Capacity Building

Technical Tidal Course

TWCWG 4 and GLOSS GE XVI
08 - 13 April 2019
Busan, Republic of Korea

R.E. FARRE Cert. Nat. Sci.
Superintendent Tidal Information
South African Navy Hydrographic Office

A Short History

- July 2013 - The previous South African Navy Hydrographer (Abri Kampfer) required the development of a capacity building programme for SADC countries (Southern African Development Communities).
  - Outcome from technical visits to these countries.
  - Emphasis on tide gauge installation, maintenance and the importance of connecting the tide gauges to the relevant national benchmark system.

- March 2014 – The SANHO trialled the programme to participants from 8 of the 13 SADC countries.
  - Presented as a workshop with a practical component.
  - Was the primary “test” courses.

A Short History

- October 2014 – Australian Hydrographic Office presented the workshop to the South West Pacific Hydrographic Commission (SWPHC)
  - Presented using initial workshop material with some additionally created training material.
  - Was part of the “test” courses to aid in developing the final course.

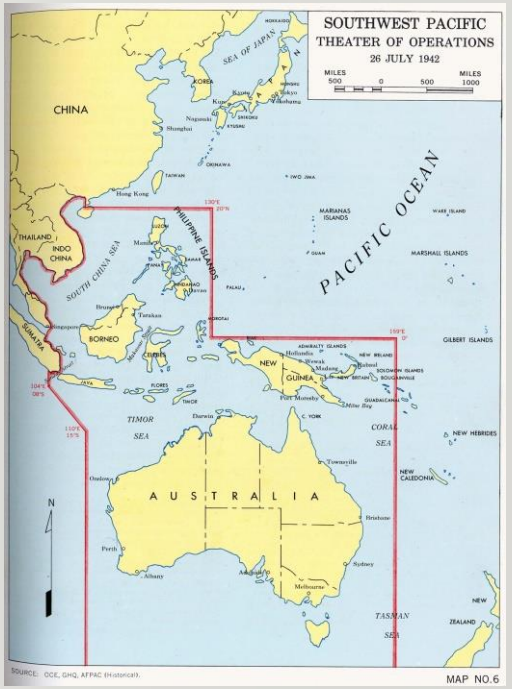
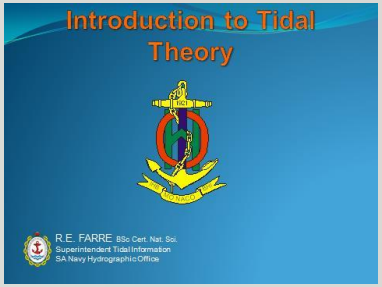


Figure 1: Bathymetry used in this study.

- September 2015 - SANHO presented the workshop to ROPME Sea Area Hydrographic Commission (RSAHC) in Abu Dhabi.
  - Consisted of theory and field trip
  - Was part of the “test” courses to aid in developing the final course.

A Short History

- April 2016 – TWCWG 1 in Niterói, Brazil.
  - SANHO gave feedback, experiences and general discussion via SKYPE (not ideal).
  - Australia gave feedback and experiences.
- May 2017 - TWCWG2 in Victoria, Canada
  - Further feedback given and discussions.
- April 2018 – TWCWG 3 in Vinã del Mar, Chile.
  - Course content was discussed.
  - Suggestions for changes, additions/deletion of content was requested.
  - Arrangements made for translations.

