



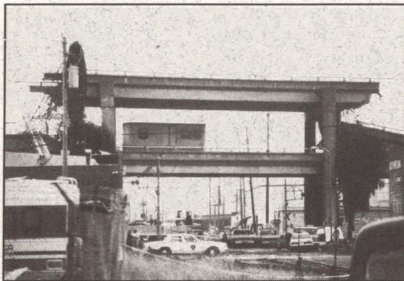
Fault Line Forum

Volume 16, Number 1 - 2000

Improved Earthquake Safety for Wasatch Front

New Urban Earthquake Monitoring in Utah by Walter Arabasz and Sue Nava University of Utah Seismograph Stations

The University of Utah's earthquake-recording network is being modernized into a multipurpose, real-time earthquake information system. The aim is to improve earthquake safety in Utah's dramatically growing Wasatch Front area by providing faster and better



1989 "World Series"
Loma Prieta earthquake
Photo by Fred Mag

information, especially for emergency response and earthquake engineering (for background, see "Utah's Earthquake Information Needs—New Technologies and Solutions," *Fault Line Forum*, vol. 14, no. 2, 1998).

With funding from the U.S. Geological Survey, the University of Utah Seismograph Station (UUSS) is installing new infrastructure for this modernized system, which by late 2001

will provide:

- (1) automated broadcasts of the location and size of a potentially disruptive earthquake, within a few minutes of its occurrence, and
- (2) automated computer maps (Shake Maps) available on the World Wide Web within several minutes of any significant earthquake, showing the geographic distribution and severity of ground shaking (see, for an example, www.trinet.org/shake).

The 2002 Winter Olympics provides a secondary motivation for advancing quickly towards realtime seismic monitoring in the Wasatch Front area.

By the end of September, installation of 20 modern digital strong-motion instruments in the Ogden-Salt Lake City-Provo urban corridor will be completed. Data will be continuously recorded in real-time as part of the University of Utah's seismic network. Additional federal funding is expected in 2001 to expand this urban network to 40 stations, enlarging the geographic coverage. Similar urban networks, modeled after one in southern California, are being installed in Seattle and San Francisco.

See Earthquake Monitoring page 3

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Fault Line Forum Welcomes New Editor

For those of you questioning the absence of the Fault Line Forum's spring and summer 2000 issues, we are happy to announce the return of the publication under new direction. Comprehensive Emergency Management (CEM) will be the new home of the FLF with Tammy Palmer as the new editor.

The change was brought about by the departure of Utah Geological Survey (UGS) editor Tim Madden at the end of last year. The declining UGS budget could no longer support the expense of editing, publication and mailing. We would like to thank Tim for his contributions as editor in 1998 and 1999. He has brought about many positive changes in the focus and format of the Forum.

The Forum's effort to promote earthquake safety in Utah has evolved over the years. During the 1980s, the U.S. Geological Survey's (USGS) Wasatch Front National Earthquake Hazards Reduction Program focused on publishing preliminary results of scientific research. Its present format is as a broad-based newsletter reporting on a wide variety of earthquake issues that highlight the work of the Utah Seismic Safety Commission (USSC).

Originally published jointly by the USGS and UGS, the UGS took over publication in 1987. With the evolving change in focus, we believe CEM is the proper home for the Forum. The mission of CEM is

to prepare, implement and maintain programs to plan for, respond to and recover from disaster situations including earthquake risk and loss reduction.

We plan to maintain quarterly publication and will continue using the more readable layout and format started by former editor Tim Madden. The Forum will also be posted electronically at www.dps.state.ut.us/cem/ussc and www.ugs.state.ut.us. We welcome contributions from those concerned with earthquake safety. Contact Tammy at 538-3392 (fax 538-3770; email: tpalmer@dps.state.ut.us) if you have questions or contributions.



CEM technical team in response to Salt Lake City tornado Aug. 11, 2000

Recent Earthquakes and Seismic Risk

Implications of Recent Earthquakes on Seismic Risk is the title of a new book edited by A.S. Elnashai and S. Antoniou. The volume contains contributions from several internationally renowned earthquake engineers on lessons learned from recent earthquakes.

