Fault Line Forum

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Improved Earthquake Safety for the Wasatch Front

New Chair voted for the Seismic Safety Commission

Barry H. Welliver has been involved in structural engineering since 1973. Moving from the state of Connecticut to pursue an interest in earthquake engineering, he chose California as his classroom. There he worked for several prominent firms before establishing his own private practice in 1979. After twenty two years of residency, he moved with his family to Utah where he presently has a growing practice while maintaining his California office.

He has been actively involved in the Structural Engineers Associations of California and Utah serving on and chairing several committees. His interests in seismic engineering lead to involvement with the Utah Seismic Safety Commission beginning in 1996 as an observer and later as delegate commissioner for the Structural Engineers Association of Utah. And, now sits as the Chair for the Seismic Safety Commission.

Also, congratulations to Anne vonWeller to becoming the new Vice-Chair to Seismic Safety Commission.

Reflecting on the Past....Looking to the Future

By Barry Welliver

When the earth moves underneath our feet, we can't help but appreciate the power of earthquakes. It takes us from "what if" thinking to "what now" reality. It is as strong an argument as you can get about why we should be concerned with earthquakes and why we should plan for their eventuality.

But what happens when your arguments are absent such events? Isn't it more difficult to justify concerns and raise appropriate awareness? Perhaps the easier task is to point to damaged buildings, lost services, and general disruption of life after an earthquake rather than to project its' potential havoc.

The establishment of the Utah Seismic Safety Commission was never to be an easy task. There was no deep well of evidence ready to help "prove" the concern. Its' creation followed the will and desires of many concerned individuals who could relate from personal experience or obvious conclusion that ignoring the threat of earthquakes in Utah was indeed a disservice to our state.

As we consider our future as a commission, we should be bolstered by our progress so far and

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University of Utah Quarterly Seismicity Summary

EARTHQUAKE ACTIVITY IN THE UTAH REGION
October 1 - December 31, 2001

by
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with significant contributions
by Jeff Fotheringham and Fabia Terra
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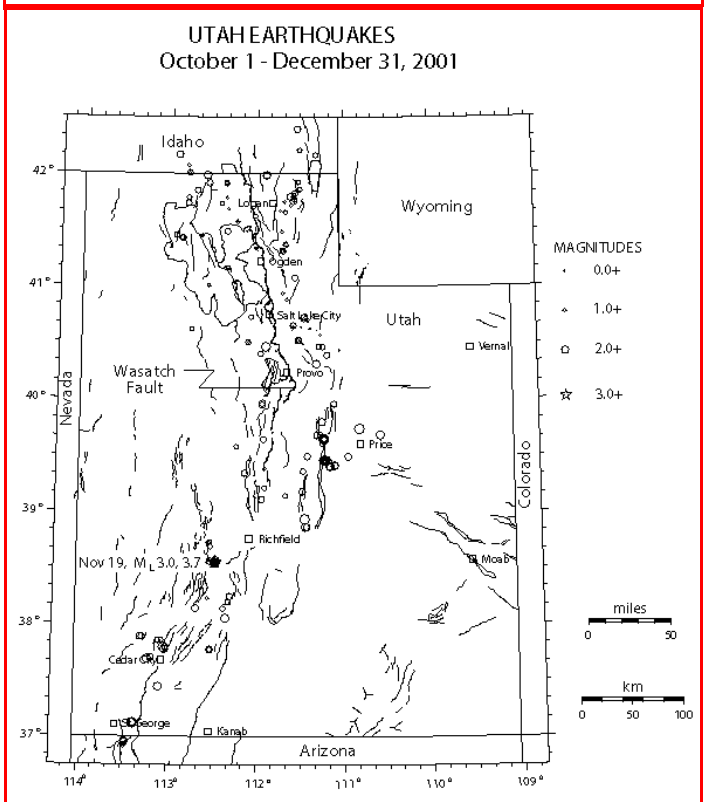
During the three-month period October 1 through December 31, 2001, the University of Utah Seismograph Stations located 234 earthquakes within the Utah region (see accompanying epicenter map). The total includes two earthquakes in the magnitude 3 range, and 76 earthquakes in the magnitude 2 range. Earthquakes which have magnitudes of 3.0 or larger (plotted as stars and specifically labeled on the epicenter map) are described below. There were three earthquakes reported felt during the report period. (Note: All times indicated below are local time, which was Mountain Daylight Time from October 1 through 29 and was Mountain Standard Time during the remainder of the report period.) Additional information on earthquakes within the Utah region is available from the University of Utah Seismograph Stations.

