared for this meeting. See Annex E.

#### **3 National Presentations**

National presentations were made by Canada, Chile, Japan and the Republic of Korea. Titles of the presentations made are at Annex D and pdf versions of the presentations can be downloaded from the TWLWG3 section of the IHO web site.

## 4 Programme matters

### 4.1 Standard Constituent List

.1 UK reported that there had been no additions or changes since the last meeting. The UK reported on a message that he had received regarding the Standard Constituent List and his draft reply - document TWLWG3/4-1A. Based on the discussion the UK will respond to the enquiry and will investigate the sources of nodal corrections and consider including them in the Standard Constituent List. **Action UK.**

.2 Japan presented document TWLWG3/4-1B. The meeting found this very interesting and were unaware of anyone having compared predictions based on constituent analysis of a common data set by different analysis processes. After discussion it was considered a worthwhile task to identify a suitable data set (strong tide with some shallow water effects) and then for members to analyse this data set using their various approaches and finally to prepare and compare predictions based on these analyses. It was agreed to put this task on the draft work programme of TWLWG. Australia, Canada, Chile, Japan (*To be confirmed*), Korea, Norway and South Africa agreed to take part in this task group.

### 4.2 Standard for Digital Tide Tables

.1 The IHB reported that no feedback from SNPWG had been received following the forwarding of document TWLWG2/4-2A (Standard for Digital Tide Tables) and it was agreed that IHB should contact SNPWG to determine what further action was required. **Action IHB**

### 4.3 Dynamic Application of Tides in ECDIS

.1 Australia introduced document TWLWG3/4-3A. The meeting noted the extensive work undertaken by Australia in developing this draft "Tidal Heights – Objects and attributes Catalogue". The UK introduced document TWLWG3/4-3B commenting on TWLWG3/4-3A. Following discussion it was agreed that this work should focus on S-100 and not S-57 although noting that the work undertaken so far would provide a solid foundation for further development. It was agreed that S-101 (ENC Product Specification) should include the basic tidal information, as in S-57, plus additional information on tidal zoning i.e. the area of application of the tidal information. Any further tidal aspects should be developed as separate product specifications in the S-1xx series. TWLWG noted that they would need further assistance from TSMAD and DIPWG in developing such product specifications. It was further agreed that efforts should focus on predicted tides first and real-time tidal information second. M Jean-Luc Deniel (France) who would be attending the TSMAD/DIPWG meeting the following week was requested to pass on this information to TSMAD at the meeting. Mr Gigab Ha, Korea, asked to join this Task Group. **Action France**

*Post meeting Note: M Jean-Luc Deniel presented a paper at the TSMAD/DIPWG meeting in Seoul, Korea which was accepted by TSMAD and DIPWG.*

### 4.4 Standard for the Transmission of Real Time Tidal Data

.1 USA introduced document TWLWG3/4-4A. The IHB reported that he had discussed this with the secretary of TSMAD who considered the document a very good starting point. It was considered that a further part was required setting out an

XML transmission format and that this should be done in consultation with industry. The IHB had been in contact with some tide-gauge manufacturers who had provided some examples of formats which they used. It was reported that some work was being undertaken by IALA with respect to the transmission of tidal information by AIS binary message. It was agreed that cooperation was important to avoid duplication of effort and the introduction of differing standards. It was noted that Australia, Japan and Korea had members who participated in both IALA and IHO groups and that they could ensure that communication between the two groups was maintained. This task to continue under the co-ordination of the USA.

#### 4.5 Advise the translator of the French Manual of Tides into English

.1 The IHB informed the meeting that the translation of the Manual had been completed and that this task was therefore complete.

#### 4.6 Proof read the French Manual of Tides in English

.1 The IHB reported that in the week before the meeting he had received the draft English text and that this had now been circulated to the volunteers for proof reading. He hoped that this task could be completed in a relatively short period of time and that by TWLWG4 he could report that the English edition of the manual had been published.

