



SK-5

SEISMIC RISK MITIGATION IN AN URBAN REGION: EARTHQUAKE PREPAREDNESS IN CALIFORNIA

Richard K. EISNER¹ and Paula A. SCHULZ²

¹Director, Bay Area Regional Earthquake Preparedness Project (BAREPP)
California Office of Emergency Services, USA

²Deputy Director, Bay Area Regional Earthquake Preparedness Project (BAREPP)
California Office of Emergency Services, USA

SUMMARY

The earthquake threat is not confined to an individual jurisdiction, but impacts many independent municipalities and government units. In developing a program for earthquake preparedness in a large urbanized region, it is therefore necessary to initiate activities focussing on several geographic and governmental levels: preparedness within a jurisdiction; preparedness between adjacent jurisdictions; preparedness between private sector and government; and regional preparedness among all jurisdictions at risk. It is also necessary to form a partnership between the public and private sectors to share the responsibility for earthquake countermeasure planning, preparedness and response. This approach is being taken in California's two urban regions: the San Francisco Bay Region and the Los Angeles/southern California region.

DISASTER COUNTERMEASURE PLANNING AND HAZARD MITIGATION IN CALIFORNIA

Disaster countermeasure planning and response are the responsibility of local governments in California. Cities and counties have the primary responsibility to identify hazards, develop and implement mitigation programs and respond in the event of a disaster. If the disaster exceeds the local government's resources, the State, and ultimately the federal government, will provide assistance to augment the local response. This philosophy of strong local self rule results in a patchwork of planning efforts, plans, and capability that varies from jurisdiction to jurisdiction.

As noted above, earthquakes can be regional in nature, impacting tens of jurisdictions simultaneously. In the San Francisco Bay Region, a major earthquake on either the Hayward or San Andreas Fault System would result in damage in as many as ten counties, and nearly 100 cities, effecting nearly 6 million people. The southern California region has a similar number of jurisdictions at risk and a population of over 11 million.

CALIFORNIA'S INNOVATIVE APPROACH TO COUNTERMEASURE PLANNING AT THE REGIONAL LEVEL

Faced with varied levels of awareness, preparedness, response capability and political support for countermeasure planning, the State of California in partnership with the Federal Emergency Management Agency (FEMA) initiated two preparedness advocacy programs in California. The Southern California Earthquake Preparedness Project (SCEPP) was started in Los Angeles region

in 1980 and developed programs and guidelines for local earthquake countermeasure planning and hazard mitigation. The San Francisco Bay Area Regional Earthquake Preparedness Project (BAREPP) began its activities in 1983. The projects operate in territory that corresponds with the regions at highest risk from an earthquake in California. Both programs emphasize a comprehensive regional approach that promotes public/private coordination.

ELEMENTS OF A COMPREHENSIVE PLANNING APPROACH

- Planning is based on a detailed understanding of the hazard and risk; and a regional assessment of vulnerability
- Planning recognizes that the threat is regional and multi-jurisdictional
- Planning addresses the multi-hazard nature of an earthquake disaster
- Planning identifies tasks in all phases of the disaster; pre-event, earthquake, response, recovery, and reconstruction
- Planning integrates all public and private organizations, and individuals into the preparedness effort

PROBLEMS THAT NEED TO BE ADDRESSED

Earthquake disasters present a number of problems of varying magnitude and scale. The following chart presents these problems as issues to be addressed by an appropriate level of government action during a sequence of disaster phases.

- Pre-event Countermeasure Planning
 - A. Local Government
 - 1. Land Use Planning and Development Policy to Reduce Hazards in New Development
 - 2. Identification and Abatement of Hazardous Buildings
 - 3. Response Preparedness and Employee Training for Response
 - 4. Community (citizen) Self-Help Training
 - 5. Community and School Education
 - 6. Building Code Enforcement for New Construction
 - B. Inter-government
 - C. Regional
 - 1. Develop Public Information and Communication Systems
 - 2. Develop Regional Transportation and Transit Recovery Plans and Processes
 - 3. Develop Hazardous Materials Containment Plans
 - 4. Harden Lifeline Facilities
 - 5. Designate Debris Disposal Sites and Transport Routes

