GROUP REPORT
&
ABSTRACTS

Group 2

Local Goverment Preparedness

GROUP 2 REPORT
LOCAL GOVERNMENT PREPAREDNESS

Co-Chairpersons: Shirley Mattingly and Yujiro Ogawa

Introduction

During the local government preparedness work group's opening discussions, consensus was quickly reached on the scope of our work, determining that "local government preparedness" appropriately encompasses a broad range of integrated programs. Mitigating earthquake effects, enhancing public awareness, and building capability for recovery as well as readiness for response are all responsibilities of local governments. When a major urban earthquake occurs, local governments' actions are pivotal to the well-being and survival of their communities.

In addition, the group recognized that earthquakes exaggerate existing urban problems and social issues, such as shortages of affordable housing. Therefore, planning and preparing for the effects of earthquakes and other disasters must be integrated into how local governments go about the business of government on a day-to-day basis.

Critical Issues

The group identified the following topics as critical issues emerging in recent earthquakes which impact local government preparedness efforts.

Of primary concern to many work group participants is the need for political commitment for earthquake hazard mitigation and emergency preparedness by state, prefecture, and local leaders. It was noted that political support varies in time and that it is likely to be higher immediately following damaging earthquakes. A corollary issue is the difficulty in maintaining a high level of awareness and commitment among both political leaders and the public.

Citizen awareness was considered by the group to be critical. One factor which can work against continued high levels of awareness and readiness is the uncertainty presented by long-term predictions for future earthquakes. To heighten public awareness and preparedness, the group strongly endorsed programs which promote the neighborhood self-help concept.

To overcome insufficient political commitment, local government emergency planners need effective tools such as earthquake scenarios. Credible scenarios can help achieve political support for risk reduction measures and also provide a realistic basis for emergency response and recovery exercises, simulations and drills.

Public and political support for hazard reduction measures is also negatively impacted by a lack of true understanding of potential earthquake effects. The group believed that recent earthquakes do not give an accurate picture of a major urban earthquake and may mislead us to underestimate what the effects of a large event will be.

Recent earthquakes, particularly Loma Prieta, clearly illustrated that government itself can be a victim of the quake. Cities must be prepared before the event to manage both short- and long-term impacts of the quake on its ability to provide services. Training must be emphasized to prepare local government leaders and staff, particularly to ensure the capacity to resume and maintain government services when they are needed the most.

In summary, cities need a future vision of how they will survive and what the post-earthquake city should look like. A strategic planning approach would provide such a vision.

Other issues raised and considered important by the group include:

- Lack of retrofit standards and techniques
- Code performance should be reconsidered to include continuing functioning of the structure
- Need for retrofit of unsafe structures
- Need for individuals to help themselves
- Weakness of systems to manage volunteer response, and
- Need for good information acquisition to carry out emergency preparedness and mitigation programs.

Lessons Learned in Recent Earthquakes

Recent earthquakes have emphasized the impact of soil conditions on damage. Although well designed and constructed buildings in many cases performed well with intense ground shaking, liquefaction effects must be taken into account in site development.

The vulnerability of several types of existing buildings has been demonstrated repeatedly, showing graphically the collapse potential of unreinforced masonry and nonductile concrete frame buildings.

Many lessons for emergency responders have also been learned in recent earthquakes. Mutual aid must be expanded and improved. We need to be prepared to utilize volunteers effectively and to improve the ability to communicate with the diverse populations of our cities. Emergency power must be ensured, and agencies need to coordinate the restoration of utilities. The vulnerability of entire systems, such as transportation, must be reduced. The business community, including small businesses, must become involved with local government in joint efforts to prepare their firms and employees for earthquakes. Recovery and reconstruction must be managed and well planned in advance before the earthquake.

Changes in Practice

The work group discussed a number of actual changes in practice that have resulted from recent earthquakes and ensuing research. Since the Mexico City earthquake of 1985, for instance, there have been many improvements in local emergency plans, and the State of California has adopted a catastrophic earthquake response plan. The Loma Prieta earthquake produced a flurry of legislative activity at the state level in California, marked by a significant increase in willingness to spend money--over $1 billion statewide--for hazard mitigation measures.

In Japan the tsunami warning system has been improved to provide more timely warning, and the national government has expanded the number of radio frequencies available to local governments for use by emergency services. In some prefectures and cities geographic information systems (GIS) are being implemented and provide information and tools such as hazard avoidance maps.