#### 4.7 Definitions of MSL and relevance of IHO Technical Resolutions

.1 Finland introduced document TWLWG3/4-7A. Following discussion a draft definition of MSL was agreed as follows:

***mean sea level.** The average HEIGHT of the surface of the SEA at a TIDE STATION for all stages of the TIDE over a 19-year period, usually determined from hourly height readings measured from a fixed predetermined geospatial reference level.*

*It should be noted that:*

*The measured value of **mean sea level** is tied to the location and the observation period. Therefore the tide gauge location and the observation period should always be quoted where the value of **mean sea level** is to be used as a precise reference level.*

*The measured **mean sea level** is only an apparent level. Vertical movements of the earth's crust at the location of the tide gauge will affect the mean value measured.*

*Sea level also has long period variations (the global rise of the oceans). These also affect the mean value measured.*

*Where modelling is used to eliminate the movement of the earth's crust (post glacial rebound for example) and/ or the effect of the global rise of the oceans, the resulting **mean sea level** is relevant to a specific epoch. This epoch (year) and the modelled annual change of **mean sea level** should always be quoted when **mean sea level** is used as a precise reference level.*

This definition would now be referred to the HDWG for consideration. **Action IHB**

.2 Following discussion on the remaining two points raised in the document it was agreed that further work was required on the revision of resolution 3/1919, as amended (formerly A2.5) and the definitions of Low Water, Mean Water and High Water. Canada, IHB, Norway, UK and USA agreed to work on this with Finland leading.

## 4.8 Inventory of tide gauges

.1 The IHB introduced document TWLWG3/4-8A showing the latest data in the inventory. He reported that he was still receiving input and updated information. The meeting was agreed that this was a valuable source of information but that it was incumbent upon everyone to maintain the data up-to-date. It was agreed that additional information on the data sampling rates of gauges and the provision of a link to a national web site where additional tide gauge information could be found would be useful. **Action ALL.**

## 4.9 Short Course on Tides for Hydrography

.1 The IHB reported that the course outline had been passed to the CBSC but that currently there had been no requests for the delivery of the course. The USA outlined the philosophy that had been used in preparing the course outline and asked everyone to review the outline and provide any suggestions for improvement. **Action ALL.**

## 4.10 Review of relevant IHO resolutions

.1 The IHB introduced document TWLWG3/4-10A listing those IHO resolutions which fell within the area of competence of TWLWG. South Africa introduced document TWLWG3/4-10B outlining the review of resolution 6/1932, as amended (formerly A 6.5) on the “Study of Mean Sea Level”. South Africa’s conclusion that the expression “long term” should be more specifically defined in the text was supported and the meeting agreed to recommend the following text for the resolution:

<b>STUDY OF MEAN SEA LEVEL</b>	<b>6/1932 as amended</b>	<b>26/1965</b>	<b>A6.5</b>
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*1 It is recommended that the IHB encourage Member States to carry out systematic, long-term tidal observations, records of typically 40 years or longer, in view of the importance of monthly and secular variations of mean sea level in connection with tidal prediction.*

*2 It is recommended that Member States make such data available for publication by the Permanent Service for Mean Sea Level of the International Council of Scientific Unions, since that service publishes regular monthly and annual values of mean sea level for tidal stations throughout the world.*

This revision of the resolution will be included in the TWLWG report to HSSC3 seeking their endorsement and submission to Member States for adoption. **Action IHB.**

.2 Chile introduced document TWLWG3/4-10C outlining the review of resolution 5/1932, as amended, (formerly A6.4) on “Extension of world network of tidal observations”. Following discussion the meeting endorsed the conclusion of Chile that no amendment to the resolution was required.

## 4.11 Review of relevant IHO Charting Specifications (S-4)

.1 The IHB introduced document TWLWG3/4-11A outlining the sections of publication S-4 which relate to tidal issues. Finland had reported in their document TWLWG3/4-7A that when discussing the datum to be used for vertical clearances, whilst sections B-302.2 2b and B-405.3 paragraph 2 had been amended to reflect the

changes in resolution 3/1919, as amended (formerly A2.5), section B-380.1 incorrectly states that “In areas where the tidal range is not appreciable it shall be Mean Sea Level (MSL).” The IHB were requested to bring this to the attention of CSPCWG. **Action IHB.**

#### 4.12 Global sea level rise effects

.1 The UK made a presentation on this topic (TWLWG3/4-12A). The meeting concluded that there was a need to monitor this topic and study long term data sets. It was agreed that the title of this agenda item should be changed to “The study of long term data sets for the determination of global sea level rise.” It was also agreed that this should be included in the draft WP. **Action IHB.**

#### 4.13 Exchange of harmonic constants / predictions

.1 The UK made a presentation on this topic (TWLWG3/4-13A). The information provided was noted and members were encouraged to share the data using the format available from the UKHO website which is linked from the TWLWG web page.

