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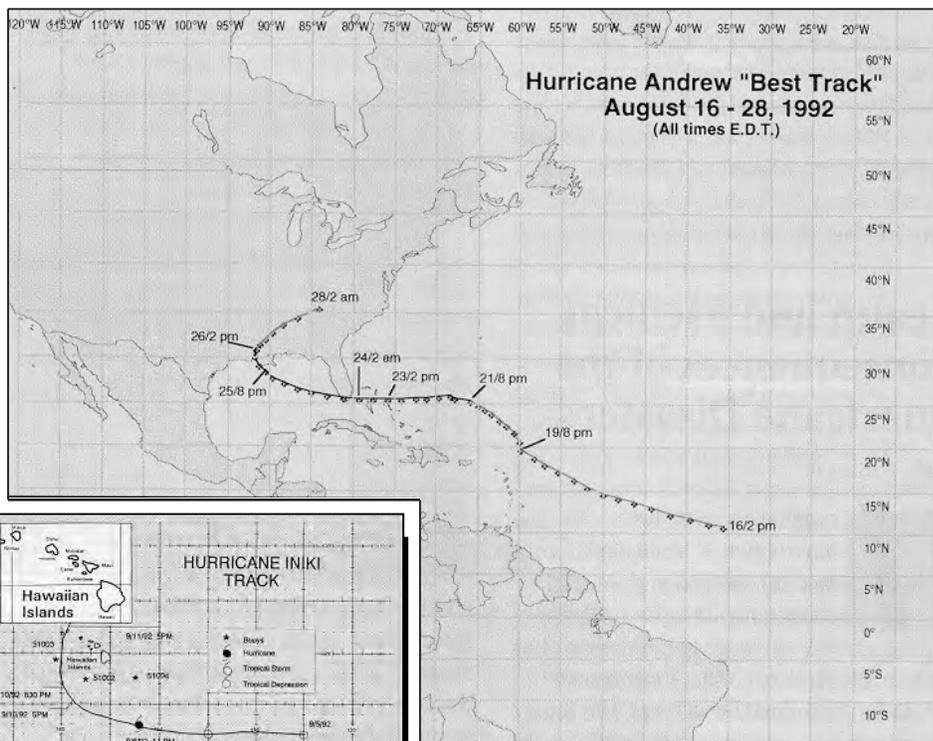
DISASTER RESPONSE RE-EXAMINED IN AFTERMATH OF HURRICANES ANDREW AND INIKI

Our nation's ability to respond effectively to a catastrophic disaster has been the subject of several recent studies, media reports, and Congressional hearings. The underlying theme of these reports and studies is that Andrew and Iniki exposed some serious flaws in our nation's intergovernmental system of disaster response.

The findings and recommendations of these studies - conducted by the U.S. General Accounting Office (GAO), National Academy of Public Administration (NAPA), Congressional Research Services (CRS), the FEMA Inspector General, and others - have important implications for the states and communities in the New Madrid Seismic Zone. While hurricanes and earthquakes are clearly different natural phenomena, their consequences are similar - people are injured and displaced, jobs are lost, the community infrastructure that supports our daily routines at home and the workplace are suddenly disrupted. The following is a synopsis of key findings and recommendations, with emphasis on implications for CUSEC and member states.

*** *The Federal Response Plan is not adequate for dealing with catastrophic disasters; a major reason for the failure is the absence of provisions for rapid damage and needs assessments (GAO).***

In the Central U.S., damages and casualties will be greatly dispersed following a disaster; emphasis needs to be placed on anticipating needs and resource requirements based on existing vulnerability studies. FEMA should



Charts showing the tracks for Hurricanes Andrew and Iniki provided by NOAA.

establish self-contained Impact Assessment Teams that can be immediately deployed to disaster sites to gather and analyze disaster "intelligence," and translate this information into resource requirements.

*** *Federal, State, local and volunteer agencies fell far short in providing the amount of life-sustaining services needed in the immediate aftermath of Hurricane Andrew (GAO, NAPA, FEMA, IG).***

Earthquakes offer no warning; furthermore, damages will likely be spread over a multi-state area. FEMA

should work with CUSEC states, local governments, and the private sector to develop a mutual-aid network and system to identify, inventory, organize, and utilize the specialized resources that are available throughout the region, and nation. Consideration should also be given to utilizing non-impacted State and local government personnel (e.g. from CUSEC associate states) as members of Disaster Management Support Teams to assist and support response and recovery efforts.

*** *State and local governments must be able to successfully manage small and medium disasters on their own, and they must be able to function***

(Continued on page 10)

LESSONS FROM HURRICANES ANDREW AND INIKI: IMPLICATIONS FOR CUSEC

Rick Roman and Elaine Clyburn, CUSEC liaisons from the U.S. Centers For Disease Control and Prevention and the American Red Cross respectively, responded to the hurricane disasters in south Florida and Hawaii in September and October, 1992. Under the auspices of the Federal Response Plan which was activated for the Presidentially declared disasters, Mr. Roman represented his agency under Emergency Support Function (ESF) #8, Health and Medical Services; Ms. Clyburn responded for the Red cross under ESF #6, Mass Care. The following articles reflect their personal observations, particularly as it relates to preparedness efforts in the central United States.

Health and Medical Consequences of the Hurricane Disasters

By Rick Roman

Imagine an immediate interruption of health and medical services in your community. Imagine total power outage to hospitals, public health facilities, water treatment and sewage facilities. Imagine damage to hospitals, clinics, and other health and medical facilities. Imagine increases in vector insect populations because of optimum breeding and environmental conditions. Imagine the loss of all communications, including the phone system. These were the realities confronting government and health officials in the wake of Hurricanes Andrew and Iniki. The following is an overview of some of the major health and medical consequences of the hurricane disasters, and implications for state and local officials in the central United States if a catastrophic earthquake strikes along the New Madrid seismic zone.

