

A Fly-on-the-Wall: Notes from Port Alberni's Exercise Coastal Response

Submitted by Max Kasprzik Tue, 2016-06-28 11:13

As Canada's west coast braces for a much-anticipated major earthquake, Ocean Networks Canada (ONC) is working with partners to develop an earthquake early warning system. ONC has also been collaborating with other research agencies to develop preliminary tsunami wave propagation models that provide time of arrival, wave height, and inundation maps. These models, together with ONC's observatories, sensors, and the new warning system under development, are crucial tools for tsunami preparedness.

Model Animations

Port Alberni

Barkley Sound

West Coast

In June 2016, these preliminary tsunami models were integrated into Exercise Coastal Response, Emergency Management BC's first ever full-scale earthquake and tsunami response exercise. ONC staff scientist Tania Insua lead ONC's tsunami modeling project. She traveled to Port Alberni to take part in this ground-breaking week and to experience the aftermath of an earthquake first-hand.

It is an atypical day. I am not sitting in front of my computer at the University of Victoria; instead, I am shadowing Lori Wilson, the mapping and computer expert for the Alberni-Clayoquot Regional District (ACRD) in Port Alberni. Canada's first full-scale earthquake and tsunami exercise, Coastal Response, is about to start.



Lori Wilson in her Alberni-Clayoquot Regional District office.

While most of Port Alberni proceeds with business as usual, a few select locations are targeted with a fictitious magnitude 9.0 earthquake resulting from a rupture of the Cascadia subduction zone off the coast of southwestern British Columbia. ?The Big One? would also generate a tsunami on the west coast of Vancouver Island minutes after the initial shock.

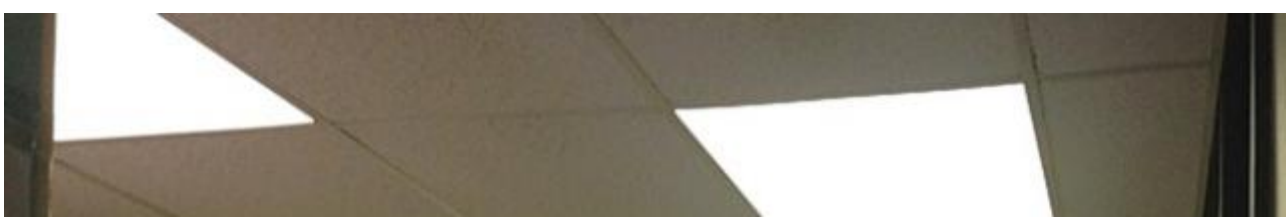
The downstairs floor of the Alberni-Clayoquot Regional District building is one of the locations that is hit by the mock earthquake. After we drop, cover and hold on, everyone leaves the building, which is being inspected by the Rapid Damage Assessment team. A green sticker goes on the door indicating that the building is safe. In a matter of minutes, the Emergency Operations Centre becomes a beehive of non-stop activity.



The Rapid Damage Assessment team meets after evaluating the damage to several Port Alberni buildings.

As I enter the room, a safety officer in a red vest runs past me. People are standing in small groups. Alberni-Clayoquot Regional District's Chief Administrative Officer Russell Dyson looks particularly serious in his green vest as he assesses the situation with his staff. The color-coded vests and uniforms help identify the emergency response teams: planning is blue, logistics is yellow, operations is orange, and finance is pale gray.

And then there is the white team. White is the colour of support, the ?what-if?? colour that teaches participants what things can go wrong and how to respond. They are the quiet evaluators in the room observing how everything is developing, the ones that throw red herrings at the team. Pieces start falling into place in my head as I get thrown into the Incident Command System pool and begin to learn the meticulous structure that keeps things together during an emergency.



Coloured vests indicate the different sections at the Emergency Operations Centre.

