



Mouth of Bells Canyon, Salt Lake City. Graben between fault scarps. Broken, tilted, and downdropped blocks characterize the zone of deformation.

Picture the Ups and Downs of the Wasatch Fault

The Wasatch Fault, a new brochure by the Utah Geological Survey (UGS), depicts the fault and the hazard it poses. The colorful, photo-packed booklet by UGS geologist Sandra N. Eldredge summarizes the risk, "Given that a large Wasatch fault earthquake occurs, on average, every 350 years, the next 'big one' may occur at any time. However, although the 'big one' could strike while you are reading this brochure, the event may not happen in our or even our grandchildrens' lifetime." Maps, a block diagram, a chart showing the timing of prehistoric earthquakes, and a guide to additional information, along with numerous photos, put the Wasatch fault in perspective for the non-geologist. The 17-page booklet tells you what the fault is, where it is, and how to recognize it. The brochure also gives examples of good and bad land uses in the fault zone, summarizes how often earth-

quakes occur on it, and discusses the fault's potential for future activity.

The Wasatch fault is one of the longest and most active faults of its type in the world, and contributes to the Wasatch Front's designation as having the greatest earthquake risk in the interior of the western United States. The fault runs along the base of the Wasatch Range, near numerous Wasatch Front communities. Fault escarpments provide attractive foothills locations for parks, trails, and golf courses, as well as 'view lots' for homes, and convenient sites for water tanks and reservoirs. Paleoseismic studies tell us that the most recent large earthquakes on the Wasatch fault may have occurred 600 and 400 years ago. During the next 50 years, the probability of a large earthquake on the fault is about 13 percent. The probability during the next century is about 25 *See* Brochure *page 8*

State Seismic Safety Commissions can be Insurance Industry Partners in Promoting Risk Reduction

Utah Seismic Safety Commission News

by Janine L. Jarva Utah Geological Survey

State Seismic Safety Commissions can be partners in...working with the insurance industry to develop and encourage incentives,... promoting uniform school curricula, and championing hazard education.

> The message from citizens was...don't use the word 'mitigation'



The Utah Seismic Safety Commission (USSC) met on January 23, 1997.

Partners in risk reduction. "State Seismic Safety Commissions can be partners in supporting and promoting risk-reduction programs, working with the insurance industry to develop and encourage incentives for protective measures, promoting uniform school curricula, and championing hazard education." That was the message delivered at the State Seismic Safety Commissions meeting in December in Los Angeles by Harvey Ryland, formerly of the Federal Emergency Management Agency (FEMA) and now with the Insurance Institute for Property Loss Reduction (IIPLR). USSC representatives Les Youd, Walter Arabasz, and Bob Carey, who attended the Los Angeles meeting, said Ryland's message was one of the most important to come from the State Seismic Safety Commissions' gathering. At the Los Angeles meeting Ryland also mentioned that in order to create new program incentives for hazard- and risk-reduction activities on the part of individuals and communities, the IIPLR convened a number of citizen focus groups. The consensus message from citizens was: (1) don't use the word 'mitigation' (personal safety or disaster-resistant community protection may be better); (2) I won't do anything without an incentive, unless-my child comes home from school and tells me to do something; (3) television is the most effective way to reach me; and (4) I need to be told often and reminded. The State Seismic Safety Commissions meeting was sponsored by FEMA and the California Seismic Safety Commission.

Legislative update. The USSC's January 23 meeting was held while the 1997 Utah Legislature was in session. Senate bill 135 was the only bill pending before the Legislature that addressed earthquake issues. Carl Eriksson and the Engineering and Architecture Standing Committee based the language of the bill on their buildingcode enforcement and plan review white paper developed in 1996 (see Fault Line Forum [FLF], v. 12, no. 3, p. 10). Sponsored by Senate majority leader Craig Peterson, who represents the Senate on the USSC, the proposed amendments to the Uniform Building Standards Act addressed the education and testing procedures leading to licensure of plans examiners and building inspectors. After receiving the support of the Utah Advisory Council on Intergovernmental Relations (UACIR)

in July 1996, Carl made some modifications to the proposals based on suggestions from the Inspector Licensing Board of the Uniform Building Code Commission. He then approached the Utah League of Cities and Towns for their support. They indicated that they could not support the bill unless the requirement for local governments to establish a dedicated fund for enforcement of the building code was removed. Without this provision, the legislation would have fallen short of achieving USSC Strategy 3.1, "Improve plan review procedures on new construction to ensure that buildings are being designed in accordance with current seismic code requirements," but it was a beginning. Unfortunately, the Legislature defeated the bill.

Earthquake Engineering Research Center proposal. The proposal for a National Science Foundation (NSF) earthquake-engineering research center in Utah was submitted to NSF by Dr. Matthew Mabey of the Geology Department at Brigham Young University. Each center (NSF may fund up to three) may receive up to \$2 million in federal funds per year, over an initial fiveyear period, with a possible extension of three years if non-federal dollar-for-dollar matching funds are provided. It may take NSF up to nine months to evaluate all the proposals.