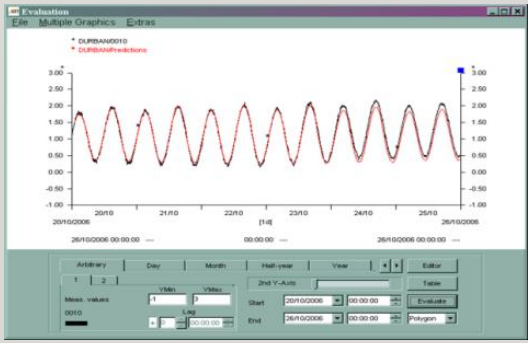


A Short History

- August 2018 _ English version uploaded to IHO website.
- November 2018 _ French version uploaded to IHO website
- September 2018 – April 2019 _ Spanish translations supplied for format/layout validation
- April 2019 _ Portuguese version supplied for format/layout validation

“Test” Course Challenges and Solutions

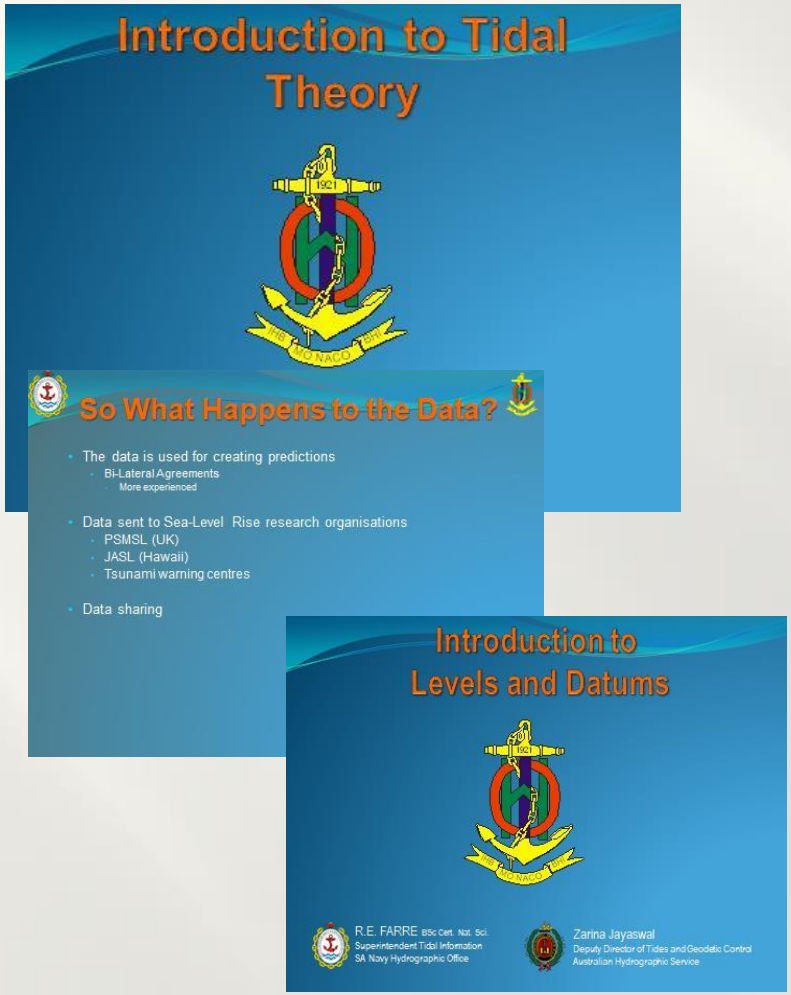
- **Candidates were not necessarily the best candidates for the training and some candidates were not proficient in English, spoken or written. Two attendees spoke no English.**
  - To create a set of criteria / minimum requirements for candidates so CBSC co-ordinators select the candidates who will benefit the most.
    - Language proficiency (spoken and written)– English, Spanish, French or Portuguese.
    - Grade 12/ A - levels mathematical knowledge.
    - Entry level course – Cat A/ CAT B gain no benefit from this course.
    - The Candidate criteria list may be amended as further criteria is identified.



"Test" Course Challenges and Solutions

- **Host Countries did not supply requested information.**
  - Multiple requests for information on the host countries equipment in use was never supplied ∴ trainers could not research the equipment/ tide gauges.
  - Equipment required for practical sessions were not available - candidates could not see and practice learnt techniques.
    - Host countries need to "buy into" the course and it's benefits to their regions.
    - A standard list of required equipment will be prepared (posted on the IHO website) and host country must be able to make that equipment available for the practical session. This is in process – inputs still awaited
    - Information on the types and makes of tide gauges in use / being purchased, as well as the information on relevant software must be supplied to facilitators. Commercial training must be supplied with the purchase of equipment.

