ATC NEWS BULLETIN

Applied Technology Council, A Nonprofit Corporation
Advancing Engineering Applications for Natural Hazard Mitigation
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ATC COMMENCES OUTREACH CAMPAIGN TO FORGE A STRONGER LINK WITH PRACTICING ENGINEERS

Since its inception in 1972, the Applied Technology Council has developed from a California focused organization to one with national scope. In addressing earthquake issues on a national basis, ATC recognizes that the earthquake hazard is but one of many natural hazards with which the structural engineering community must reckon. Other natural hazards of concern to ATC are wind storms and coastal flooding. Within the last five years we have expanded our area of interest to include these hazards, with the goal of using experts in funded efforts to produce user-friendly guidelines that reflect state-of-the-art knowledge.

One of this year's goals established by the current ATC President, Andrew Merovich, is to strengthen the linkage between ATC and practicing design professionals nationwide. To this end we are planning an outreach effort to expand our consultant talent pool and to seek input from our constituency on engineering resources and applications needed to improve structural engineering practice.

While our consultant registry includes a broad array of experienced practitioners and researchers accomplished in the fields of earthquake, coastal flooding, and wind hazard mitigation, more consultants specializing in wind and coastal flooding hazard mitigation are needed specifically to address the geographical diversity demanded of guidelines that are national in scope.

At the heart of the outreach effort is a soon-to-be initiated national poll of practicing structural engineers to define, understand, and rank the hazard mitigation tools most in need. We are planning to seek outside funding for critical hazard mitigation technology transfer projects identified during this process. If outside funding is not available, however, critical projects will likely be funded by the ATC Endowment Fund, which was established to support such projects of interest to structural engineering design professionals and for which funds are not available from traditional government sources.

Over the coming years, ATC will strive to address the needs of a national audience of structural engineers seeking to mitigate a range of natural hazards to the built environment. To do this effectively will require a broad range of support from the structural engineering community. If you have specialized experience in the areas of seismic, wind or coastal flooding hazard mitigation and are interested in participating in future ATC projects as a paid consultant, or if you have ideas for future technology transfer projects, or are curious to learn more about existing ATC products, please contact us at atc@atcouncil.org or call us at our Redwood City, California, office (contact Gerry Brady at 650/595-1542) or Washington DC office (contact Ian Friedland at 202/204-3011). Within the coming months we will add a feature to our web site (www.atcouncil.org) to enable interested design professionals to enter their names in the ATC consultant registry.

Andrew Merovich
ATC President

CONTRIBUTORS SOUGHT FOR ATC-55 PROJECT: EVALUATION AND IMPROVEMENT OF INELASTIC SEISMIC ANALYSIS PROCEDURES

On September 18, 2000, the Applied Technology Council was awarded an 18-month contract by the Federal Emergency Management Agency (FEMA) to evaluate and improve the application of inelastic analysis procedures used in state-of-the-art performance-based engineering methods for seismic design, evaluation, and rehabilitation of buildings.

The objectives of the project are (1) development of practical recommendations for improved prediction of inelastic structural response of buildings to earthquakes (that is, guidance for improved application of inelastic analysis procedures) and (2) identification of important issues for future research.

The results of the project will culminate in a project document to be published by FEMA, which will contain guidelines for applications of

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Published by Applied Technology Council, 555 Twin Dolphin Drive, Suite 550, Redwood City, California, 94065
Phone: 650/595-1542. Fax: 650/593-2320. E-mail: atc@atcouncil.org. Web site: www.atcouncil.org
ATC Executive Director: Christopher Rojahn, Deputy Executive Director: A. Gerald Brady, News Bulletin Editor: Michelle Schwartzbach