The building community and URM guide. The Utah Division of Comprehensive Emergency Management's (CEM) unreinforced masonry (URM) retrofit publication has been published and is being distributed (see *FLF*, v. 12, no. 3, p. 13). In discussing how to specifically target the important audience of contractors, builders, engineers, and architects, the USSC believed that a workshop targeting the building community on how to use the new URM publication could be a highlight of this year's earthquake conference.

USGS's NEHRP 1997-2002 plan. Lee Allison and Walter Arabasz each attended one of the seven U.S. Geological Survey (USGS)-sponsored National Earthquake Hazards Reduction Program (NEHRP) planning workshops aimed at collecting broad input from the earthquake lossreduction community. The information will be used to develop USGS's NEHRP 1997-2002 fiveyear plan. The National Earthquake loss reduction Program (NEP) was the focus of much of the discussion. The NEP aims to foster the creation of more effective federal and private-sector partnerships with state and local jurisdictions where the power to address land use, zoning, and building codes most often resides. Lee reported to the USSC that he had suggested the USGS consider Utah as a high-priority regional-program focus, along with current areas such as the Pacific Northwest and the Central U.S. Walter suggested that Utah ought to be considering the possibility of joint proposals to funding agencies involving the USSC (and its standing committees), the Utah Geological Survey, the University of Utah Seismograph Stations, and CEM. The USSC agreed to pursue this approach.

USSC's 1997 action plan. The USSC began the discussion of their 1997 action plan. Walter Arabasz suggested that accomplishing the mission of the USSC outside the legislative process might best be done long term by focusing on children, both by educating those children and then letting them hold the feet of their elders to the fire as the millennium approaches. The USSC's Awareness and Education Standing Committee (AESC) will again sponsor an earthquake conference similar to the one

held last September (see *Fault Line Forum*, v. 12, no. 3, p. 1). The day-long conference will be held in Salt Lake City on Tuesday, September 9, 1997, again in conjunction with Salt Lake City and County's "It's Our Fault" week. Joni Whitear of State Farm Insurance Companies is the Conference Chair. Registration will be \$50. The conference will again focus on workplace and business preparedness issues, targeting businesses, the construction and contracting industry, and community non-profit organizations. Expanded breakout sessions with specific, hands-on training will be emphasized, as requested by participants at last year's conference.

The next meeting of the USSC will be on Tuesday, April 29 at 9:00 a.m. in the State Office Building. Anyone interested in attending is welcome. Please contact staff for more details: Janine Jarva, Utah Geological Survey, (801) 537-3386, fax: (801) 537-3400, or Brenda Edwards, Utah Division of Comprehensive Emergency Management, (801) 538-3752, fax: (801) 538-3770. Accomplishing the mission of the USSC outside the legislative process might best be done long term by focusing on children



FEMA to Support APA's "Growing Smart" Effort on Planning Statutes

The Federal Emergency Management Agency's (FEMA) Mitigation Directorate has entered into an interagency agreement with the Department of Housing and Urban Development (HUD) to support the American Planning Association's (APA) "Growing Smart" (GS) project-a multi-year effort to help states modernize statutes affecting planning and the management of community growth and change. The project will aid the development of the next generation of model planning laws and procedures. Through GS, APA will assist decision makers in evaluating alternative planning approaches for state, regional, and local authorities. HUD serves as the lead federal agency, while the Environmental Protection Agency, Department of Agriculture, Federal Highway Administration, Federal Transit Authority, and several private foundations also provide financial support.

The principal product of GS will be a guidebook containing model legislative language with commentary. A continuum of legislative alternatives will be presented, and the book will not dictate one particular approach. The guidebook is being developed in three phases: Phase 1, which will be available soon, deals with state and regional planning; Phase II deals with local planning; and Phase III will focus on implementation tools and administrative procedures. APA will also establish a national planning statute clearinghouse and data base of legislative materials related to planning.

The target audience of GS will be officials in the executive and legislative branches of state government in offices with missions related to housing, economic development, transportation, community revitalization, and the environment—in other words, any office dealing with land use and the built environment. The audience will also include officials serving regional councils of government, regional planning agencies, and local officials.

A directorate will guide product development. It is composed of eight national organizations representing elected officials: Council of Governors Policy Advisors, Council of State Legislatures, National League of Cities, U.S. Conference of Mayors, National Association of Counties, National Association of Regional Councils, Council of State Community Development Agencies, National Association of Towns and Townships, and APA. As a sponsor, FEMA is an ex officio member also contributing to the guidebook's content and format. The process of guidebook development is



Phase I...deals with state and regional planning, Phase II with local planning, and Phase III will focus on implementation tools and administrative procedures. New Utah County Map Shows Critical Facilities and Earthquake Hazards

by Robert D. Carey Comprehensive Emergency Management EPI Center

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State Capitol

FEMA wants to ensure that the appropriate authorities exist within state law to provide the tools necessary for state and local governments...