In particular, studies of the 1995 Kobe earthquake and the 1999 earthquakes in Turkey, Taiwan and Greece are included. The editors of the volume hope that through assimilation of the lessons learned and dissemination of the information, future earthquakes will not exact such a heavy toll.

Topics of the papers include: Observations From Two Recent Earthquakes in Turkey and Greece; Damage to Bridges in the Turkey and

Taiwan Earthquakes; Vulnerability Functions for Japanese Buildings; Using Real Accelerograms for Seismic Design; Response of Hollow Bridge Piers; Transparent Nonlinear Method for Seismic Performance Evaluation; Load-Carrying Capacity of Beam-to-Column Connections Limited by Fracture.

The 236-page volume is published by the Imperial College Press and distributed by World Scientific Publishing. The cost of the book is \$62 or £38, plus shipping and handling. It can be ordered from the World Scientific Publishing web site at www.worldscientific.com.

WSSPC Honors USSC

by Bob Carey CEM

The Western States Seismic Policy Council awarded the Utah Seismic Safety Commission's Schools Awareness and Education Subcommittee with the 2000 National Award in Excellence for Educational Outreach.

The subcommittee is receiving the national award for the Prepared Schools Certificate for Effective Drills and Safe Surroundings program.

The two-year program has been successful in creating awareness for regular earthquake drills. This program

also stresses the importance of assessing and mitigating potential falling hazards in the classroom. The subcommittee was granted, once again, a Gubernatorial proclamation designating April as Earthquake/Disaster Preparedness Month.

In addition to this program, the subcommittee created training for emergency school plans along with the Comprehensive Emergency Management's



Gov. Michael O. Leavitt congratulates Jan Gibbons, chair of School Subcommittee, on working to

EPICenter. Ten training sessions have been conducted at various locations in the state as a result of this coordinated effort.

HAZUS 99

by Bob Carey CEM

In November 1999, FEMA released the most recent version of Hazards United States (HAZUS99). HAZUS 99 is a model used to estimate loss after an earthquake. This new version is designed to be user-friendly.

The Comprehensive Emergency Management's (CEM) EPICenter is the first agency in the country to sponsor training for the new software. During January, two training sessions were held in the CEM Command Center taught by Ken Taylor, earthquake program manager for North Carolina. In addition, Mei Mei Wang of the Oregon Department of Geology and Mineral Industries assisted in an advanced training course the final day. Wang presented steps recommended by Portland, Oregon, a pilot community in the development of HAZUS, to use in the planning process.

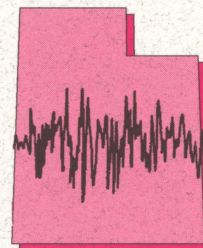
The 20 participants in attendance were from local government community development agencies, public works, water districts, private utilities and state agencies.

Earthquake Monitoring...continued from page 1

The 2002 Winter Olympics provides a secondary motivation for advancing quickly towards real-time seismic monitoring in the Wasatch Front area. Haunting memories of the 1989 "World Series" (Loma Prieta) earthquake argue for having basic capabilities in place at the time of the Olympics for rapid earthquake alert and production of Shake Maps, just in case.

The urban networks in Utah, Seattle and San Francisco are being built with seed-funding for an Advanced National Seismic System (ANSS), a large-scale initiative now pending before Congress. If the ANSS receives full funding, Utah's urban network would eventually expand to about 500

stations along the Wasatch Front. By comparison, the entire University of Utah regional seismic network currently consists of 105 conventional seismographic stations, not counting the new urban strong-motion stations.



For more information about earthquakes and seismographic instrumentation in Utah, see the Web site for the University of Utah Seismograph Stations at www.quake.utah.edu. For more information on the Advanced National Seismic System, see <http://pasadena.wr.usgs.gov/eqhaz/ANSS.html>.

Utah Seismic Safety Commission (USSC) Meetings

Bill To Expand USSC Membership Approved January 14, 2000 Meeting

On January 14, 2000, a regularly scheduled quarterly meeting of the USSC was held at the State Office Building in Salt Lake City, Utah.

