

GHI Helps Blind Students Prepare for Earthquakes

GeoHazards International (GHI) began working with the Blind Relief Association in New Delhi, India, this year to help the institution prepare its visually impaired students and teachers for natural hazards like earthquakes. GHI's sister organization in India, GeoHazards Society, has been conducting weekly workshops at the Blind Relief Association's campus, which includes an elementary and secondary school, a vocational training center, a special education college and housing blocks, all for the visually impaired.

India has one of the highest earthquake risks in the world, but few schools—even those as professionally run as the Blind Relief Association—adequately prepare their students and staff for these natural hazards. Providing basic safety information and conducting drills can help protect children from injury during earthquakes.

One of the first activities GHI organized at the school was a series of discussions that taught students and teachers about the causes of natural hazards and what they could do to make themselves safer during these events. GHI staff and sighted members of the school's staff went room to room on a "hazard hunt" to identify objects that could potentially fall and injure students or block evacuation routes during earthquakes.

GHI currently is working with every department within the Blind Relief Association to develop a comprehensive preparedness plan for



(Above) GHI/GeoHazards Society Country Coordinator Hari Kumar guides Blind Relief Association students in an earthquake drill.

the campus. The school should begin testing the plan through safety drills before the end of the year.

GHI always aims to have the benefits of its work spread beyond the immediate partners of its projects. The program with the Blind Relief Association is no different. Having felt for themselves the confidence that comes with disaster preparedness, Blind Relief administrators said they are committed to taking the message of safety to other schools for the blind throughout Delhi and beyond. And GHI will be ready to support them when they do.

GHI Goes Video

If you have visited our website recently, you may have noticed an exciting addition—a growing number of videos about our organization and projects. The videos give us a new way to tell our stories and, we hope, make our website more dynamic.

With the help of Palo Alto, California-based video producer Bear Capron, we created and posted our first video in October, called *Walking to Safety*, about GHI's tsunami evacuation project in Indonesia. In coming months, we hope to add as many as two dozen short interviews of GHI partners, contributors and staff from around the world, as well as a video about GHI's overall mission and work.

Reconnaissance and Rebuilding in Haiti

This February, GHI Project Manager Veronica Cedillos travelled with a reconnaissance team of U.S.-based engineers and scientists to Port-au-Prince, Haiti, following the devastating Jan. 12 earthquake that killed an estimated 230,000 people. The team visited heavily damaged downtown areas, two hospitals and one health clinic, numerous school buildings, several government buildings, the public pier, and a cement plant.

The goal of the trip was to better understand and document the vulnerabilities of Haiti's damaged buildings. Upon Ms. Cedillos's return, she gave a presentation at Stanford University, and GHI plans to apply the engineering lessons learned in its future risk mitigation efforts in other developing countries.

It won't be long before GHI returns to Haiti. We are working with San Francisco-based structural engineering firm Forell/Elssesser Engineers to design earthquake-resistant model homes as part of a larger housing reconstruction effort led by the U.S. nonprofit Build Change.

Thousands of homes were destroyed by the Jan. 12 earthquake, and Haitians are eager to rebuild. This project will help ensure that their new homes are safe from collapse during future earthquakes. Forell/Elssesser and GHI will design two model homes that could be replicated by developers and builders throughout the country. One design will be for single-family homes and the other will be for multi-story structures that could, perhaps, have retail on the ground floor and apartments above.

GHI will work with Forell/Elssesser and Build Change to ensure that the designs incorporate locally appropriate construction materials and techniques. At the time of publishing this newsletter, the project team had just finished its kickoff meeting.



Prof. Kakar in remote northern Balochistan installing a GPS instrument.