Utah's Comprehensive Emergency Management (CEM) EPI Center has released its map of selected critical facilities and earthquake hazards in Utah County. The 40 x 27-inch map identifies critical facilities such as schools, hospitals, and dams, and locates liquefaction and surface-fault-rupture hazards and landslides. The map was compiled by Pam Heman, CEM GIS intern.

The new map adds to EPI Center's earthquake hazard maps for Weber, Davis, and Salt Lake Counties, released during the summer of 1996. Maps for

FEMA...Continued from previous page

open, and any individual or group may provide comments and/or information. **FEMA's Role**

Generally only community planners in areas that have experienced continuous disasters, such as Florida and California, recognize and make use of planning tools and strategies to influence construction in hazardous areas or the implementation of incentives for retrofitting existing construction. Thus, there is a need for further research to ensure that these tools become more widely used in other regions. Through its participation in GS, FEMA is identifying and promoting the use of promising planning approaches that have not traditionally been used for hazard mitigation.

FEMA wants to ensure that the appropriate authorities exist within state law to provide the tools necessary for state and local governments to identify and manage their unique hazards and risks. Further, by including hazard mitigation in the GS legislative models, planning professionals will be prompted to consider natural hazards when making land-use and development decisions. In so doing, mitigation will be seen by planners as an important component in local and state land-use policy.

Indeed, in Phase I, reducing the effects of natural hazards on people and property was articulated as one of the fundamental goals of state, regional, and local planning; and specific examples of state legislation and planning tools used for mitigating hazards will be included in the guidebook. Achieving mitigation through the local planning process will follow in Phase II (now under way), as model comprehensive plan elements are developed (including a hazard mitigation element), and in Phase III. Cache and Box Elder Counties are in progress. These maps are a collaborative effort of EPI Center and the Utah Geological Survey, U.S. Forest Service, Weber State University, and the Utah Automated Geographic Reference Center.

Copies of the earthquake hazard maps are free and can be obtained from either the Natural Resources Bookstore, 1594 West North Temple, Salt Lake City, or the Division of Comprehensive Emergency Management at 1110 State Office Building, Salt Lake City.

A Call for Information

Because GS focuses on the local planning process during Phase II, FEMA is interested in obtaining local comprehensive or general plans that address natural hazards and mitigation issues through a separate element or chapter, and/or by articulating policies related to hazard mitigation. Specifically, FEMA would like to receive plans that integrate the concept of reducing natural hazard damage with the local planning process. This does not include stand-alone mitigation plans. Anyone forwarding such plans should indicate what implementing tools or strategies are used to carry out the mitigation policies. Looking ahead to Phase III of GS, FEMA will be interested in obtaining examples of zoning ordinances, special purpose ordinances and other requirements, and any other development regulations used specifically to advance mitigation. The agency is also interested in learning about any local incentives that encourage mitigation for both existing and new development.

Anyone with such information is asked to forward it to Cecelia Rosenberg, FEMA Project Officer for Growing Smart, FEMA-MT, Room 416, 500 C Street, S.W., Washington, DC 20472; fax: (202) 646-4387; e-mail: crosenbe@fema. gov.

For information about Growing Smart, contact *Stuart Meck, American Planning Association*, 122 South Michigan Avenue, Suite 1600, Chicago, IL 60603-6107; (312) 431-9100; email: smeck@planning.org.

Reprinted from Natural Hazards Observer, v. 21, no. 2, November 1996, p. 13-14; original title "FEMA Mitigation Directorate Assists in Developing Model Planning Legislation."

Stanford Group Tests Multidisciplinary Approach to Earthquake Preparedness of Megacities Studies Focus on How to Improve Mitigation of Urban Risk

The following is extracted and modified from Gupta, A., Kakhandiki, A., and Davidson R., 1996, Research spotlight—Multidisciplinary approach to urban earthquake disaster risk assessment and management: The John A. Blume Earthquake Engineering Center [Newsletter], issue no. 8, Summer Quarter.

To effectively improve the earthquake preparedness of megacities, we need to develop a new approach that combines all the pieces of information into an integrated earthquake risk assessment and management technique, according to A. Gupta, A. Kakhandiki, and R. Davidson. Their research group at Stanford's John A. Blume Earthquake Engineering Center is currently involved in three projects that adopt new approaches. Together the projects address the three main issues associated with earthquakes:

• **risk assessment** which attempts to assess a city's overall level of risk and the factors that contribute to risk,

• **risk management** which seeks to compare the cost-effectiveness and feasibility of different mitigation strategies for a city, and

• **risk forecasting** which predicts how the risk, and thus the mitigation strategies, would change over time.

The three studies described below are attempting to develop one such approach to help understand and mitigate the urban risk:

Risk Assessment: Disaster Risk Index. The risk assessment study involves the development of a multidisciplinary Earthquake Disaster Risk Index (EDRI) (Davidson, 1996). This composite index will allow us to compare the relative earthquake disaster risk of different cities worldwide, and evaluate the relative contributions of various factors to that risk. In this study, a disaster is considered to be a function of not only the physical impact of an earthquake, but also the response of the affected city, and the relevance of the impact to the city and to world affairs.