Walter Arabasz, chairman of USSC, spoke on a bill to amend the act establishing House Bill 200. "Both Representative Bush and Senator Knudson are to sponsor legislation to amend the USSC Act, revising commission membership," said Arabasz.

House Bill 200 expands the USSC membership to include a representative from the Association of Contingency Planners, Utah chapter; American Public Works Association, Utah chapter; and the Utah Department of Insurance.

This bill will enable accepting contributions, grants or any other funding. It will also designate unspent funds under \$10,000 as "non-lapsing." House Bill 200 was unanimously approved by the USSC. The bill passed the 2000 legislature and became law July 1, 2000.

Dr. Marv Halling, Utah State University, gave a presentation on the post-earthquake study of the magnitude 7.6 earthquake of September 1999 in Taiwan. The damage caused by this natural disaster is an estimated \$10 billion with a death toll more than 10,300. Dr. Halling related the study's relevance to seismic issues in Utah.

Earthquake preparedness in Utah County Highlighted in April 7, 2000 USSC Meeting

Provo—The USSC quarterly meeting was held at Brigham Young University (BYU) April 7, 2000. Elected officials and city staff members met to discuss potential earthquakes along the Wasatch Front and preparations that have taken place or need to take place.

Walter Arabasz, chairman of the USSC, reported on the goals and responsibilities of the USSC. The USSC reviews earthquake-related hazards and risks in Utah, prepares recommendations to identify and mitigate these hazards and prioritizes recommendations to present them to local and state governments. Arabasz said, "USSC also acts as a source of information for individuals and groups concerned with earthquake safety and as a promoter of earthquake loss reduction measures."

James Bailey, representative from the Structural Engineers Association of Utah (SEAU), reported on the status of the existing-buildings initiative. "The SEAU has been working through the UBC Commission to see if there is some way to make re-roofing safer," said Bailey. Three recommendations to increase safety were presented. First, enforcement of the Parapet Ordinance. Second, use of guidelines from the Uniform Code for Existing Buildings (UCEB). Third, revision of chapter 34 of the UBC.

At the conclusion of the meeting, Richard Nelson, BYU project engineer, showcased the earthquake-resistant design techniques used in the construction at the BYU campus.

USSC Makes Plans for 2001 July 7, 2000 Meeting

Salt Lake City—Anne Von Weller nominated Walter Arabasz for Chair of the USSC during the July 7 meeting of the USSC. The commission discussed the nomination and unanimously approved.

Representatives from four committees presented and discussed ideas to help prepare for future earthquake disasters and the implications that follow.

Although each committee contributed different ideas, all agreed on one: the need to educate the public by preparing and distributing information sheets.

An information sheet would list resources such as Web sites, books, magazines and people to contact before, during and after an earthquake.

See Plans for 2001 next page

Earthquake Activity in Utah...see map on page 6

During Oct. 1- Dec. 31, the University of Utah Seismograph Stations located 399 earthquakes within the Utah region. The total includes two earthquakes in the magnitude four range, six earthquakes in the magnitude three range and 32 earthquakes in the magnitude two range.

Earthquakes that have magnitudes more than three are described here. (Note: All times indicated are Mountain Standard Time) Additional information on earthquakes within the Utah region is available from the University of Utah Seismograph Stations.

Significant earthquakes include:

Southern Utah:

- M_L 4.2 Oct. 22 11:51 a.m. 13 miles ESE of Minersville, UT
- M_L 3.0 Oct. 22 1:06 p.m. 13 miles ESE of Minersville, UT
- M_L 3.2 Oct. 22 6:02 p.m. 13 miles ESE of Minersville, UT
- M_L 3.4 Oct. 23 5:20 p.m. 13 miles ESE of Minersville, UT

- M_L 3.2 Oct. 23 10:31 p.m. 13 miles ESE of Minersville, UT

Central Utah:

- M_L 3.8 Oct. 11 4:43 p.m. 4 miles E of Richfield, UT
- M_L 4.0 Dec. 22 1:03 a.m. 20 miles SW of Emery, UT

Northern Utah:

- M_L 3.0 Nov. 13 12:21 p.m. 14 miles NNW of Lakeside, UT

Eastern Wasatch Plateau-Book Cliffs Area near Price (coal-mining related): A total of 204 seismic events (magnitude 0.7 to 2.5), interpreted to be mining-related, were located in this region during the period.