RAPID DAMAGE AND NEEDS ASSESSMENTS

An important initial step following any disaster is to determine the nature and

extent of the problem. Following Hurricane Andrew in Florida and Louisiana, it was extremely difficult to assess the health and medical problems because of a lack of communications, and problems in gaining access to the disaster sites due to debris and downed road signs. Initial flyovers by military aircraft could only provide visual assessment of damage to medical facilities and homes, but could not provide information on the status of a community's health and medical well being.

To gain such information, the State Health Departments of Florida and Louisiana in conjunction with the local health departments involved in the disasters, with assistance from the Centers For Disease Control and Prevention, conducted "Rapid Health Needs Assessment Surveys" as soon as the most heavily damaged areas could be traveled. These assessments were conducted by developing a site specific questionnaire and interviewing randomly selected households to get a representative sample of the damages and health status of the communities. In addition to providing valuable information on the health status and medical needs of victims, these "Health Surveys" served an important outreach function. Interviewers provided information on availability of medical care at disaster assistance centers; answered questions; curtailed rumors regarding disease outbreaks; and provided preventive health service messages on a range of subjects.

RESTORATION OF FACILITIES AND SERVICES

The restoration of power and water service is critical to resumption of health and medical care in disaster stricken areas. Hospitals and health care facilities should be among the first structures surveyed for damage following a disaster. State and local officials, in collaboration with health and medical officials, should develop plans and procedures for

supporting a community's health and medical needs until the medical "infrastructure" is restored.

In restoring power to medical facilities, portable generators were used in both hurricane events. While some of the larger hospitals had back-up generator capability, most had to wait for generators to arrive, be hooked up, and fueled prior to servicing the community. Refueling schedules had to be established so hospital generators did not run out of fuel. Generator power was used for an extended period of time because of the difficulty and tedious detail needed in re-establishing an entire power grid. When a major earthquake strikes the central United States along the New Madrid seismic zone, health and medical officials at the local and state level need to anticipate the loss of power systems for an extended period of time. Generator specifications need to be established; fuel supplies need to be examined. For hospitals with automatic back-up generator capability, a secondary mechanism for supplying power is warranted. Do not assume hospital back-up generators will survive a major earthquake undamaged.

DEBRIS AS A PUBLIC HEALTH HAZARD

As response efforts became organized and debris clean-up began, it became apparent that there would be a major refuse problem. Refuse pick-up service was shut down because roads were impassable and power loss made refueling vehicles difficult. Food began to spoil. In the absence of refrigeration, food establishments - supermarkets, convenience stores, restaurants, food processing plants, and average households, began discarding food that had spoiled. Problems were compounded by a human waste build-up that was caused by power loss and damages to sewage treatment plants.

To handle the excess refuse that accumulated, state and local officials permitted burning and burying of debris. Additional refuse collection points and sanitary landfill stations were selected. Military assistance was used to supplement local refuse collection and disposal. On those sites where burning

occurred, careful air monitoring of smoke and monitoring of refuse segregation for combustibles and hazardous materials was handled by state and local environmental health officials with assistance from the U.S. Environmental Protection Agency.

Debris removal and disposal will be a significant problem in the central United States following a major earthquake. Within minutes, an earthquake can cause immense debris problems. States should take steps to determine debris removal and disposal requirements; identify temporary sites to hold earthquake

areas. The military played a key role in the distribution process; water tankers proved effective. In addition to water, ice was a critical commodity, particularly for maintaining perishable foods, medicines and providing relief to residents and relief workers in the hot and humid weather which prevails in south Florida and Louisiana during the summer months.

Water availability may be one of the most critical problems following a New Madrid earthquake. The vulnerability of water lines to groundshaking are well documented. In addition to a lack of potable water for drinking and bathing,

spraying sites were also identified based on mosquito movements observed through this surveillance.

MONITORING INJURIES DURING RESPONSE AND RECOVERY

Injury monitoring was a key issue to both residents and workers assisting in the clean-up and recovery operations. Injuries from cuts and puncture wounds were common at all disaster sites. With unsanitary conditions often the norm, secondary infections and Tetanus became a concern. Another concern was the potential for injuries to workers restoring the power systems in Miami, Louisiana, and Kauai. Under these circumstances, a major initiative was undertaken by local, state and federal health officials at each disaster site to prevent injuries and infection. Injury prevention and Tetanus prophylaxis information was relayed to the public and to relief workers using every available means: flyers, public service announcements on radio and television, door-to-door outreach efforts, and through the disaster assistance centers. Besides injury information, public health messages on water potability, waste management, food handling and storage, personal hygiene, and refuse handling and disposal were also distributed.

In summary, the health and medical consequences of Hurricanes Andrew and Iniki were diverse in terms of their effects on Miami, the State of Louisiana, and the island of Kauai. Initial damage and needs assessments of the health and medical community is essential in mounting a response in the aftermath of any major disaster. Once a response is formulated, cooperation among local, state, regional, and federal health and medical agencies can greatly facilitate the response. Proper pre-disaster planning and coordination among the various government level health and medical agencies will enhance preparedness. In the final analysis, disaster health and medical community concerns need to be addressed as soon as they arise; if they are not, the result could be worse than the disaster itself.