Risk Management: Strategy Effectiveness Chart. The risk management study focuses on the development of a Strategy Effectiveness Chart (SEC) that compares the cost-effectiveness of mitigation strategies (Gupta, 1996). The study deals with a variety of parameters such as effect of the strategy (structural, financial, and informational), target groups [for] implementation (private, public), and policy issues (voluntary, regulatory). Since the level of risk, priorities, and resources vary within society, SECs are developed separately for each sector in the region, such as residential, commercial, and government. To compare the strategies, a Performance Index (PI) is created. The PI is a measure of the severity of impacts of an earthquake, and the sector's capacity to recover from those impacts. The SEC is a graph that relates the change in PI to the dollar investment in a strategy.

Risk Forecasting: Future Earthquake Risk. The final study estimates how the earthquake disaster risk of a city varies over time, and evaluates how the mitigation strategies affect this risk in a dynamic setting (Kakhandiki and Shah, 1996). The technique is based on a systems approach. The time variation of risk is depicted through a dynamic simulation. Each component of a city's behavior is represented by a set of variables that are functions of time. The interactions among the components are characterized by equations that relate those variables. The risk model will incorporate the behavior of, and interactions among, the region's socioeconomic characteristics, such as demographics, inter-industry dependencies, and capital flow. The goal of the study is to develop a decision-making support tool that will help policymakers understand future implications of the mitigation policies.

Background and Summary

Rising losses in recent urban earthquakes such as Northridge and Kobe have shown that there is a widening gap between the increase in urban risk and our efforts to mitigate that risk. Data from future earthquake scenarios indicate that the consequences of the next major urban earthquake are going to be far greater than experienced in the past. As a result of rapid urbanization, the nature of the risk and response capacities of cities are changing. Factors from differ-



Data from future earthquake scenarios indicate that the consequences of the next major urban earthquake are going to be far greater than experienced in the past. The Role of Universities in Disaster Reduction--Is the Earthquake Information Generated by Universities Relevant for Earthquake Safety?

Each time we are told that the codes are not tough enough... Yet every earthquake is worse than the preceding one.



Meetings and Conferences

The following is excerpted from <u>Natural</u> <u>Hazards Observer</u>, January, 1997, v. 21, no. 3, p. 10. Readers can e-mail Dr. Lomnitz at **cinna@ollin.igeofcu.unam.mx**.

Refining and maximizing the role of universities in disaster reduction in cities throughout the world strikes me as setting a goal that is (like the moon) brilliant, but not out of reach. Universities are the stewards of science and technology, an enterprise that has accounted for half the economic growth in the world over the past 50 years...Yet, the number of natural disasters has risen by a factor of four since 1960. The economic losses from disasters grew by a factor of six and the insured losses by a factor of 14 over the same period. Mortality from earthquakes reached an all-time low between 1950 and 1960 and is now again at the 1920 level.

These numbers in themselves are an indictment of our strategy of disaster prevention (emphasis added)...Going through the motions of scientific research is not enough. To guarantee results we must sit down and *rethink* our approach to disasters. This, I think is the real role of universities.

Three cities at risk (Mexico City, San Francisco, and Kobe) have a lot in common in terms of earthquake hazard. All three are urban settlements in a bayshore or lakeshore environment. Soil types are similar. Historical patterns of landfill (extending the urban area into water-logged areas) are similar. It is hardly surprising to find that the patterns of damage from the 1985, 1989, and 1995 disastrous earthquakes in these cities are also similar. The common evolution of these cities gives rise to the question: Should disasters be viewed as emergent properties of complex nature-society systems that have a *history*?

Take a disaster such as the Kobe earthquake of January 17, 1995. How far back into the past do we have to go in order to understand how this disaster was generated? Landfill in the area began in 1868. The city was razed by air aids in 1945. Artificial

- April 9 11, 1997, **Seismological Society of America Annual Meeting**, Honolulu, Hawaii. Information: (510) 525-5474; fax (510) 525-7204; e-mail: ssa7@ginger.bachman.hawaii.edu *and* info@seismosoc.org; www: http://www. seismosoc.org/ssa/
- April 25 26, 1997, Symposium to Honor Haresh Shah: "Risk Management and Mitigation for Natural Hazards," Stanford,

islands were built after 1960. The original layer of bay mud is now covered by a layer of crushed granite that was believed to be resistant to liquefaction in earthquakes and which nevertheless liquefied on an unprecedented scale. What kind of a concerted interdisciplinary effort will it take to investigate these contributing factors and provide an answer that will actually help prevent similar disasters in the future?

