Chapter 7

Understanding Urban Seismic Risk around the World:

A comparative study of the RADIUS initiative

Carlos Villacis, Rachel Davidson and Cynthia Cardona, GeoHazards International (GHI), United States

Introduction

Earthquakes are infrequent, so no single city has suffered many earthquake disasters. Every city has much to gain through the sharing of their resources and experiences with earthquakes and earthquake risk management. To use the untapped potential of inter-city collaboration, the secretariat of the International Decade for Natural Disaster Reduction (IDNDR) and GeoHazards International launched in April 1998 the Understanding Urban Seismic Risk Around the World (UUSRAW) project. The UUSRAW project was implemented as part of the RADIUS initiative. The 18-month project was designed to help cities around the world compare their earthquake hazard and to share their experiences and resources in working to reduce the impact of future earthquakes.

Project objectives

The objectives of the UUSRAW project were to:

- Provide a systematic comparison of the magnitude, causes, and ways to manage earthquake risk worldwide;
- Identify cities facing similar earthquake risk challenges and foster partnerships among them; and
- Provide a forum in which cities can share their earthquake and earthquake risk management experiences using a systematic framework for discussion.

Project participants

The IDNDR Secretariat invited seismically active cities around the world to participate in the UUSRAW project. The city governments of 74 cities from 50 countries expressed interest in participating (see figure 1).

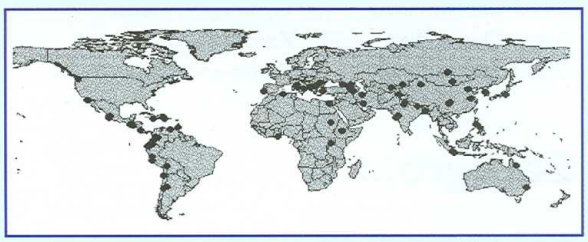

Figure 1: Map of the 74 cities that applied to the UUSRAW project.

City representatives

For each of the 74 cities that applied to participate in the study, a scientist served as city representative. The city representatives were the key to the project's success. Using their personal knowledge, connections and resources, they gathered the information required to develop an earthquake risk profile of their respective cities. They formed partnerships and shared comments about the process of gathering information, the proposed methodology, and the project.

Project coordinators

The project coordinators developed worksheets to gather information from the city representatives, compiled and analyzed information for each city, moderated an internet forum for city representatives and international advisors, kept participants informed of the project's status, and wrote the final report and city profiles.

International advisors

Several international advisers participated in the internet forum with the city representatives and the project coordinators. They answered questions and shared their experience and knowledge of earthquake risk.

For various reasons, only 20 of the 74 cities participated actively in all phases of the project, collecting the requested information and participating in discussions. These 20 cities represent a diverse group with respect to their size, seismicity, collateral hazard potential, structural types, economic and political situations, and social and cultural characteristics.

These cities are:

Algiers, Algeria
Bogota, Colombia
Bucharest, Romania
Dehra Dun, India
Dhaka, Bangladesh
Gilgit, Pakistan
Guadalajara, Mexico
Gyumri, Armenia
Kampala, Uganda
Kathmandu, Nepal
Pimpri, India
Quito, Ecuador
Rome, Italy
San Juan, Argentina
San Salvador, El Salvador
Santiago, Chile
Skopje, Macedonia
Sofia, Bulgaria
Tehran, Iran
Ulaanbaatar, Mongolia

Background

The Earthquake Disaster Risk Index (EDRI) provided a framework for the UUSRAW project's worldwide comparative urban earthquake risk assessment. The EDRI compares metropolitan areas according to the degree and nature of their earthquake disaster risk, using five main factors: hazard, vulnerability, exposure, external context, and emergency response and recovery.

Project design

In the UUSRAW project, the EDRI methodology offered a useful structure with which to conduct a systematic discussion of earthquake risk, including issues in all disciplines of interest to academics and practitioners in all regions of the world. The project involved city representatives through two principal components:

- The gathering of information required to develop an earthquake risk profile and gain a better understanding of a city's earthquake risk; and
- The sharing of experiences in gathering information and comments on the form and usefulness of the project's methodology in general.

Data collection

The project coordinators created worksheets requesting earthquake risk information necessary to determine EDRI values for each city. Information was requested about earthquake risk management efforts undertaken, comments on the gathering of data, the usefulness of the EDRI, and project design and management. The worksheets were distributed to the city representatives, who completed and returned them.

Compilation and analysis

The project coordinators entered the earthquake risk information into a database and distributed this database to city representatives for their comments. Project coordinators also compiled a database of earthquake risk management information and comments on the EDRI methodology and the project. The risk assessment analysis, risk management information and comments are incorporated into the project's final report, along with city profiles that systematically describe the key elements of each city's risk and risk management efforts.

Internet forum

Throughout the project, an internet forum provided a way for city representatives, project coordinators, and international advisers to share questions and comments about the information-gathering process, the proposed methodology, and urban earthquake risk and risk management in general. The forum, an e-mail group list, was moderated by the project coordinators.

Worldwide Web page

A Web page was also established to provide information about this project to non-participants. The Web page included project documents, a list of member cities, articles and reports from member city participants, and other relevant information.

Project final report

The final products of the UUSRAW project are included in the final report, which will be published and disseminated by the United Nations. The report includes a summary of the assessments of earthquake risk and risk management in the participating cities, city profiles, specific risk management efforts made in the participating cities, and a summary of feedback received from project participants throughout the project.