Photo courtesy of Memphis/Shelby County Emergency Management Agency

generated debris; and identify agencies and their responsibilities for sorting and monitoring hazardous material disposal. Policies and actions should be coordinated on a regional basis. Debris problems can also give rise to potential vector insect and rodent control problems. Control procedures and pre-planning by agencies responsible for vector issues should be considered.

WATER AVAILABILITY AND VECTOR CONTROL ISSUES

Availability of water for drinking, bathing, and cleaning was a major issue in all hurricane disaster areas. With water systems temporarily out of service, residents desperately needed clean water to maintain their health status until systems went back on line. This was a monumental task. Bottled water was shipped in from various areas and distributed throughout disaster stricken

communities in the central United States face potential problems in fire suppression, particularly in larger, urban centers.

With the hot and humid climate, and with the high amounts of standing water from Hurricane Andrew in south Florida, the mosquito population began increasing with optimal breeding conditions. As health officials became concerned with mosquito borne diseases, i.e. encephalitis, measures were taken to control the potential vector problem. Local environmental health officials along with assistance from military support units, sprayed breeding sites routinely to curtail the increase of mosquitos. State and local environmental health agencies, with assistance from the Centers For Disease Control and Prevention conducted vector surveillance through analysis of mosquito populations monitoring for disease carrying species. Future potential

HEALTH AND MEDICAL PREPAREDNESS CHECKLIST: LESSONS FROM HURRICANES ANDREW AND INIKI

Hurricanes Andrew and Iniki have drawn attention to the need for pre-disaster planning and coordination to prepare the health and medical community in the central United States for a damaging earthquake. While there is no advanced warning of an earthquake as there is for hurricanes, the consequences for the health and medical sectors are similar - power systems destroyed, communication lines interrupted, transportation disrupted, and unprecedented demands placed on health and medical service providers.

There are several lessons for health and medical emergency response planners, in relation to earthquake preparedness in the central United States. The basic tenet, simply stated, is that pre-disaster planning for health and medical responders will pay dividends following a hurricane, an earthquake, or any other rapid-onset disaster. The following is a brief checklist of planning and preparedness measures that should be considered for the health and medical sector:

EMERGENCY NOTIFICATION

Anticipate difficulty at first in locating and notifying local health and medical personnel after an earthquake.

- * Do hospitals and health care facilities in your area have up-to-date recall rosters of emergency medical personnel?
- * Does your emergency response or operations plan have procedures for notifying and mobilizing health and medical personnel in the immediate aftermath of a disaster?
- * Do state and local health departments have up-to-date recall rosters of various department divisions including environmental health, communicable disease, community health nursing, and other key groups?
- * Are back-up communication systems in place, e.g. an automated pager system, to facilitate call-up in a major emergency?

REGIONAL COORDINATION

Response to a New Madrid earthquake will involve numerous health and medical agencies and personnel at all government levels.

- * Do you know your health and medical counterparts in surrounding counties, regions, and at your State Health Department?
- * Have you established a working relationship with the U.S. Public Health Service's Regional Emergency Response Coordinator in your Public Health Service region? Do you know this individual?

“Following a catastrophic earthquake, public health problems will be a primary concern.”

- * Is there a local and state level health and medical mutual aid system in place that can begin to address a community's immediate health and medical needs until Federal Disaster Medical Assistance Teams (DMATs) and other Public Health Service resources can be activated and deployed?
- * Are emergency response plans shared between other agencies at the state and local level?

RESTORATION OF CRITICAL FACILITIES AND SERVICES

Anticipate electricity, water supply, sewage treatment, and communication systems will be destroyed or temporarily disrupted following a catastrophic earthquake.

- * Does your emergency response or operations plan have contingencies for alternate power sources to bring power to hospitals, the health department, and other health care facilities?
- * If generators are the alternate power source, do your hospitals have generators large enough to power hospitals temporarily, at least until large capacity generators can be brought in?

- * Are there provisions for identifying sources of fuel?
- * Are staging areas identified, and personnel trained to manage the staging areas for mass casualty triage and evacuation if necessary?
- * Does your emergency response or operations plan have pre-determined alternate sites that can serve as emergency hospitals and first-aid stations in the event medical structures are destroyed or severely damaged?
- * Do you have back-up communication capabilities?

DAMAGE AND NEEDS ASSESSMENTS

Critical to an effective and timely response is accurate information on the nature and scope of damages, and an ability to translate this information into resource requirements.

- * Does your response plan and strategy include a post-disaster assessment of a community's health and medical status?
- * Are public health problems and issues included in this assessment?
- * Are personnel and procedures in place to conduct post-disaster structural surveys of hospitals, the health department, and other health care and medical facilities?

PUBLIC HEALTH ISSUES

Following a catastrophic earthquake, public health problems will be a primary concern, particularly in view of the vulnerability of water supply and sewage treatment facilities in the central United States.

- * Does your emergency response or operations plan address public health concerns, including: refuse build-up, vector control issues, health surveillance, injury prevention, disease prevention, and potable water and wastewater treatment?
- * Does your emergency response or operations plan provide for an intergovernment, interagency outreach campaign to disseminate information on public health problems, issues, and recommended solutions?

LESSONS LEARNED FROM CATASTROPHIC STORMS ANDREW AND INIKI

By Elaine Clyburn

The challenges of response to a catastrophic hurricane are similar to major earthquakes, because even in fairly predictable events where warnings and watches occur, communities may be still caught unprepared.

On the island of Kauai, even though the Red Cross and other agencies had staffed shelters and pre-positioned paid and volunteer staff—there was still a period of time following landfall when the island was completely isolated. Power went out, effectively shutting off communications. Local people responded by helping one another in an unselfish manner. Local heroes emerged. Common sense and the need for survival became more important than other considerations. How often have people been told that they will be on their own for the first 72 hours after a catastrophic disaster!