In Mexico City, building codes have been revised and toughened every few years since the 1957 earthquake. Each time we are told that the codes are not tough enough to prevent structural damage in earthquakes. Yet every earthquake is worse than the preceding one. The public concludes that we are now prepared for the 1985 earthquake. The question is, are we ready for the 1997 event?

I wonder how useful the dissemination of past knowledge about disasters really is. I have been in quite a few earthquake disasters over the years. What strikes me is that every quake was unexpected. Valuable engineering structures end up taking a punishment they apparently were never designed or tested to actually withstand. At the same time, the nature-society system does not stand still. Patterns of urban settlement that have already changed a lot may change even faster. Should not emergency administrators and academic researchers take another look at the knowledge being generated by universities and how relevant it actually is? And, if knowledge is inadequate, is it worth disseminating?

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Dr. Lomnitz' *Natural Hazards Observer* article was adapted from the United National International Decade for Natural Disaster Reduction Internet Conference, "Solutions for Cities at Risk," August 26 to October 25, 1996.

California. Sponsored by Stanford University Department of Civil Engineering. Information: Blume Earthquake Engineering Center, Department of Civil Engineering, Stanford University, Stanford, CA 94305-4020; (415) 723-4150; fax (415) 725-9755; e-mail: ShahSymp@ce.stanford.edu

May 9 - 10, 1997, Fourth Conference on Tall Buildings in Seismic Regions, Los Angeles, See Meetings next page

Multidisciplinary ... Continued from page 5

ent fields of study come together to create this risk. To protect cities against an earthquake disaster, we need to develop a new risk assessment and management approach that can deal with this dynamic and complex situation. Such an approach must focus on the unique issues of urban risk, adopt a holistic multidisciplinary perspective, and develop results that are feasible to use and implement.

Rapid urbanization has created megacities that are conglomerations of dense population, aging infrastructure, and development in unsafe areas. Northridge and Kobe are only glimpses of what could happen when a major earthquake strikes directly under an urban region. The difficulty is that it is beyond the scope of any single discipline to provide a solution independently. Each discipline—earth scientists, engineers, sociologists, political scientists, and practitioners provides an answer to one part of the problem of how to mitigate urban risk. To keep pace with the rapidly changing nature of urban risk, it's

Meetings...Continued from previous page

California. Sponsored by the Los Angeles Tall Buildings Structural Design Council and the Council on Tall Buildings and Urban Habitat. Contact Los Angeles Tall Buildings Structural Design Council, 800 Wilshire Boulevard, Suite 510, Los Angeles, CA 90017, (213) 362-0707; fax (213) 688-3018.

- May 13 15, 1997, Basin and Range Province Seismic Hazards Summit, Reno, Nevada, at the Silver Legacy Hotel. Sponsored by the Western States Seismic Policy Council, Federal Emergency Management Agency, U.S. Geological Survey, and geoscientists from Arizona, California, Colorado, Idaho, Montana, Nevada, New Mexico, Oregon, Utah, and Wyoming, the conference will evaluate approaches, techniques, and policies for seismic hazard characterization in extensional regions. Information is posted on WSSPC's web site: http://www.wsspc.org, or contact Western States Seismic Policy Council, 121 2nd Street, 4th Floor, San Francisco, CA 94105; (415) 974-6435; fax (415) 974-1747; e-mail: wsspc @wsspc.org
- July 20 24, 1997, Eighth International Conference on Soil Dynamics and Earthquake Engineering (SDEE '97), Istanbul. Information: http://www.ceor.princeton.edu/ sdee.html
- August 20 22, 1997, Northridge Earthquake Research Conference, Los Angeles.
 Information: Northridge Earthquake Research Conference, California Universities for Research in Earthquake Engineering, 1301 S. 46th Street, Richmond, CA 94804; (510) 231-9557; fax

necessary to look past the confines of a single discipline and focus instead on the bigger picture. Together these projects develop a framework that views a bigger picture.

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 Proceedings of the 11th World Conference on Earthquake Engineering, Acapulco, Mexico, June, 1996, *in press*.
- Gupta, Anju, "Development of strategy effectiveness charts to compare earthquake disaster mitigation strategies," Proceedings of the 11th World Conference on Earthquake Engineering, Acapulco, Mexico, June, 1996, *in press*.
- Kakhandiki, Abhijit, and Shah, Haresh,
 "Understanding time variation of risk: Crucial implications for megacities worldwide,"
 Proceedings of the 11th World Conference on Earthquake Engineering, Acapulco, Mexico, June, 1996, *in press.*

We need to develop a new risk assessment and management approach that can deal with this dynamic and complex situation.



