Working Group 2: Tsunami Detection, Warning and Dissemination

Report to ICG/PTWS 2019 (April 2019)
Ken Gledhill, Working Group Chair
LOCAL TSUNAMI SOURCE RESPONSE
WG 2: Summary (1)

**Local-Source Tsunami Response Best Practice:** A draft document on Local-Source Tsunami Response Best Practice is available for the groups’ consideration. This document is framed as guiding principles, with individual MS then able to shape their own SOPs to fit their own unique scenarios/circumstances.

**Minimum competency level for NTWC operations:** A draft document is available for the groups' consideration. The competency framework suggested is a multi-tier systems with different levels of knowledge and skills required depending on the roles.

**Optimal sensor networks for tsunami:** This is still a work in progress. Defining the task more clearly led to the following two goals:

- **Primary goal:** Detect and characterise the generation of a tsunami within 5 minutes;
- **Secondary goal:** Monitor and understand the evolution of tsunami waves/tsunami event.
WG 2: Summary (2)

Report and Review of PTWS (PTWC & NWPTAC) enhanced products: The working group considered reports from the current TSPs, and discussed the need for a major review of TSP. The consensus was that this was not required at present.

Recommendations:

- That the ICG accepts the WG recommendation that there is no need for a major review of TSP products at this stage, but that we should continue conducting reviews after events and exercises to gather feedback on the products.
- That the working group convene during the session to further discuss and refine the documents on:
  - Local-Source Tsunami Response Best Practice
  - Minimum competency level for NTWC operations
  - Optimal sensor networks for tsunami.
Local-Source Tsunami Response Best Practice (1)

**Context:** The ICG instructs Working Group 2 to develop guidelines and SOPs to inform the ‘best practice’ response to these local tsunami events

- A draft document was presented to WG1, 2, 3 and the Steering Committee for discussion; An updated version including feedback is available for the groups’ consideration.
- This document is about guiding principles, allowing Member States to shape their own SOPs to fit their own unique scenarios/ circumstances.

**Recommendation:**

- That the working group convene during the session to further discuss and refine the document on *Local-Source Tsunami Response Best Practice*.

**VERSION 1 APPROVED BY ICG/PTWS-XXVIII (2019) - PROVIDED**
MINIMAL COMPETENCY LEVEL FOR NTWCs
Minimum competency level for NTWC operations (1)

**Context:** The ICG instructed Working Group 2 to establish by mid-2018 the minimum competency level for NTWC operations, by identifying (i) what competencies are required and (ii) what training schemes are currently in existence and what guidelines and principles can be adapted for this purpose. Report progress on this task to the PTWS Steering Committee.

- A draft document outlining a proposed competency framework for NTWC staff was developed by the working group *(DRAFT - PROVIDED)*
- The competency framework suggests a two-tier system with different levels of knowledge and skills required depending on the roles.
Minimum competency level for NTWC operations (2)

Suggested competency levels:

- **Tier 1** - Tsunami event controller (or manager) which requires a comprehensive understanding of tsunami causes and impacts, the interpretation of PTWC products and national warning procedures.

- **Tier 2** - Tsunami event assistant which requires a basic understanding of tsunami causes and impacts, an understand of the PTWC products and can follow the national warning procedures.

A list of knowledge and competency levels is defined for each tier.
Minimum competency level for NTWC operations (3)

A small team was nominated to work further on the document. This team was made up of: Wilfried Strauch, 'Ofa Fa'anunu, Yuelong Miao, Chip McCreery, Lara Bland, Laura Kong, and Ken Gledhill.

This group produced a revised draft of the document to be presented to the ICG next year.

Recommendation:

That the sessional working group (above) also discuss and refine the document on *Minimum competency level for NTWC operations*.
WG2 Task Team: Minimum Competency Levels for National Tsunami Warning Centre (NTWC) Operations Staff

This expert Task Team will establish and document the minimum competency levels for NTWC operations staff and develop a framework for the competencies and training requirements of the roles of a NTWC.

• Establish the minimum competency levels required for NTWC operations staff.
• Establish a framework for the required competencies required by the roles of a NTWC.
• Establish what training is required to ensure NTWC staff meeting minimum competency levels.
• Investigate and document what schemes are currently in existence and what guidelines and principles can be adapted for this purpose.