Kauai's isolation presented problems for responders. Information on damages was not immediately forthcoming. Victims needed to know where additional shelters and first aid centers were, and how to gain access to them. The media was instrumental in providing information and instructions to an anxious public.

Safety concerns quickly surfaced as residents tried to find their way around in the dark; others attempted to travel among downed power lines. Others suffered minor or major medical emergencies.

Transportation into, out of, and within the damaged areas was problematic in Hawaii. Those vehicles not affected by the storm had no readily available supply of fuel. In South Florida, traffic lights were not in service and massive traffic jams occurred as relief workers competed for space on crowded highways. On Kauai, thousands of tourists abandoned rental cars in parking lots or along highways. With few established roads around the island, debris removal was an immediate priority in order to begin



Photo courtesy of Memphis/Shelby County Emergency Management Agency

resupply efforts. Airports and harbors were out of commission because of the lack of power and damage to structures. On Kauai, air travel was initially restricted by government authorities; relief workers were given priority, but any additional personnel in the affected area became another strain on an already overloaded infrastructure.

While the situation in Kauai was unique in some respects, there are important lessons that are applicable to the Central United States, as reflected below.

SELF-SUFFICIENCY AND ORIENTATION OF RELIEF WORKERS

Iniki and Andrew reinforced the importance of self-sufficiency for trained disaster relief workers. Plans often include provisions for the “loaning” of professional services, assuming that accommodations will be provided. This was not the case in Iniki, where there was great reliance on the military and the

national guard, who are self-sufficient with respect to tents, kitchens, sanitation units, security, and vehicles.

Orientation for incoming personnel is important. Maps of the area may only be helpful as a general reference in situations where street signs and local landmarks are missing.

Tent cities were erected to house displaced victims of Hurricane Andrew.

Cultural sensitivity is essential. The fact that we live in a culturally pluralistic society prompted the American Red Cross to develop a course entitled, “Serving the Diverse Community.” This course prepares relief workers to operate in a multi-cultural environment. In Florida and Hawaii, the multiplicity of languages presented additional challenges for relief officials, a problem that will be encountered in select urban centers in the Central U.S.

MASS CARE—EMERGENCY SUPPORT FUNCTION #6

The American Red Cross has lead agency responsibility for ESF #6, Mass Care, which is described in the Federal Response Plan as shelter, feeding, first aid, bulk distribution and disaster welfare information. One of the most puzzling questions during Iniki was whether or not the Federal Response Plan had been activated in whole or in part and exactly

what that meant for local jurisdictions. Local agencies and volunteer organizations operate under the ESF #6 umbrella as called for in the Federal Response Plan. In practice, however, the blurred lines of authority and responsibility lead to questions relative to reimbursement procedures, expenses covered, and agency autonomy.

Mass feeding in both disaster sites had its own set of problems. The most available and least labor intensive meals were MRE's (meals ready to eat). Military kitchens are equipped to prepare T rations which do not require sanitation units. "A" rations require the greatest amount of support in terms of labor, refrigeration, sanitation, garbage removal, etc. On both Iniki and Andrew there were combinations of agencies providing meal services to victims and relief workers. Fixed feeding sites are generally served cafeteria style and an added feature on Kauai was the addition of mental health workers available to talk with people in the lines.

A damaging earthquake on the New Madrid Fault will stress the nations capability to provide timely, sustained services—including feeding, shelter, water, first aid—to potentially tens of thousands of victims. Several agencies, government and non-government, have a significant role. Predisaster planning is critical to effective mass care services. The role, responsibilities, and capabilities (including limitations) of the American Red Cross, Department of Defense, and other organizations need to be acknowledged on the front end.

RESPONDING TO INQUIRIES

Inquiries from anxious friends and relatives from all over the world are a challenge. For the first few days after the hurricane, every resource available was directed to meeting the immediate needs of victims. With phone service unavailable on Kauai, there was general information about damage but little, if any, about specific addresses of persons. Three weeks after Iniki struck, hundreds of inquiries were still being processed. When emotions run high and people are worried and anxious for news of loved ones, there is a high demand for instant information, which typically cannot be

met. In essence, public inquiries can be a lengthy, contentious process.

MANAGING DONATED GOODS AND SERVICES

While some progress has been made since Hurricane Hugo in 1989, the management of solicited and non-solicited goods and services following a major disaster continues to challenge relief workers and disaster managers.

In Florida, the American Red Cross coordinated with local agencies to develop a system that accessed the goods in the ARC warehouse for distribution individuals and families in the disaster areas. This approach resulted in faster service to victims, and capitalized on the local agencies' knowledge of the community. On Kauai, bulk distribution of items such as ice, family size tents, camp stoves, work gloves, etc. was a cooperative effort among the voluntary agencies and FEMA. One stop distribution and assistance centers were used effectively.

The Volunteers in Technical Assistance (VITA) hotline served as a valuable clearinghouse for potential donors. A toll free 800 number expedited the processing of donations.

In summary, a catastrophic disaster, by definition, overwhelms the capacity of most responders. While an earthquake on the New Madrid Fault will potentially be more destructive than Hurricanes Andrew and Iniki, the lessons in disaster response and recovery are relevant, and applicable to the planning efforts in the Central U.S. Problems and challenges are predictable; the key is to anticipate these issues and develop a multi-state, intergovernmental strategy that fully utilizes available resources in the CUSEC region.