ATC/MCEER HIGHWAY BRIDGE SEISMIC DESIGN SPECIFICATION NEARS COMPLETION

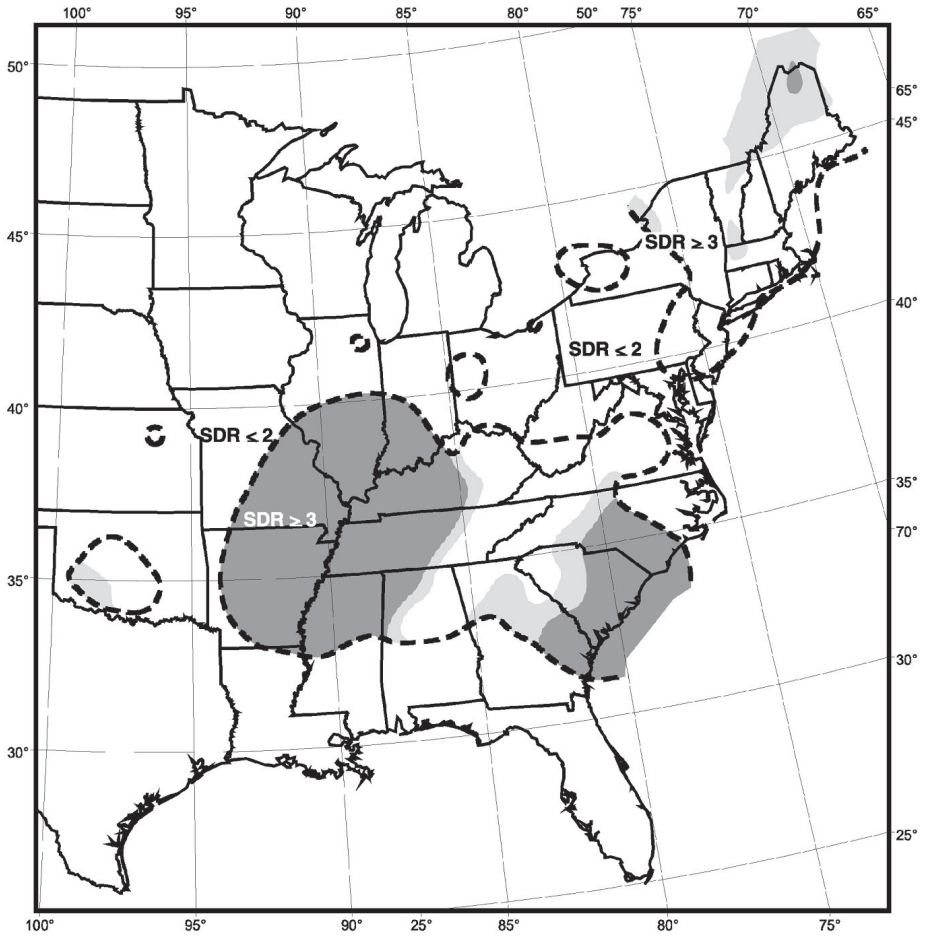
Since August 1998, a partnership of ATC and the Multidisciplinary Center for Earthquake Engineering Research (the ATC/MCEER Joint Venture) has been conducting a project to develop the next generation of seismic design specifications for highway bridges in the United States. The project is sponsored by the American Association of State Highway and Transportation Officials (AASHTO) and is being conducted by the National Cooperative Highway Research Program (NCHRP) of the Transportation Research Board. The intent of the project, known as NCHRP Project 12-49, "Comprehensive Specifications for the Seismic Design of Bridges," is to develop load and resistance factor design (LRFD) specifications and commentary that are expected to be incorporated into the AASHTO *LRFD Bridge Design Specifications*. These are being supplemented by a series of design examples demonstrating the application of key features of the new specifications.

The final draft of the recommended specifications and commentary was completed in February 2001. Using funds provided by the MCEER Highway Project (sponsored by the Federal Highway Administration), the provisions have also been reformatted into a standalone set of recommended *Guidelines*. The recommended *Guidelines* have been submitted to the AASHTO Highway Subcommittee on Bridges and Structures for review, and a decision is expected soon regarding adoption of the recommended guidelines as an AASHTO *Guide Specification*.

The recommended *Guidelines* incorporate all state-of-the-art practices in highway bridge seismic design, and are performance-based. They address the latest approaches for representation of seismic hazard, design and performance criteria, analysis methods, steel and concrete superstructure and substructure design and detailing, foundation design, and soil behavior and properties. The *Guidelines* are national in scope and explicitly address differences in seismic hazard, soils, and bridge construction practice found throughout the United States. The design basis for these new provisions is markedly different from the design philosophy, approach, and requirements currently in use in the United States.

ATC plans to publish the recommended *Guidelines*, fully-detailed design examples, and additional background research reports this year. A supporting study that was conducted by the ATC/MCEER Joint Venture assessed the impacts of liquefaction and lateral spreading on highway bridge design and performance. The recommended *Guidelines* were applied in two actual bridge design case studies and the extent and cost of mitigation technologies were assessed. The liquefaction case studies report will be immediately useful to structural and geotechnical engineers engaged in the design and construction of buildings and bridges in areas with liquefaction-susceptible soils.