In New York, unanimous consensus was achieved on a proposed landmark seismic code. In Berkeley, California, the city has taken several actions to encourage seismic upgrading of existing structures, such as waiving permit fees on seismic work for homes and providing other financial incentives. In addition, the city enacted an ordinance requiring seismic safety analysis of residences at point of sale. Berkeley has also set aside funds to conduct seismic assessments of schools and public buildings.

In Los Angeles, California, in 1990 the city's voters approved by an overwhelming majority a $376 million bond measure for seismic strengthening of public buildings and bridges. In 1991 the city's mayor and council approved a $4.6 million program to provide emergency generators for critical facilities, and the city's emergency management team has expanded over the past few years to incorporate many new participants including urban planners and housing officials.

Unresolved Problems

As characterized by one of the work group's members, earthquake hazard reduction is like milking cows. You milk them in the morning and again in the evening and then again the following morning, and you still have to do it again that evening. It's never completely done. Thus, we identified *the cow milking syndrome*. The need never goes away. There are always new faults and new information from the research community about the earthquake threat and earthquake impacts which must be analyzed and applied. There are always new employees and emergency responders and populations to be trained and retrained and the public to be made aware and spurred into preparedness actions. Local government's earthquake preparedness job is never done.

Second, we have no solid criteria to measure the effectiveness of our hazard mitigation and preparedness programs. How are we doing? We do not have mechanisms to measure how much we have accomplished toward our hazard mitigation goals. We do not have tools to evaluate where best to dedicate our limited resources or which of various retrofit techniques are the more cost effective for different types of problem structures.

Third, we lack effective incentives for investment by both the public and private sectors in mitigation and preparedness measures. In California, for example, local governments are given the task of identifying risks but they receive no resources to act on such knowledge. Low cost or even market rate loans are often not available for seismic retrofit work.

Again and again the work group returned to the continuing problem of needing political commitment and public will to institute and maintain meaningful risk reduction programs.

In Japan as well as in the United States, emergency planners do not know how to adequately protect their communities' special populations or "disaster handicapped persons." This is only one of the defects identified in existing emergency plans. Plans often lack detail, substance, procedures and basic information explaining how to do what is called for in the plan. In some cases, the plan may be good, but the capability to carry out the plan is weak. Both professional responders and volunteers may be untrained or inadequately trained; communications capabilities may be interrupted and ineffective in the aftermath of a quake.

The susceptibility to fire of large numbers of buildings in the urban environment continues to vex emergency planners in both countries

Finally, it was noted that while much research and development work has been accomplished in recent years, it has seldom been applied by local governments. Local governments need to make major efforts to adopt and incorporate current technology into their hazard reduction and preparedness programs, such as real time monitoring for purposes of warning, geographic information systems for land use decisions, and satellite communications to link emergency response personnel and agencies.

Existing Research Needs

Although local governments are pursuing a wide variety of programs intended to reduce earthquake hazards and impacts, very little is being done in the way of evaluating these existing efforts. There is an urgent need for case studies of what is working, what is not, what are the characteristics of effective programs, which strategies and techniques are most cost effective, etc. The work group pointed out one case of an inquiry into the effectiveness of an existing disaster management system, the Incident Command System (ICS), where we see researchers questioning its value at the same time many agencies across the country are adopting it. We need more study of our systems and programs like this.

Local planners also recognize the need for conceptual tools for how to formulate scenarios which are meaningful. For instance, in California scenarios are being used that are twenty years old and do not address housing and other contemporary concerns. The work group recognized the need to reevaluate existing loss estimation techniques and develop better models as well as guidance on how to translate scenarios into effective planning and response actions.

Research leading to consensus standards for retrofit of existing buildings and for post-earthquake repair is also urgently needed so that local governments can enact such legislation with confidence. The work group believed that this research should focus on development of two standards: life safety and survival of the functionality of the structures.

Additionally, the group strongly favored more emphasis on research on the economic consequences of major urban earthquakes, into differentiation in damage based on soil conditions and the application of seismic microzonation, and into what are effective management techniques to implement hazard reduction strategies. Disaster management information systems are being developed and used in Japan and need to be studied for application in the U.S

Recovery and reconstruction processes need to be evaluated, and finally, the group expressed concern about the mental health needs of public officials in response and recovery.