MITIGATION OPPORTUNITIES

Enforcement of Newly Adopted Building Codes

Most of the CUSEC states have adopted seismic building codes on a statewide basis. The exceptions to this are Illinois and Mississippi, who at this point leave the authority to adopt seismic building codes to the local governments. All the states in the CUSEC region have placed the authority to enforce any adopted seismic codes in the hands of the local authorities. Most of whom do not have sufficiently trained personnel, in regard to seismic design, or the staff necessary to enforce these codes. This is a problem for even the larger cities within the CUSEC region. For example, Memphis/Shelby County Code Enforcement has one of the largest departments in the southeastern United States; but Plan Reviewers and Building Inspectors have not had appropriate training on the seismic provisions which are a part of the building code. This training needs to be provided on a regular basis in formalized sessions. Information and materials need to be accessible before seismic building codes can be effective.

ACTIONS TO TAKE

Adoption of seismic building codes is merely the first step. Codes must be enforced properly to be successful in their intentions, preventing loss of life and property. To do this seismic building codes must be:

- * Up-to-date and current
- * Building permits required must be obtained
- * Buildings must be:
 - Designed to at least minimum standards as provided for in the code
 - Reviewed by a qualified and trained plan reviewer
 - Constructed according to approved plan

- Inspected by a qualified and trained inspector
(This information is taken from a publication, which has gone to print, by Robert Olshansky, Ph.D entitled "Reducing Earthquake Hazards in the Central United States: Seismic Building Codes")

All of the above steps must be performed before a community will be able to have a building stock of seismic resistant structures. This is not an easy nor speedy task for communities trying to achieve this. There will have to be processes for educating the public, building officials and elected officials on the benefits of seismic building codes and what they mean to their community. For more information on this please contact:

Building Officials and Code Administration (BOCA)
4051 West Flossmoor Rd.
Country Club Hills, IL 60477
(708) 799-7800

Building Seismic Safety Council
1201 L Street NW, Suite 400
Washington, D.C. 20005
(202) 289-7800

Council of American Building Officials
5205 Leesburg Pike, Suite 1201
Falls Church, VA 22041
(703) 931-4533

International Conference on Building Officials
5360 South Workman Mill Rd.
Whittier, CA 90601
(213) 699-0541

Southern Building Code Congress International
900 Montclair Rd.
Birmingham, AL 35123
(205) 591-1853

Federal Emergency Management Agency
P.O. Box 70274
Washington, D.C. 20024
(202) 646-2811

INCORPORATING SEISMIC CONSIDERATIONS INTO LAND USE AND PLANNING PROCESSES

This is an area where the most benefit can be made if the right information is given to key "Influentials" and local

decision makers on incorporating seismic mitigation practices into planning and development processes. Seismic building codes are the current practice to try and implement these into Land Use and Planning. Here are some other strategies to consider in placing seismic mitigation practices into these processes for local and state governments:

- * Planning mandates which also take into consideration seismic elements
- * Plans required for funding; Set up tax increment funding projects; Finance public projects with seismic incentive funds
- * Set minimum standards for subdivisions; Review site studies and plans
- * Require fault setbacks; mandate this through zoning ordinances
- * Set standards for grading; prepare and mandate through ordinances
- * Control siting of public facilities and lifeline facilities funded through public funds
- * Prepare model codes and standards; provide for training and educational materials to public officials
- * Prepare hazardous building ordinances
- * Land acquisitions to remove unsafe land from possibility of development
- * Geotechnical report requirements in hazard risk areas

(The above information is taken from *Improving Earthquake Mitigation*:

Report To Congress as required under Public Law 101-614, Section 14(b) for the National Earthquake Hazard Reduction Program Reauthorization Act. The document was prepared by the FEMA - Office of Earthquakes and Natural Hazards)

In forthcoming editions of *The CUSEC Journal* each section of FEMA's *Improving Earthquake Mitigation: Report to Congress* will be discussed and presented. The report was published in January 1993 and focuses on issues from hazard mitigation insurance to public awareness and education with these two basic premises:

- * identifying impediments to effective earthquake mitigation strategies and analyzing the roles of the Federal, State and Local government, along with the private sector in preparing and responding to economic impacts from earthquakes.
- * considering the effectiveness and efficiency of alternatives Federal, State and Local governments can use to incorporate seismic mitigation strategies to reduce the economic impacts from earthquakes. Some of these will include disaster assistance, earthquake insurance for homeowners and small business and reinsurance for general commercial liabilities.

1993 National Earthquake Conference in Memphis, Tennessee

The conference will be held on May 2-5 in Memphis, Tennessee. It has been over ten years since the last earthquake conference focusing on the central and eastern United States took place in Knoxville, Tennessee in 1981. There has been significant events which have occurred during this twelve year period; a number of major earthquakes have occurred around the world; an earthquake prediction for the central United States. There has also been significant advances in research on seismology, earthquake engineering, mitigation, response and recovery. The 1993 National Earthquake Conference will provide a forum for researchers and practitioners to review, examine and document the progress and advances in earthquake hazard mitigation; along with

identifying future needs and actions.

Five topic areas of major importance will be focused on for the conference, these are:

- * **Hazard Assessment**
- * **Mitigation of Damage to the Built Environment**
- * **Preparedness, Awareness, and Public Education**
- * **Emergency Response and Recovery**
- * **Socioeconomic and Public Policy Impacts**

A team of experts has been assembled to gather and provide information on these topics. This information will be documented and presented through a series of monographs which will be available at the conference. For more information on the monograph series please contact **CUSEC Headquarters at (901) 345-0932.**

RESEARCH AND INFORMATION TRANSFER

There is a gap between what is known about earthquakes and their effects, and what is being applied. One of CUSEC's goals is to improve the application of earthquake hazards research and information in the Central U.S., and in the process begin to narrow this gap. This section of the CUSEC Journal is devoted to Research and Information Transfer. The first part provides a synopsis of current research projects; the second part is a review of useful publications; the final section examines twelve factors that are critical to the application of hazards research.