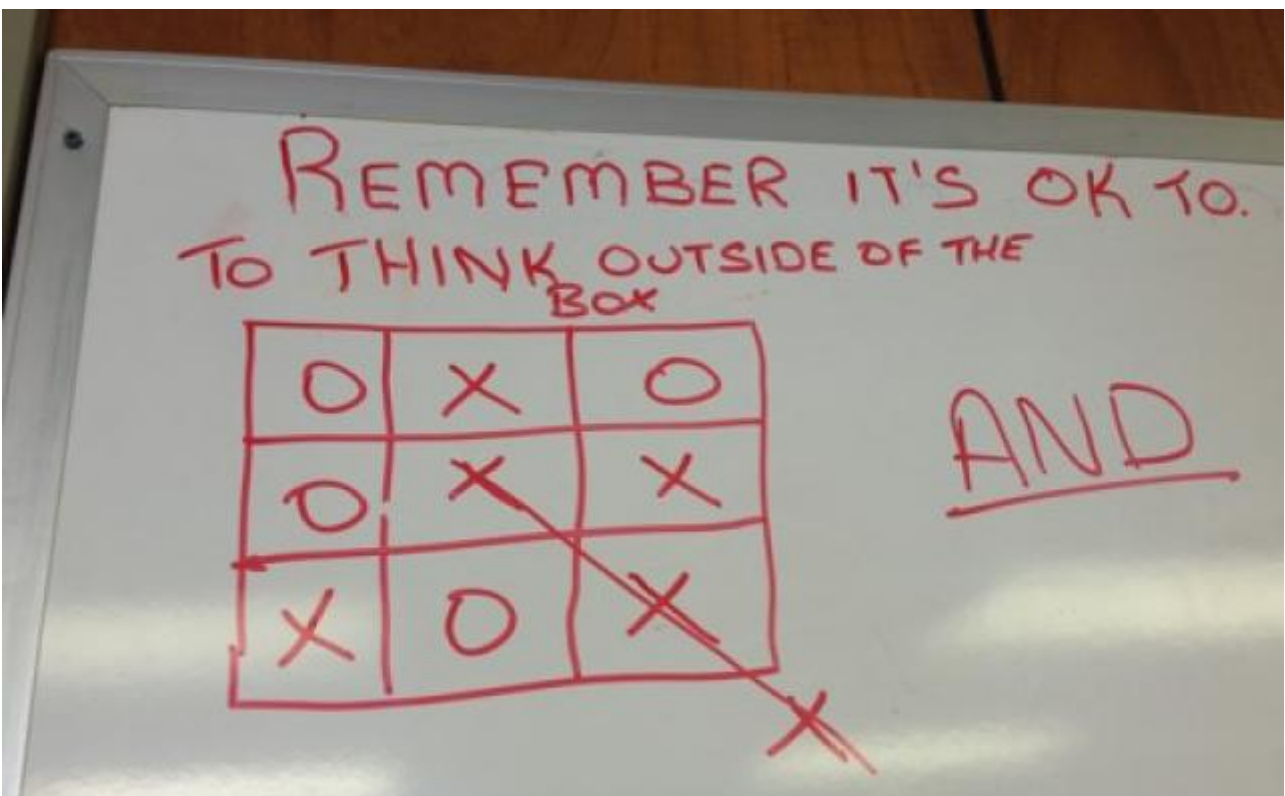
People are moving in and out of rooms and corridors, dealing with a myriad of issues.
?We need to secure food! We need a bus to transfer people injured during the earthquake.?

Communications from Port Alberni to the Emergency Operation Centre have been cut; there?s no Internet and no phone service. All we have now is radio communication. An elderly man with a cane walks into the room, holding a little piece of paper. He passes messages to the radio team who are outside in an improvised trailer. They will be Port Alberni?s only antenna to the world for the next two days.



The Port Alberni Arrowsmith amateur radio club helps with communications.

An ambulance officer runs into the operations room; she looks at the phone in her hands and smiles nervously: *?Somebody just died.?* The team looks at each other, uneasy smiles moving across the room. The thought that *?this could be real?* crosses our minds and leaves everyone feeling unsettled.



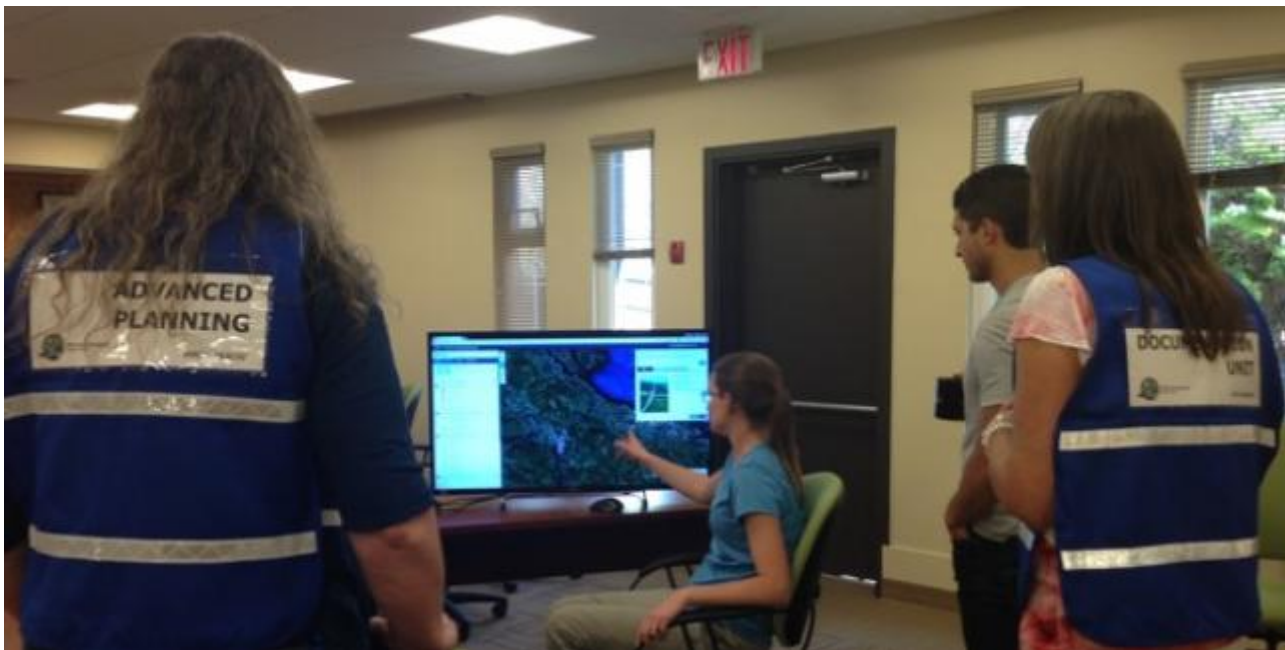
A note on the whiteboard reminds everyone to think outside the box.