□ Earthquake Response

- A. Local Government
 1. Develop Community Self- Help Network
 2. Develop Business and Industry Coordination and Resources
 3. Integrate School Preparedness Planning
 4. Develop, Implement and Test Command and Control Protocols
 5. Design and Implement Redundant Communications Systems and Procedures
 6. Develop Resource Inventory and Allocation Method
- B. Inter-government
 1. Develop Police, Fire, Public Works, Mutual Aid Agreements
 2. Develop Communications Systems
 3. Develop and Test Protocols for Boundary Conditions
- C. Regional
 1. Identify Mass Care Facilities and Casualty Collection Points
 2. Plan for Transient Populations
 3. Develop Public Information Plan and Procedures
 4. Develop Transportation Planning and Route Recovery Priorities
 5. Develop Resource Inventory and Allocation Method

□ Reconstruction and Recovery

- A. Local Government
 1. Develop and Implement Land Use Development Policy and Plan
 2. Develop Plans for Maintenance of Government Continuity
 3. Integrate Private Sector into Public Recovery and Reconstruction Planning Process
- B. Inter-government
- C. Regional
 1. Develop Regional Land Use Development Policy to Reduce Risks
 2. Development Regional Resource Allocation Process
 3. Develop Regional Lifeline Restoration Priorities
 4. Develop Financing Methodologies for Long Term Recovery and Reconstruction
 5. Develop and Maintain Public Information System

This apparently overwhelming number of issues must be addressed in order to build the capability to respond to an earthquake disaster before the event while simultaneously implementing hazard abatement activities to reduce the amount of damage and the population at risk in the region.

PROGRAM APPROACH

In order to provide for the broad range of needs of jurisdictions, BAREPP and SCEPP have brought together varied staffs with skills to act as consultants to local government, businesses and community associations to promote earthquake preparedness, assist in the development and implementation of local programs, and serve as facilitators between jurisdictions in the development of regional plans.

To ensure that the activities initiated by the projects are responsive to the needs of their respective regions, Policy Advisory Boards (PAB) comprised of local elected officials, business leaders,

government managers, engineers, seismologists, geologists, and community activists provide guidance and oversight of project operations. Individual project PABs have tailored their respective projects to two unique geologic regions, political constituencies, and earthquake hazards.

The following elements comprise the range of services provided by BAREPP and SCEPP:

- Planning Assistance
The Project staffs provide planning assistance to jurisdictions and businesses in establishing countermeasure planning programs. This assistance includes the identification of key participants in a planning process, identification of community goals and objectives, and development of a community's work program. In addition, guidelines developed by the projects illustrate a step by step process for government and private sector preparedness
- Technical Assistance
Technical staff of the Projects include a geologist, an architect, urban planners, disaster response planners, public relations and marketing and community preparedness specialists. These staff members are available to serve as consultants to jurisdictions and businesses to support their development and implementation of a broad range of preparedness activities. These activities have included employee education, community and Boy Scout Earthquake Preparedness Fairs, preparedness product marketing campaigns, developing community vulnerability analyses, conducting hazardous building inventories, and participating in non-structural hazard identification and inventories.
- Regional Resource Center (RRC)
BAREPP has developed a regional information center and resource library to serve its program area. The RRC contains a number of resources, technical and planning publications, community awareness and preparedness brochures, damage scenarios, lists of product and service vendors, and over 5,000 slides on a range topics. Publications and slides are catalogued on an automated database and can be located by keywords. The RRC also houses earthquake preparedness training curricula on topics including hazardous materials, hazardous structures, and community preparedness; and over 100 training video tapes that are available for use by staff and for loan.

BAREPP has also developed a referral service for the region's electronic and print media. Calls from the media requesting information on specific topics of the earthquake threat, levels of risk, and structural hazards, are referred to regional and/or state experts. The project's technical staff are often called upon to respond to requests for interviews in the aftermath of earthquake events. The contacts developed during these events have provided BAREPP with the capability to provide the media with information and story ideas on a range of earthquake related topics.

In 1988, BAREPP published the first in a series of guides to earthquake faults in the Bay Region. *LIVING ON THE FAULT: A Field Guide to Visible Evidence of the Hayward Fault* provided a self guided tour to facilities that have been built on or adjacent to the Hayward Fault trace. Publication of the guide fostered a number of stories in the media on the location of the fault, and has promoted a number of "fault tours" for local officials. The guide has proved extremely successful in raising the level of awareness to the region's risk of local officials.

- BAREPP NETWORKS
Project newsletters, such as BAREPP's NETWORKS reach over 8,000 business and government leaders in the Bay Region. Published on a quarterly basis, the newsletters promote preparedness by publicizing the latest information on threat levels, "showcasing" outstanding examples of public and private sector preparedness programs, publishing special editions documenting the impacts of recent earthquakes (Mexico City, 1985; Whittier, 1987) and translating technical information into articles for the general public.

