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# civil + structural ENGINEER

CELEBRATING THE DESIGN AROUND US



## WOOD VS. CONCRETE

THE BATTLE FOR MULTIFAMILY CONSTRUCTION MARKETS

Mass timber high-rise buildings

Refined dam design

Stormwater risks and liabilities





## GANGS, EARTHQUAKES, AND PUPUSA

TAKING RISKS TO BE CHANGE AGENTS IN  
DEVELOPING COUNTRIES.

By H. Kit Miyamoto Ph.D., S.E.

**WE ARE DRIVING** on a bumpy urban jungle road, right behind an armed police escort. Hot equatorial sun beats down on our black truck, keeping it nicely humid and hot. I am in San Salvador, the capital of El Salvador, heading to a gang-ridden public housing area.

This is the city where a moderate, M5.5 earthquake killed more than 1,500 people in 1986. We are on a mission, working together with the government to assess the seismic risk of the city and identify gaps in earthquake disaster preparedness.

We park in the muddy parking lot in the front of smog-stained, five-story concrete apartments. As soon as our team gets out of the truck, armed police escorts rapidly scatter around the perimeter. Many of the buildings are haphazardly out of plumb, either caused by settlement or cracked concrete. A city engineer explains to me that many of these buildings were damaged by the 1986 earthquake and red-tagged, but people went back to live there anyway, having no place else to go.

As we assess the buildings, my interpreter nervously whispers to me, “Kit, you see a teenage boy around the corner who is looking at us? I guarantee that he is a member of a powerful local gang group. By now, everybody knows we are here.”

The first step of the risk assessment is on-the-ground building data collection. Combining this data with remote sensing satellite images, we can construct an accurate picture of the city’s built environment and population. As engineers, we sometimes need to expose ourselves to certain risks. Being in a gang-controlled area is one thing, but being on a normal construction site is also filled with danger. Nevertheless, society needs us to do this; it is our job.

We get back to our ever-more-heated truck and head back to safer city areas. It is a 13-hour day road trip around the traffic-jammed city with a 15-minute gas station hot dog lunch stop. We are meeting various agencies to understand their preparedness capacity. We arrive at a ministry that is in charge of multi-hazard risk monitoring. A young researcher greets us with fluent English. A semi-dark room is full of blue computer screens showing real time weather and earthquake monitoring.

In 2010, the UN ranked El Salvador as having the highest natural hazard risk in the world. But it is an absolutely beautiful place — untouched jungles, wild beaches, 1,000 volcanoes. It is also a truly undiscovered place. We saw very few foreign tourists besides rogue surfers and businessmen escaping the capital city on weekends. Salvadorians are very kind and friendly. I say, the coffee is the best in the world, and their national dish — cheese-filled pupusa — is something I dream about.

The young researcher explains how they monitor earthquakes. Later we learned that she is a director of the agency. Impressive, where male dominance is common in this part of the world. This is something I often find in many developing countries. Talent and knowledge are sometimes buried and fragmented. Foreigners like us can help as change agents by breaking pre-existing social or political barriers, connecting dots, and supporting talents.

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