UTAH EARTHQUAKES October 1– December 31, 2001



Earthquake epicenters, located by the University of Utah Seismograph Stations, superposed on a map of Quaternary (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.

Earthquakes of Magnitude 3.0 or Larger (or Felt)
MC 2.2 Oct. 3 1:25 a.m. 5 mi WSW of Summit, UT (felt in Cedar City)
ML 2.5 Oct. 3 1:31 a.m. 6 mi WSW of Summit, UT (felt in Cedar City)
ML 3.7 Nov. 19 2:36 p.m. 12 mi WSW of Sevier, UT (felt west of Sevier)
ML 3.0 Nov. 19 2:43 p.m. 12 mi WSW of Sevier, UT

Other Notable Seismicity (see map)
West-Central Utah: The felt earthquakes near Richfield, Utah, on November 19 (see table above) were part of a cluster of 15 located shocks (0.6 ¡Ü M ¡Ü 3.7) that occurred between November 19 and November 21 about 11 miles WSW of Sevier, UT. Similar clusters of small earthquakes (including felt shocks) have episodically occurred in the Sevier Valley area near and to the southsouthwest of Richfield since April 1999. Seismic events that are densely clustered to the southwest of Price and scattered immediately to its north spatially coincide with sites of active underground coal mining in the eastern Wasatch Plateau and Book Cliffs, respectively, and are interpreted to be mining-related. These include a total of 88 located shocks.

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WSSPC Annual Conference

By Bob Carey

"Earthquake Risk: From Awareness to Action - A Mile High Challenge" was the theme for the 2002 WSSPC annual conference appropriately held in Denver. The four day conference, consisting of five sessions, featured talks that took the participants from hazard analysis to motiving action. The themes of five sessions were 1.) Analysis - Understanding the Hazard, 2.) Moving from Analysis of the Hazard to Assessment of the Risk, 3.) How Do We Communicate Risk Analysis to the Public?, 4.) Communicating the Subtle Risks of Low Probability, High Impact Events, and 5.) From Awareness to Action - How Do We Motivate Action?

Session 2 presenters spoke to the use of HAZUS for assess risk. Studies conducted in Oregon, Montana, and South Carolina illustrated the usefulness of HAZUS in developing quality risk assessments based on quality data. This risk assessment can influence emergency planning, emergency response, fire suppression, sheltering, debris removing, recover, and the legislative process.

Session 4 gave participants a look at some tools that could be employed to communicate low probability, high consequence events. Two tools that have considerable promise are Performance Based Engineering (PBE) and market incentives. PBE has been in use in some parts of the country for over 30 years. PBE is based on communicating earthquake risk in a manner that leads to informed decisions based on performance objectives. Since the Northridge earthquake, PBE has moved for a design office procedure to a formal set of guideline and standards.

Market incentives have always been a challenge in the interim between earthquakes. Using incentives like lower interest rates from lenders and lower insurance premiums not based on seismic upgrades, but based on seismic evaluations by a structural engineers. These evaluations would be both structural and non-structural. A list of requirements for a "seismic certification" could in turn could help increase property and rental value.

As with all WSSPC conference, the final session was used to develop potential policies from the all session that can taken back to the individual states and territories to influence their seismic policy decision making process.

FEMA Strategic Plan

By Bob Carey

FEMA has released its Strategic Plan for the fiscal of years of 2003-2008. The Plan's vision of "A Prepared Nation" and the mission statement, "Lead America to prepare for, prevent, respond to, and recover from disasters", sets the tone for the document. FEMA has developed six goals to guide them through the next six years. These goals include: 1.) Reduce loss of life and property, 2.) Minimize suffering and disruption caused by disasters, 3.) Prepare the Nation to address the consequences of terrorism, 4.) Serve as the Nation's portal for emergency management information and expertise, 5.) Create a motivating and challenging work environment for employees, and 6.) Make FEMA a world class enterprise. Each goal has up to five objectives outlining how FEMA plans to achieve each of the goals. The Plan also has up to three performance measures for each objective.