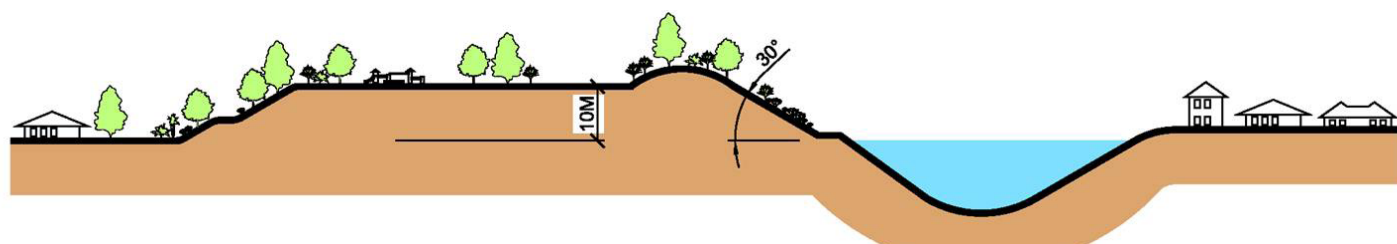
Promoting Seismic Safety Where It's Least Expected But Greatly Needed

Din Muhammad Kakar, a Pakistani geologist at the University of Balochistan in Quetta, spends much of his time educating the Pakistani public about its earthquake risk. But Professor Kakar—whose membership in the Seismological Society of America is sponsored by GHI—faces significant obstacles.

He needs armed escorts when he installs and services GPS instruments, which allow him to remotely monitor stress accumulation in faults, in the areas outside Quetta along the Pakistan-Afghanistan border. And for the past several years, on the anniversary of the 1935 Quetta earthquake that killed 35,000 people (70% of the city's population at that time), Professor Kakar has gone on live TV to debate an imam about the causes of earthquakes—some local clerics advise the people that earthquakes are punishment for their sinful acts.

This year, Professor Kakar, funded by donations from GHI members, wrote and published a booklet on earthquake safety for nontechnical readers. The booklet was written in Urdu, one of the official languages of Pakistan, and has been distributed for free to schools throughout Quetta, the provincial capital of Balochistan, and its environs. The response has been so positive that a colleague of Professor Kakar's is working on translating it into the local Baloch language and Professor Kakar has started writing his second booklet, this one including more information about seismology and building codes.

Tsunami Evacuation in Indonesia



Conceptual cross-section of TERE. Credit: Kornberg Associates.

Indonesia's seaside city of Padang, home to about 1 million residents, has one of the world's highest tsunami risks. Scientists believe there is a high probability of a tsunami wave five–10 meters tall striking the coast of Padang during the life of the children living there today. Because of the city's flat terrain, dense population, and lack of effective evacuation alternatives, more than 100,000 people could die if the large, expected tsunami battered Padang's shore today.

The magnitude 7.7 earthquake this Oct. 25, which ripped along a fault below the Indian Ocean and had an epicenter about 175 miles south of Padang, underscored the city's pressing problem. Upon feeling the shaking and thinking a tsunami might be coming, residents in some pockets of the city scrambled to evacuate to the distant hills, only to clog roads. Fortunately, the earthquake did not create a large tsunami in Padang, as few would have reached higher

ground in enough time to escape.

GHI believes there is a simple, cost-effective solution for Padang: a series of "hills," each roughly the size of a soccer field, built within the city that would allow people to walk to safety above a tsunami. We call these hills "Tsunami Evacuation Raised Earth Parks," or TEREPs. Each would be home to sports fields, walking paths or other public space, making them part of everyday life of the community.

This year, with funding from Swiss Reinsurance Company, GHI began a one-year effort to design Padang's first TERE. The GHI-led project team selected BPBD, the disaster management agency of Padang, as its project co-leader and hired Andi Syukri, a young Indonesian civil engineer, as its local project coordinator (see the New Faces sidebar on page 4).