#### 4.14 Update on IOC GLOSS programme

.1 The IHB reported that the GLOSS Group of Experts had not met since his report to TWLWG2 in Norway in April 2010. The next meeting was scheduled for 9 – 11 November 2011 at the IOC in Paris. The IHB reported that on this occasion he would not be able to represent the TWLWG at this meeting as it clashed with another IHO meeting. It was agreed that it was important to be represented at the GLOSS GE meeting. Chile and Norway said that they were likely to attend and it was noted that Brazil also normally attends GLOSS meetings. It was agreed that one of these delegates should also represent the IHO and TWLWG at the meeting and that the IHB would liaise with them to confirm the representative and prepare a short briefing on IHO and TWLWG activities. **Action IHB.**

#### 4.15 Vertical Reference Framework update on IAG ICP 1.2

.1 The IHB introduced documents TWLWG3/4-15A and TWLWG3/4-15B which were the latest reports from IAG ICP 1.2 and the European Combined Geodetic Network (ECGN). The latter was similar in nature to ICP 1.2 although with a purely European focus. The meeting noted that both papers contained many similar topics to those which had been discussed over the last two days and agreed that it was important to maintain contact with both groups to ensure that “hydrographic” interests were taken into account during their discussions. The IHB was invited to continue to monitor and contribute to their work and keep TWLWG informed. **Action IHB.**

#### 4.16 Tides and datums in rivers and estuaries.

.1 No documents had been submitted on this topic however it was considered an important issue. The matter had initially been raised by Brazil at TWLWG1. It was agreed that the Chair would approach Brazil seeking further input for TWLWG4. **Action USA.** It was further suggested that the IHB approach the Inland ECDIS group for information on their activities in this area. **Action IHB.**

#### 4.17 Tsunami warnings

.1 Chile made a presentation (TWLWG3/4-17A) outlining the result of investigations that they had made of the tide gauge records covering the arrival of the Chilean tsunami in February 2010 and the Japanese tsunami in March 2011. This was a very interesting and important topic which attracted much discussion and it was agreed that this should remain as an agenda item.

#### 4.18 TWLWG work plan

.1 The IHB displayed the draft work plan which had been prepared in advance of the meeting. He indicated the areas where amendments were required as a result of decisions taken during the meeting. There were no comments on the draft work plan and it was noted that the updated version would be included in the meeting report and that all delegates would therefore have the opportunity to comment before it was submitted to HSSC3 for approval.

### 5 Any other business

.1 Canada asked if there was any guidance / instruction on the number of high and low waters that should be shown in tide tables. They were about to redesign their tide tables and had some ports where the tide was complex with more than two high / low waters each day. IHB outlined the requirements in resolution 28/1919, as amended, (formerly G3.1) which only stated that:

*It is resolved that Tide Tables shall include:*

- a) Detailed predictions for the ports chosen as standard ports ; these predictions may consist of either the time and height of high and low water or the hourly heights of the tide; and*
- b) Special tables giving data required for calculating, from the predictions for the standard ports, the corresponding predictions for the secondary ports.*

It was also noted that SOLAS Chapter V simply required contracting governments to publish Tide Tables and for ships to carry them. The UK outlined how they prepared their tables, both paper and digital (TotalTide) as shown in document TWLWG3/5-1A). Others explained their approach which followed more or less the same methods. Canada thanked delegates for their input.

.2 As explained in paragraph 2.1 above there was a need to elect a new Vice-Chair. Canada proposed Zarina Jayaswal (Australia). This was seconded by the UK and approved by acclamation.

### 6 Review of Items

.1 A draft list of Action Items from the meeting were reviewed and agreed. All Action Items are marked in this report and are collected together at Annex D. It should be noted that the list of action items does **NOT** include tasks that are in the TWLWG Work Programme. An updated list of the Action Items will be maintained on the TWLWG4 web page and all those who have actions to complete should keep the IHB informed of any progress. **Action ALL.**

## 7 Venue and dates of the 4<sup>th</sup> TWLWG Meeting

.1 The IHB reported that in recent years IHOTC/TWLWG meetings had been held as follows: Asia-Pacific - 2, Europe – 2, North America – 1 and South America - 2. The absence of a recent meeting in Africa was noted. South Africa thought it possible to host a meeting but maybe not in 2012. It was therefore agreed that TWLWG4 would be held at the IHB in Monaco.