CURRENT RESEARCH

Urban Seismic Risk Assessment: Impact of Earthquake Generated Lifeline Failures on Business Operations. *Disaster Research Center, University of Delaware with funding from the National Center for Earthquake Engineering Research (NCEER).*

This study is one of a series that focuses on seismic risk assessment in the Central U.S., with emphasis on the probability and consequences of lifeline disruptions. Analyses by several NCEER researchers have concentrated on the impact of a New Madrid event on lifeline systems, particularly natural gas and water distribution systems in the Greater Memphis area. These studies have led to a series of projections regarding the extent of expected lifeline disruption for different shaking intensities and peak ground acceleration levels.

An important component of this study is an assessment of how the physical damages to lifeline systems would translate into business closures and secondary economic losses. This two year project will attempt to characterize the likely impacts of earthquake induced lifeline damage and supply interruptions on economic activity in Memphis and Shelby County.

This study will provide hazard managers with information on how businesses use and depend on various lifeline services; the length of time that economic activity could be conducted in the absence of these services; the extent that businesses are adopting mitigation measures and risk management strategies,

and other information that can be used in developing integrated business-government mitigation, preparedness, and recovery strategies.

Economies of Expertise: Factors Promoting Comprehensive Local Hazards Management. *Hazard Reduction and Recovery Center, Texas A&M University. Dr. Jack Kartez, Principal Investigator.*

Since the concept of comprehensive emergency management (CEM) was first promoted a decade ago, it has been widely observed that local governments fail to give enough attention to the mitigation and recovery planning phases of managing hazards. A lesson of the Loma Prieta earthquake is that a wider group of local government agencies need to be involved not only in mitigation, but also recovery and reconstruction.

This study investigated how improved collaboration between local emergency management agencies and planning departments may produce economies of expertise that result in a more comprehensive effort in all phases of hazards management.

One potential benefit of this study for CUSEC is that the spotlight will be placed on a key player in mitigation and recovery - planning departments. In most urban centers, planning departments

represent a significant source of poorly tapped local resources to support mitigation and recovery planning. This study, which will partly focus on the Central U.S., should ultimately lead to more meaningful interaction and resource sharing among planning departments and EMA's in the Central U.S.

USEFUL PUBLICATIONS

Seismic Building Codes. *Robert O. Olshansky and Paul Hanley. Department of Urban and Regional Planning, University of Illinois at Urbana-Champaign. 1993. 64 pp. Available from the Central U.S. Earthquake Consortium.*

This is the first in a series of nine booklets on strategies for reducing earthquake hazards in the Central United States. This manual, which is intended for State and local officials who have the power to adopt and enforce seismic building codes, provides a comprehensive overview of current seismic design practice in the Central U.S. One of the most useful sections is entitled, "How to Adopt a Seismic Code." The message of the manual is straightforward: A seismic building code is easy to adopt, widely accepted in the design and construction community, and a cost-effective way to a safer community.

OTHER BOOKLETS IN THIS SERIES INCLUDE:

State Seismic Safety Advisory Councils. This booklet provides a description of what a council or committee is; why they are needed; what it costs to support such a council; and a description of State councils that currently exist.

Seismic Hazard Mapping. This booklet serves as a useful primer on seismic hazards mapping, with an emphasis on the Central U.S. It addresses a technical subject in a non-technical fashion.

Historic Resources. The State role in historic preservation is the primary focus of this booklet, which outlines a framework and strategy for pre-disaster planning to reduce the earthquake threat to historic resources.

Nonstructural Hazards. This booklet offers practical and cost-effective steps for State and local officials to follow in eliminating non-structural hazards. Attention is focused on successful projects in the CUSEC member states.

These booklets can become a useful tool for State hazard managers, particularly in the process of developing and maintaining a broad based constituency of officials from the public, private, professional, and voluntary sectors.

Preparing for Earthquakes: It's Your Business. A Model Earthquake Preparedness and Recovery Plan for Central Business Districts. *Jeff Eichenfield, City of Alameda, Community Development Project. 1992. 139 pp. Limited copies available for Twelve Dollars from Alameda Main Street, c/o Jeff Eichenfield, Community Development Department, City of Alameda, City Hall, room 103, Santa Clara Avenue at Oak Street, Alameda, CA 94501.*

This publication is designed to help business associations and chambers of commerce to develop strategies for rebuilding following an earthquake or other major disaster. Although written for California communities, the model plan and planning process that is outlined is relevant and adaptable to the needs of communities in the Central U.S. The model plan addresses many of the recovery issues that face local government and the business community, including: access control, damage assessment, re-entry/retrieval, business re-location, establishing rebuilding standards, and financing disaster recovery. This manual can serve as a useful guide for local governments in the Central U.S. in pre-disaster planning for recovery.

Hazardous Materials Problems in Earthquakes: A Guide to Their Cause

and Mitigation. *Association of Bay Area Governments (ABAG). 1990. 71 pp. Copies available from ABAG Publications, P.O. Box 2050, Oakland, CA 94604-2050.*

This is one of the few publications that addresses the range of problems associated with hazardous material releases following an earthquake, and the steps that can be taken to minimize the problems before they occur. One chapter, for example, outlines nine recurring structural problems that surface in most damaging earthquakes. This guide can be a valuable tool for earthquake program manager in reaching out to hazardous materials professionals, including representatives of the local emergency planning committees (LEPC'S), established under SARA Title III.

