

# Earthquake preparedness: Addressing hazards before the disasters

BY ARCHITECT FELINO A. PALAFOX, JR. ON MANILA TIMES, APRIL 20, 2017 ANALYSIS

THE Philippines is an earthquake-prone country, with trenches on both its eastern and western portions (except the island of Palawan), as well as active fault lines throughout Luzon, the Visayas and Mindanao. In this regard, it is best to be aware of our situation and take the necessary steps to be properly equipped. I believe that addressing hazards is 90 percent cheaper than rebuilding from disasters.

Last 29 March, 2017, I had the opportunity to speak to students in Metro Manila on earthquake preparedness together with Undersecretary Renato Solidum, Director of the Philippine Institute of Volcanology and Seismology. It was also a good opportunity to learn from him and bust some earthquake myths. For example, it is more ideal to get out of the building after an earthquake than go up the rooftop. This is not just because a damaged building could collapse, but also to ensure safety from one of the consequences of an earthquake, which is fire. He also emphasized that there is no such thing as an earthquake-proof structure, only earthquake-resistant ones. This means that a building's structural integrity should remain to be unimpaired after an earthquake, even if superficial cracks may appear.

## Urban planning, architecture and engineering

Adding to the important points of Undersecretary Solidum, there are also urban planning, architecture, and engineering interventions that may be applied towards earthquake preparedness. In terms of urban planning, I highly recommend the development of urban growth centers outside of Metro Manila, as well as relocate government centers and embassies outside of it. This could effectively decongest the megalopolis and ensure that the economy will not be as gravely affected should a disaster hit Metro Manila. Currently about 37 percent of the national economy is contributed by Metro Manila.

As country leader and fellow of the Council on Tall Buildings and Urban Habitat (CTBUH), I was invited to Mumbai to learn and brainstorm on the Indian government's plan to remake part of the city which is vulnerable to disasters. One of the recommendations is to demolish around 32,000 buildings which were found to be old and prone to hazards already. I believe that conducting a structural audit of all buildings in our cities would be a good first step towards getting ready before hazards become actual disasters.

Undersecretary Solidum also said that although Palawan is safe from the shaking during an earthquake, it is not completely invulnerable to tsunamis. In the planning of San Vicente in Palawan, Palafox Associates recommended to have a setback of 50 meters from the shoreline and to build habitable spaces above five meters, as precaution against tsunami or storm surges. In addition, Undersecretary Solidum also explained that the development of tall buildings along the coast of Manila Bay could be beneficial because they create a roughness along the coastline that can break up tsunami waves.

Another important component for planning our cities to be prepared for disasters is to create enough open space for evacuation. The international standard suggests that there should be at least one square meter of open space per person for evacuation. Unfortunately, open spaces in our cities are gradually being developed for profit. An ideal evacuation area should have

emergency clinics, water stations, food stations, shelters, telecommunication and command centers, fire trucks, police, ambulance, helipad, and places for worship.

### **Learning from MMEIRS study**

According to the 2004 Metro Manila Earthquake Impact Reduction Study, around 170,000 residential houses will be heavily damaged or collapsed (13 percent of total buildings), 340,000 will be moderately damaged (26 percent of total buildings) and 10,000 alongside of Manila Bay will be affected by liquefaction in the first hour of impact by a magnitude 7.2 earthquake. It also stated that only 2 percent of high-rise buildings (30-60 stories) will be severely damaged. This is because there are many studies and professionals involved in the planning, design, and construction of tall buildings, compared to low and mid-rise structures. For example, the first five towers in Rockwell Center, Makati underwent performance-based standards borrowed from California, Japan and Chile. These buildings are also 30 meters apart, although our building code allows a distance of one meter between buildings.

In working with the Tzu Chi Foundation to help survivors of natural disasters, Palafox Associates and Palafox Architecture Group are able to plan and design schools and a hospital that could withstand an intensity 10 earthquake. Most recently, in Nepal after the earthquake, Master Cheng Yen instructed us to design the structures to last 1,000 years. That is equivalent to 40 generations of users. Some people are already skeptical when I talk about a 100-year vision, which involves only four generations. I believe it can be done if there is structural audit conducted every 75 years and electrical audit every 25 years.

While a strong political will and visionary leadership can help enforce good planning and design, each citizen's awareness and preparedness is also necessary to ensure fewer casualties from disasters. Equip yourselves with timely information and participate in emergency training or drills. As an extra preparation, like in our offices at Palafox Associates and Palafox Architecture, all of our employees are equipped with emergency kits that have a whistle, flashlight, bottle of water, compass, first aid kit, and multi-function portable tools. But at the end of the day, these are things that we hope will not be necessary because preparation goes beyond first-aid reactionary measures.