Announcements about the availability of these reports will be posted on the ATC web site and in various professionals newsletters in the latter part of 2000.



Map of the eastern United States showing (1) the boundary (dashed line) between the lower and higher levels of seismic design requirements (SDRs) for the maximum considered earthquake (MCE) ground accelerations at stiff soil sites, and (2) the area (shaded) within the region of higher level SDRs, where the mean magnitude contributing to the MCE acceleration is greater than 6 (light shading) or greater than 6.4 (dark shading) (ATC/MCEER *Guidelines*, 2001).

ATC BOARD NEWS

The Applied Technology Council Board of Directors is pleased to welcome two new Board members: Anthony (Tony) B. Court, a practicing structural engineer from San Diego, California, who joined the Board on January 20, 2001, and Chris Jones, a coastal engineer from Durham, North Carolina, who will join the Board on April 28, 2001. Both are leading authorities in their respective fields. Tony specializes in seismic engineering and performanced-based design. Chris has extensive experience in the development of flood provisions for building codes and standards, and in the identification and mapping of coastal flood hazard areas.

At its January meeting, the Board also elected new officers (see insert), appointed committees for the coming year, and scheduled Board meetings for the following dates and locations:

- April 28, 2001, Atlanta, Georgia
- July 28, 2001, Seattle, Washington
- October 20, 2001, Sacramento, Cal.
- January 26, 2002, San Francisco

At each of these locations the Board will host special functions and confer with hazard mitigation specialists. In Atlanta, for example, the Board will visit the campus of Georgia Tech and confer with faculty in the School of Civil and Environmental Engineering. The Seattle meeting will include a visit to a local university, and the Sacramento meeting will include a reception for representatives from various State agencies.

2001-2002 Board of Directors

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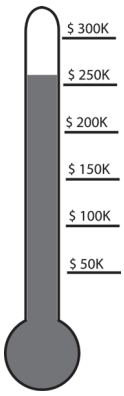
ATC ENDOWMENT FUND ON THE RISE

The ATC Endowment Committee is nearing this year's goal for increasing the size of ATC's Henry J. Degenkolb Memorial Endowment Fund, which was established in 1989 in honor of Henry J. Degenkolb, an exceptional practicing structural engineer from San Francisco who contributed substantially to the field of earthquake engineering.



The purpose of the *Fund* is to support projects of critical interest to structural engineering design practice, but for which funds are not available from traditional government-sector funding sources.

The *Fund* provides (1) funding for small research projects, (2) seed money for selected engineering applications for natural hazard mitigation, and (3) funding for the new ATC Design Guide series, unveiled in December 1999, which present succinct, state-of-the-art information on important design issues for practicing structural engineers.

The current *Fund* drive is being headed by Maryann Phipps, Chair of the ATC Endowment Committee. Her goal is to build the Endowment Fund to $300,000 through the continued support of ATC's benefactors, the practicing structural engineering community, and by soliciting contributions from foundations and corporate giving programs. The corporate outreach will have a national focus, reflecting ATC's multihazard scope and geographic diversity.

Endowment funds are presently supporting development of three new ATC Design Guides. Future *Fund* programs designed to strengthen the engineering community's efforts to mitigate natural hazards are under development. The Endowment Committee welcomes new ideas and guidance from its donors and the broader professional community.

Applied Technology Council
Major Donations as of April 25, 2001

Sponsors

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Degenkolb Engineers
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Tokyo Engineering Power Company

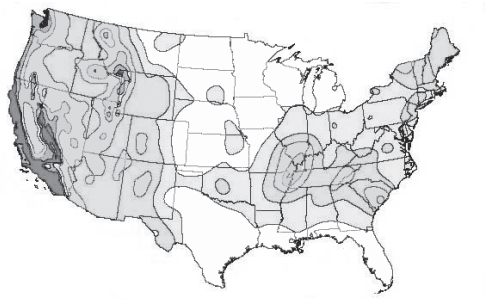
ATC AND USGS SPONSOR THE 2ND NATIONAL EARTHQUAKE GROUND-MOTION MAPPING WORKSHOP

The 2nd ATC-35 Workshop on National Earthquake Ground-Motion Mapping will be held on Thursday and Friday, May 10-11, 2001, in San Francisco at the Radisson Miyako Hotel.