Areas of Future Collaboration

Collaborative mechanisms, first and foremost, must be developed for practitioners, particularly government officials, as well as researchers. The scientific and engineering communities seem to have been more successful in establishing and maintaining bicultural working relationships and collaborative efforts than have government officials or emergency planners/managers; therefore, what is working for scientists and engineers should be studied for application to government and business practitioners.

Sister city programs present one type of opportunity for maintaining ongoing contacts and pursuing joint work projects. Existing sister city relationships between Japanese and U.S. cities, such as Nagoya-Los Angeles, could be expanded to include exchange of information and joint work on seismic projects. New pairings can be crated specifically for the purpose of seismic hazard reduction, such as the existing Earthquake Preparedness Agreement between Mexico City and Los Angeles. Work group participants from California noted that one idea might be to invite Japanese local officials to a meeting of the League of California Cities which would be designed to include a major session on seismic safety on its agenda.

The work group noted the need for continuing contact to overcome barriers and allow for meaningful exchange of information. Participants favored the assignment of joint tasks to binational groups for report back at the next Japan-U.S. workshop. The group favored an action program be developed as a result of this workshop, with recommendations to government officials, in order for our meetings to have a public policy impact. Improving the

public policy impact of a wide range of projects sponsored by the National Science Foundation and others was urged by the group.

The work group strongly endorsed the concept of fielding joint Japan-U.S. post-earthquake investigation teams, with priority for including state or prefectural and local government practitioners on the teams.

Finally, the group strongly endorsed the need for collaboration on engineering solutions to seismic safety problems, so that we can achieve broader application of appropriate standards. It was also felt that joint work would be productive on structural assessment techniques.

Administrative and Institutional Needs

As the work group's primary concern was for public policy, discussion also focused on administrative and institutional proposals to effect change in public policy.

The results and recommendations from meetings such as this one need to be made known. We need to identify, define and utilize mechanisms to make such recommendations affect practice.

Because the earthquake problem is so overwhelmingly complex, strategic plans are needed for dealing with the risk. Strategic plans are needed at every level, to guide national, state and local seismic hazard reduction efforts. This is an issue of leadership and management, involving moving a team systematically, in a strategic direction, and with a goal orientation.

Public input should be built into local hazard reduction processes, perhaps through advisory citizens' commissions along the lines of the California Seismic Safety Commission at a local level.

California's earthquake projects, the Southern California Earthquake Preparedness Project (SCEPP) and the Bay Area Regional Earthquake Preparedness Project (BAREPP) present strong models which could and should be replicated both in the U.S. and Japan, to assist local governments with their overwhelming tasks.

Finally, the work group recognized that dollars and yen, effectively applied, are always needed. The group would like to see the money and access the resources before a catastrophic event either in Japan or the U.S., and apply them to reducing potential losses rather than to rebuilding lives, livelihoods and communities after an earthquake's devastation.

Working Group Abstracts

EMERGING PUBLIC POLICY ISSUES IN LOCAL GOVERNMENT PREPAREDNESS

Hal Bernson

Introduction

Earthquake mitigation and preparedness cannot be successfully carried out in a community by the local governmental bureaucracy alone. Political will and commitment of the elected officials and other community leaders are essential if barriers and apathy are to be overcome. All segments of the community must become involved--schools, businesses, and community groups as well as government.

Critical Issues and Lessons Learned

Public officials face dozens of challenges and conflicting and competing demands. Immediate and pressing needs require their attention every day, making it difficult at best to focus on preparing for and mitigating the effects of nature's disasters. It is local government's responsibility, however, to protect the community, and that means that cities and counties must implement loss prevention programs, effectively manage emergency response, and ensure the recovery and restoration of society, the economy, and the built environment. Public officials face the challenge of reducing vulnerability to disaster while at the same time sustaining their community's growth and economic vitality and protecting its environment.

Recent earthquakes such as the 1989 Loma Prieta earthquake have generally validated our conclusions from previous disasters such as the 1985 Mexico City quake. In Los Angeles, our "benchmark" quake was the 1971 Sylmar event, which motivated our city to take a myriad of actions to improve response capabilities and reduce vulnerability to future earthquakes. The 1971 quake led to the development of our multiagency Emergency Operations Organization and implementation of our program to strengthen the 8,000 existing unreinforced masonry buildings in the city.