NEHRP BIENNIAL REPORT TO CONGRESS PUBLISHED

The Federal Emergency Management Agency (FEMA) has recently published the National Earthquake Hazards Reduction Program Biennial Report to Congress for Fiscal Years 1991-1992. The report summarizes the earthquake risk reduction related activities of the NEHRP principal (FEMA, USGS, NSF, and NIST) and contributing agencies. Copies are free of charge and can be obtained by writing:

Federal Emergency Management Agency
P.O. Box 70274
Washington, D.C. 20024

The report should be requested by the title "Building For the Future, NEHRP Fiscal Years 1991-1992 Report to Congress".

RESEARCH APPLICATIONS: THE PROCESS

During the first ten years of the National Earthquake Hazards Reduction Program (1977-1987), approximately \$610 million dollars was expended by the four principal agencies to mitigate the effects of earthquakes. A report was issued in 1988, Applications of Knowledge Produced in the National Earthquake Hazards Reduction Programs: 1911-1987 (USGS Open File Report 88-13-B), which examined the critical factors in the research applications process. Sixty case histories were investigated. Twelve critical factors emerged which strongly influence the research applications process. While these factors may not guarantee successful research applications, the absence of any one will diminish the chances of success. The twelve factors are highlighted below.

* *People to provide leadership in the research applications process.*

* *Funding to create programs that forge a partnership between researchers and practitioners.*

Funding should be adequate to support a critical mass of researchers and practitioners; furthermore, the funding should extend over a long enough period (5 to 10 years) to complete the integration period.

* *Time to reach the implementation period.* Researchers and practitioners work under different time frames (the former accept longer timelines); therefore, efforts

should be directed towards shortening the time necessary to apply the research and knowledge.

* *A knowledge base.* Building a sound knowledge base that practitioners can use is essential. Researchers and practitioners need to collaborate in the development, translation, and use of the knowledge base.

* *A perceived need for action.* Knowledge must be accompanied by a willingness and commitment to use the information.

* *Internal advisors and advocates.* These are men and women who may not have a scientific or technical background, but who are in a position to influence and advise the leadership in their organizations.

* *Champions.* Those individuals who by virtue of their strong commitment to earthquake hazards reduction, have been able to influence mitigation policy and program implementation. Champions can be found in every field and discipline.

* *Credible products.* Credibility is essential, and is often developed over time. The products of research are a function of the reputation of the researcher, the supporting organizations, and the peer review process that is used.

* *Useful products.* In addition to being credible, the products must be useful. Useless products are often the result of non-collaboration between the researchers and users (or collaboration that takes place after the research is completed).

* *Balanced technical, societal, and political considerations.*

* *Windows of opportunity.* The legislative process is invariably enhanced by a "window of opportunity" that often follows a damaging event. These windows do not stay open very long.

* *Collaboration of researchers and practitioner champions.* The case histories showed that long term collaboration of champions of earthquake mitigation is the single most important factor for success. Practitioners and researchers are inherently different; sustained communication is the key for narrowing these differences.

Continued from page 1

DISASTER RESPONSE RE-EXAMINED

effectively as part of an inter-governmental team when an event warrants a presidential disaster declaration and federal intervention. At the state and local levels, emergency management suffers from:

- 1) A lack of clear and measurable objectives; 2) Low levels of public concern and support for events of low probability but potentially high impact; 3) Local sensitivity surrounding building code enforcement and land-use planning, both essential elements in planning and implementing mitigation measures and prominent in recovery efforts; and 4) Fragmented decision-making and strained intergovernmental relations (NAPA).

CUSEC, and other non-governmental organizations or consortia are uniquely positioned to address the types of problems and challenges cited by the National Academy of Public Administrators. Although there is no "quick fix" to these problems, a strategy must include: a focused constituency building program; a concerted effort to reach and motivate key "influentials" at the State and local levels; and a sustained initiative to integrate hazard management into the mainstream of community decision-making.

* *FEMA can make better use of the resources it currently has available to improve its own catastrophic response capability, as well as that of State and local governments (GAO, NAPA).*

FEMA's National Preparedness Directorate has resources - personnel, communications, computer modeling capabilities - that can be adapted to the operational requirements of a multi-state response to a damaging earthquake. However, high-tech equipment is no panacea, and certainly not a substitute for sound planning, training, and exercising.

* *Greater emphasis needs to be placed on increasing State and local capabilities to respond to*

catastrophic disasters (GAO, FEMA IG, NAPA).

In the central U.S., priority should be given to focused, specialized training that addresses disaster intelligence (Emergency Support Function #5);

estimating mass care needs, and how to meet those anticipated needs; and intergovernmental coordination across all ESFs.

** Victims were confused by the multiple aid programs. FEMA needs to take the lead in reducing the complexity of aid programs for victims (GAO, FEMA IG).*

CUSEC and its member states can work with FEMA to streamline disaster assistance programs to maximize efficiency, minimize confusion, and accelerate the recovery process. The administration of disaster relief must balance the need for program accountability with the need for maximum flexibility in meeting the immediate, post-disaster needs of a society that is increasingly diverse - ethnically, socially, and culturally. The guiding maxim should be "... it's the

victim, stupid!"

** The public was cut off from sources of information. Intergovernmental coordination is needed to establish systems for public information ion extraordinary disasters (FEMA IG).*

This problem will be compounded in the central U.S. due to the fact that several states and hundreds of communities will be potentially impacted. The lack of power will disrupt the print media; alternative communications of strategies need to be developed to reach a dispersed population in a timely and effective manner.