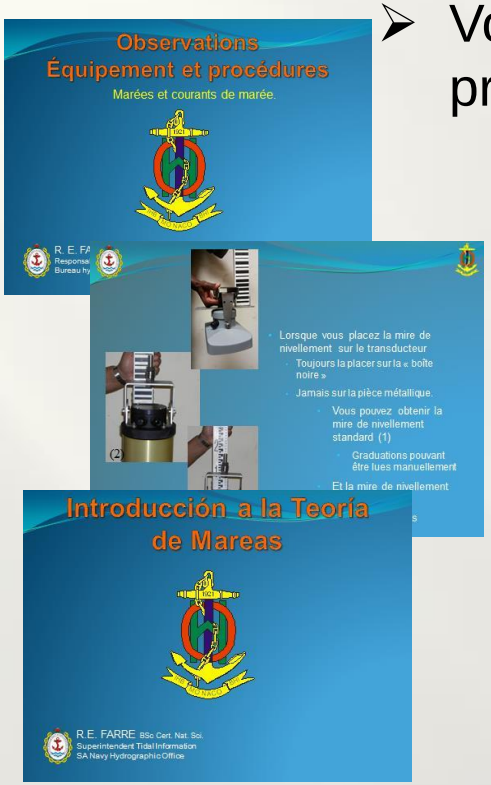
TWCWG 2 outcomes



- Call for a review of the original presentation and feedback wrt possible amendments.
  - AUS and USA supplied feedback and possible changes. RSA consolidated and applied all information received.
  - Course was modulated.
    - 1. Introduction to Tide
    - 2. Introduction to Tidal Stream/Currents
    - 3. Levels and Datums
    - 4. Tides and Tidal Stream/ Current Equipment
    - 5. How to install a Tide Gauge
    - 6. Data – what to do next.

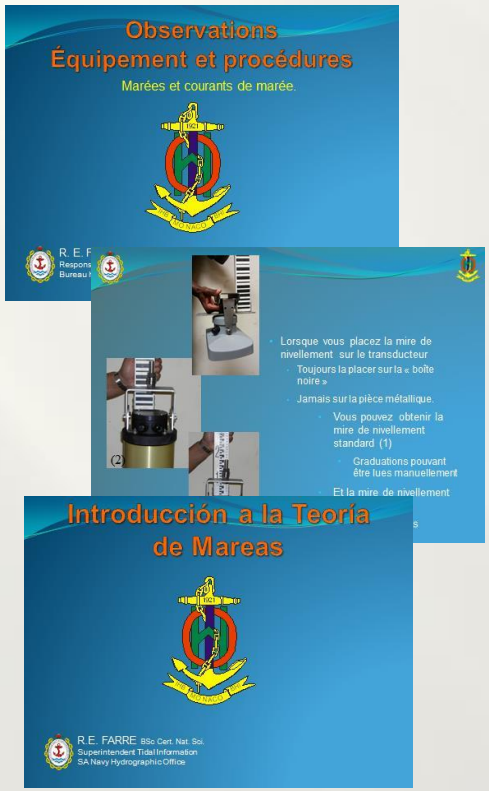
TWCWG 3 outcomes

- Call for a review of the original presentation and feedback wrt possible amendments continued.
  - Proposed amendments were discussed and relevant changes made.
  - Volunteers were identified to carry out translations of the presentations, precise and relevant documents.



- April 2018 - French translation were completed and undergoing validation.
- April 2018 – Spanish Module 1 complete. (translation and validation assistance required.)

TWCWG 3 outcomes



- November 2018 - French translations of the presentations and documentation's format validations completed and posted to IHO website
- February 2019 – Spanish presentations format validations completed. Precise and additional documentation in process.
- April 2019 – Portuguese awaiting format validation.

