

Predicting Earthquake Rebuttal

By MICHAEL R. SMITH

The Fall 2008 Disaster Recovery Journal published an article, "Why Predicting Earthquakes is a Dangerous Idea" in which the author (perhaps unwittingly) applies 19th Century reasoning against warning of tornadoes to warning of earthquakes in the 21st. While the science does not yet allow us to warn of earthquakes, at some future time that scientific capability might exist. So, it is appropriate to ask, "Are earthquake warnings a good idea?" Given sufficient spatial and temporal accuracy, my answer is a resounding, "YES!"

To learn why, let's examine the remarkable track record of the tornado and hurricane warning system and see what parallels might exist with earthquakes.

Author Thejendra BS poses this scenario:

Imagine a situation where some reliable agency predicts a major quake will hit the city and blasts the warnings through text messages, radio, TV, etc.

REALITY: Actually, this is very close to what happens with tornadoes and hurricanes today. The National Weather Service (for the public) or a weather company (to specific businesses) forecasts a tornado or hurricane to occur.

As soon as the initial shock is absorbed, the very next thing everyone will do is scoot to safety with their belongings and loved ones.

REALITY: When a tornado warning is issued, families gather up their loved ones and head for their basements or, perhaps, a bathroom in the center of their home. People at work move to designated shelter areas. During the devastating Greensburg, Kan., tornado of May 2007, authorities called for three refrigerated trucks to hold the "hundreds" of bodies they expected to find. The actual death toll was nine. Ample advance warning saved approximately 230 lives. "Scooting to safety" has great merit when a major storm is expected.

A tornado warning, 21 minutes before the storm struck, allowed the 80 people inside this plant to be sheltered. No significant injuries occurred. Storm warnings routinely save lives.

Why Predicting Earthquakes is a Dangerous Idea

By THEJENDRA BS

Whenever there is a major natural disaster like an earthquake, cyclone, tsunami, etc., that kills thousands of people and destroys countless properties the first question everyone asks is why our scientists can't predict them well in advance. After all if they can put a man on the moon surely it must be possible to invent some scientific equipment able to predict an earthquake, say two days in advance.

If such a device were available then it is obviously very easy to save lives and property as everyone can take the necessary precautions. Simple natural arguments followed by the common man, media, politicians, bloggers, talk shows, businesses, armchair commandos, etc.

This is why disaster recovery and business continuity experts inside and outside the corporate world are always under pressure to come up with innovative ideas on how to be prepared for earthquakes.

The good news is there are some special scientific equipments that can predict natural disasters based on atmospheric changes, satellite pictures, etc., though it is not sure whether they can always give pinpointed predictions.

Your next question would be, "If such equipment is available (even if not fully accurate) why does the government or a disaster prevention agency not inform people in advance so that everyone can run away to safety?"

However ignoring the reasons why it is not informed to everyone for the moment, just think again. Is it really possible to save lives and property even with such accurate advance information?

Unfortunately the answer is a big no. In fact an advance prediction of any major natural disaster like an earthquake will let loose another kind of man-made disaster that can actually cause more damage than the impending natural disaster. To understand how, just imagine any densely populated city in any country con-

taining a few million citizens. Imagine a situation where some reliable agency predicts a guaranteed major quake that will hit the city in the next 24 hours, and blasts the warning through mails, text messages, radio, TV, public address system, etc.

Now imagine what will happen next. As soon as the initial shock is absorbed, the very next thing everyone will do is think of ways to scoot to safety with their belongings and loved ones. Within hours you can expect the following horror unfolding all around.

Financial chaos: Thousands of people will flock to banks, financial institutions and insurance agencies to withdraw all their cash, valuables, deposits and other things they may have deposited. This is because there is no guarantee that if and when you come back your house and bank building will still be intact. Besides how many buildings are truly earthquake proof? The most important thing required after a disaster is always hard cash. You can't go around with a credit card. In a disaster it area to buy food and water. However no bank or financial institution will be able to manage such an abrupt withdrawal demand from all customers in addition to looking after their own safety. This is of course assuming their systems are capable of handling a mad rush of customers and clients.