The operations continue: *?The field team is confirming the inundation caused by the tsunami.?* I am all ears. They are covering the area by land, but the helicopter is on the way, so no air survey yet.

My head spins once again. What if we were able to identify specific locations to survey in advance? Or even instrument them with cameras? What if our tsunami models were able to pinpoint areas that would provide an overview of the event, to quickly assess the emergency situation?

An update meeting provides context for everything that is happening. Lori and I run upstairs to generate a map for the tsunami inundation. With no Internet or phones, she has to correctly identify the streets so that the information can be transmitted verbally by radio.

?What is the status of the bridges?? somebody asks. I try to wrap my head around the impact based on the preliminary models that we have been running during the last few months. How can these models help with emergency planning? Can our models simulate the impact on buildings or do we need to use different tools for critical infrastructure?



The planning team reviews imagery from the air survey using Truvian Labs' GIS mapping software.

It's now Day Two, and the room is even busier today. *?Are the phones back??* I hear someone say.

The Coastal Response team is doing an amazing job at keeping a cool head while handling emergency issues. Russell sets a great leadership example by not only keeping an eye on logistics, but also checking in on how everyone is coping. Appreciative and positive comments such as, *"I am learning so much from this,"* or, *"We'll incorporate that change into our real emergency plan,"* are constant.



Briefings help the different teams to coordinate.

The Salvation Army's Hope Van drops by with coffee for the emergency team and volunteers, while a survey plane flies by. It's good to see how all the different teams and volunteers work together, adapting to the moment-by-moment changes that are the reality of this situation.



The Salvation Army's Hope Van brings coffee for the team.

The Alberni-Clayoquot Regional District has called an emergency Board of Directors meeting. I have been asked to present the preliminary tsunami models of the wave that is expected to hit the town. I explain that the wave generated by the earthquake's fault displacement needs to propagate over an accurate map. To do this, we need both a Digital Elevation Model that maps the area's natural features in three-dimensions, and a source model that delineates the earthquake's unique rupture pattern.



ACRD Chief Administration Officer Russel Dyson (left) present to the Emergency Board.

Our preliminary tsunami inundation videos have simulated a six-hour event that shows the waves still rolling in. I explain that we need to extend the simulation timeline to help us understand when the waves will stop. I show how we can model specific locations that will quickly help to assess the damage.

In the future we could compare a real scenario with pre-modelled scenarios to help the field teams optimize and hasten their evaluations as these maps can help plan evacuation routes. I explain that ONC's offshore instrumentation can measure the wave before it funnels up the Alberni inlet and hits the town. When compared with our models, this information will help everyone understand and identify the wave action that is on its way.

I explain that ONC has prepared the ground work for emergency preparedness and we have the technology and algorithms to develop the rest. This is a great step towards working together more effectively. The presentation is well received and several people approach me to discuss the needs of other coastal communities. I am excited! This is the beginning of an open discussion about emergency preparedness in coastal communities for British Columbia.

Before leaving town, I'm invited to spend the day with the Tseshaht First Nation to spread the word about emergency preparedness with their community and to participate in the Emergency Support Services debrief. I learn just how far ahead the Tseshaht are in their emergency preparedness efforts. They want to be ready.

Two years ago, the Tseshaht led me by the hand as I took my first steps in tsunami science; we organized a workshop that brought tsunami modellers to Port Alberni from all over the world. I will never forget the moment when Tseshaht elder Ron Dick's recollections of the 1964 Port Alberni tsunami hushed the room, allowing all the modellers to feel the importance of their work.



Tina House (APTN) interviews Tseshaht elder Ron Dick.

As I drive away from Port Alberni, I am overwhelmed with an intense community feeling. I am so thankful to everyone who made this possible, and especially to Alberni-Clayoquot Regional District's Lori Wilson and Russell Dyson for allowing this fly-on-the-wall into the room, despite limited space. I have learned a lot. I look forward to continuing to work with everyone to improve our emergency preparedness.

Together we can do this. Together we can get ready. Everyone is a critical part of the solution, especially you! Get yourself ready and do your part to get British Columbia ready for 'the Big One'!

This project would not be possible without the support of Emergency Management BC, NOAA-NCEI, the University of Victoria, the Tseshaht Nation, Natural Resources Canada, Fisheries and Oceans Canada, GeoBC, Alberni-Clayoquot Regional District, the University of Rhode Island, the University of Paris-Est, the University of Alaska-Fairbanks, Compute Canada, and Westgrid.

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