

# ATC NEWS BULLETIN

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## ATC CONVENES TWO MAJOR WORKSHOPS

### **ATC-35 WORKSHOP -- NATIONAL SEISMIC HAZARDS GROUND MOTION MAPPING**

*Los Angeles, Calif.* Anticipated earthquake ground motions are needed for sound structural design in earthquake-prone areas. Although much research in the last decade has addressed ways to model and estimate ground motions, many questions are still debated among earth scientists and practicing engineers.

For example, exactly what parameters of anticipated ground motions should be mapped? Maps of peak ground acceleration and velocity are invaluable to geotechnical engineers evaluating potential ground failures. But they may not

be as useful to engineers designing structures to resist seismic inputs.

In addition to the choice of parameters to be mapped, other issues to be resolved in improving seismic mapping include:

- What reference site conditions should be used as a basis?
- Should maps be based on a probabilistic approach, a deterministic approach, or both?
- How should uncertainty in seismic source characterization and ground motion attenuation be incorporated in the mapping process and results interpretation?

In September of 1995, with funding from the U. S. Geological Survey (USGS), ATC convened a national earthquake ground motion mapping workshop in Los Angeles to resolve these four broad seismic mapping issues -- choice of parameters, reference site conditions, risk representation, and incorporation of uncertainty in models. All four are key issues that affect the preparation and use of national earthquake ground motion maps.

The workshop, attended by over 150 professionals, was part of the USGS-funded ATC-35 project to  
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### **ATC/JSCA WORKSHOP -- THE IMPROVEMENT OF STRUCTURAL DESIGN AND CONSTRUCTION PRACTICES: LEARNING FROM NORTHRIDGE AND KOBE**

*Kobe, Japan.* The first anniversary of the January 17, 1995 Hyogo-ken Nanbu earthquake was a fitting time for the 7th US-Japan Workshop on Improvement of Structural Design and Construction Practices: Lessons Learned from Northridge and Kobe. ATC and the Japan Structural Consultants Association (JSCA) co-sponsored the workshop, held January 18-20, 1996 in the New Otani Hotel in Kobe. In attendance were over 250 structural engineers, practitioners and researchers, from Japan, the United States, the Republic of China, Taiwan, Mexico and Panama. Technical papers, presented in two days of con-

secutive sessions, covered the following topics:

- Strong ground motion and earthquake damage
- Behavior of soils and foundations
- Performance of steel structures
- Performance of reinforced concrete and composite structures
- Postearthquake investigations and damage levels
- Repair and strengthening of structures
- Seismic design methodology and implications

Panel discussions concentrated specifically on the Northridge and Kobe lessons, with particular emphasis on performance-based design issues.

A technical tour of important aspects of the Kobe reconstruction effort concluded the workshop. The tour included visits to a site where carbon fiber is being used to retrofit reinforced concrete columns, a site where upper stories have been removed from a building that sustained an inter-story collapse, and a religious temple where workshop attendees participated in a ceremony honoring the repair and reconstruction of the temple.

### **ATC FILLS THREE NEW POSITIONS:**

#### **DEPUTY EXECUTIVE DIRECTOR**

Following a 1-year search, the ATC Board of Directors has selected Dr. Gerald Brady to fill the position of Deputy Executive Director. The role of the Deputy is to assist the Executive Director in all corporate functions, including financial management, technical and administrative management, proposal and product development, and client relations. Dr. Brady will also serve as in-house advisor on strong ground shaking.

Prior to joining ATC, Gerald served as chief of the National

Strong-Motion Program Data Processing Project for the U. S. Geological Survey with responsibility for the preparation, processing, and dissemination of significant records from the network of accelographs, and the analysis of strong-motion earthquake recordings, recovered from ground level arrays and structural arrays.

He also served as a member of the Earthquake Engineering Research Institute Board of Directors from 1992 to 1995.



#### **SENIOR STRUCTURAL CONSULTANT**

Earlier this year ATC engaged Mr. Craig Comartin as Senior Structural Consultant for earthquake engineering. Mr. Comartin, who provides independent consulting services to ATC on a part-time basis, will serve as Principal Investigator and/or Project Director on selected ATC projects and will provide general technical support.

Mr. Comartin has extensive experience in seismic analysis and design of buildings and other structures. Since 1991, he has

served as a technical advisor in the management of the seismic rehabilitation program at Stanford University. In this role, he has advised on risk assessment and planning, damage investigations and structural evaluations, and development of seismic rehabilitation standards for the University.

Mr. Comartin is Secretary/Treasurer and a member of the Board of Directors of the Earthquake Engineering Research Institute.