Transport chaos: As soon as the news is made public everyone will leave their workplaces and start rushing home to their near and dear ones. Very soon everyone will also start leaving the city using every available means of transport. And that will mean roads, trains and planes will be choked everywhere leading to fist cuffs in desperation to get to somewhere safer. Vicious fights will start everywhere for fuel, bus tickets, train tickets, etc. It will be a rush hour of gigantic proportions. Imagine situations where you have to evacuate thousands of patients lodged in hospitals, care centers, senior care homes, offices, factories, schools, senior citizens, tree houses, jails, and every other place. Can you imagine the kind of Herculean transport arrangements, medical arrangements, food and other logistics that need to be done to take them to safety? And

imagine how many children, family members, tourists and even pets can get lost and separated in the rubble.

Rioting: Once panic sets in mob hysteria will take over, and no one can be controlled the streets as people will start shouting and hurling whatever is available, not to mention influential people and teachers who will make their own rules during such a crisis. And in the worst countries that have a large population of uneducated people controlling the streets no police or military can control the mob fury. And this is assuming the police and other agencies will ignore their own safety and remain standing around to help citizens, which is highly unlikely. There will be a total breakdown of law and order within hours. And no amount of education or skills can keep people calm and rational when the disaster time approaches nearer. Just imagine your own panic if you know that a major earthquake will hit your city in the next six hours. So where do you go and what can you really do in that limited time?

The above are some of the advance disasters that will happen well before the actual disaster strikes. And in all probability the actual disaster may cause less damage than the havoc created by people's panic because of advance information. No doubt many lives can be saved because people can come out of buildings so that ceilings and pillars will not crash on them, but the civilian disorder generated will be almost a similar or a worse nightmare to a sudden earthquake.

The timing of the information is also important because if it happens on holidays or late in the night there can be additional chaos. Hence, instead of getting prior information and completely ruminating a city you are better off not knowing when an earthquake will hit. Maybe ignorance is bliss in such matters.

We can conclude this article with an apt quote from Alfred Hitchcock who said, "There is no terror in the bang, it is only anticipation of it."

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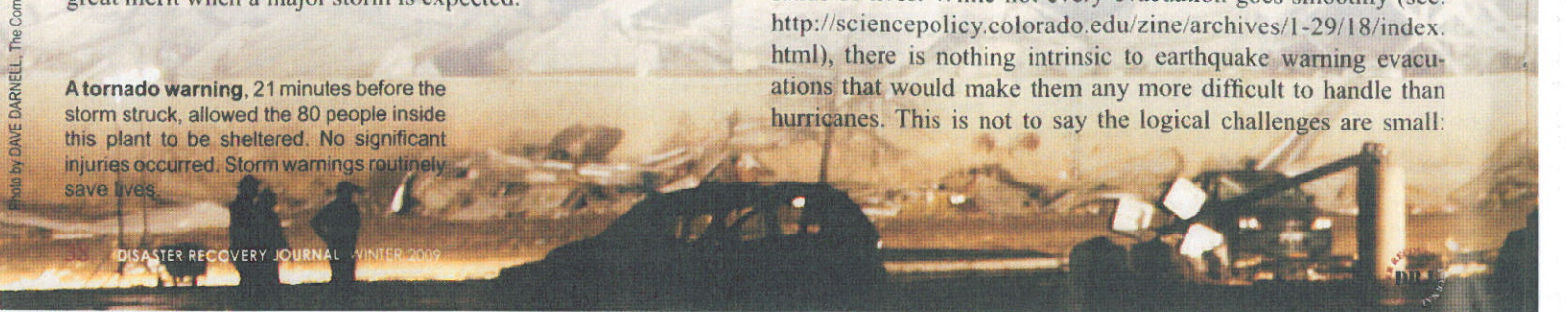
Within hours you can expect the following horror unfolding all around: ... Thousands of people will flock to banks, financial institutions, and insurance agencies to withdraw all their cash, valuables, and other things they may have deposited. This is because there is no guarantee that if and when you come back your house and bank building will still be intact.

REALITY: The United States successfully executes coastal evacuations for hurricane warnings every year, and none has caused a run on financial institutions. Credit/debit cards and checks are far more portable and safer in an emergency evacuation than large amounts of cash.

As soon as the news is made public, everyone will leave their workplaces and start rushing home to their near and dear ones. Very soon everyone will also start leaving the city using every available means of transport. That will mean roads, trains, and planes will be choked everywhere leading to fistcuffs in desperation to get somewhere safer.