Module outlines

- Module 1: Tides and Water Level_ Introduction to Tides
  - Content: Basic/ introduction to tidal theory
  - Brief History
  - Definitions of basic terminology
  - Introduction to the main tide raising forces
    - Newton's law of motion and gravity
    - Equilibrium Tide theory vs real time tide
    - The Earth-Sun-Moon system
    - Tidal Patterns
    - Frictional/shallow water effects
    - Meteorological effects
  - Summary of what Hydrodynamics determines

Module outlines

- Module 2: Tides and Water Level_ Introduction to Tidal Stream
  - Effects of Tidal stream on navigation
  - Introduction to tidal steam theory
    - Progressive and standing waves
    - Nature of tidal streams
    - Nature of Oceanic currents

Module outlines

- Module 3: Tides and Water Level_ Levels and Datums

  - Introduction to levels/datums and the terminology.
  - CD vs MSL vs LLD/ordinance datum vs LAT
  - The symbols used
  - How to establish a relevant datum
  - Introduction to co-tidal and co-range charts

Module outlines

- Module 4: Tides and Water Level_ Tides and Tidal Stream Equipment
  - Types of tide gauges/ Sea level recording equipment – advantages and disadvantages
    - Level/Tide Pole
    - Float Acctuated
    - Pressure
    - Altimeter
    - Capacity gauges
  - How to select the best type of gauge for your environment
  - Installation location considerations
  - Basic requirements for Port Records

Module outlines

- Module 4: Tides and Water Level_ Tides and Tidal Stream Equipment
  - IHO S-44: When should currents (tidal streams) be measured?
  - Tidal Stream/Current equipment:
    - Logship poles
    - Flow meters
      - Impeller or rotor
      - Electromagnetic Current Meter (ECM)
      - ADCP
      - Mention of newer methods to measure tidal stream/current

Module outlines

- Module 5: Installing a Radar Type Tide Gauge
  - Leveling the transducer
  - Leveling into the national benchmark/ geodetic network
  - Calibration method
  - Useful tips

Module outlines

- Module 6: Tides and Water Level_What to do with the Data
  - Introduction Tidal Analysis and Predictions
    - Methods that can be used
    - How to validate raw data
    - Introduction to tidal constituents
  - Introduction to Tidal Stream/Current Analysis