(510) 231-5664; e-mail: curee@nisee.ce.berke-ley.edu

- September 9, 1997, Utah Seismic Safety
 Commission (USSC) 1997 Earthquake
 Conference, Salt Lake City, at the State Office
 Building. For information contact Janine Jarva,
 Utah Geological Survey, (801) 537-3386; fax
 (801) 537-3400; email: nrugs.jjarva@state.ut.us
- November, 1997, Seventh Chilean Conference on Seismology and Earthquake Engineering, Santiago, Chile. Information: Conference Secretariat, Blanco Encalada 2120 Piso 4, Casilla 228/3, Santiago Chile; phone (56-2) 6784372; fax (56-2) 6892833.
- December 9 11, 1997, 2nd National Mitigation Conference, Arlington, Virginia, at the Hyatt Regency Crystal City. Sponsored by FEMA.
- February 4 8, 1998, **EERI 1998 Annual Meeting,** San Francisco, California, at the Fairmont Hotel.
- May 31 June 4, 1998, 6NCEE Sixth U.S. National Conference on Earthquake Engineering, Seattle, Washington. Information: Earthquake Engineering Research Institute (EERI), 510-451-0905.
- September 6 11, 1998, XIth European Conference on Earthquake Engineering, Paris. Information: AFPS Secretariat; 4, Avenue du Recteur Poincare; 75782 PARIS CEDEX 16; France; phone (33-1) 40 50 28 34; fax (33-1) 45 25 61 51; internet: http//dfc2.enpc.fr/ecee11

Brochure...Continued from page 1

percent. Author Eldredge says, "I hope readers will understand what the Wasatch fault is, and become aware of just what it means to live with this ominous geologic feature."

This new UGS brochure's photos show evidence of past movement on the fault and hopefully will motivate preparedness for the large earthquake that eventually will strike Wasatch Front communities. "Awareness is the first step in risk reduction."

The Wasatch Fault by Sandra N. Eldredge is available for \$2.00 at the Natural Resources Bookstore, 1594 West North Temple, Salt Lake City, Utah 84114; phone (801) 537-3320, fax (801)537-3395; e-mail: nrugs.geostore@state.ut.us. Mail orders, add \$2 for shipping and handling; Utah orders add additional \$0.12 sales tax.

Recent Publications

Earthquake-Caused Hazardous Materials Incidents Database: EQHAZMAT

Two data bases of earthquake-caused hazardous materials incidents are ready for distribution—EQHAZMAT: Japan, and EQHAZMAT: Northridge. The Japan database compiles hazardous materials incidents that occurred during Japanese earthquakes through July 1993. The Northridge material comprises incidents that occurred during the Northridge earthquake, and does not include natural-gas-related incidents. The Japan database contains 177 records, the Northridge database 239 records. Each record has 25 frames.

Developed with funding from the National Science Foundation, both use a public domain database software, Clipper, and will run on any IBM compatible computer with a 386 or later microprocessor, with DOS or Windows.

Copies of the databases are available through Guna Selvaduray, Department of Materials Engineering, San Jose State University, San Jose, CA 95192-0086; e-mail: gunas@email.sjsu.edu

- Carll, E.K., editor, 1996, Developing a comprehensive disaster and crisis response program for mental health—Guidelines and procedures: New York State Psychological Association, 75 p.; \$6.95. Order from the New York State Psychological Association, Executive Park East, Albany, NY 12203; (800) 732-3933.
- Creath, W.B., 1996, Home buyers' guide to geologic hazards: American Institute of Professional Geologists (AIPG), 32 p.; \$6.00, AIPG members; \$9.00, nonmembers. Order from the American Institute of Professional Geologists, 7828 Vance Drive, Suite 103, Arvada, CO 80003; (303) 431-0831; fax (303) 431-1332; email: aipg@aipg.com; www: http://www. nbmg.unr.edu/aipg. Prepayment required.
- Earthquake Engineering Research Center, 1996, Seismological and engineering aspects of the 1995 Hyogoken-Nanbu (Kobe) earthquake: Earthquake Engineering Research Center (EERC), UCB/EERC-95-10, 256 p.; \$26.00. Order from EERC, University of California at Berkeley, 1301 South 46th Street, Richmond, CA 94804-4698. California orders add 8.25% sales tax. Make checks payable to UC Regents. VISA and MC also accepted. Information: Shirley Edwards (510) 231-9468.

---1996, Earthquake engineering research at Berkeley—1996: Earthquake Engineering Research Center (EERC) UCB/EERC-96-01, 245 p.; \$26.00. 196 papers presented at the Eleventh World Conference on Earthquake Engineering. Order from EERC, University of California at Berkeley, 1301 South 46th Street, Richmond, CA 94804-4698. California orders add 8.25% sales tax. Make checks payable to UC Regents. VISA and MC also accepted. Information: Shirley Edwards (510) 231-9468.