Most noticeably lacking in the Plan is any predisaster mitigation goals. FEMA's loss reductions measures will be accomplished through information sharing, training, education, and emergency planning. Missing is FEMA's PreDisaster Mitigation (PDM) efforts. FEMA is currently directing a hazard mitigation planning effort throughout the country. This effort involves the development of state hazard mitigation plans generated at the local level and incorporated into a State Hazard Mitigation Plan. When the State Hazard Mitigation Plan is in place, the states will be eligible for PDM funding. This funding will be given at the local level for projects identified in the their local hazard mitigation plans and reflected in the state plan. Projects can be for any pre-identified hazard, technological or natural.

A complete version the FEMA Strategic Plan can be found at:

www.fema.gov/library/strategicplanfy03.shtm

Utah Seismic Safety Commission

By Amisha Lester

USSC Minutes April 5, 2002

The Utah Seismic Safety Commission held its quarterly meeting in Salt Lake City, Utah. Pete McDonough, Chair, spoke on the signing of the April Earthquake/Disaster Preparedness Declaration. Lieutenant Governor Walker signed it successfully on March 13, 2002.

The Commission was awarded the Utah Emergency Management Association (UEMA) Partner of the year for its participation and efforts to promote the April Earthquake/Disaster Preparedness Month for the year 2001.

The final portion of the commission meeting was focused on earthquake hazards and their affects on infrastructure. Dr Les Youd from Brigham Young University spoke to the recent earthquake in Taiwan and the impact it had on the country's infrastructure. Elliot Lips from the Salt Lake City Project Impact Infrastructure Committee gave presentation on the assessment of landslide vulnerability of Salt Lake City lifelines. Dave Skoubye with the Metropolitan Water District spoke to the agencies efforts to upgrade its existing facilities, their building program for new facilities and the process of determining performance standards for those facilities. Bob Carey with DES demonstrated how HAZUS could be utilized in creating preliminary evaluations of lifeline performance with different earthquake scenarios. Dave Nazare, Chief Structural Engineer for UDOT, gave presentation on the process used to determine the performance standards for bridges in the recently I-15 reconstruction project.

USSC Minutes July 12, 2002

The Utah Seismic Safety Commission held its July Meeting in Salt Lake City, Utah. Walter Arabasz made a motion to nominate Barry Welliver as Chair and Ann vonWeller as Vice-Chair for the Seismic Safety Commission.

During an open discussion of the Commission, a AD HOC Committee was formed to address the issue of the sunset on the Commission. This ADHOC Committee will push to give a report to the Caucus for the State Senate & House side during the next legislative session. The report is to be brief, consisting of the vision and outlook for the Commission future.

Michael Essrig, President and CEO of Safe-T-Proof Disaster Preparedness Company Inc. came to demonstrate the effects of an earthquake. Using a trailer with shelves, a computer monitor, T.V. and a VCR all mounted within the walls of the trailer, during this quaking of this cottage, not one fell to the ground during the motions.

Scott Behunin, Director, DES and Maralin Hoff, EQ Lady, DES.

New Federal Earthquake Grants Announced

By Gary Christenson

Grant awards for 2003 under the U.S. Geological Survey (USGS) National Earthquake Hazards Reduction Program were announced in October 2002. The Utah Geological Survey (UGS) received a grant to convene a technical working group to establish consensus on fault slip rates, recurrence intervals, and other paleoseismic data for major Quaternary faults in Utah. William R. Lund, UGS, is the principal investigator. The working group will review existing paleoseismic data and hold meetings in 2003 to establish consensus values for fault parameters, mainly for use in the USGS National Seismic Hazard Maps on which seismic design under the International Building Code is based. The consensus values can also be used in other, more detailed probabilistic seismic hazard assessments for buildings, bridges, dams, and other facilities.

Utah State University (USU), in cooperation with the UGS and the University of Utah Seismograph Stations, received a grant to measure in-situ shear-wave velocities used to estimate the effects of local geologic site conditions on earthquake ground shaking in Salt Lake Valley and the central Wasatch Front area. Dr. James Bay, USU Department of Civil and Environmental Engineering, is the principal investigator. The project will use SASW (spectral analysis of surface wave) geophysical techniques to estimate shear-wave velocities of soil and rock to a depth of 100 feet. These data are critical to determine how much earthquake ground-shaking levels in rock will be amplified or deamplified by local geologic site conditions. The project is scheduled for completion in March 2004.