REALITY: For tornadoes, most "shelter in place." For hurricanes, evacuation is the preferred tool that has saved tens of thousands of lives. While not every evacuation goes smoothly (see: <http://sciencepolicy.colorado.edu/zine/archives/1-29/18/index.html>), there is nothing intrinsic to earthquake warning evacuations that would make them any more difficult to handle than hurricanes. This is not to say the logical challenges are small:

Photo by DAVE DARNELL, The Commercial Appeal



Evacuating portions of, say, Los Angeles County would be a huge challenge. Fortunately, there appear to be more evacuation routes (far more freeway capacity in more directions) and transportation alternatives (i.e., train capacity and routes, multiple airports) than are available to Dade County, Fla., in an evacuation for a major hurricane.

Hurricane evacuations could serve as a template for future earthquake evacuations.

Rioting: Once panic sets in, mob hysteria will take over, and no one can be controlled. Rampant looting and arson will start on the streets as people will start stealing and hoarding whatever is available.

REALITY: This has not been the experience with weather warnings, and there is no reason to believe it would be the experience with earthquakes.

And, in all probability, the actual disaster may cause less damage than the havoc created by people's panic because of advance information [warning].

REALITY: In 1899, meteorologist Cleveland Abbe wrote these words: "The stoppage of business and the unnecessary fright would in its summation during a year be worse than the storms themselves." Yet, today, we know the opposite is true. Hurricane Andrew, a category 5 hurricane, killed fewer than 30 people. If there had been no warning, the death toll may have been in the thousands.

Generally, the tornado and hurricane warning systems have cut death rates (deaths per thousand population) by more than 90 percent in the last 60 years!

Storm warnings aren't just a matter of interest just to the public: B2B warnings of high-impact weather are an essential element of business continuity. On Feb. 5, 2008, I was involved in issuing a tornado warning to the Caterpillar plant in Oxford, Miss., allowing them to move more than 80 employees on-site at the time to shelter before the storm hit. The story of Caterpillar's people rallying to restore production in less than two weeks is the story of a feature article in *The Wall Street Journal* of May 19, 2008. The fact the warning kept their people safe and ready to return immediately to work underpinned the recovery effort.

In my book manuscript, "Warnings – The Remarkable True Story of Science's Battle to Tame the Weather," I document the development of the storm warning system in the United States that protects us every day. Other geosciences can adapt what meteorologists have learned into more effective warnings for tsunamis and volcanoes and, when scientifically possible, earthquakes.

There is no reason, given sufficient accuracy, earthquake warnings should not be made public just like warnings of tornadoes, hurricanes, and blizzards. Let's hope earthquake science progresses to the point we have that opportunity to save lives and property.



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Earthquake Article Scares Emergency Manager

By JEFF RUBIN, PhD, CEM

I had to comment on Thejendra's article on earthquake prediction in the Fall 2008 issue. Seeing stuff like this scares me. Although we don't have to "worry" about being able to predict earthquakes with any meaningful precision or accuracy, the author's purported downsides of such a warning not only are without basis, they actually contradict observed behavior.

No question that warnings don't always help (e.g., the Homeland Security Alert System), particularly if they are too broad, too late, or do not have sufficient direction (HSAS providing excellent examples of all of that as well, particularly under its original format). Timing and delivery are critical; also no question that anticipation of an event can be far worse than the actual thing, whether relating to an injection or a "dirty bomb" (thus the tactics of terror) – that's why we need to understand how people perceive risk.

All of that said, people rarely display mass panic, and it is extremely uncommon for them to obey evacuation orders en masse (it's actually just the opposite: see how many people evacuate a building when the fire alarm goes off, or how many stay in advance of a hurricane). In the overwhelming majority of documented incidents, whether single-site incidents like fires or large-scale disasters, people tend to respond communally and altruistically. Most people do not fight over access/egress, loot, riot, etc. I could site a substantial research that supports this, including some exhaustive reviews of actual incidents, e.g.:

- ▶ Clarke, L., 2002, Panic: myth or reality? *Contexts*, v. 1, no. 3 (Fall), p. 21-26; free abstract, PDF (fee): <http://caliber.ucpress.net/doi/abs/10.1525/ctx.2002.1.3.21?prevSearch=authorsfield%3A%28Clarke%2C+Lee%29>
- ▶ Quarantelli, E.L., 2001, Sociology of panic, in *International Encyclopedia of the Social and Behavioral Sciences*: Pergamon. Free PDF: <http://www.udel.edu/DRC/preliminary/pp283.pdf>

It's not like we can withhold an earthquake warning because the best we can do is maybe a minute's notice in heavily instrumented areas, but when we start to follow the path of believing that we must control information to prevent panic, we end up with a lot of very bad results.

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