*Post Meeting Note: South Africa informed the Chair and Secretary that they were in a position to host the meeting in 2012. Consequently TWLWG4 will be held in Cape Town, South Africa from 8 – 10 May 2012.*

## 8 Draft Report to the HSSC / Draft Agenda for TWLWG4

.1 It was agreed that the IHB would circulate a draft meeting report to all attendees by Friday 15 April. **Attendees were requested to provide any comments by Monday 2 May. Action ALL.**

.2 The IHB and Chair would prepare the final report to HSSC3 using the format required by HSSC. The Chair expected, subject to budgetary approval to represent TWLWG at the HSSC3 meeting. **Action IHB and USA.**

.3 A draft Agenda was presented to the meeting and is included at Annex G to this report. The draft Agenda may require further amendment following the outcome of HSSC3.

*Post meeting note: As the dates agreed for TWLWG4 fall after the XVIIIth International Hydrographic Conference it is necessary, in accordance with the TWLWG Terms of Reference item 4d to elect / re-elect the Chair and Vice-Chair of the TWLWG. Consequently a new agenda item 5 has been introduced in the draft agenda and subsequent items re-numbered.*

## 9 Closing remarks

.1 Dr Moon-Bo SHIM of KHOA thanked everyone for coming to the meeting, wished them a safe journey home and expressed the hope that they would come back to Korea again.

.2 Stephen Shipman (IHB) on behalf of the Directing Committee thanked Korea for their excellent support and facilities for the meeting which had undoubtedly contributed to a successful outcome and also for their very generous hospitality.

.3 The Chair thanked Korea for their support and all delegates for coming and contributing to the meeting. The meeting closed at 1100 on Thursday 7 April.

The following Annexes are attached:

- A. List of participants.
- B. Agenda of TWLWG3
- C. List of Documents
- D. List of national presentations made
- E. TWLWG3 – List of Actions
- F. TWLWG Draft Work Programme
- G. Draft agenda for TWLWG4

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**Tidal and Water Level Working Group**  
*Jeju Island, Republic of Korea, 5 – 7 April 2011*  
**Agenda – (TWLWG3)**

**1 Opening**

- .1 Opening address by the Chairman
- .2 Address by host nation
- .3 Welcome by the IHB

**2 Administrative Arrangements**

- .1 Adoption of the Agenda
- .2 Conduct of the Sessions
- .3 Report on Intercessional Activities including HSSC2
- .4 Matters arising from TWLWG2 / Review of Action Items

**3 National Presentations**

- .1 Presentations by delegates on “National Tidal Issues”

**4 Programme Matters**

*Note: {xx} indicates TWLWG Work Plan reference*

- .1 Standard Constituent List {A.1} (Chris Jones)
- .2 Standard for Digital Tide Tables {B.2} (Lucia Pineau)
- .3 Dynamic Application of Tides in ECDIS {C.1} (Ian Halls)
- .4 Standard for the transmission of real time tidal data {C.2} (Stephen Gill)
- .5 Advise the translator of the French Manual of Tides into English {D.1} (Steve Shipman)
- .6 Proof read the English translation of the French Manual of tides {D.2} (Steve Shipman)
- .7 Definitions of MSL and relevance of IHO TRs to non-tidal waters {E.1} (Jukka Varonen)
- .8 Inventory of Tide gauges used by IHO Member States {F.1} (Steve Shipman)
- .9 Short course on Tides for Hydrography {G.1} (Stephen Gill)
- .10 Review of relevant IHO Technical Resolutions (Steve Shipman)
- .11 Review of relevant IHO Charting Specifications (Steve Shipman)
- .12 Global Sea Level Rise effects (Chris Jones, Lucia Pineau & Jose Quijano)
- .13 Exchange of Harmonic Constants / Predictions (Chris Jones)
- .14 Update on IOC/GLOSS Program (GLOSS / Steve Shipman)
- .15 Vertical Reference Framework Update on IAG 1.2 (Steve Shipman)
- .16 Tides and datums in rivers and estuaries (ALL)
- .17 Tsunami Warnings (ALL)
- .18 TWLWG Work Plan (IHB)

**5 Any Other Business**

- .1 Tide Tables format - events per day and event selection (Phil MacAulay)
- .2 Election of a Vice-Chair