#### **COMPUTER SPECIALIST**

Mr. Peter Mork joined the ATC staff in July, 1995, as Computer Specialist. His responsibilities include maintaining and updating ATC's in-house software applications, upgrading ATC's personal computers, and establishing and maintaining ATC's home page on the World Wide Web. In addition, Mr. Mork will provide report production and multi-media services.

Prior to joining ATC, Peter served as a Computer Specialist for the U. S. Geological Survey. His responsibilities included computer programming, evaluating computer hardware and software, and developing and maintaining a database management system to record strong-motion station inspection, installation, and record gathering activities of the Survey.



## ATC BOARD NEWS

### ATC BOARD WELCOMES NEW MEMBERS AND ELECTS NEW OFFICERS FOR 1996

At its January 1996 meeting in San Francisco, the ATC Board elected officers. Succeeding Edwin Huston as President is Mr. John Theiss, of the firm EQE-Theiss, St. Louis, Missouri. Mr. Theiss is an at-large member appointed by the ATC Board. He previously served ATC as Vice President.

Mr. Mark Saunders, Vice President of Rutherford & Chekene, San Francisco, California, was elected as Vice President.

Mr. Saunders was appointed by the Structural Engineers Association of California (SEAOC). At-large Board member Prof. Bijan Mohraz, of Southern Methodist University, Dallas, Texas was elected Secretary/Treasurer.

Incoming Directors are Edwin Dean, structural engineering practitioner from Portland, Oregon, and John Shipp, structural engineering practitioner from Los Angeles. Maryann Phipps,

SEAOC President, was appointed to the ATC Board at the October quarterly Director's meeting to coincide with her SEAOC term.

Members retiring from the Board are Past President Nicholas Forell, structural engineering practitioner from San Francisco, California and Past Secretary/ Treasurer James Hill, structural engineering practitioner from Los Angeles, California.

## NEWLY PUBLISHED ATC REPORTS

### ATC-20-2 ADDENDUM TO THE ATC-20 POSTEARTHQUAKE BUILDING SAFETY EVALUATION PROCEDURES

Updated information on ATC-20 procedures is available in the newly released U. S. Geological Survey and National Science Foundation-sponsored ATC-20-2 report, *Addendum to the ATC-20 Postearthquake Building Safety Evaluation Procedures*.

The report provides updated assessment forms, placards, and procedures based on a review of the ATC-20 procedures following five earthquakes, including: Loma Prieta

(1989); Cape Mendocino, Landers, and Big Bear (1992); and Northridge (1994).

The report contains sections on recommendations pertaining to safety assessment management; information on technological considerations for safety evaluation pertaining to wood frame, unreinforced masonry, reinforced masonry, steel and concrete construction; updated information on hazardous materials; newly developed information on

loss-value estimation; updated information on human behavior following earthquakes; and an appendix on "Guidance for Owners and Occupants of Damaged Buildings."

The assessment forms and placards are also available on ATC's newly established Internet Home Page ([www.atcouncil.org](http://www.atcouncil.org)). The report is available through the ATC office. Price: \$15.00 per copy.

### ATC-R-1 CYCLIC TESTING OF NARROW PLYWOOD SHEAR WALLS

ATC recently published the ATC-R-1 report, *Cyclic Testing of Narrow Plywood Shear Walls*. This report documents the first self-directed research project to be funded by the Henry J. Degenkolb Endowment Fund of the Applied Technology Council.

This first research report addresses the dynamic performance of narrow plywood-sheathed shear walls, which have been and continue to be used extensively in wood frame construction throughout California and other western states.

This study was initiated in 1993 based on the recommendations of members of the Structural Engineers Association of California, who were concerned about the strength and deflection characteristics of narrow plywood wall panels exposed to seismic forces.

A major conclusion of the study is that "both the static and the dynamic load tests showed that the narrow plywood sheathed walls possessed substantial inherent flexibility"...resulting..."in large horizontal movements of the top of

the shear panel in both the static and dynamic tests. The total horizontal movement at design load level, corresponding to a drift ratio on the order of .017, is over three times the 0.005 maximum specified in the code."

The ATC-R-1 report, which describes the details of the testing program and summarizes the results, is available through the ATC office. Price: \$20.00 per copy.

## ATC-35 WORKSHOP (Continued from page 1)

ensure the transfer into engineering practice of earth science research results. The workshop also kicked off the ATC-35 Ground Motion Initiative (see box)

The workshop Steering Committee organized the workshop to produce meaningful results by commissioning a series of pro and con state-of-the-practice papers to advocate differing positions on each of the four issues. These advocacy papers served two important purposes. First, they provided a beginning point for four working groups that met two weeks before the workshop. These working groups of experts developed position papers on each issue. The advocacy papers and the working group position papers then served as a common basis for subsequent discussion and decision-making at the workshop itself.