The Evolution of a Bill

PART 2

By Bob Carey

With the passage of the Alfred E. Alquist Hospital Seismic Safety Act, the California Legislature clearly spoke to the future of California hospitals which was that they would be significantly more resistant to earthquakes. As future earthquakes took place, the post Alquist Safety Act hospitals performed much better than older hospitals. However, other problems became very apparent. The nonstructure components of the hospitals as well as the contents sustain significant damage. An example of this was the Olive View Hospital after the Northridge earthquake. The hospital was shaken by significant earthquake forces and performed well. However, failure of nonstructural components in the building resulted in the temporary closure of the hospital.

This lead to the passage of Senate Bill 1953 which was signed into law in September 1994 just eight months after the Northridge earthquake. Provisions of SB 1953 stated that if a facility is to remain a general acute care hospital facility beyond a specified date, the owner must conduct seismic evaluations, prepare both a comprehensive evaluation report and compliance plan to attain specified structural and nonstructural performance categories which must be submitted to the Office of Statewide Health Planning and Development in accordance with these regulations.

The purpose of these regulations is to evaluate the potential earthquake performance of a building or building components and to place the building into specified seismic performance categories. The evaluation procedures were developed from experience gained in evaluating and seismically retrofitting deficient building is areas of high seismicity.

One of the main provisions of SB 1953 is the development of seismic performance categories, specifically the Structural Performance Categories (SPC) and the Nonstructural Performance Categories (NPC). The provisions include seismic performance categories for new and existing general acute care hospital facilities at various current levels of performance. This would include those facilities capable of providing services to the public to those at significant risk of collapse and danger to the public after a seismic event. Each facility would receive both an SPC and NPC, with both seismic performance categories considered for determination of a facilities compliance with the provisions of the Alquist Act.

Next issue will look at the Division III-R.

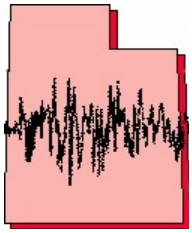
Vision cont.

driven by the challenges unique to our state. Our position as an advocate for earthquake safety and risk reduction should be our banner and foremost in our planning. We should endeavor to associate our efforts with all levels of supporters of seismic safety and be prepared to showcase successful mitigation efforts within our state.

Over the next year our commission needs to address our pending sunset as a body of advisors to the state. We need to review and update our Strategic Plan in concert with this effort to help legislators understand the importance of continuing the work of seismic safety. These are opportunities to renew our commitments and refine our vision.

The need for accountability will suggest that we stand behind our advice and actively support those whom we have backed in the past. We need to advocate regulations to ensure safer buildings as well as support the use of hazard mappings to restrict unwise land developments. It is not sufficient to harbor our knowledge in these areas, we need to press for recognition of dangerous conditions and help search for reasoned solutions. Our position as facilitator to bring to bear parties and issues should be strengthened.

We need to plan our strategies wisely, seizing opportunities to build influence and make in-roads into apathy and inaction. I look forward to strengthening our effect in local and regional seismic safety issues.



Fault Line Forum

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Fault Line Forum

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Calendar of Events

JANUARY 2003

17
Utah Seismic Safety Commission Meeting
State Office Building, Salt Lake City, Utah.

23
Dept. of Emergency Services
City and County Director's Conference
Salt Lake City, Utah.

FEBRUARY 2003

5-8
EERI Annual Meeting
Portland Marriott Downtown, Portland, Oregon. Info: www.eeri.org

MARCH 2003

8-12
2003 National Disaster Medical System Conf.
Reno Hilton, Reno, NV.

APRIL 2003

7-10
7th Annual GIS Conference
Lake Coeur d'Alene, Northern Idaho.

MAY 2003

20-22
Fourth Inter-Mountain HazMat Conference
Ogden, Utah.

AUGUST 2003

10-13
Sixth U.S. Conference and Workshop on Lifeline Earthquake Engineering (TCLEE), Long Beach, CA.

22
Dept. of Emergency Services
Public Officials Conference
Location, TBA