RADIUS (Risk Assessment Tools for Diagnosis of Urban Areas against Seismic Disasters)

An initiative for IDNDR

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INTRODUCTION

The Secretariat of the International Decade for Natural Disaster Reduction (IDNDR 1990-2000), United Nations, has launched the RADIUS initiative, which aims to reduce seismic disasters in urban areas, particularly in developing countries. In collaboration with 9 selected cities around the world, the RADIUS initiative will develop practical tools for seismic risk assessment of urban areas to raise public awareness and provide directions for the development and implementation of disaster mitigation measures

The nine cities selected serve as case studies to develop seismic damage scenarios and a risk management plan, aiming to raise public awareness to seismic risks and strengthen the collaboration between local governments and local scientists The experiences of the nine cities will be incorporated into the development of a practical manual and its graphic application for seismic damage assessment in urban areas, which could be applied to any earthquake prone cities. The results of the initiative as well as the case studies will be available to other cities.

The nine selected cities for case studies:
Addis Ababa (Ethiopia), Antofagasta (Chile), Bandung (Indonesia), Guayaquil (Ecuador), Izmir (Turkey), Skopje (TFYR Macedonia), Tashkent (Uzbekistan), Tijuana (Mexico), Zigong (China)

OBJECTIVES OF THE PROJECT

The RADIUS initiative has four concrete objectives:

1. To develop seismic damage scenarios and risk management plans for the nine case study cities selected worldwide
2. To develop practical tools for the seismic damage assessment, which could be applied to any earthquake prone city in the world.
3. To conduct a comparative study to understand urban seismic risk around the world
4 To promote information exchange for the seismic risk mitigation at city level

The local governments in the nine cities selected worldwide will develop seismic damage scenarios and a risk management plan as the case studies. It aims to raise public awareness of seismic risk and strengthen the collaboration between local governments and local scientists. The scenario will describe various stages of the city's damage during and after a probable earthquake Internationally renowned institutes will transfer the appropriate technologies for seismic risk mitigation to the cities. The methodologies would vary according to the availability of data.

A practical manual and its graphic application for seismic risk assessment will be developed, based on the analysis of the case studies. These tools will be utilized by local users of any earthquake prone cities, particularly the local governments. With these tools, the

local people can estimate the physical damages to buildings and infrastructure, human losses, and their effects to the urban activities.

In order to better understand the urban seismic risk around the world, a comparative study on "Understanding Urban Seismic Risk Around the World" is conducted The study aims to better understand various aspects contributing to the seismic risk in different urban areas of the world, and identify solutions and risk management practices that have been successful and can be duplicated Cities which have joined RADIUS as "Member Cities" are incorporated in the study. The Member Cities are able to participate in information exchange with other cities.

Interaction among cities is an important aspect of the RADIUS initiative Cities which have carried out a seismic risk assessment or are in the process of doing so with independent resources are participating in RADIUS as "Associate Cities" for information exchange and international cooperation. The RADIUS homepage is being developed as a fully interactive medium to exchange information on the experience of RADIUS An Internet Forum is held for the information exchange among the member cities.

HOW THE RESULTS WILL BE UTILIZED

The seismic risk assessment with these tools must be regarded as the first step for earthquake disaster prevention What is of importance is to raise awareness of decision makers, government officers, communities and the private sector.

For decision makers and government officials

- To decide on priorities for urban planning to mitigate seismic disasters
- To prepare an improvement plan for the existing urban structures such as reinforcement of vulnerable buildings/infrastructures and securing of open spaces/emergency roads
- To understand the necessity of prevention policies such as land use control and building regulations
- To prepare for emergency activities such as life saving, fire fighting, emergency transportation, and assistance to suffering people

For communities, NGOs, and citizens

- To understand the vulnerability of the area and their houses and how to practically retrofit them
- To understand how to behave in case of an earthquake disaster
- To participate in preparing a plan for disaster prevention

For business leaders and related private companies *(building owners, urban developers, real estate agents, insurance/reinsurance companies, etc.)*

- To understand the city's seismic risk so that they could minimize the damage on their business

CASE STUDIES

The case studies aim to prepare earthquake damage scenarios and a risk management plan with financial and technical assistance from the IDNDR Secretariat. Nine cities were selected (please see the front page) from 58 cities, which had applied for the case studies, by the IDNDR Secretariat, under consultation with the STC (Scientific and Technical Committee for IDNDR) subcommittee for RADIUS (members: Dr. Tsuneo Katayama (chair), Mr. Robert Hamilton, Dr Mustafa Erdik). The case studies are carried out from February, 1998 until July, 1999. The IDNDR Secretariat will offer financial assistance to the cities ($50,000 to the full case study cities) An international workshop will be held in 1999 to present the results of the case studies.

