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Proceedings of the

3rd UNITED STATES/JAPAN WORKSHOP

ON

URBAN EARTHQUAKE HAZARD REDUCTION

Honolulu, Hawaii
November 13-15, 1991

Sponsored by

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Executive Summary

The Third U.S./Japan Workshop on Urban Earthquake Hazard Reduction was held in Honolulu, Hawaii, November 13-15, 1991. The workshop provided a forum for the exchange of information between participants from the United States and Japan regarding changes in mitigation, preparedness, response and reconstruction practices that resulted from research and other lessons learned in recent earthquakes.

The Second Japan/U.S. Workshop on Urban Earthquake Hazard Reduction was held in 1988 at Tokai University in Shimizu, Shizuoka Prefecture, Japan. That workshop provided a forum for the exchange of information on earthquake problems at the urban level, focusing on ongoing mitigation efforts mostly in Japan and the United States. Proceedings of this workshop were compiled and published by the Institute of Social Safety Science of Japan.

The First Workshop was held at Stanford University in August 1984, in conjunction with the 8th World Conference on Earthquake Engineering (8WCEE). This workshop focused on urban earthquake problems - such as lifelines and fires following an earthquake -as these severely impact the highly urbanized/industrialized and populated areas of Japan and the United States. The proceedings of the first workshop were compiled for publication and circulation (EERI, 1985).

This Third Workshop was specifically designed to build upon the first two workshops and to offer opportunities for more in-depth discussions, on the following topics: (1) Preparedness and Mitigation; (2) Local Government Preparedness; (3) Search and Rescue; (4) Damage and Assessment; (5) Recovery and Reconstruction — Seismic Zonation, Planning and Development; (6) Recovery and Reconstruction — Architecture and Urban Design; (7) Assessment and Repair of Damaged Structures; and (8) Business and Industry — Preparedness and Recovery.

Participants were divided into eight working groups which were intentionally kept small to encourage dynamic discussion. This approach was highly successful in improving understanding of mutual problems and solutions.

Each group was asked to address the following tasks during the two and a half day meeting:

1 Identify critical issues pertaining to earthquake hazard mitigation that have emerged in recent earthquakes;

2 Identify lessons learned in recent earthquakes;

3 Identify areas where post-earthquake research has changed practice in earthquake preparedness, planning, response, recovery and reconstruction;

4 Identify areas of practice where change is needed and has yet to be made due to a lack of adequate knowledge:

5 Identify further research needs and areas of possible collaboration.

Conclusions of the working groups are summarized here and provided in greater detail as Group Reports.

In addition, this publication contains plenary presentations and detailed outlines prepared by many of the participants, and organized under working group topic.

Summary of Findings and Recommendations

Group 1. Preparedness and Mitigation

Findings:

- Existing preparedness and mitigation programs have little impact on low-income and minority communities, particularly those programs responsible for the provision of emergency sheltering and housing recovery.

- Building codes and practices have not adequately addressed the relationship between building performance during an earthquake and the type of soil under the building.

- The interaction of lifelines during earthquakes, and specifically the impact of the failure of the electrical network on the performance of other lifeline systems, has not been addressed.

- There appears to be no particular pattern to post earthquake fires, suggesting the critical importance of rapid detection and suppression.

- Public education, about earthquake risks and preparedness for the general public and school populations, is not widespread nor uniform in impact.

Recommendations for collaborative work:

- Research is needed to develop an understanding of lifeline system vulnerability and methods to assess and reduce damage.

- Cross cultural research on earthquake preparedness should develop effective methods to stimulate and maintain neighborhood preparedness and develop techniques to reach populations with special needs.

Group 2 — Local Government Preparedness

Findings:

- Effective community preparedness depends upon political commitment from government and private sector leaders. We often lack the proper tools to educate officials and advocate preparedness objectives.

- Local governments should augment their capability through development of neighborhood preparedness programs to train "civilians" in response techniques.

- Local governments rely upon building codes that do not address continued function of structures after earthquakes. Common guidelines have not been developed that address retrofit of damaged structures.

- Local governments are not prepared to manage and maximize the resources presented by emergent volunteer response after a disaster.

Recommendations for collaborative work:

- Techniques should be developed for effectively presenting "disaster scenarios" to public and private officials and decision makers.

- Ongoing exchanges and collaboration between public officials and practitioners, such as "sister city programs", should be promoted as a means of sharing experiences and pursuing joint projects.

- An action program should be developed as a result of this workshop, to make specific recommendations on public policy to local government officials in both countries.

- Public officials and practitioners from the US and Japan, particularly state (prefectural) and municipal governments, should field joint post earthquake investigation teams to focus on local government response and needs.

- California's earthquake projects, the Southern California and Bay Area Regional Earthquake Preparedness Projects should be replicated as models for preparedness efforts in both countries.

Group 3 — Search and Rescue

Findings:

- The first 48 hours after an earthquake places enormous demands on critical resources for search & rescue (SAR), often before those resources are identified or available.