The Loma Prieta quake resulted in Los Angeles in increased focus on various issues related to pre-earthquake planning for recovery and reconstruction after a destructive quake. Clearly, land use and reuse issues necessitate pre-event attention, because they are among the most difficult to be managed in the chaotic post-event environment. It has become increasingly evident that urban planning--and urban planners--need to be integrated into the emergency planning activities of the city. The Seismic Safety element of a city's General Plan can do double duty as a hazard mitigation plan, so it needs to be consistent and coordinated with the jurisdiction's other hazard mitigation plans and programs.

Microzonation has implications not only for new construction and reconstruction after an earthquake but also for existing buildings in areas of particularly high seismic risk or ground failure potential. The development of a jurisdiction's multipurpose geographic information systems should integrate hazards databases and mapping so they may be useful in planning emergency response as well as guiding decision-making in regard to rebuilding.

An additional issue emerging from recent earthquakes is the need to assign new emergency management roles to new players throughout a city's bureaucracy. In addition to drawing urban planners into these efforts, major new roles are emerging for agencies such as those responsible for housing preservation and production, community redevelopment agencies, and social service agencies. Moreover, the Loma Prieta quake reminded us of the

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200 North Spring Street, Room 237, Los Angeles, California 90012

city's responsibilities as an employer to ensure employee preparedness and ability to survive and respond, and as a provider of essential public services to continue to serve the public under circumstances which may include loss of office space, records, communications capabilities, etc.

Changes Made to Practice

Major earthquakes around the globe consistently stimulate renewed interest in and commitment to emergency planning and preparedness for response and recovery. In Los Angeles, because we have a citywide organizational commitment to ongoing hazard mitigation, training, exercising, and preparedness programs, earthquakes generally spur ongoing efforts and motivate previously uninvolved individuals and groups to join in.

Specific actions taken in Los Angeles as a result of the Loma Prieta quake include: expanding the city's recovery and reconstruction planning process to deal with interjurisdictional, transportation, and emergency public information issues; development of a multi-million dollar program to ensure provision of emergency power to critical city facilities and offices; and reevaluation of plans for the sheltering and housing of displaced persons.

Further Research Needs

Each of the emerging issues listed above merits study and development. The public policy implications of hazards mapping and microzonation need to be better understood, as do the implications of various hazard mitigation tools on development and economic vitality. Adequate housing for displaced persons is still an issue in the Bay Area, two years after the earthquake; alternatives and solutions need to be evaluated if the Bay Area experience is to assist other communities such as Los Angeles in pre-event planning to meet housing needs after the event. Public information campaigns and materials need to be systematically evaluated in order to improve the effectiveness of future efforts. Successful local government preparedness programs should be analyzed to determine what makes them work and these case histories made available to assist other jurisdictions. Finally, a full range of financial tools and mechanisms for funding emergency preparedness, response, recovery and mitigation costs should be developed and packaged for use by local communities facing seismic risk.

PRE-EVENT PERIOD--LOCAL GOVERNMENT PREPAREDNESS

Alan Goldfarb

Critical Issues

While all levels of government have significant roles in earthquake preparedness, ultimate responsibility under our federal system lies at the local level. The local political system, however, tends to give priority to immediate and visible needs, such as maintenance of streets and parks, fire and police protection, and provision of basic community services. With local revenues barely sufficient to keep up with routine infrastructure needs, where does earthquake preparedness fit into the perspective of politicians who must run for office every two or four years? For the most part, it doesn't! The failure of political leaders, at all levels, to acknowledge that seismic safety is one of the most critical issues facing California cities and perhaps the number one problem in the state of California, is *itself* the most critical issue confronting local preparedness efforts.

Thanks to an avalanche of information and enlightened media efforts by agencies such as the State Office of Emergency Services in California, and the U.S. Geological Survey, the earthquake "story" is out there; but it doesn't play well at city hall, or in the state capitol, or at the local chamber of commerce. Obviously, we can't simply identify unreinforced masonry buildings and then put all other preparedness issues on hold (including what to do with URMS after we've identified them).

Despite these difficulties, some cities have taken significant, if only incremental, steps in the pre-event period, and it is important to identify lessons learned and changes in practice, as well as issues that require more attention and research.

Lessons Learned

Seismic events tell us much, or confirm what we already know. But from a socio-political viewpoint, the events present a mixed result. Earthquakes in Whittier, California, and in the Santa Cruz mountains have lulled many into thinking that earthquakes are manageable, that we can recover from them without having to significantly invest in our public and private buildings and infrastructure, and that existing personnel can be stretched to cover the necessary bases. After all, thousands have not been killed, most of the damage is surgically removed within weeks or months, and the attention span of the public is short. How, then, can preparedness programs be instituted and maintained, and how should the private sector be engaged? I believe this can be done in two ways.