Like the first ATC-35 Workshop held in Los Angeles in 1995, this Workshop will provide input from the structural engineering, geosciences, and geotechnical engineering professions to the U.S. Geological Survey (USGS) on key issues that affect the preparation and use of the second round of national earthquake ground-motion maps. The Workshop will also provide input for the USGS on new map-related products desired by map users.

The following topics will be the focus of the Workshop:

- *Scientific Issues*: Near-fault directivity effects; time-dependent earthquake probabilities; ground motion attenuation relationships; uncertainty.
- *Issues for Design Maps*: Frequency of updating maps; degree of detail in maps; deterministic bounds, role of USGS.
- *Map Products and New Directions*: Current and planned map products; new directions in mapping.



In addition, Workshop participants will have the opportunity to review and provide input to USGS on preliminary plans for change to seismic source models in locations such as the Pacific Northwest and the New Madrid seismic zone.

A special presentation on ground motions in the recent Nisqually earthquake in the Seattle region is included in the program.

The Workshop is open to the profession at large. Registration is accepted on a first-come, first-serve basis. The registration fee is $150 ($120 for ATC subscribers) and includes the cost of Workshop handouts, luncheons, and refreshments. A late fee of $25 will be imposed on registrations postmarked after May 1, 2001.

Additional information about the Workshop, including hotel accommodations, and the Registration Form, are available on ATC's web site (www.atcouncil.org).

ATC-55 PROJECT

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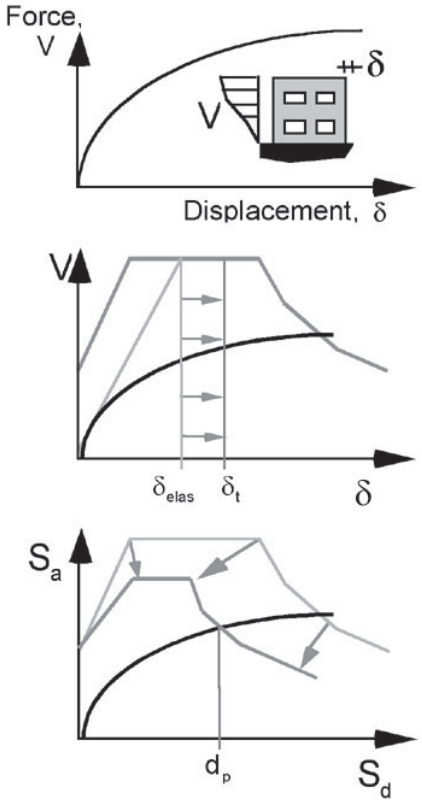
selected procedures, including their individual strengths, weaknesses and limitations. The document will also contain illustrative examples and expert commentary on key issues, and is expected to serve to update and supplement existing publications, including *FEMA 273/274*, *ATC 40*, and the *NEHRP Recommended Provisions for New Buildings*.

Engineers are encouraged to log-on to the ATC-55 web page, which can be accessed through ATC's home page (www.atcouncil.org) and participate in the development of technical material on the ATC-55 project. The web page contains a Project Profile, Issue Summaries, State of the Practice data forms (to be completed by contributors), State of the Research Data (to be completed by contributors), the Project Work Plan, and a list of Project Participants. The forms can be downloaded, completed, and e-mailed back to ATC.



Schematic representations of pushover curves (ATC-55 project)

Other Ongoing ATC Projects

- ***ATC-21-1 Project:*** *Update of ATC-21/FEMA 154 Report, Rapid Visual Screening of Buildings for Potential Seismic Hazards: A Handbook*
- ***ATC-39 Project:*** *Development of a Homeowner's Guide for Seismic Rehabilitation of Masonry Dwellings*
- ***ATC-43-1:*** *Training Seminars on Procedures for Evaluation and Repair of Earthquake Damaged Concrete and Masonry Wall Buildings*
- ***ATC-45 Project:*** *Procedures for Post Wind Storm and Flood Safety Evaluation of Buildings*
- ***ATC-50 Project:*** *Development of Methods for Seismic Grading and Retrofitting of Detached Single-Family Wood Frame Dwellings*
- ***ATC-51-1 Project:*** *Development of Exemplary Hospital Seismic Emergency Response Planning Procedures for Italy*
- ***ATC-54 Project:*** *Guidelines for Utilizing Strong-Motion Data in Post-Earthquake Response*
- ***ATC-56 Project:*** *Updating of FEMA Seismic Considerations Report Series*