

# The politics of earthquakes

*Too many countries are playing Russian roulette when it comes to seismic risk.*

**Claire Berlinski, Los Angeles Times, 7-24-11**

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Seismic risk mitigation is the greatest urban policy challenge the world confronts today. If you consider that too strong a claim, try to imagine another way in which bad urban policy could kill a million people in 30 seconds. Yet the politics of earthquakes are rarely discussed and, when discussed, widely misunderstood.

Take Japan's Sendai earthquake on March 11, which released 600 million times the energy of the Hiroshima bomb. The ensuing partial meltdown at the Fukushima Daiichi nuclear power plant prompted international hysteria about nuclear power, but few seemed to realize that a far deadlier threat had been averted. As seismologist Roger Bilham aptly put it, houses in seismically active zones are the world's unrecognized weapons of mass destruction — and Japan's WMD didn't go off. Its buildings — at least those that weren't swept away by the accompanying tsunami, a force of nature against which we are still largely helpless — remained standing, and the people inside survived.

That so few buildings collapsed in the earthquake was a human triumph of the first order. But cities around the world seem happy to ignore the earthquake threat — one that is only growing as the cities themselves get bigger and bigger.

The Japan quake was not the catastrophe it could have been because the country learned from experience. In the wake of the 1995 Kobe quake, in which 200,000 buildings collapsed, Japanese engineers took extensive measures to reinforce buildings and infrastructure. They installed rubber blocks under bridges. They spaced buildings farther apart to prevent domino-style tumbling. They introduced extra bracing, base isolation pads, hydraulic shock absorbers. A minute before the March earthquake, seismic monitoring systems sent warnings to Japanese cellphones. Elevators glided obediently to the nearest floor and opened. Surgeries were halted. Videos from Tokyo show skyscrapers swaying gracefully, like cornstalks in the wind. Not one collapsed.

## Cities at risk

But many of the world's biggest cities are at massive seismic risk, built more like Port-au-Prince, Haiti, which was devastated by an earthquake in 2010, than like Kobe. Eight of the world's 10 biggest cities are built on fault lines, and they are growing larger every day. The urbanization trend is continuing upward, as is the trend of housing migrant populations in death traps. As a result, it's likely that before long we'll see a headline announcing, "1 Million Dead in Massive Earthquake."

Yet, just as we know how to build airplanes that don't crash, we know how to construct buildings that don't collapse. We also know which cities are most at risk: Bogota, Cairo, Caracas, Dhaka, Islamabad, Istanbul, Jakarta, Karachi, Katmandu, Lima, Manila, Mexico City, New Delhi, Quito and Tehran. Los Angeles and Tokyo are prime candidates for a major quake, but they will probably survive because they are well-built — though Los Angeles could do better.

It's tempting to think that people in certain countries are cavalier about the risk because they're poor. The argument goes like this: Safe houses cost more to build than cheap ones. Cement watered down with sand

stretches further. People in poor cities don't have the money to build safe houses, or if they do, they have decided to use it to mitigate more immediate risks such as hunger.

If wealth was all there was to it, the solution would be, if not simple, at least obvious: To prepare for an earthquake, promote economic development and cross your fingers. When a country becomes wealthy enough, the problem will solve itself.

This theory has been voiced in Istanbul, where I live. Mustafa

Erdik, chairman of the Department of Earthquake Engineering at Bogazici University, has suggested that Turkey's best hope is rapid economic growth. If growth happens fast enough, he says, property owners will be able to replace the worst housing stock before the ground starts shaking. If we look at it this way, we see seismic risk reduction as a paradox: The best way to reduce the risk is to ignore it.

The idea is tempting and elegant. But it's wrong.

### **Money isn't everything**

Wealth in and of itself is not enough to get people to take earthquakes seriously. Here is the evidence. On Feb. 27, 2010, a magnitude 8.8 earthquake struck near the city of Concepcion, Chile. Though the epicenter was not at the heart of the city, this quake was 100 times bigger than the one that leveled Port-au-Prince. It was so massive that it shortened the length of the day by 1.26 microseconds and moved the Earth on its axis by eight centimeters. When it was over, the entire city of Concepcion had been moved three yards to the west.

The death toll from this monster was 521. Each death was its own disaster, of course, but the number was nevertheless astoundingly small for an earthquake that, by all rights, should have destroyed Chile as a whole. Chile did so well because it has some of the strictest and most advanced building codes in the world, and because the codes do not merely exist on paper — they are enforced.

Now consider Turkey. Like Chile, Turkey is no stranger to earthquakes. In 1509, an earthquake killed between 5% and 10% of Constantinople's population. The Ottomans called it Kiyamet-i Sugra, the Minor Judgment Day. Since then, the city has suffered serious quake damage 11 times, most recently at the end of the 19th century.

There is not a geologist alive who doubts that a major earthquake is likely to hit Istanbul soon. In 2000, the U.S. Geological Survey put the odds of it happening within 30 years at 62%. Erdik has estimated that it will kill 200,000 to 300,000 people. The cost of the cleanup — \$50 billion would be an optimistic estimate — will surely set Turkey's economy back decades. It will be a political cataclysm, with massive ramifications for the entire region.

Every day I walk past buildings in Istanbul that are clearly unsound. I see ground floors, for example, with walls or columns removed to make way for store displays, violating one of the most important principles of earthquake-resistant construction. There are vast neighborhoods filled with illegal, flimsy structures called gecekondur, "landed overnight." Gecekondur aren't built by engineers. They tend to be built on bad soil. They are packed with children.

