

Not My Fault: The Great East Japan earthquake – not over

Lori Dengler/For the Times-Standard

Posted: Mar. 10, 2017

It is not over. Not over for the millions of people in Japan who felt the ground shake on March 11, 2011 and still startle when aftershocks strike. Not over for the hundreds of thousands who saw homes and work places destroyed and lost relatives, friends, and colleagues. Not over for the tens of thousands who are reminded of their loss daily as they look out on vast areas of emptiness where their town used to be.

This week I divert from my recounting of the Cascadia earthquake story to remember the Great East Japan earthquake and tsunami. It is not unrelated to the Cascadia story however. The Japan experience of 2011 offers a preview of what could happen when the next great Cascadia earthquake occurs here, beneath our feet.

The Japan earthquake sequence began six years ago today, March 9th, when a M 7.3 earthquake struck off the coast of northeastern Japan. It was noticed by the millions who felt it, but caused little damage, few minor injuries and was no surprise to seismologists. In the past 400 years, 50 earthquakes of this size or bigger had occurred here and the 7.3 quake was what was expected.

All of Japan's mitigation measures went into effect. The Earthquake Early Warning (EEW) system notified people 10 to 30 seconds beforehand that strong shaking was on its way, automatically slowing trains, triggering emergency power and giving people a little time to drop and cover. A tsunami warning was issued minutes later to warning coastal residents to expect up to three foot surges along the coast. There were many aftershocks – at least 25 of magnitude 5 or larger over the next two days. Everything was happening as expected.

Until 53 hours later. Until the M 7.3 was upstaged by a magnitude 9 earthquake and was demoted to a mere foreshock. All large earthquakes are part of sequences. The largest is the mainshock. Smaller earthquakes afterwards are aftershocks. For really big earthquakes, aftershocks can continue for many years. In most sequences, the first quake is the biggest. But around 10% are preceded in the days, weeks or months

beforehand by smaller earthquakes or foreshocks. The problem is that there is nothing about a particular earthquake to suggest a bigger one may be coming. The magnitude 9 was a complete surprise – much larger than any Japanese earthquake of the past millennium.

Despite the size of the earthquake, many aspects of Japanese efforts to prepare paid off. The Earthquake Early Warning System worked as planned. Announcements of impending ground shaking popped up on television screens and cell phones. A colleague of mine was on a bullet train when the earthquake happened. He noted the train stopping far from any station. When the ground shaking arrived a few seconds later, he knew exactly what had happened. Japan's dense network of seismic stations had detected the initial earthquake rupture seconds after it began. The lightning-fast EEW analytical system determined the magnitude and slowly and safely stopped all of the trains running at the time. The train my friend was on had been traveling at just under 200 miles an hour. He is sure that this automated system saved his life.

Japan's strict engineering design codes also performed well. There were no catastrophic collapses. Bridges and other large structures not only withstood the shaking, but most were operable with minimal damage. If the only effects of this earthquake had been ground shaking, the casualties would have been a few hundred, a small number considering that over 32 million people experienced extremely strong shaking. But for one thing, we would be remembering this earthquake for its successes.

That one thing – the tsunami. The tsunami that was so much bigger than expected. The tsunami that erased cities, towns and villages and changed forever the physical and cultural landscape of so many places.

Six years later there is progress. A multi-billion dollar rebuilding program paid for by the central government is remaking the Northeast coast of Japan.

An example of the recovery efforts is what has been happening in Rikuzentakata. The tops of nearby hills have been lopped off providing fill to elevate the ground and provide safe area to rebuild upon. Every day the area is buzzing with trucks and bulldozers moving dirt and building supplies. A new hotel and City Hall have been completed and the first shopping complex is scheduled to open next month.

I mention Rikuzentakata because California's North Coast became connected to that small city after a small boat was found in Del Norte County two years after the tsunami. That set in motion a remarkable series of events – linking the boat to Rikuzentakata's high school, the return of the boat, student exchanges and just last month a formal sister school and the initiation of a sister city relationship between Crescent City and Rikuzentakata.

There is still a long way to go before Rikuzentakata and other tsunami-stricken communities achieve a new normalcy. There is much we can learn from Japan about the long slow process of recovery.

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