First, political leadership at the local level must insist that their city establish a permanent citizens' advisory commission or board, just as we establish a local planning commission, or citizens' budget commission. It should be appointed by the elected body, and advise on earthquake preparedness strategies, including training and preparing local government leaders and responders. The commission needs to reach out to other departments and agencies, both within and outside of government, including neighborhood organizations, to establish an emergency preparedness mind-set throughout the community. It must also involve the expertise of the business community and its leaders, whose concerns it should also reflect. It must identify and organize in the pre-event period an effective volunteer network committed to mutual self-help to supplement the traditional responders. We learned from Loma Prieta that a high percentage of those who survived the Cypress Freeway collapse were aided by volunteers, and that fire fighters and police at San Francisco's Marina district were

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significantly aided by volunteers. We also learned that hundreds of skilled volunteers were not deployed because trained managers were not available to effectively utilize them.

This brings us to the second aspect of political commitment. Elected officials must insist, as part of pre-event preparedness, that adequate staff dedicated exclusively to disaster preparedness be in place, ideally in the office of the city's chief executive, where they can: (1) coordinate the work of all city departments in a disaster, (2) provide staff support to the citizens' earthquake commission, (3) refine, test and implement the city's disaster plan, (4) coordinate the city's program with other key entities, such as the county, the state, the schools, and the Red Cross, (5) help organize and train neighborhood organizations to utilize available skills in first-aid, light search-and-rescue and other basic emergency work, and (6) assist the business community in its own preparations for survival.

Changes in Practice

Local communities are unique in most respects, and each responds differently to cataclysmic events that occur elsewhere. In Berkeley, we have established a permanent citizens' advisory commission and have organized in the city manager's office a staff of four full-time officials to coordinate earthquake preparedness. In addition, an interagency group has been formed that brings together representatives of the school district, the city, the University of California, Alta Bates Hospital, the Red Cross, and other key actors who have special responsibilities in a disaster. The City has authorized a number of actions, in addition to integrating earthquake preparedness within the framework of local government, including: an ordinance requiring an inspection for earthquake safety at point of property sale; an ordinance requiring that tenants in unreinforced masonry buildings be informed of the risks in such structures; exploration of a jointly sponsored City-School District Bond Issue for retrofitting schools and critical public buildings and facilities; a city-wide earthquake preparedness drill for the fall of 1991; funds to perform a seismic evaluation of city-owned buildings; an exemption that allows residential property owners to invest in seismic retrofitting of their buildings rather than pay a property transfer tax of one-half of one percent, retroactive to October 17, 1989.

Issues Requiring More Research

There are many weak links and untested strategies that challenge local government, not the least of which is great dependence on state and national assistance or incentives for public and private reinvestment in aging buildings and public infrastructure. Whether loans and grants, as well as tax incentives, will be available in time to help older and vulnerable communities is a critical issue that has not received adequate attention. Major federal and state legislation of the kind that provided substantial urban renewal subsidies in the 1950s and 1960s will no doubt be needed. Given the fiscal constraints affecting all levels of government in the United States, it will probably take a major urban catastrophe, unprecedented in modern times, to bring about this legislation.

LOCAL GOVERNMENT PREPAREDNESS FOR RESPONSE AND RECOVERY

Shirley Mattingly and Valerie Melloff

Preparedness for Response and Recovery

Developing and maintaining preparedness for response to and recovery from earthquakes is an integral part of the business of government in Los Angeles. Since preparedness is not a static state which, once achieved, effortlessly remains, cities must design programs to ensure that enhanced preparedness is constantly pursued, particularly during the lulls between damaging quakes. Maintaining momentum in these efforts is highly dependent on two key factors: commitment at the top and broad involvement throughout the city's agencies, businesses and community groups. The abundance of such commitment and involvements in Los Angeles has enabled the City to make powerful strides in enhancing its ability to protect citizens, property and livelihoods from disaster effects.

Preparing for response is only one element of what must be an integrated approach to reducing the community's vulnerability to earthquakes and other disasters. In Los Angeles, other elements of this integrated approach include:

- A systematic, fully funded program for seismic strengthening of public buildings and bridges
- Several structural and nonstructural hazard mitigation programs
- Planning and preparedness for response to earthquake predictions and forecasts
- Planning and policy development for recovery and reconstruction
- Innovative seismic resistance code development and enforcement, and
- Development of seismically sensitive zoning, grading and land use practices.