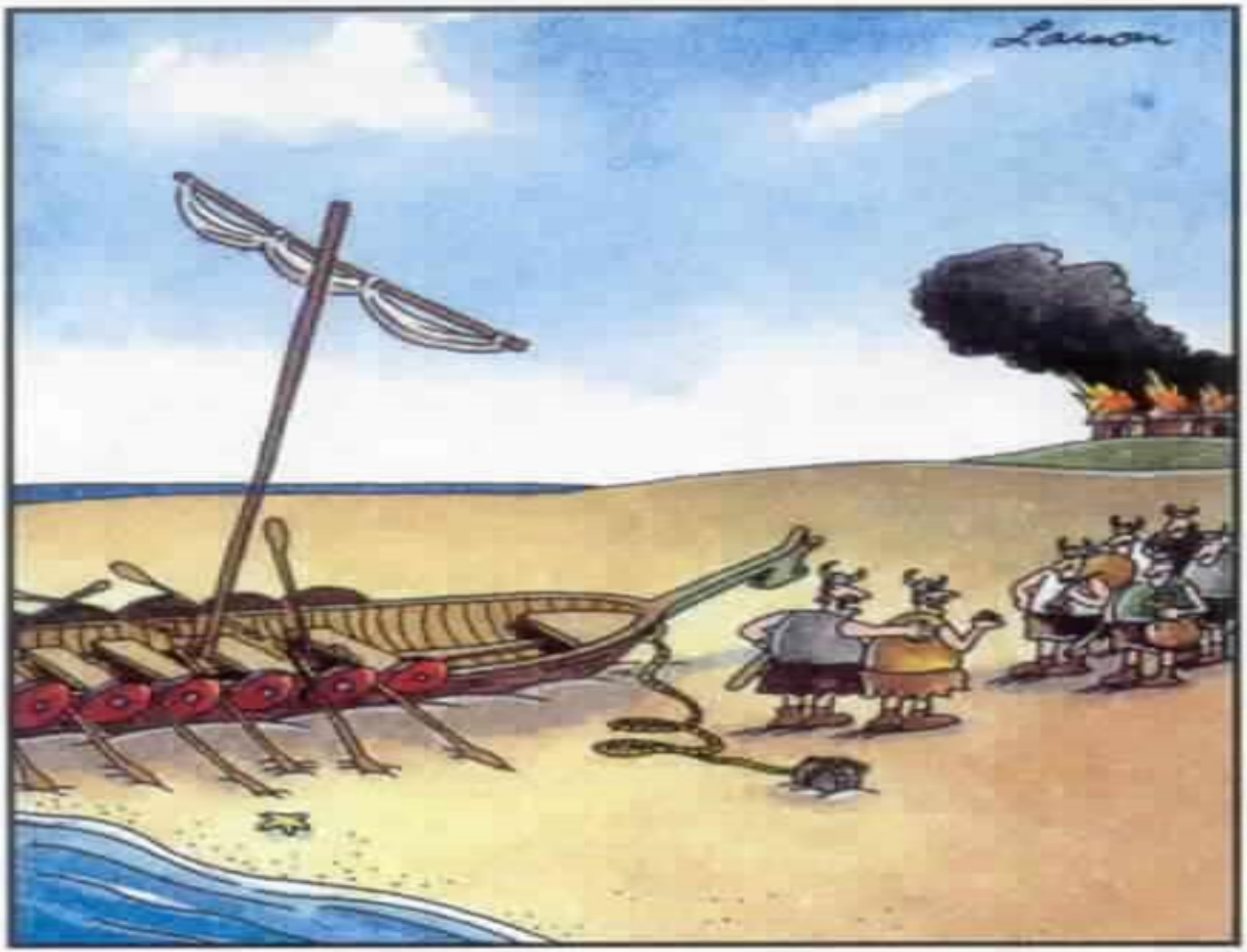
Suggestions for Improvement

- A thank you note giving acknowledgement to translators and their organisations to be included.
  - Translators to supply RSA with Crests/Company Logo.

- Security of the test/course evaluation
  - Password protected?
  - Only issued on request?

Suggestions for Improvement

- Maintenance of Source Documentation
  - Locking presentations and documentation from unauthorised editing.
- The material/ content to be reviewed annual
  - Keep material up to date and relevant.
  - TWCWG Members, Users feedback
- Additional reading/course material
  - Supplied to RSA



"Everyone can just put down their loot and plunder, and Sven here—yes, old Sven, who was in charge of reading the tide chart—has something to say to us all."

The way forward…

- The development of the Introductory course into an e-learning program if required.

- The development of the Introductory phase into an Advanced Technical phase.

- Facilitators to act as mentors to the learners.
- RHC to supply support with further requirements and courses.
- NB: This is not going to be as in-depth as CAT-A/B and will thus NOT be for CAT-A/B candidates.

- The members of TWCWG will have the opportunity to review and make suggestions/proposals on amendments/content once completed.

Advanced Technical Phase

- Advanced Technical phase.
  - Maintenance of equipment and upgrading systems.
  - Calibration methods.

  - A further focus will be on the understanding and appreciation of how data collection will impact hydrographic products.
  - The validation and processing of raw information.
  - Mixing of waveforms in Harmonic Analysis.
  - The processes/various methods used in analysing the data and creating prediction.

- Suggestions, comments and inputs from TWCWG members will be greatly appreciated
  - Email either RSA or AUS.

  .


QUESTIONS?
COMMENTS?
CONCERNS?