At the end of the two-day workshop, participants reached conclusions on all four issues by written balloting. The major workshop conclusions are summarized below.

**Choice of parameters.** At least two types of parameters need to be mapped. They are elastic response spectral values, which are most needed by seismic structural designers, and updated maps of peak ground acceleration and velocity, which are most needed by geotechnical engineers concerned with potential ground failures. It would also be most desirable, but presently impractical, to map duration of strong shaking. However, as shown in Figure 1, detailing the mapping hazard at selected locations to identify dominant earthquake magnitude and distance contributions would allow map users to at least estimate duration.

**Reference Site Condition.** Rock was favored over soil as the reference site condition although workshop participants preferred maps

for both conditions.

### **Risk Representation.**

There was a strong preference for probabilistic, rather than deterministic, based maps. However, workshop participants also called for deterministic maps for scenario earthquakes on selected major faults.

### **Incorporation of Uncertainty.**

Workshop participants recognized the need to understand the uncertainty associated with the mapped values but also appreciated the necessity of simplified modeling approaches when mapping seismic hazard for the entire country.

Based on trial map results obtained to date, the USGS's simplified approach for incorporating uncertainty is promising but further detailed analyses and comparisons at selected sites and a final, formal peer review of the mapping process are needed.

The workshop was co-sponsored by the Building Seismic Safety Council, National Center for Earthquake Engineering Research and Structural Engineers Association of California. The Steering Committee consisted of M. Power and E. V. Leyendecker (co-chairs), R. Bachman, J. Beavers, R. Borchardt, I. Buckle, A. Frankel, T. Holzer, C. Poland, A. Porush, C. Rojahn and C. Thiel. A final report on the workshop will be available through ATC in 1996.

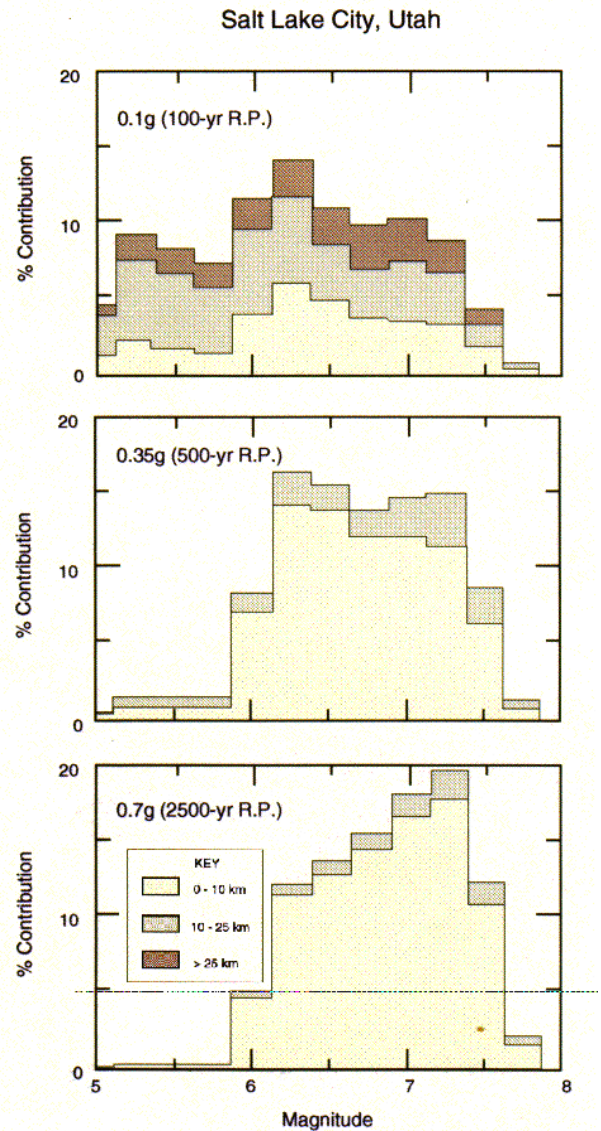


Figure 1.- Example of the deaggregation of probabilistic seismic hazard to determine magnitude and distance contributions (Youngs et al., 1987).

### **ATC Ground Motion Initiative**

The Ground Motion Initiative is an important part of the ATC-35 project. The intent of the Initiative is to provide the means by which earth scientists and structural engineers, together, will determine how best to represent ground motion to fit within the next generation of seismic codes. A workplan for the Initiative is currently under development. C. Thiel is Project Director for this effort.