**6 Review of Action Items from TWLWG3**

**7 Venue and dates of the 4<sup>th</sup> TWLWG Meeting (TWLWG4)**

**8 Draft Report to HSSC3 / Draft Agenda for TWLWG4**

**9 Closing remarks**

**TWLWG3 - List of Documents**

<b>Document No</b>	<b>Document Title</b>
TWLWG3_Participants	List of participants.
TWLWG3/2/1A	Agenda
TWLWG3/2/1B	Draft Timetable
TWLWG3/2/4A	Status of actions from TWLWG2 - correct to 28 February 2011
TWLWG3/3-Canada	National presentation Canada
TWLWG3/3-Chile	National Presentation Chile
TWLWG3/3-Japan	National Presentation Japan
TWLWG3/3-Korea	National Presentation Korea
TWLWG3/4/1A	Question on Tidal Constituents
TWLWG3_4-1B	Harmonic Analysis Trial based on the Tidal Constituents list.
TWLWG3/4/3A	Tidal Heights -Proposed S-57 Objects and Attributes Catalogue
TWLWG3/4/3B	Object and Attribute Catalogue - comment by the UK
TWLWG3/4/4A	Draft Standard for the transmission of real-time water level data
TWLWG3/4/7A	Definition of MSL
TWLWG3/4/8A	Inventory of Tide Gauges
TWLWG3/4/9A	Short course on tides for hydrography
TWLWG3/4/10A	IHO resolutions from M-3 of relevance to Tides and Water Levels
TWLWG3/4/10B	Review of resolution 6/1932 as amended (formerly A.5)
TWLWG3/4/10C	Review of resolution 5/1932 as amended (formerly A.6.4)
TWLWG3/4/11A	Review of relevant IHO Charting Specifications
TWLWG3/4/12A	Global Sea level Rise Effects
TWLWG3/4/13A	Exchange of Harmonic Constants
TWLWG3/4/14A	Report from GLOSS
TWLWG3/4/15A	IAG Inter Commission Project 1.2 Update
TWLWG3/4/15B	ECGN Update
TWLWG3/4/17A	Tsunami Signals in a Sea Level Register
TWLWG3/4/18A	Draft TWLWG Work Plan
TWLWG3/5/1A	Tide table format

## **Tidal and Water Level Working Group**

### **National Presentations**

**Canada:** National Report of Canada

**Chile:** Chilean Sea Level Network

**Japan:** Tidal Observation in Japan and 3.11 Earthquake

**Korea Rep of:** Introduction to KHOA

## Tidal and Water Level Working Group

### Actions from TWLWG3

The numbering of action items relates to the final report paragraph numbers:

- 4.1.1 **UK** to respond to the enquiry on the Standard Constituent List and investigate the sources of nodal corrections for possible inclusion in the Standard Constituent List
- 4.2.1 **IHB** to contact SNPWG regarding the Standard for Digital Tide Tables in order to determine what further action was required.
- 4.3.1 **France** M Jean-Luc Deniel to report verbally to TSMAD/DIPWG who were meeting the week after TWLWG on the outcome of TWLWG3 and in particular its decisions relating to tidal information in ENC's.
- 4.7.1 **IHB** to refer the revised definition of Mean Sea Level to the HDWG for consideration.
- 4.8.1 **ALL** to provide additional information on tide gauge sampling rates and web site links where available for inclusion in the Inventory of tide gauges.
- 4.9.1 **ALL** to review the outline of the "Short Course on Tides in Hydrography" and provide any suggestions for improvement to Stephen Gill.
- 4.10.1 **IHB** to include the revised draft text of IHO resolution 6/1932, as amended (formerly A 6.5) on the "Study of Mean Sea Level" in the TWLWG report to HSSC3 for their endorsement and subsequent submission to Member States for adoption.
- 4.11.1 **IHB** to bring the discrepancy in the wording used for the high water datum to be used in areas of negligible tides in S-4 B-380.1 to the attention of CSPCWG and to inform them of the current work on resolution 3/1919, as amended, (formerly A2.5) being undertaken by the TWLWG.
- 4.12.1 **IHB** to include "The study of long term data sets for the determination of global sea level rise." In the draft Work Plan for TWLWG.
- 4.14.1 **IHB** to confirm with Chile / Norway / Brazil their ability to represent IHO/TWLWG at the GLOSS Group of Experts at the meeting due to be held at the IOC in Paris from 9-11 November 2011 and to prepare a short report on TWLWG and IHO activities for delivery at the meeting.
- 4.15.1 **IHB** to continue to monitor the work of IAG ICP 1.2 and the ECGN project and keep TWLWG informed.
- 4.16.1 **USA** to contact Brazil regarding future input to TWLWG regarding tides and datums in rivers and estuaries.
- 4.16.1 **IHB** to contact the Inland ECDIS group regarding their activities on tides and datums in rivers and estuaries.
- 6.1 **ALL** to keep IHB informed on progress with these Action Items.
- 8.1 **IHB** to circulate a draft meeting report to all attendees by Friday 15 April 2011. All attendees to provide any comments by Monday 2 May 2011.
- 8.2 **IHB and USA** to prepare TWLWG report and submit to HSSC3.