□ Training Workshops

BAREPP and SCEPP have organized and convened a number of training workshops for local government and business countermeasure planners and responders. Topics have included identification of hazardous buildings, land use and development policy to reduce risk, the threat of hazardous materials during earthquakes, preparedness in schools and day care centers, preparedness in hospitals, and community self-help preparedness. These workshops have been targeted at both decisionmakers and operational personnel in the public and private sectors.

□ Preparedness Guidelines and Checklists

As noted earlier, the Projects have published a number of planning guides to assist in preparedness efforts. Guides are available for cities, counties, schools, day care centers, corporations, small businesses, hospitals, and communication facilities. One page Checklists are also available for these entities.

One of the most innovative aspects of BAREPP was the introduction of a marketing approach to earthquake preparedness. Too often government programs charged with improving the public welfare have concentrated on telling the citizenry what government thinks they should do to reduce risks. Such broad, general campaigns on earthquake preparedness have significantly raised the level of awareness to the earthquake threat in the general population, but have not been successful in motivating action to reduce hazards. The recent introduction of a marketing approach, borrowed from private sector advertising concepts, has resulted in targeting specific motivational messages to specific groups, with positive results. A marketing approach required an indepth knowledge of the target audience, the ability to provide information to that audience, and a knowledge of the factors that will motivate the target group to change their behavior. There is still a great deal to learn about this approach, but it promises to significantly improve community earthquake preparedness campaign effectiveness.

CONCLUSIONS

The BAREPP and SCEPP programs, as part of the Governor's Office of Emergency Services, provide a broad range of services to jurisdictions, businesses and community organizations in California. Because businesses and local governments in California are independent and individualistic, the two projects have tailored their approaches to foster creation of a constituency for earthquake countermeasure preparedness. The approach taken by BAREPP and SCEPP includes public advocacy and education about the earthquake threat, education for publicly elected officials, planning and technical assistance to local governments and businesses who initiate and operate preparedness programs, serving as facilitators to foster joint and regional interaction, and the creation of a regional resource center and lending library of technical and educational materials, including reports and audio-visual training materials.

BAREPP and SCEPP have been successful in the raising the level of awareness to the earthquake threat of both the general population and of public and private officials and decisionmakers. This increase in awareness has been reflected in preparedness actions that have been initiated. In southern California, the counties of Orange and Los Angeles have begun multi-million dollar programs to strengthen their facilities and train their staffs for earthquake response. In the San Francisco Bay Region, the cities of San Francisco, Sunnyvale, Oakland, and San Jose have developed similar programs with the support of BAREPP. The City of San Francisco recently passed a \$40+ million bond issue to expand its earthquake and fire fighting capability and the City of San Jose recently approved a multi-year \$16 million program of community hazard reduction. In both northern and southern California, businesses have joined with government in planning and coordinating preparedness activities. The Business and Industry Council for Emergency Preparedness (BICEP) in southern California and the Industrial Emergency Council and Red Cross,

Business and Government Disaster Preparedness Conference in northern California provide unique examples of the participation fostered between the public and private sectors.

Annual Statewide Earthquake Preparedness Campaigns in April, coordinated by BAREPP and SCEPP, have resulted in a significant increase in the awareness of the earthquake threat by the general population. BAREPP has taken a unique approach to "selling earthquake Preparedness" by developing a marketing strategy involving businesses and local governments in promoting preparedness through product sales campaigns as part of the annual campaign and through targeting campaign activities.

An essential element of a successful risk abatement program is public and government understanding and support. A comprehensive approach to earth quake preparedness and hazard mitigation including public education and campaigns targeted to business and government decisionmakers has proved successful in California in fostering local government programs to educe the level of risk through the use of geologic information, hazardous structures abatement, and training. These programs have been in place in California for over three years. The ultimate test of their effectiveness will be the next damaging earthquake to strike the State.

PLANNING GUIDELINES

- The Effective Use of Earth Science Information at the Local Government Level*
- Comprehensive Earthquake Preparedness Planning Guidelines: City*
- Comprehensive Earthquake Preparedness Planning Guidelines: County*
- Comprehensive Earthquake Preparedness Planning Guidelines: Corporate*
- Earthquake Preparedness: A Key to Small Business Survival*
- Reducing the Risks of Non-Structural Earthquake Damage: A Practical Guide*
- Marketing Earthquake Preparedness: Community Campaigns That Get Results*
- Earthquake Preparedness and Public Information: An Annotated Bibliography*
- Earthquake Preparedness in Hospitals*