The team, led by GHI Project Manager Veronica Cedillos, selected and investigated a handful of potential

TEREP sites this summer in Padang, including three fields on a university campus, an elementary school soccer field and two open spaces in residential areas—the hope is that the land would ultimately be donated for the project. The team is now whittling their options down to three potential TERE sites based on the vulnerability of the surrounding communities, their willingness to support the project and soil conditions, among other criteria. If all goes as planned, construction should begin by 2012.

This year, the project team formed a committee in Padang made up of representatives from local government and community organizations that will provide advice, facilitate community integration, and support other project-related activities throughout the remainder of the project. GHI's goal is that this committee will continue to advocate for tsunami evacuation solutions for Padang long after the project is completed



Ms. Cedillos's frequent visits to Padang haven't been all about hard hats and engineering calculations. During weekends, Ms. Cedillos—a lifelong violinist—often plays violin with local musician friends and helps give music lessons to elementary school children (see image left). She says sharing her musical talent with children makes the experience of working in Padang even more rewarding.

Training Engineers & Developing Innovative Designs in Pakistan

GHI continued its work this year with NED University of Engineering and Technology in Karachi to help Pakistani engineers learn how to make buildings safer during earthquakes.

Pakistan has one of the highest earthquake risks in the world, but most of its engineers aren't adequately trained to identify seismic weaknesses in buildings and then retrofit them with strengthening schemes.

As part of the project, GHI Project Manager Janise Rodgers and GHI Senior Advisor L. Thomas Tobin led a team of U.S. and Pakistani engineers to develop retrofit case studies for common building types throughout the South Asian country. The case studies, which go step by step through the process of evaluating a building for vulnerabilities and then designing retrofit measures to fix those shortcomings, will be incorporated into training courses for engineers in practice as well as engineering courses at NED University.

Another goal of the project was to identify and describe engineering research topics that could lead to dramatic benefits in earthquake engineering in Pakistan. During a meeting in Kathmandu this summer that brought together academics and practicing engineers from the United States, Pakistan and Nepal, the project team agreed that the key research topic to focus on should be so-called "infill buildings." These buildings, which have a concrete frame filled in with unreinforced masonry to complete the walls, are widespread in South Asia and elsewhere and are notoriously dangerous during earthquakes.

Acting on the recommendations made at the Kathmandu meeting, GHI launched an initiative to connect engineers from around the world to develop strategies for making infill buildings safer during earthquakes. Called the Framed Infill Network, participants will seek locally



appropriate, low-cost methods for improving the seismic safety of these buildings. The Pakistan-US Science and Technology Cooperation Program is providing seed funding for the network through GHI's current project in Pakistan.

(Above) Project team members discuss the details of a building under construction in Kathmandu. From the left: Dr. Sarosh Lodi of NED University, Karachi, Pakistan; David Mar of Tipping Mar, Berkeley, California; Aslam Mohammed of NED; and Dr. Masood Rafi of NED.

New Faces at GHI

Andrew Castaldi joined GHI's Board of Trustees this November. An expert in risk and catastrophe management, Mr. Castaldi directs Swiss Reinsurance's product management activities in the Americas. He has more than 30 years' experience working in the insurance and reinsurance industries and is the past chairman of the Extreme Events Committee of the Reinsurance Association of America.

Justin Moresco is GHI's new Director of Communications. Based in GHI's Palo Alto, California, office, Mr. Moresco has more than 10 years' experience as a civil engineer and professional writer and is leading GHI's communications efforts. He also is managing engineering projects, with his first beginning this December that will study successful earthquake risk reduction activities in 10 cities around the globe.

Andi Syukri is GHI's new Project Coordinator in Indonesia. Mr. Syukri, a civil engineer and native Indonesian, is coordinating all local efforts in the city of Padang, Sumatra, for GHI's tsunami evacuation project there. He is currently pursuing a Master's Degree in civil engineering at Andalas University in Indonesia.

Kristen Yawitz, GHI's former Director of Communications, took a position outside GHI that offers her new opportunities. We wish her well and thank her for her contributions to our organization.