- In recent earthquakes, volunteers rescued the vast majority (approximately 80 percent) of victims.

- Rescue site coordination, in general, is problematic. There is no effective management system for integrating and coordinating SAR volunteers at the scene of a disaster.

- Diffusion and utilization of existing research findings are inadequate.

Recommendations for collaborative work:

- There is a need for comprehensive cross cultural research on disaster management, integration and management of emergent volunteers and the use of international expert teams.

- U.S. and Japan researchers should jointly pursue study in the areas of "human factors" and "protective actions"

Group 4 — Damage Assessment

Findings:

- Language difficulties and a lack of cultural familiarity between professionals from the U.S. and Japan limit the effective exchange of information and experience. Our countries do not share common preparedness approaches nor terminology.

- There are significant cultural differences between the American utilization of "legal remedies" versus the Japanese tradition of "taking personal and corporate responsibility " These differences influence damage assessment and hazard abatement practices in the two countries.

- There are no uniform model codes which set standards for post earthquake repair and reconstruction.

- Pre-event planning and training in disaster management would help avoid "crisis management" decision making.

- In Japan earthquake and fire research and practice are typically integrated. This approach is not followed in the U.S. Greater study of management practices in Japan might lead U.S. governments to better coordinate emergency response.

Recommendations for collaborative work:

- Support should be provided in both countries for longer term research exchange programs to promote the study of culture and language.

- Practitioners from the two countries should develop a glossary of terminology and practice to assist in cross cultural communication and technology transfer.

- Practitioners from the two countries should collaborate on post disaster investigations of preparedness, response and recovery and reconstruction practices.

- A collaborative periodical, should be developed to document mitigation, preparedness and recovery practice and research. It would serve as a forum for the exchange of information and observations from both countries.

Group 5 — Seismic Zonation

Findings:

- Currently available methodologies for seismic zonation are inadequate. There is also a lack of guidelines for those attempting to develop zonation procedures.

- Land use, development, mitigation and redevelopment policies do not exist for the utilization of zonation data.

- Reconstruction policies and strategies are lacking at both the local and national levels.

Recommendations for collaborative work:

- Jointly develop a uniform set of guidelines for the preparation of seismic zonation maps for utilization in Japan and the U.S.

- Jointly develop guidelines for the implementation of mitigation techniques utilizing zonation

- Conduct joint post disaster investigations that focus on the utilization of zonation during post earthquake reconstruction.

- Implement professional exchange programs of researchers, practitioners and public officials to promote better understanding of cross cultural issues and the exchange of experience, knowledge and approaches to earthquake preparedness.

Group 6 — Architecture and Urban Planning

Findings:

- Tensions between planners and developers that emerge during the development process are increased during disaster reconstruction. Pressures to expedite reconstruction often govern redevelopment decisions, to the detriment of a redevelopment process that could promote earthquake mitigation.

- We do not have a clear understanding of the economic recovery process and the interdependency of the various elements of a community.

- Historical preservation after an earthquake is a major force in the United States, but is not an issue in Japan.

Recommendations for collaborative work:

- There is need for joint post earthquake studies of the socioeconomic recovery of communities.

- Collaborative studies of urban lifeline vulnerability would provide a better understanding of the interaction between lifelines and response capabilities.

- Studies should be made in both countries of the development and utilization of disaster scenarios and their effectiveness for preparedness and response capability; and to better understand the social and economic impacts of disasters.

- Researchers and practitioners should take advantage of the opportunity to continue longitudinal study of the reconstruction process following the Loma Prieta earthquake.

- Opportunities should be identified for exchanges between U.S. and Japanese researchers and planners to address urban planning and development policy issues during reconstruction.

Group 7 — Assessment and Repair of Damaged Structures

Findings:

- Recent earthquakes illustrate the vulnerability of urban lifelines and the need for real time assessment of lifeline capability after earthquakes. Intelligent monitoring systems capable of decision making should be developed.

- There is a need for guidelines and standards for lifeline redundancy and/or alternative paths, and critical element fail-safe capability.

- Building damage assessment methodologies for both structural and non-structural elements are not reliable nor calibrated based on experience.

Recommendations for collaborative work:

- Joint research should be undertaken to develop an information management system for lifelines, utilizing a real time monitoring network.

Group 8 — Business and Industry Preparedness and Recovery

Findings:

- There is widespread apathy among business organizations about disaster preparedness and recovery planning. The level of preparedness appears to be proportional to the size of the business unit; with larger corporations and industries better prepared than small and moderate sized businesses.

- There is a need to better inform small businesses of the value of risk reduction and recovery planning

Recommendations for collaborative work:

- Collaborative research activities should address estimation and comparison of indirect economic losses from disasters.

- Business and local government leaders from both countries should support the development of a systematic earthquake preparedness training program for small and moderate sized businesses

The Workshop was judged to be a great success by all participants. Plans were initiated in the closing session to hold a Fourth U.S./Japan Workshop in Japan for the purpose of exchanging information on the status of the cooperative U.S./Japan research efforts that were stimulated by this third workshop.

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