- Earthquake Engineering Research Institute, 1996, Scenario for a magnitude 7.0 earthquake on the Hayward Fault: Oakland, California, EERI. The Scenario report grew out of the symposium at the 1995 EERI annual meeting. Cost is \$15 plus \$5 shipping and handling. Information: EERI, 499 14th Street, Suite 320, Oakland, CA 94612-1934, (510) 451-0905, fax (510) 451-5411.
- Insurance Services Office, Inc., 1994,
 Catastrophes—Insurance issues surrounding the Northridge earthquake and other natural disasters: Insurance Services Office Inc., 42 p.;
 \$40.00. Available from Industry Relations-Customer Service, Insurance Services Office, Inc., 7 World Trade Center, 14th Floor, New

From State Agencies

Eldredge, Sandra N., 1996, Homebuyer's guide to earthquake hazards in Utah: Utah Geological Survey PI 38, 27 p. From the Natural Resources Bookstore* (for mail orders, add \$2 for shipping and handling; Utah orders add additional \$0.18 sales tax).\$3.00

Utah Seismic Safety Commission (Funk, F.B., compiler), 1996. Earthquake safety in Utah-a progress report on activities for the period July 1994 - June 1996: Utah Seismic Safety Commission. 30 p. From the Natural Resources Bookstore* or contact Janine Jarva at the Utah Geological Survey, (801) 537-3386; fax (801) 537-3400; email: nrugs.jjarva@state.ut.us, or Brenda Edwards, Utah Division of Comprehensive Emergency Management, (801) 538-3752; fax (801) 538-3770; e-mail: pscem.bedwards@state.ut.us.FREE

Reaveley Engineers & Associates, Inc., 1996, The Utah guide for the seismic improvement of unreinforced masonry dwellings: Utah EPI Center (Earthquake Preparedness Information Center), 75 p. From the Natural Resources Bookstore* (for mail orders, add \$3 for shipping and handling; Utah orders add additional \$0.44 sales tax), or contact Utah Division of Comprehensive Emergency Management, State Office Building (on Capitol Hill), Room 1110, Salt Lake City, UT 84114(, (801) 538-3400.\$7.25



Eldredge, Sandra N., 1996, The Wasatch Fault: Utah Geological Survey PI 40, 17 p. From the Natural Resources Bookstore* (for mail orders, add \$2 for shipping and handling; Utah orders add additional \$0.12

*For orders and information on items handled by the Natural Resources Bookstore, visit the bookstore, located on the first floor at 1594 West North Temple, Salt Lake City, Utah 84114, or contact the bookstore at (801) 537-3320; fax (801) 537-3395; e-mail: nrugs.geostore@state.ut.us

York, 10048-1199; (800) 888-4476; fax (212) 898-5554.

- -1994. The impact of catastrophes on property insurance: Insurance Services Office Inc., 50 p.: \$40.00. Available from Industry Relations-Customer Service, Insurance Services Office, Inc., 7 World Trade Center, 14th Floor, New York, 10048-1199; (800) 888-4476; fax (212) 898-5554.
- Institute of Real Estate Management, 1966, Before disaster strikes-Developing an emergency procedures manual: Institute of Real Estate Management, 200 p.; \$49.95 plus \$6.00 shipping. Available from the Institute of Real Estate

Management, 430 North Michigan Avenue, Chicago, IL 60611; (312) 329-6000; fax (312) 329-6039.

- -1966, Before disaster strikes: Institute of Real Estate Management videotape, VHS, 10 minutes; \$25.00. Available from the Institute of Real Estate Management, 430 North Michigan Avenue, Chicago, IL 60611; (312) 329-6000; fax (312) 329-6039.
- **International Association for Earthquake** Engineering (IAEE), 1992, Earthquake resistant regulations-A world list-1992, Rev. ed.: Tokyo, International Association for Earthquake





U.S.G.S. Loss-Mitigation Fact Sheets

U.S. Geological Survey (USGS), 1996, Reducing earthquake losses throughout the United States—fact sheets: U.S. Geological Survey. Free. These color-illustrated fact sheets highlight a wide range of loss mitigation actions that have resulted from the work of collaborating government agencies, universities, consultants, corporations, and the USGS-supported National Earthquake Hazards Reduction Program (NEHRP). They are available by mail from the Earthquake Information Hotline, U.S. Geological Survey, MS 977, 345 Middlefield Road, Menlo Park, CA 94025; via fax (without illustrations) from Earthfax (the USGS fax-on-demand system; dial 1-800-USA-MAPS, press button 4, press button 4 again, and request individual sheets by their fax document numbers, below); and via World Wide Web: http://quake.wr.usgs.gov.

Title	Earthfax Doc. Number
The Los Angeles Dam Story	7180
Speeding Earthquake Disaster Relief	7181
Averting Surprises in the Pacific Northwest	7182
The Mississippi Valley"Whole Lotta Shakin' Goi	n On" 7183
Utah Braces for the Future	7184
Pay a Little Now, or a Lot Later	7185
Seismic Maps Foster Landmark Legislation	7186
Building Safer Structures	7187
Saving Lives Through Better Design Standards	7188
Southern Californians Cope with Earthquakes	7189
Quake Forecasting—An Emerging Capability	7190

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Engineering (IAEE), 100 p.; \$180. Contact IAEE (Kokusai Jishin Kogaku-kai), Kenchiku Kaikan, 3rd Fl., 5-26-20, Shiba, Minato-ku, Tokyo 108, Japan; phone (81) 3-3453-1281; fax (81) 3-3453-0428.