** Mass care by multiple agencies was not well coordinated. Confusion and duplication resulted from fragmented responsibility for providing mass care to disaster victims. Responsibilities were shared by the American Red Cross, Department of Defense, Department of Agriculture, and other organizations. A restructuring of ESF #6 - Mass Care, is needed (FEMA IG). Mass care involved a broad range of governmental and non-governmental organizations in providing food, shelter, water, and ice to potentially tens of thousands of victims in a catastrophic disaster. CUSEC is positioned to assume a more active role in pre-disaster planning and coordination, including: identification of mass care resources in the New Madrid region; coordination of distribution networks and systems; regional planning for staging of mass care resources; and development of intrastate computer communications to facilitate response and recovery efforts.*

Perhaps the most important lesson that emerged from Hurricanes Andrew and Iniki is that more emphasis needs to be placed on developing a truly integrated, national disaster response capability. Our nation's approach to disaster response and recovery is based on an intergovernmental system where each level - local, State, and Federal - has a role. When one or more links become weak or fail, the entire system breaks down, as evidenced in Florida following Hurricane Andrew.

CUSEC IN TRANSITION

With the spirit of change sweeping the nation CUSEC has also been experiencing some changes of its own. Probably the biggest and most well known change was the nomination of Judge James Lee Witt for the Director of FEMA. Judge Witt's confirmation as Director of FEMA took effect as of April 6, 1993. Jack B. DuBose will be serving as the Acting Director for Arkansas Office of Emergency Services. Col. (retired) Jerry B. Uhlmann has been named as the Director of the Missouri State Emergency Management Agency replacing R.D. Ross. Governor Jim Hunt of North Carolina has named Billy Ray Cameron as their new Director of the Division of Emergency Management. Mr. Cameron replaces Joe Myers who accepted the position as Director of Florida's Division of Emergency Management. Stan McKinney was named as the Director of South Carolina's Emergency Preparedness Division. Mr. McKinney moved over from the South Carolina Division of Public Safety. And on the program side of things, Jim Wilkinson transferred from Population Protection Planning and is now the Earthquake Program Manager for the Mississippi Emergency Management Agency.

Along with the changes in the States the CUSEC staff has had some recent changes and additions. As of March 8, 1993 Harvey Ryland will be on leave of absence from CUSEC while on consultant status with FEMA. Tom Durham has been appointed by the CUSEC Board of Directors as the Acting Executive Director for CUSEC and will be on leave of absence status from the Earthquake Program Manager position with the Tennessee Emergency Management Agency. R.D. Ross is now serving as a consultant to CUSEC on the Multi-Hazard Mitigation and Insurance Legislation project which Harvey Ryland had been working on. Andy Hellenthal has come on board the CUSEC staff filling the Mitigation Specialist position. Mr. Hellenthal comes to CUSEC from the local government in Memphis and Shelby County, Tennessee where he previously worked as a planner.

CONFERENCES AND TRAINING

CUSEC Sponsored

EVENT	DATE	LOCATION
* Recovery and Reconstruction	March 24	Evansville, IN
* Executive Order 12699 Workshop	March 29	Jonesboro, AR
* Executive Order 12699 Workshop	April 21	Springfield, IL
* State AG – State EMA Directors Annual Meeting	April 27	Nashville, TN
* National Earthquake Conference	May 3-5	Memphis, TN
* Nonstructural Mitigation Workshop	May 18	Joiner, AR
* Overview of EQ Hazard in the Central U.S.	May 25	Ashville, NC

International Conferences and Training

* Disaster Mitigation and Response: An International Invitational Conference	Sept. 19-24	Puerto Villarta, Mexico
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**For more information on training please contact CUSEC Headquarters or the Earthquake Program Manager with your State Emergency Management Agency.*

State / National Training

EVENT	DATE	LOCATION
* Earthquake Safety Program for Schools (Train-the-Trainer)	March 22-26	Emmitsburg, MD
* ATC-20 Post Earthquake Safety Inspection of Buildings Workshop (Engineers)	April 1	Champaign, IL
* ATC-20 Post Earthquake Safety Inspection of Buildings Workshop (Firefighters / First Responders)	April 2	Champaign, IL
* Earthquake Hazards in Low-Rise Public Buildings	April 7	Jonesboro, AR
* Nonstructural EQ Mitigation for Hospitals & Health Care Facilities	April 22-23	Mt. Vernon, IL
* Earthquake Hazard Mitigation for Utility Lifeline Systems	May 18-19	Jonesboro, AR
* Community Emergency Response Team Training (Train-the-Trainer)	June 1-3	Jonesboro, AR
* Response '93 Exercise	June 7-10	Salt Lake City, UT
* Nonstructural EQ Hazard Mitigation for Hospitals	July 21-22	Oklahoma City, OK

The **Central United States Earthquake Consortium** is a not-for-profit corporation established as a partnership with the Federal government and the seven member states: Arkansas, Illinois, Indiana, Kentucky, Mississippi, Missouri and Tennessee; and eight associate member states: Alabama, Georgia, South Carolina, North Carolina, Ohio, Oklahoma and Nebraska. The Federal Emergency Management Agency provides the basic funding for the organization.

CUSEC's purpose is to help reduce deaths, injuries, damage to property and economic losses resulting from earthquakes occurring in the central United States. Basic program goals include: improving public awareness and education, mitigating the effects of earthquakes, coordinating multi-state planning for preparedness, response and recovery; and encouraging research in all aspects of earthquake hazard reduction. CUSEC supports the International Decade for Natural Disaster Reduction.

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