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The essential lesson from the Japan earthquake for the U.S.

By Richard Allen | Saturday, March 12, 2011 | 7 comments



As we watch in the images rolling in from Japan we are yet again reminded of the sudden destructive potential of mother Earth. The number of fatalities is currently in the hundreds; the number displaced from their homes is in the tens of thousands. The tsunami generated by this magnitude 8.9 earthquake sent a wall of water sweeping across Japan, and across the Pacific. It was more than 30 feet high in places and reached six miles inland carrying cars, homes and everything else with it. Although the earthquake was 230 miles northeast of Tokyo, this was the worst shaking that people have felt in a city used to earthquakes. Explosions at the Fukushima Daiichi Nuclear Power Station have leaked radioactive material into the surrounding area, and we will undoubtedly hear of other catastrophic impacts over the next few days.

But it could have been much worse. The 2010 Haiti earthquake was magnitude 7; Japan's earthquake released almost 1000 times more energy than the Haiti event. Yet it is estimated that more than 200,000 people were killed in Haiti compared to the current estimate of hundreds in Japan. The reason for this difference is that Japan is one of the most earthquake-ready countries on Earth, Haiti was not.

For decades Japan has steadily pushed the limits of earthquake preparedness. It invests in research and development to understand the earthquake process and create infrastructure that is better able to withstand future effects. Their state of the art buildings shake but do not collapse. Classes about earthquakes in their schools make earthquake preparedness part of everyone's lifestyle, and regular public earthquake drills reinforce this for a lifetime. Their seismic networks, the best in the world, provide a tsunami warning system, and more recently an earthquake warning system that provided tens of seconds warning in this earthquake.

This long-term investment that Japan has made to reduce the impact of earthquakes seems like a very good deal today. It has undoubtedly saved many thousands of lives, and will also reduce the long-term impact of the earthquake on the economy as Japan rapidly bounces back. The investment will pay for itself many times over for this earthquake, and the next.

In the U.S. we also have an earthquake problem. Our west-coast cities are built atop active fault zones that give us occasional jolts reminding us of their presence from time to time. The 1989 magnitude 7.0 Loma Prieta earthquake was one such reminder, as was the 1994 magnitude 6.7 Northridge earthquake. Both events were moderate in size and the strongest shaking was in unpopulated mountainous areas. We have not seen the true power of west-coast earthquakes since 1906 when a magnitude 8 earthquake destroyed San Francisco. Los Angeles, the San Francisco Bay Area, or Seattle could be next.

Today, we should not have any illusions about the ability of an earthquake to bring wide-spread destruction a modern city. We most recently experienced the might of mother Earth in the U.S. when Hurricane Katrina hit New Orleans in 2005. In addition to the immediate destruction of the widespread flooding, New Orleans also stands as a testament to the long-term effects of these events on our cities. The recent census count shows that the New Orleans population is still down almost one third since the previous pre-Katrina count.

So what is our fate on the west coast? Do we follow Japan's lead, or do we fall back in the direction of Haiti? We must use this terrible event in Japan as a reminder to redouble our efforts to build an earthquake resilient society. We need to invest in the research and the

development that brings about better earthquake safety. We must push the limits of our technologies to deliver new earthquake mitigation strategies.

Modern buildings are built to standards that make them unlikely to collapse, but we need to focus on improving older buildings to bring them up to modern standards. We need more education about earthquake preparedness in our schools, and large-scale drills such as the California Shake-Out. And we need a warning system, like the one that delivered a warning in Japan. A prototype is operational in California. With only a moderate investment, public warnings could be available state-wide. Perhaps this warning from Japan can spur the investment now. We will be very glad we did when the next earthquake strikes.

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Image of the explosion at the JFE Steel Chiba factory via the Creative Commons license of Danny Choo

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