## 1 TWLWG Work Plan

### 1.1 TWLWG Tasks

- A Maintain Standard Tidal Constituent List (IHO Work Programme 3.2.4 refers)
- B Prepare a Standard for Digital Tide Tables (IHOTC Report to the XVII<sup>th</sup> IHC as adopted)
- C Liaise with TSMAD on tidal matters relevant to the Dynamic Application of Tides in ECDIS and develop a Standard of the transmission of real-time tidal data (Action HSSC1/18)
- D Monitor and assist in the preparation of English translation of the Tidal Manual prepared by the Institut Océanographique and SHOM (IHO funded the translation from French to English)
- E Review the various definitions of MSL and their relevance to Hydrographic Offices and review the IHO tidal resolutions to ensure that they are compatible with the requirements of non tidal areas such as the Baltic Sea.
- F Prepare and maintain an inventory of tide gauges used by Member States and to publish it on the IHO/TWLWG web site.
- ~~G Prepare structure and contents for a short course (maximum 5 days) on "Tides for hydrography" for the Capacity Building Sub-Committee~~
- H The study of long term data sets for the determination of global sea level rise.

Task	Work item	Priority H-high M-medium L-low	Milestones	Start Date	End Date	Status P-planned O-ongoing C-completed	Contact Person(s) * indicates leader	Related Pubs/Standard
A.1	Maintain Standard Tidal Constituent List	H	No updates required in 2010	Continuous		O	Chris Jones*	

Task	Work item	Priority H-high M-medium L-low	Milestones	Start Date	End Date	Status P-planned O-ongoing C-completed	Contact Person(s) * indicates leader	Related Pubs/Standard
A.2	Compare the tidal predictions generated as a result of analysis of a common data set using different analysis software.	H	Select Common data set Analyse using different software Predict common set of tides Compare results	2011 2011 2011 2012	2012 2012 2012 2012	P	Chris Jones Juan Fierro Stephen Gill Tor Tørresen Phil MacAulay Ruth Farre Kwan Chang Lim Japan?	
B.2	Prepare a Standard for Digital Tide Tables	H	Prepare draft Standard	2009	2012	O	Stephen Gill* Chris Jones Zarina Jayaswal Ian Halls	
C.1	Liaise with TSMAD <b>and DIPWG</b> on tidal matters relevant to the Dynamic Application of Tides in ECDIS	H	Review Objects and Attributes required for water levels and streams (Passed to TSMAD April 2010) Prepare draft pages for Objects and Attributes.  Prepare draft Product Specifications (S1**) for tidal data in S-100.	2009  2010  2012	2011  2012  2013	C  O  P	Ian Halls* Zarina Jayaswal Stephen Gill Chris Jones Juan Fierro Ruth Farre Dan Pillich Gigab Ha	
C.2	Develop a Standard for the transmission of real-time tidal data	H		2009	2012	O	Stephen Gill* Chris Jones Zarina Jayaswal Ian Halls Juan Fierro	

