Earthquakes in Asia: Whole Lotta Shakin'

It's hard not to notice the earthquake risk around the Pacific Rim these days. Maybe the risk is actually higher, or maybe I just notice it more, but in the last four months, Asia has had three earthquakes of 6.0 or higher on the Richter scale, the magnitude at which earthquakes are generally considered destructive.

The Wenchuan earthquake in China's Sichuan province in May drew worldwide attention to the enormous impact of a big earthquake, even in areas with low population density: 70,000 people killed, 18,000 missing, 375,000 injured, and 5 million people homeless. And that was only the second-deadliest earthquake in Chinese history: the Tangshan earthquake was worse (250,000 people killed, 150,000 injured) and that took place just 30 years ago in 1976.

China is in the largest orogenic zone on the planet (that's how the Himalayas got there), but Wenchuan had "never been considered high-risk compared to cities near other fault lines", according to Hong Kong-based seismologist Dr. Michael Spranger. And now, after the Wenchuan earthquake, the earthquake risk in China is even higher because of tectonic shifting.

The Indian Ocean earthquake near Sumatra that caused the 2004 tsunami was also in an "unexpected location", Dr. Spranger said. In fact, Munich Reinsurance reports that Sumatra accounted for nearly a quarter of all earthquakes measuring 6.9 or greater in the world since the 2004 tsunami; Sumatra had accounted for only 2 percent of them in the previous *30* years.

"We have a geological record that goes back 1,000 years. It shows the region being hit by major quakes every 200 to 300 years. The last cluster of powerful quakes happened about 200 years ago. We are entering a new cluster," Prof. Kerry Sieh, director of the Nanyang Technological University (NTU) Earth Observatory, said in Singapore's daily *The Straits Times*.

So, earthquakes have been more frequent and they've been more serious, it's likely that more are coming and they might happen in places we don't expect. Well, then.

Earthquakes made the front page in Singapore (population density 6,500 per square kilometer) this month when *The Straits Times* revealed that two government-sponsored earthquake studies are in progress–both by NTU. The Monetary Authority of Singapore (MAS) is co-funding a study to assess the impact of natural catastrophes on the financial sector, and the Building & Construction Authority (BCA) is funding an earthquake vulnerability study as part of its "review [of] building codes and regulations after several major earthquakes in the region".

"What is certain is that our buildings are not designed to withstand earthquakes," Munich Re's Dr. Spranger said. The studies could easily have been kept quiet, so the government has obviously decided it's OK to draw attention to that risk.

One evening last February, I found my neighbors here in Singapore standing in the street, craning their necks up at their 10-storey building. It had been shaking so violently from a magnitude 6.6 earthquake–four hundred kilometers away and 57 kilometers deep under Sumatra (Indonesia's largest island)–that they all evacuated into the street. I'd been on a train, and hadn't felt a thing.

Any official acknowledgment that earthquakes could happen here would have been remarkable because "in known history, Singapore has not experienced an earthquake", according to Singapore's "National Environment Agency (those were "tremors" we felt in February, you see, not an earthquake). An indication of the sensitivity: the BCA does not have an earthquake hotline, but it does have a hotline for "tremor due to distant Earthquakes" (*sic*), a subtle–but now irrelevant–distinction.

So it's official: earthquakes are no longer banned in the Republic.

There have been recent earthquake preparation activities on both sides of the Pacific. Japan held a drill on its Disaster Prevention Day (Sep. 1) for a tsunami generated by a 8.6-magnitude earthquake in one of its coastal earthquake zones. Japan's (now former) Prime Minister actively participated in the drill. The scenario was definitely plausible: an earthquake of that magnitude struck Hokkaido in 2003, generating a tsunami.

Ten days later, on the night on Sep. 11, a 6.8-magnitude earthquake hit just off the coast of Hokkaido. Halmahera, Indonesia was rocked by a 6.6-magnitude quake the same night.

Two big earthquakes in Asia at the same time. On a Sep. 11… That should be enough to make anybody superstitious.

On the other side of the Pacific, California will conduct Exercise Golden Guardian '08, its largest earthquake drill ever, in November, based on a 7.8-magnitude earthquake in Southern California referred to in a study as the "ShakeOut Scenario". That study, released by the U.S. Geological Survey and the California Geological Survey, predicted an earthquake that big would cause 1,800 deaths, 50,000 injured and US$200 billion in damages in California (fewer casualties but more financial impact than China's Wenchuan earthquake).