Plans for 2001...continued from previous page

When disasters strike, information is as important to the public as food, water and shelter.

"A list of resources would be beneficial because there is so much information out there already," said Anne Von Weller, representative of the Engineering & Architectural Committee. A list of resources would be an easy and direct way for the public to get correct information.

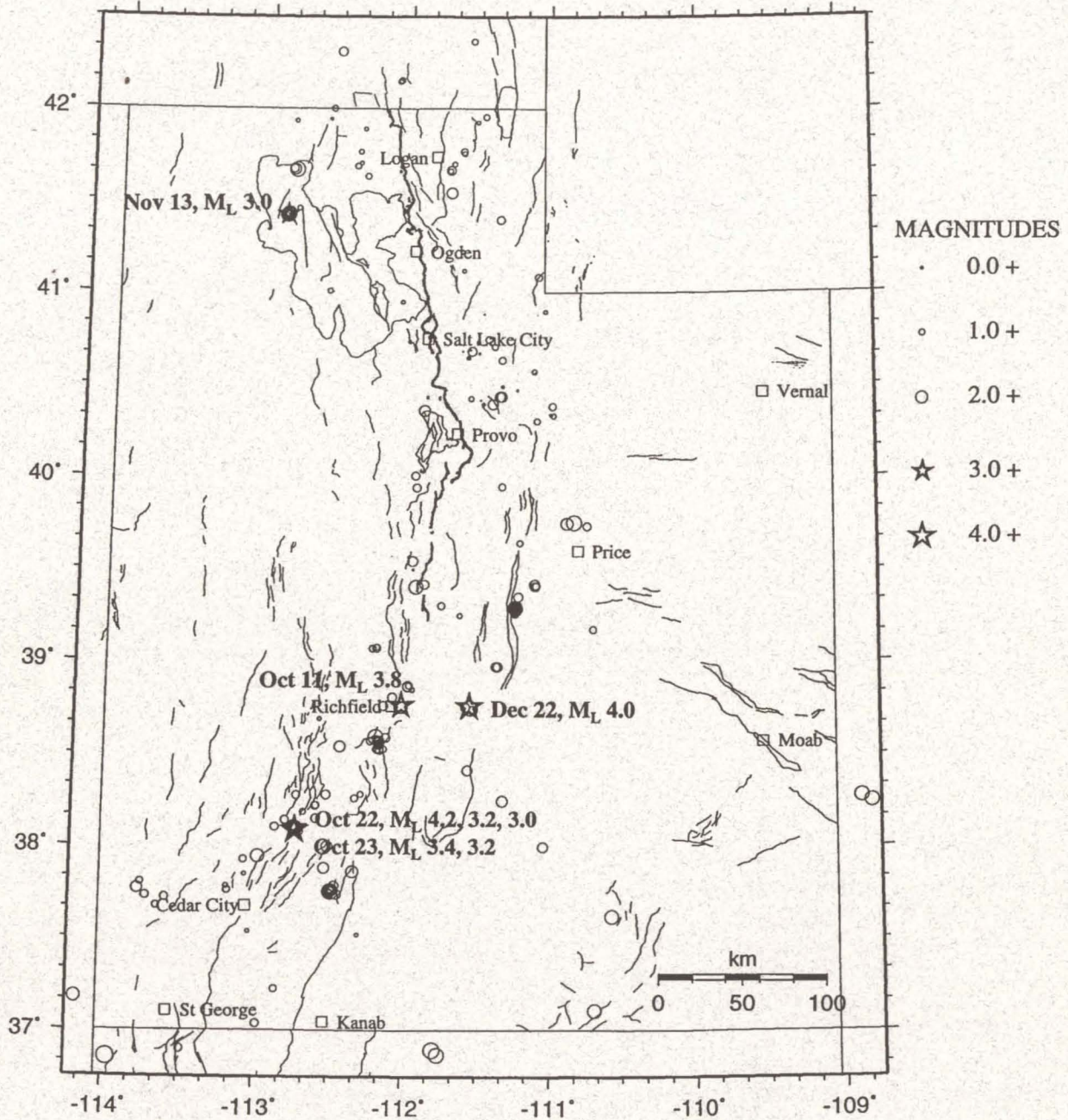
Other ideas for earthquake preparedness include an impact map that shows locations of faults and areas that would be impacted, an informational statewide video on how to prepare for an earthquake and brochures for owners of older homes and businesses.