Task	Work item	Priority H-high M-medium L-low	Milestones	Start Date	End Date	Status P-planned O-ongoing C-completed	Contact Person(s) * indicates leader	Related Pubs/Standard
D.1	Provide advice to the translator preparing the English text of the Tidal Manual prepared by the Institut Océanographique and SHOM	H	Completion of translation into English.	2003	2011	C	Stephen Shipman*	
D.2	Proof read the English translation of the Tidal Manual prepared by the Institut Océanographique and SHOM	H	Proof reading of the English text. Chapters 1, to 6 complete Chapter 7-10 and Annexes A to E in progress	2009	2011	O	Stephen Shipman* Glen Rowe Ruth Farre Dan Pillich Zarina Jayaswal Juan Fierro Stephen Gill Chris Jones Bill Mitchell Chris Andreasen	
E.1	Review the various definitions of MSL and their relevance to Hydrographic Offices and review the IHO tidal resolutions to ensure that they are compatible with the requirements of non tidal areas such as the Baltic Sea.	H	Reviewed at TWLWG2- Further work undertaken at TWLWG3. Definition of MSL approved for submission to HDWG. Work on the IHO resolutions ongoing.	2009	2012	O	Jukka Varonen* Tor Tørresen Phil MacAulay Stephen Shipman Chris Jones Stephen Gill	
F.1	Prepare and maintain an inventory of tide gauges used by Member States and to publish it on the IHO/TWLWG web site.	H	Initial inventory from TWLWG members available on IHO web site. CL36/2010 sent to Member States seeking wider input.	Continuous		O	Stephen Shipman* Stephen Gill	

Task	Work item	Priority H-high M-medium L-low	Milestones	Start Date	End Date	Status P-planned O-ongoing C-completed	Contact Person(s) * indicates leader	Related Pubs/Standard
G-1	Prepare structure and contents for a short course (maximum 5 days) on "Tides for hydrography"	H	Delivery of course structure to CBSC. (Passed to CBSC8 – June 2010)	2009	2010	C	Stephen Gill* Stephen Shipman	
H1	The study of long term data sets for the determination of global sea level rise.	H		2011	2014	O	Chris Jones Jose Quijano France	

## 1.2 TWLWG Meetings (IHO Task 3.1.11 refers)

Date	Location	Activity
27 – 29 April 2010	Stavanger, Norway	2 <sup>nd</sup> Meeting
5 – 7 April 2011	Jeju Island, Rep of Korea	3 <sup>rd</sup> Meeting
8 – 10 May 2012	Cape Town, South Africa	4 <sup>th</sup> Meeting

Chair: Stephen Gill  
 Vice-Chair: Zarina Jayaswal  
 Secretary: Stephen Shipman

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**Tidal and Water Level Working Group**  
*Cape Town, South Africa, 8-10 May 2012*  
**Draft Agenda – (TWLWG4)**

**1 Opening**

- .1 Opening address by the Chairman
- .2 Address by host nation
- .3 Welcome by the IHB

**2 Administrative Arrangements**

- .1 Adoption of the Agenda
- .2 Conduct of the Sessions
- .3 Report on Intercessional Activities including HSSC3
- .4 Matters arising from TWLWG3 / Review of Action Items

**3 National Presentations**

- .1 Presentations by delegates on “National Tidal Issues”

**4 Programme Matters**

*Note: {xx} indicates TWLWG Work Plan reference*

- .1 Standard Constituent List {A.1} (Chris Jones)
- .2 Standard for Digital Tide Tables {B.2} (IHB)
- .3 Dynamic Application of Tides in ECDIS {C.1} (Ian Halls)
- .4 Standard for the transmission of real time tidal data {C.2} (Stephen Gill)
- .5 Report on the English translation of the French Manual of tides {D.2} (IHB)
- .6 Definitions of MSL and relevance of IHO TRs to non-tidal waters {E.1} (Jukka Varonen)
- .7 Inventory of Tide gauges used by IHO Member States {F.1} (IHB)
- .8 The study of long term data sets for the determination of global sea level rise. {H.1} (Chris Jones, Tør Torresen, Stephen Gill & Jose Quijano)
- .9 Review of relevant IHO Technical Resolutions (IHB)
- .10 Review of relevant IHO Charting Specifications (IHB)
- .11 Exchange of Harmonic Constants / Predictions (Chris Jones)
- .12 Update on IOC/GLOSS Program (GLOSS / IHB)
- .13 Vertical Reference Framework Update on IAG 1.2 (IHB)
- .14 Tides and datums in rivers and estuaries (ALL)
- .15 Tsunami Warnings (ALL)
- .16 TWLWG Work Plan (IHB)

**5 Any Other Business****6 Election/Re-election of Chair and Vice-Chair****7 Venue and dates of the 5<sup>th</sup> TWLWG Meeting (TWLWG5)****8 Review of Action Items from TWLWG4****9 Draft Report to HSSC4 / Draft Agenda for TWLWG5****10 Closing remarks**