The Task Team will be composed of Wilfried Strauch (Nicaragua), Ofa Fa'anunu (Co-Chair, Tonga), Yuelong Miao (Australia), Chip McCreery (USA), Lara Bland (Co-Chair, New Zealand), Laura Kong (USA), and Ken Gledhill (New Zealand). Co-chairs to be elected by the ICG.
OPTIMAL SENSING NETWORKS FOR TSUNAMI
Optimal sensor networks for tsunami (1)

**Context:** The ICG instructed Working Group 2 to review the sensing network of the PTWS and develop an optimal (defined by functional, resourcing and capability requirements) multi-instrument design that integrates emerging techniques and sensor technologies (e.g. better use of tide gauges; GNSS technology and processing; sensors on telecom cables) with the existing sensing network to meet tsunami warning service requirements. This investigation should include cost-benefit analysis of the potential technologies being considered.

➢ The working group discussed the instruction from the ICG to review the sensing network of the PTWS and develop an optimal multi-instrument design that integrates emerging techniques and sensors with the existing sensing network to meet tsunami warning service requirements.
Detection and Characterisation (5)

Data Availability 2004—2030

- Centroid Moment Tensor (GNSS)/Finite Fault Model (GNSS)
- Full Bottom Pressure (Tsunameters and Cables)
- In-situ Accelerometers
Optimal sensor networks for tsunami (2)

Because the task was not well defined, we redefined the goal of the sensing network as follows:

- **Primary goal**: Detect and characterise the generation of a tsunami within 5 minutes
- **Secondary goal**: Monitor and understand the evolution of tsunami waves/tsunami event

We then decided that our objective was to define the optimal observing network to achieve these goals.

After much discussion about frameworks to compare the effectiveness of the various monitoring and detecting technologies, we tasked a small group of Tim Melbourne, Lara Bland, Mike Angove, Diego Arcas and Ken Gledhill to pull together a framework based on the discussions.
Optimal sensor networks for tsunami (3)

- The framework which is emerging will be based largely on Seismic, DART and GNSS technologies.
- We then propose to devise a process that allows us to test the coverage of the networks, based largely on achieving the primary goal listed above.
- The framework is based on what it takes to identify directly or estimate the sea-surface changes.
Optimal sensor networks for tsunami (4)

For example:

- if we can fully measure the sea surface within the defined detection time we have “excellent” information
- if we can estimated the sea surface within the defined detection time we have minimum information
- if the sea surface is unknown within the defined detection time we have minimal or no information

This framework was further developed as a part of the OceanObs19 paper led by Mike Angove (see following diagram).
PTWC ENHANCED PRODUCTS - UPDATES
Report and Review of PTWS (PTWC & NWPTAC) enhanced products (1)

**Context:** The PTWC enhanced tsunami warming products were introduced in 2014, and the NWPTAC products in 2017. Is it now time to review the enhanced products and look at how they can be improved?

The working group discussed the need for a TSP product review. Key discussion points and outcomes were:

- There is no need for a major review of products at this stage but we should continue conducting reviews after events and exercises to gather feedback on the products.
- Repeated and regular PTWC messages over the course of an event should highlight whether information has changed.
- Should graphical product transmission only be repeated if the information changes? This should be discussed by the ICG.
Agencies using the products would like the messages containing predicted or observed arrival times at points around the Pacific to group these arrivals by country, and order them by arrival time within that group.

A new system was proposed whereby the PTWC would issue monthly tests to these numbers and if a number fails for three consecutive months it would be removed from the database. This would then be advised to the Secretariat.

The PTWC website may be rearranged to show domestic US/Canada warnings separately from international warnings. A static display with example screen pages was shown.

Soon PTWC will alter the wave height measurements in its products to show how they were calculated.
Report and Review of PTWS (PTWC & NWPTAC) enhanced products (3)

--> A list of currently outstanding changes to PTWC products will be included in the PTWC report.

Recommendations:

--> That the ICG accepts the WG recommendation that there is no need for a major review of TSP products at this stage, but that we should continue conducting reviews after events and exercises to gather feedback on the products.

Questions for the ICG:

1. Should PTWC products be altered so that repeated messages highlight the nature of any changes since previous messages?
2. Should graphical products be sent repeatedly if there is no change in them?