It is only through integration of response preparedness activities with these and related programs that a local government can seriously address its community's needs in responding to an earthquake.

Critical Issues and Lessons Learned

Recent earthquakes have urged civic leaders, emergency responders, and urban and emergency planners to revitalize existing preparedness programs, seek inventive and creative ways to motivate preparedness actions throughout the community, and focus on critical issues such as alternative methods of financing mitigation, preparedness and recovery programs. Recent earthquakes also resulted in the realization that pre-event planning must be accomplished to prepare local governments to manage housing shortages and socioeconomic problems which will be exacerbated in the post-earthquake period.

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200 N. Main Street, Room 300, Los Angeles, California 90012

The City of Los Angeles has ongoing preparedness programs to deal with these and other issues. These programs are diverse and multifaceted and are characterized by a highly participatory TEAM approach. The following preparedness program areas will be emphasized during the workshop discussions:

1 Those activities which have proven particularly successful in training and preparing the city's leaders. This would focus primarily on the city's annual policy level retreats/workshops on such subjects as earthquake prediction response planning and response to a major hazardous materials emergency.

2. Exercises and drills to provide hands-on experience to a wide range of city officials, employees, and other potential participants in emergency response, such as volunteers. This would include such events as the citywide Master the Disaster 1990 drill and emergency City Council meeting held in a tent in Dodger Stadium to simulate the loss of City Hall, and drills of employee, business, and community-based citizen emergency response teams.

3. City actions to ensure prompt resumption of departmental operations and services in the aftermath of an earthquake. Attention would be focused on the mayor's executive directive mandating such actions and programs and successes in implementing it.

4. Preparedness activities to ensure the city's ability to recover and reconstruct after a major earthquake. This included focusing on financial planning and meeting short-term, mid-term and long-term housing needs.

5. City work with the business community to enhance preparedness and business resumption capability. This would focus on BICEPP, the Business and Industry Council for Emergency Planning and Preparedness, a joint city-private sector initiative to promote emergency planning among businesses.

Research and the application of research findings play a major role in the city's ongoing programs in each of the above areas. Several approaches are used to capture and disseminate information to potential users throughout the city's organization. Strong emphasis is placed on managers' interacting with their counterparts in other jurisdictions and locations. Examples are the 20-member city management team which traveled to Tokyo and Shizuoka, Japan, in 1985, the dozen-member city management team which participated in the Peoples' Republic of China's Symposium on Earthquake Countermeasures in 1988, the Bilateral Cooperative Agreement for Earthquake Preparedness between Los Angeles and Mexico City, and the Tri-Cities Earthquake Workshop with San Francisco and Oakland in 1991.

A second city approach to pursuing and utilizing new knowledge is its practice of sending multidisciplinary reconnaissance teams to disasters such as the Mexico City earthquakes in 1985 and the Loma Prieta earthquake in 1989. Third, the City emphasizes multidisciplinary participation in conferences and workshops presenting new research findings, such as the Loma Prieta - One Year After Conference and various disaster briefings such as those by EERI reconnaissance teams. Additionally, City staff prepare and present to policy officials after-action reports and critiques from each of our emergency activations for either an exercise or for a real emergency.

Research Has Changed Practice

In each of these instances, research has changed practice in Los Angeles. For instance, study of Japan's public information and education programs led to the development, upon the City team's return, of the City's Shakey Quakey Van for school children's earthquake education. Our Loma Prieta report identified 26 action items, all of which were adopted by the

Mayor and City Council; the quake impacts caused us to rethink a number of existing strategies and systems in such areas as coordination and communications, emergency public information, and provisions for emergency power and other services to critical facilities. Outcomes of the follow-up work have included, for example, adoption of a policy regarding cellular telephones for emergency operations and adoption of a systematic program for provision and replacement of emergency generators at City facilities.

Further Research Needed

Further research is needed to better understand the social, psychological, and economic impacts of earthquakes and earthquake predictions and the effectiveness of public awareness campaigns. Research is also needed on how to maximize the effectiveness of information transfer activities such as the research proposed to be undertaken in conjunction with the Los Angeles-Mexico City exchange to study crosscultural information transfer using the social interaction model.