Three **international institutes** offer technical assistance to these cities in each region while three **regional advisory committees** visit the cities to provide technical advice and to raise public awareness of the seismic risk there together with the international institutes.
Asia: International Centre for Disaster-Mitigation Engineering (**INCEDE**), Japan
Regional advisory committee: Dr. Anand S. Arya, Dr. Jack Rynn, Dr. Tsunehisa Tsugawa
Europe, Middle East and Africa: Bureau de Recherches Géologiques et Minières (**BRGM**), France
Regional advisory committee: Dr. Mohamed Belazougui, Dr. Victor Davidovici, Dr. Rainer Flesch
Latin America: GeoHazards International (**GHI**), USA
Regional advisory committee: Dr. Andrew Maskrey, Ms. Shirley Mattingly, Prof. Carlos E. Ventura

Two training seminars for the RADIUS cities were held in Japan in May/June, 1998 for technical experts as well as city government officers respectively. The seminar for the technical experts was organized by JICA (Japan International Cooperation Agency) and IISEE, Ministry of Construction, from 11 May to 18 June, 1998, in cooperation with the IDNDR Secretariat. There were 17 participants from the 9 selected cities and 8 interested cities. The seminar for the city government officers was held from 22 to 30 June 1998 in Tokyo and Fukui City, co-organized by UNCRD (UN Center for Regional Development), UNU (UN University), and the IDNDR Secretariat. There were 18 participants from 13 cities, including the RADIUS case study cities.

COMPARATIVE STUDY

More than 70 cities are participating as "Member Cities" in the comparative study on "Understanding Urban Seismic Risk Around the World," which started in June 1998 (http://www.geohaz.org/radius/understanding.html) . The member cities are now able to exchange information in an **Internet Forum** that has been established exclusively for the project. GeoHazards International (GHI, USA) is responsible for this study.

List of 73 member cities

Accra (Ghana), Addis Ababa (Ethiopia), Algiers (Algeria), Almaty (Kazakhstan), Ambato (Ecuador), Antofagasta (Chile),Athens (Greece), Bandung (Indonesia), Baoji (China), Beijing (China), Bogota (Colombia), Bucharest (Romania), Cairns (Australia), Caracas (Venezuela), Colima (Mexico), Delhi (India), Dhaka (Bangladesh), Gilgit (Pakistan), Giza (Egypt), Guadalajara (Mexico), Guatemala City (Guatemala), Guayaquil (Ecuador), Gyumri (Armenia), Huaraz (Peru), Irkutsk (Russia), Izmir (Turkey), Jakarta (Indonesia), Kampala (Uganda), Kathmandu (Nepal), Khartoum (Sudan), Kingston (Jamaica), La Paz (Bolivia), Lima (Peru), Lisbon (Portugal), Manizales (Colombia), Metro Manila (Philippines), Mumbai (India), Newcastle (Australia), Pasto (Colombia), Pereira (Colombia), Pimpri (India), Popayan (Colombia), Potenza (Italy), Quito (Ecuador), Rome (Italy), St. George's (Grenada), San Jose (Cost Rica), San Juan (Argentina), San Salvador (El Salvador), Santiago (Chile), Santiago (Dominican Republic), Santo Domingo (Dominican Republic), Seattle (USA), Seoul (Republic of Korea), Shiraz (Iran), Skopje (TFYR of Macedonia), Sochi (Russia), Sofia (Bulgaria), Spitak (Armenia), Tabriz (Iran), Tai'an (China), Tashkent (Uzbekistan), Tbilisi (Georgia), Tehran (Iran), Tijuana (Mexico), Tirana (Albania), Tokyo (Japan), Tuscan Region (Italy), Ulaanbaatar (Mongolia), Urumqi (China), Vladivankaz (Russia), Yerevan (Armenia), Zigong (China)

INFORMATION EXCHANGE

Cities which have carried out or are carrying out a seismic risk assessment with independent resources have participated in RADIUS as "Associate Cities" for information exchange and international cooperation. The Associate Cities are expected to offer their valuable experiences to other cities mainly through the RADIUS home page while they can obtain useful information from other cities. The reports from the associate cities will appear on the RADIUS home page in late 1998. They will be invited to participate in an international workshop to be held in 1999, to present their experiences.

List of 35 Associate Cities

Algiers (Algeria), Baoji (China), Beijing(China), Bogota (Colombia), Cairns (Australia), Calcutta (India), Dalian (China), Damascus (Syria), Gyumri (Armenia), Hefei (China), Istanbul (Turkey), Jabalpur (India), Kathmandu (Nepal), Khartoum (Sudan), Lima (Peru), Manizales (Colombia), Mumbai (India), Newcastle (Australia), Pereira (Colombia), Pimpri (India), Quito (Ecuador), St. George's (Grenada), San Juan (Argentina), Shiraz (Iran), Sochi (Russia), Spitak (Armenia), Suva (Fiji), Tai'an (China), Tangshan (China), Tehran (Iran), Tianjin (China), Tuscan Region (Italy), Ulaanbaatar (Mongolia), Urumqi (China),Yerevan (Armenia)

The IDNDR Secretariat launched the RADIUS website, providing an up-to-date access to all the information available concerning the RADIUS project The address of the RADIUS home page is,

http://www.geohaz.org/radius

COST

The total cost is estimated to be about US$ 2.5 millions. The Government of Japan has contributed about US$ 1.6 millions so far while several international organizations are cosponsoring the RADIUS activities. It is expected that other donors and international organizations will further contribute to this initiative to enable more activities and more elaborate but practical tools for the seismic risk assessment

TIMETABLE

Year 1998
- Case studies (1.5 years)
- Training seminars
- A comparative study on urban seismic risk
- Development of practical tools

Year 1999
- Case studies (continued)
- Development of the tools (continued)
- International workshop
- Publication