Supplements to the ShakeOut reports explore California's specific vulnerabilities to earthquake damage: concrete buildings and un-reinforced masonry collapsing, compromised pipelines, telecommunications lines severed, shipping and transportation interrupted at America's largest port. Those would be the same concerns in Hong Kong or Singapore. The telecommunications report notes that earthquakes cause not only severed phone and data lines, but also dramatically-increased call volume, making it difficult for emergency responders to communicate. If you're doing BCP (business continuity planning) for your company, that report is worth a look (it's a 50MB file, however).

Business impact analysis

The business impact of planning to mitigate, respond to and recover from earthquakes will be significant all over Asia, even if no more earthquakes occur for many years.

First of all, insurance companies are about 6.5 Richter points away from a tsunami of claims from a big earthquake in one of Asia's megacities. I imagine one of Munich Re's motives for publicizing its report so widely was to provide "cover", as it were, for a contemplated increase in its re-insurance rates, with or without another earthquake.

Property owners in Singapore, Hong Kong and Kuala Lumpur pay little or nothing extra for insurance that routinely includes earthquake cover. An insurance claims manager complained to me: "We're giving it away almost for free!" No insurance company has wanted to be the first to add an earthquake premium. I expect that to change, starting in 2009. It's a great excuse for a premium hike, and insurers can sure use the money right now. I say, just watch AIG.

If building codes are revised to mandate greater resistance to horizontal ground motion (lead dissipators , for example, or lead & rubber bearings), commercial construction costs in Asia will increase even more than they have in the last year. Those costs will be passed on in office rent increases, whether or not an earthquake occurs.

The business impact of an earthquake on the highly-developed economy and dense infrastructure of Japan is clear (see Kobe earthquake, 1995), but the business impact of a

break in the supply chain between China or India and North America gets more severe with every gadget manufactured in Shenzhen (China), every line of code written in Bangalore (India) and every phone call answered in Parel or Powai (India). The impact of an earthquake in Asia will be felt by busineses around the world.

Professor C. G. Goh of the new Centre for Hazards Research at the National University of Singapore said "a big earthquake is a low-probability but high-consequence event"–precisely the kind of risk for which business continuity planning is intended. The time, money and resources for that planning have a business cost, no matter when or where the next earthquake occurs.

Effective earthquake response, however, require much, much greater focus on emergency management than on business continuity. The public sector emergency services will be overwhelmed, as they were after the Indian Ocean tsunami and the Wenchuan earthquake. The banks, brokers and fund managers that the MAS supervises, for example, don't have medical equipment, emergency response training or environmental health & safety (EH&S) officers. Fire wardens are barely trained; some cannot even *lift* a fire extinguisher, let alone aim and discharge it. Employees routinely ignore or circumvent evacuation and assembly drills that could save their lives in an earthquake. There will be a cost–a big one, in my estimate–to persuade their bosses to spend time and money preparing for a "low probability" event.

Of course, when the next earthquake does happen, there will also be heart-rending human and social consequences. The countries in Asia most at risk of earthquakes are also those with huge numbers of people, many of them very poor. China, India, Pakistan and Indonesia are home to 40 percent of humanity, and Asia is home to over half the world's population. In the 1976 Tangshan earthquake, 7,000 entire families were wiped out in a few seconds.

There is no way Asia's governments or the many non-governmental organizations (NGOs) that provide critical disaster relief here will be able to manage the response by themselves. Emergency managers, security professionals, business continuity planners, relief workers and disaster responders will have to learn to work together.

The process of building resilience by building bridges between professionals won't be as expensive and retrofitting infrastructure, but it will take a lot longer - and in Asia, it has hardly even started.

Postscripts
We also have a fine assortment of volcanoes here in Asia around the Ring of Fire, which add to our natural hazard risks. I wrote two years ago about the possible business impact of theTaal volcano in the Philippines.

To imagine what it's like to live through an earthquake, listen to National Public Radio's Melissa Block's report, recorded during the Wenchuan quake (8 minutes).

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