School Earthquake and Tsunami Safety in APEC Economies: Reducing Risks and Improving Preparedness

Purpose: Information
Submitted by: United States
School Earthquake and Tsunami Safety in APEC Economies: *Reducing Risk and Improving Preparedness*

Ryan MacFarlane  
U.S. Department of State

---

The Magnitude of the Problem

- Worldwide, there are hundreds of millions of children in compulsory education in economies of high seismic risk who are in danger.
- If no action is taken, the problem will only get worse due to rapid population growth, particularly in developing economies.
### Students at Risk

**School-Age Children in Earthquake Zones**

Estimated number of children, ages 5 to 14, who live in areas of relatively high earthquake risk.

- **Japan**: 3/11/11, Magnitude 8.9
- **New Zealand**: 2/22/11, Magnitude 6.3
- **China**: 4/14/10, Magnitude 7.1
- **Chile**: 2/27/10, Magnitude 8.8
- **Indonesia**: 9/30/09, Magnitude 7.6
- **Japan**: 8/9/09, Magnitude 7.1
- **New Zealand**: 7/15/09, Magnitude 7.6
- **China**: 5/12/08, Magnitude 7.8
- **Peru**: 8/15/07, Magnitude 8.0
- **Japan**: 7/16/07, Magnitude 6.8
- **Indonesia**: 3/28/05, Magnitude 8.7
- **Indonesia**: 12/26/04, Magnitude 9.1

*Sources: Susana Adams and Maria Murri, Center for International Earth Science Information Network, Columbia University. Population estimates are based on data from the 2002 Grided Population of the World data set and from the United Nations (with the exception of China, which is based on the Statistical Yearbook of the Republic of China, 2006). Earthquake hazard estimates are based on data from the Global Seismic Hazard Program.*

---

### Disasters in the APEC Region

<table>
<thead>
<tr>
<th>Location</th>
<th>Date and Magnitude</th>
</tr>
</thead>
<tbody>
<tr>
<td>Japan</td>
<td>3/11/11, 8.9</td>
</tr>
<tr>
<td>New Zealand</td>
<td>2/22/11, 6.3</td>
</tr>
<tr>
<td>China</td>
<td>4/14/10, 7.1</td>
</tr>
<tr>
<td>Chile</td>
<td>2/27/10, 8.8</td>
</tr>
<tr>
<td>Indonesia</td>
<td>9/30/09, 7.6</td>
</tr>
<tr>
<td>Japan</td>
<td>8/9/09, 7.1</td>
</tr>
<tr>
<td>New Zealand</td>
<td>7/15/09, 7.6</td>
</tr>
<tr>
<td>China</td>
<td>5/12/08, 7.8</td>
</tr>
<tr>
<td>Peru</td>
<td>8/15/07, 8.0</td>
</tr>
<tr>
<td>Japan</td>
<td>7/16/07, 6.8</td>
</tr>
<tr>
<td>Indonesia</td>
<td>3/28/05, 8.7</td>
</tr>
<tr>
<td>Indonesia</td>
<td>12/26/04, 9.1</td>
</tr>
</tbody>
</table>
The proposed project responds to central themes from:

- 3rd APEC Emergency Management CEOs’ Forum

Purpose

Applying international experience, describe the major elements and guiding principles of effective school earthquake safety programs.
Major Elements

1. Seismic safety policy
2. Accountability
3. Building codes and code enforcement
4. Training and qualification
5. Preparedness and planning
6. Community awareness and participation
7. Risk reduction for new facilities
8. Risk reduction for existing facilities

Guiding Principles

1. Agree on measurable objectives
2. Define earthquake hazard
3. Define the desired resistance to earthquakes
4. Address all schools
5. Give initial priority to new schools
6. Establish long-term commitment
7. Adopt multi-hazard approach
8. Employ advisory committees
School Safety Policy Objectives

• School seismic safety is an urgent problem
• Culturally-appropriate & incremental approach called for
• Community & individual advocacy, multi-sectoral involvement
• Governmental action and accountability crucial

APEC Proposal

1. A workshop of APEC experts reviews the OECD international guidelines for school earthquake safety
2. Using these guidelines, APEC member economies assess their own school earthquake safety programs
3. APEC member economies gradually and collaboratively improve their school earthquake safety programs to conform to guidelines
• 30 Representatives from 12 out of 21 APEC economies met for 3 days in Taipei, to discuss school safety in APEC region, October 17-19, 2012

• Economies represented: Australia, Canada, Indonesia, Japan, Malaysia, Mexico, New Zealand, Peru, Philippines, Chinese Taipei, US, Vietnam

• Two days of discussion & presentations by experts (Australia, Canada, Japan, NZ, Chinese Taipei, US) and final day produced a draft statement
• One day included a visit to the “921 Earthquake Museum of Chinese Taipei” in Taichun, (built in memory of Chi Chi earthquake of 21 Sept 1999 which killed over 2,500 people)

• GHI edited Workshop Report that includes papers and ideas presented at the workshop, published online. The document is available: GHI and APEC-EPWG websites.
Project Results-3

- We had participation by Dr. Laura Kong of the IOC-NOAA, Tsunami Information Center in Hawaii and Dr. Kashimura of Tohoku University discussing Tsunami hazards. This was the focus of a second NCDR workshop the next day.

- We produced a “Workshop Participants Statement”

Purpose of Statement

• To make a consensus recommendation
• To outline a framework for school safety
• To recommend implementation measures

Websites

• GeoHazards International, www.geohaz.org
• Int'l Tsunami Information Center, www.ioc-tsunami.org and itic.ioc-unesco.org
• NOAA Tsunami Program, www.tsunami.noaa.gov
GeoHazards International

Contacts

- Fernando R Echavarria, DOS, echavarriafr@state.gov; echavarriafr@gmail.com
- Ryan MacFarlane, DOS, MacFarlaneRC@state.gov
- Tomas Tobin and Kristen Yawitz, GHI, tobint@GHI.org yawitz@geohaz.org
- Wei-Sen Li, NCDR, li.weisen@ncdr.nat.gov.tw
- Jack Medlin, USGS, medlinj@usgs.gov