

Participants inspect earthquake-resistant renovations made to the Arakawa City Office as they hear how the design minimizes shaking.



## Construction Techniques from Japan Help Save Lives

In Japan, where earthquakes are commonplace, people have developed a wide range of technologies for disaster risk reduction to use in the construction of buildings and other structures. Building codes in Japan were amended following a major earthquake off the coast of Miyagi Prefecture in 1978, leading to a revision of the Building Standards Act in 1981. The revised law imposed more stringent standards for earthquake-resistant buildings to protect lives in the event of a great earthquake.

The Great Hanshin-Awaji Earthquake in 1995, which claimed some 6,000 lives, alerted Japan to the fact that buildings were still at risk. Ninety percent of the casualties were caused by collapsing buildings, with the physical destruction heavily concentrated among structures built in accordance with the old standards. That same year Japan enacted a new law promoting renovations to improve the quake resistance of standing structures. As a result, people all over Japan began renovating homes and buildings that had been built in or before 1981.

### LEADING SEISMIC-ISOLATION TECHNOLOGY

In many developing countries that share Japan's susceptibility to earthquakes, less progress has been made in efforts to protect structures from destruction. Since 1977 JICA has operated a program for trainees from developing countries. Many have taken advantage of this opportunity. In 2013 the

program welcomed participants from 12 countries, including Algeria, Azerbaijan, El Salvador, Haiti, India, and Thailand.

For many of the trainees, the most impressive discovery is seismic-isolation technology. Japanese engineers have developed advanced seismic-isolation devices made of alternating layers of rubber and metal plating that are inserted into a building's foundation. Program lectures teach trainees the difference between an earthquake-resistant structure, one strong enough not to collapse when a quake shakes it, and a seismically isolated structure. The latter is equipped with devices that absorb or deflect the shaking, preventing it from impacting the structure in the first place. The technology can be hard to understand for many trainees at first, but it becomes clear when they go into the field to see seismic-isolation devices installed at a government facility in Arakawa, Tokyo.

Over the course of the five-week program, trainees travel all over Japan visiting locations and facilities concerned with disaster response. At the International Institute of Seismology and Earthquake Engineering, located in Tsukuba, Ibaraki Prefecture, they learn about the mechanisms of earthquakes and tsunamis, as well as earthquake-resistance diagnostics. At the Hyogo Disaster Management Center, located in Kobe, Hyogo Prefecture, they learn about disaster-prevention efforts derived from the experience of the Great Hanshin-Awaji Earthquake of 1995.

The trainees return to their homelands with lessons learned about Japanese technology to protect buildings and other structures in the event of an earthquake, tsunami, or fire. Japan's knowledge is now being put to use in this way to save lives and property all around the world.

JICA volunteer Yoshihiro Ito (center) provides training in lashing a rope to secure a ladder to a building.



## Bringing Japanese Firefighting Techniques to Colombia

As a member of the Tokyo Fire Department for almost 40 years, Yoshihiro Ito took part in rescue operations in building fires, after natural disasters, and at the scene of traffic accidents. Rising to the rank of captain, Ito gained considerable command experience and for many years oversaw the training of new firefighting staff. As a seasoned veteran, in the aftermath of the March 2011 Great East Japan Earthquake he was sent to the disaster-affected area, where he assisted with vehicle maintenance and procurement of food supplies. Following his retirement from the fire department, Ito has been working since January 2013 in the city of Medellin, Colombia, as a JICA senior overseas volunteer specializing in firefighting and disaster response.

In Medellin, which is surrounded by mountains, buildings and other structures are often built on or near steep slopes. In this steep terrain even small amounts of rain can cause dangerous landslides, sometimes resulting in loss of life.

Soon after arriving in Medellin, Ito realized that local firefighters were not employing optimal techniques for handling equipment and carrying out emergency procedures. Unlike in Japanese fire departments, where new recruits undergo about a year of training, newcomers in Medellin receive only two or three months of preparatory training

and get almost no follow-up training in the field. This was a situation that needed to change.

### STAYING SAFE

It moved quickly to improve the Medellin firefighters' approaches. Rather than lecturing them on what they were doing wrong, he offered hands-on, practical instruction based on experiences from his career in Japan. These include using checklists to ensure effective management of firefighting equipment and conducting rescue operations in teams, to enable rapid, appropriate action. The Medellin firefighters showed an immediate interest in these lessons. Through trial and error, they adapted and actively incorporated them into their own techniques.

In his capacity as a senior overseas volunteer, Ito emphasizes safety above all else. The scene of a fire or disaster is always unpredictable, and emergency personnel must be prepared for anything. In Japan, he says, firefighters inspect each other's gear to make sure they have ropes and other vital equipment. When entering a building, they coordinate their moves to ensure no roof or wall will collapse behind them. The entire team focuses on ensuring all its members' safety. Thanks to Ito's volunteer efforts, these core principles of Japanese disaster response are being put to work in Colombia, too.



The first step in staying safe is proper equipment use.



Training in how to safely approach a building with a platform truck.



Trainees learn about fire prevention at the International Institute of Seismology and Earthquake Engineering in Tsukuba.



A seismic-isolation device attached to a pillar at the Arakawa City Office.