Bob Carey, chairman of the Awareness & Education Committee, gave several suggestions on how such information could be distributed: at state and county fairs, through the library system, by emergency managers and inserts in utility bills.

Proactive planning helps communities protect themselves from the effects of earthquake disasters by taking actions to reduce disruption. Disaster can arise at any time and any location. It is the Federal Emergency Management Agency's (FEMA) goal to reduce loss of life and property in disaster situations such as earthquakes.

FEMA is taking steps to move disaster recovery costs from the federal level to the state and local government level. "It is the expressed goal of FEMA to reduce federal disaster costs, while still protecting state and local flexibility and interests," said Karla Barnes, Utah Department of Insurance, reporting on the proposed FEMA insurance regulation. "They are hoping to move costs to insurance companies. It has to be pre-disaster not post-disaster."

Utah Earthquakes Oct. 1-Dec. 31, 1999



Earthquake epicenters, located by the University of Utah Seismograph Stations, superposed on a map of Quarternary (geologically young) faults compiled by the Utah Geological Survey. The Wasatch Fault is shown in bold. Earthquakes of magnitude 3.0 and larger are specially indicated.

Meetings and Conferences

2000

OCTOBER

5-7. Deep Foundations Institute International Conference and Exposition, New York, NY. Info: www.dfi.org

9-11. First International Global Disaster Information Network (GDIN) Information Technology Exposition and Conference, Honolulu, Hawaii. Info: www.erim-int.com/CONF/GDIN.html

11-13. Risk 2000 Conference, Bologna, Italy. Info: www.wessex.ac.uk

November

4-7. International Association of Emergency Managers Annual Conference, Austin, TX. Info: iaem@aol.com

7. Kobori Symposium, Kyoto, Japan. Info: suzuki@zeisei.dpri.kyoto-u.ac.jp or wdiwan@caltech.edu

7. Earthquake Engineering in the Next Millennium, Info: Yoshiyuki Suzuki, Kyoto University, email: suzuki@zeisei.dpri.kyoto-u.ac.jp; or Wilfred Iwan, California Institute of Technology, email: wdiwan@caltech.edu

7-9. 5th International Conference on Corporate Earthquake Programs, San Jose, CA. Info: Steven Vukazich, vukazich@email.sjsu.edu

12-15. 6th International Conference on Seismic Zonation, Palm Springs, CA. Info: EERI office, eeri@eeri.org, www.eeri.org

15-16. Australian Earthquake Engineering Society Annual Conference, Hobart, Tasmania. Info: www.aees.org.au/News/2000_AGM.html

DECEMBER

3-6. Applications of Risk Analysis in Industry and Government, Arlington, VA. Info: sra@burkinc.com

13-15. International Conference on Advances in Structural Dynamics 2000, Hong Kong. Info: ceylxu@polyu.edu.hk

15-19. American Geophysical Union (AGU) Fall Meeting San Francisco, CA. Info: www.agu.org/meetings

2001

JANUARY

7-12. Conference on Computer Methods and Advances in Geomechanics, Tucson, AZ. Info: intermix.engr.arizona.edu/~epd/#IACMAG

February

7-10. 2001 EERI Annual Meeting, Monterey, CA. Info: www.eeri.org

March

19-22. International Symposium on Deformation Measurements, Anaheim, CA. Info: www.pasadena.wr.usgs.gov/scign/fig/

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