International Decade for Natural Disaster Reduction (IDNDR), 1996, IDNDR Video Catalogue: International Decade for Natural Disaster Reduction, 37 p.; free. Order from the Secretariat of the International Decade for Natural Disaster Reduction, United Nations, Palais des Nations, CH-1211 Geneva 10, Switzerland; (41-22) 7986894; fax (41-22) 7338695; e-mail: idndr@dha.unicc.org

McCalpin, J.P., editor, 1996, Paleoseismology: San Diego, Academic Press, 588 p.

- Riha, Jr., Bob, and Handschuh, David, 1995, National media guide for emergency and disaster incidents: National Press Photographers Association, 81 p.; \$12.00. Copies available from the National Press Photographers Association, 3500 Croasdaile Drive, Suite 306, Durham, NC 27705; (800) 289-6772.
- Robert Olson Associates, 1996, Second National Workshop on Modelling Earthquake Casualties for Planning and Response—Summary of proceedings: Robert Olson Associates, 188 p.;
 \$22.50. Available from Robert Olson Associates, 4164 Los Coches Way, Sacramento, CA 95864;

(916) 978-7300; fax (916) 978-7301; e-mail: robtatroa@aol.com.

- Solis, G.Y., Hightower, H.C., Sussez, Jim, and Kawaguchi, June, 1996, Disaster Debris Management: Emergency Preparedness Canada, 28 p.; free. Copies available from Emergency Preparedness Canada, 122 Bank Street, 2nd Floor, Jackson Building, Ottawa, Ontario, Canada K1A 0W6; (613) 991-7034. The complete text will soon be available on the internet: http://hoshi.cic.sfu.ca/~anderson/index.html
- Stewart, M.E., and Taylor, W.J., 1996, Structural analysis and fault segment boundary identification along the Hurricane fault in southwestern Utah: Journal of Structural Geology, v. 18, no. 8., p 1017 - 1029.
- Taniwangsa, Wendy, Clark, Peter, and Kelly, J.M., 1996, Natural rubber isolation systems for earthquake protection of low-cost buildings: Earthquake Engineering Research Center (EERC), UCB/EERC-95-12, 107 p.; \$20.00.
 Order from EERC, University of California at Berkeley, 1301 South 46th Street, Richmond, CA 94804-4698. California orders add 8.25% sales tax. Make checks payable to UC Regents.
 VISA and MC also accepted. Information: Shirley Edwards (510) 231-9468.
- Taniwangsa, Wendy, and Kelly, J.M., 1996, Experimental and analytical studies of base isolation applications for low-cost housing: Earthquake Engineering Research Center

Utah Seismic Safety Commission 1997 "It's Our Fault" Earthquake Conference, September 9, 1997



<u>The conference will be a one-day event</u> scheduled for Tuesday, September 9. It will again coincide with the Salt Lake City and County "It's Our Fault" Earthquake Preparedness Week, which will feature numerous educational and safety-related activities throughout the week of September 8 - 13.

Building upon the success of the 1996 conference, the USSC has decided to keep the same basic format, but make some minor modifications. Because of the overwhelming response from last year's participants, the 1997 conference will feature expanded breakout sessions following a shorter opening session. <u>The USSC encourages proposals</u> for breakout sessions. Contact Janine Jarva, Utah Geological Survey, fax (801) 537-3400, email: nrugs.jjarva@state.ut.us.

The registration fee is \$50.00 and includes a continental breakfast, refreshments during breaks, and lunch. Registration forms will be mailed in July. To be added to the mailing list, or if you have questions about or suggestions for the conference, please contact Janine Jarva, Utah Geological Survey, (801) 537-3386, <u>fax (801) 537-</u> <u>3400; email: nrugs.jjarva@state.ut.us</u>

(EERC), UCB/EERC-96-04; \$20.00. Order from EERC, University of California at Berkeley, 1301 South 46th Street, Richmond, CA 94804-4698. California orders add 8.25% sales tax. Make checks payable to UC Regents. VISA and MC also accepted. Information: Shirley Edwards (510) 231-9468. Yeats, R.S., Sieh, K.E., and Allen, C.R., 1997, Geology of earthquakes: Cary, North Carolina, Oxford University Press, 576 p.

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The Fault Line Forum (formerly Wasatch Front Forum) is published quarterly by the Utah Geological Survey (UGS). It makes available to the public information which may be preliminary or unavailable in other published form, but is considered to be of value. It may not necessarily conform to UGS policy, technical review, or editorial standards. Visit the Forum on the UGS web site: http://utstdpwww.state.ut.us/~ugs/. Information, contributions, questions, and suggestions concerning future issues may be sent to the Editor at the following address:

Bea Mayes, Editor Fault Line Forum Utah Geological Survey Box 146100 Salt Lake City, UT 84114-6100 (801) 537-3383, fax (801) 537-3400. e-mail address: nrugs.bmayes@state.ut.us

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