

Courtesy of Teddy Boen



Teddy Boen

Teddy Boen, a structural engineer from Indonesia, is a senior adviser for the World Seismic Safety Initiative and a former director of the International Association for Earthquake Engineering. He has worked as a consultant for The World Bank, the United Nations and NGOs involved in reconstructing Aceh and Java.

*Q: What difficulties in building safe hospitals are specific to your region?*

A: Engineers do not always know how earthquake prone the hospital site is and lack proper knowledge about earthquake-resistant design. On top of that, they rarely inspect the construction itself, leaving that to contractors and construction workers.

*Q: What are the challenges of building hospitals to withstand tsunamis and earthquakes?*

A: Tsunamis are usually caused by earthquakes, so we need to make hospitals resistant to earthquakes.

*Q: What are your proudest achievements?*

A: After the tsunami and earthquake in

December 2004, I checked the hospitals in Aceh to see which were structurally safe and could be reoccupied. After the earthquake in Yogyakarta in May 2006, I helped patients return to the wards. But, after attending a Hospital Preparedness for Emergencies and Disasters course, doctors realized that they don't always need to evacuate patients. [After that earthquake] we just had to patch up the cracks the following day.

*Q: Is building earthquake-safe hospitals cost effective?*

A: The structural cost of building a hospital is only approximately 20% of the total cost. The most expensive parts are the diagnostic equipment and

functional/operational components. If appropriately assessed, the cost of retrofitting – i.e. adding additional components to the existing structure – is minor compared to the total cost of the hospital. For newly built hospitals, important issues for building a seismic-resistant hospital are: preparing a proper, sound earthquake-resistant analysis and design both for the structural and non-structural components, followed by using good quality materials and good workmanship during the construction. The seismic design will not increase the cost for the structure significantly compared to the cost of the non-structural components and medical equipment.

*Q: How can hospital safety standards be improved worldwide?*

A: Assist developing countries in implementing a safe hospitals policy by funding the structural analysis (to identify the weak parts of the building) of several hospitals in each country, provide training to the local engineers and find the funds for retrofitting. ■

Courtesy of Tony Gibbs



Tony Gibbs

Tony Gibbs, a national of Barbados and Grenada, is the Secretary-General of the Council of Caribbean Engineering Organizations and a director and partner in an engineering firm through which he advises organizations and governments in the Caribbean and throughout the Americas on hazard-resistant hospitals.

*Q: What are the major obstacles to building safe hospitals?*

A: We know enough about technology to design and construct safe hospitals. The obstacles are insufficient determination to succeed and that people don't realize that safe hospitals can be built at a reasonable cost. The construction industry regards the effort needed to make hospitals safe as reducing competitiveness, rather than increasing value.

*Q: Is there a major distinction between hurricane- and earthquake-resistant buildings?*

A: The conventional approach to hurricane-resistance design is to prevent wind damage. A building might suffer damage by accidental impact from flying debris, but wind itself should not damage a well designed, constructed and maintained hospital. In the case of earthquakes, the conventional earthquake-resistant

design philosophy is to save lives, but not necessarily to protect the building. The result is often damage to and degradation of the facility's functional ability in severe earthquakes, which is not good enough! We need to adopt different processes at affordable costs to ensure a fully functional hospital after an earthquake.

*Q: What would be your number-one recommendation for building a hospital in a hazard-prone region?*

A: Independent review of the designs for all new facilities and quality assurance for their construction. These are important when you are designing for multiple hazards. We do not design separately for earthquakes and hurricanes – we always design for both. ■