Even buildings approved by engineers, warned a recent study by the Turkish Chamber of Civil Engineers, are largely not built to code. The group also warned that 86% of the city's hospitals were at high risk of collapse.

Is this because Turkey is poor? The per-capita gross domestic product in Chile this year is \$15,867. In Turkey,

it is \$14,077. That's not a huge difference.

The point becomes even clearer if we consider "nonstructural seismic risk mitigation" — the little things, besides building better houses, that people can do to protect themselves.

These steps aren't expensive. For example, according to studies done by the Istanbul Seismic Risk Mitigation and Preparedness Project, a quake of the size widely predicted would rupture 30,000 natural gas lines. In the aftermath of a stressful event, people do a predictable thing: They smoke. Smoking near a ruptured gas line is a good way to start a fire. But I don't think I've ever seen a sign or TV commercial anywhere in Istanbul saying, "If it happens, don't light up."

Nor have I seen more than a handful of commercials or public service announcements reminding people what else they should do in an earthquake: duck, cover and hold on. Last year, I stayed in a hotel in Palo Alto. The first thing I noticed in my room was a card on the desk, labeled "Earthquake Safety Tips for Visitors," with instructions in Spanish and English as well as diagrams. I've never once seen anything like this in a Turkish hotel room.

Although it is very expensive to tear down and replace, or reinforce, inadequate housing, it isn't expensive at all to bolt heavy goods to the walls or to move heavy furniture away from beds. Rarely is this done in Istanbul. The odd thing, though, is that everyone does fear the coming quake. Last year, a minor jolt panicked the city and sent the Turkish word for earthquake, *deprem*, to the top of Twitter's trending topics. But almost no one knows what to do if it happens, or cares to know. I know many people in Istanbul who are wealthy enough to live in safer buildings but don't. They are fully aware of the risk; they're just fatalistic.

Contrast Turkey with Japan. After the March quake, journalist Kirk Spitzer, who lives in Japan, wrote about the culture of earthquake preparedness there: "Our shelves are lined with rubberized material to keep glasses and plate-ware from sliding; nothing fell over and broke, not even delicate champagne glasses we brought from Paris. Elsewhere, floor-mounted latches kept bedroom and hallway doors from slamming or breaking loose. Picture rails built into the ceiling kept even heavy frames from crashing to the floor."

Ordinary, middle-class Japanese take these steps to protect their drinking glasses. Many museums in Istanbul fail to take similar steps to protect priceless sculptures, ceramics and cuneiform. This isn't a matter of comparative wealth; it's a matter of culture.

You see a similar failure to turn worry into action at the governmental level. Local officials in the municipality of Besiktas have elaborate earthquake plans. But though they have existed since 2008 in a PowerPoint presentation, no progress has been made toward implementation.

Fatalism kills. Short-term thinking kills. But above all, corruption kills. On the anniversary of the Haiti earthquake, Nicholas Ambraseys and Roger Bilham published an extraordinary study in *Nature* magazine. Using data from Transparency International's Corruption Perception Index, they calculated that 83% of all deaths from building collapses in earthquakes in the last 30 years took place in countries that were "anomalously corrupt" — that is, in countries that were perceived to be more corrupt than you would predict from their per-capita income.

Economist Charles Kenny's definitive 2007 study argues persuasively that the construction industry is the most corrupt sector of the world economy. And the more corruption there is in construction — whether it consists of companies using substandard materials or of governments granting permission to build in zones unsuitable for habitation — the likelier you are to die.

The absence of outright corruption isn't enough to keep countries safe; it is also essential to have in place a particular kind of legal regime. Strong tort law is the key, and Chile is a model here as well. During the recent earthquake, a new building in Concepcion collapsed. Its surviving inhabitants took the builders to court, charging fraud and, in some cases, murder. Chilean law holds the original owner of a building liable for any earthquake damage suffered during its first decade, even if ownership has changed during that time. Because of this law, owners often exceed the provisions of Chile's already strict building codes in their eagerness to avoid liability.

### **Terror in Port-au-Prince**

When the Haiti earthquake struck last year, I had a personal reason to be alarmed: My brother and his family lived in Port-au-Prince. They survived, but many of my sister-in-law's co-workers were crushed to death. From Washington, I translated text messages sent to an emergency number set up to help search-and-rescue teams locate victims. The messages were awful: "Jean-Olivier Neptune is caught under rubbles of his fallen house.... He is alive but in very bad shape." "Hotel Montana at Rue Franck Cardozo in Petionville collapsed. 200 feared trapped." "My mother is part of a medical team that had just arrived in Port-au-Prince. We received a text that she and two others are trapped beneath the rubble."

Estimates vary widely, but it seems likely that more than 150,000 people were killed in Haiti, and God knows how many more were maimed, physically and emotionally, by collapsing buildings.

This will happen again and again, in larger and larger numbers, with ever-weepier celebrity telethons to accompany the carnage. But you'll see no calls to save the world from corrupt building practices on your bags at Whole Foods. Nobody will suggest that the U.S. government enter into seismic risk reduction treaties with other nations.

Spin the wheel: Bogota, Cairo, Caracas, Dhaka, Islamabad, Istanbul, Jakarta, Karachi, Katmandu, Lima, Manila, Mexico City, New Delhi, Quito, Tehran. It will be one of them. It isn't too late to save them. But we need to discuss truthfully why they're at risk in the first place.