

WELCOME



W. Phillip Yen,
Conference Chair

Dear Conference Participants,

It has been a great honor and pleasure to work with our nation's best researchers and engineers in the structural and seismic fields on the organization of the *Sixth National Seismic Conference on Bridges and Highways*. This gathering is the sixth in a series, following successful conferences held in San Diego, California (1995), Sacramento, California (1997), Portland, Oregon (2002), Memphis, Tennessee (2004) and San Francisco, California (2006). The theme is "**Seismic Technologies for Extreme Loads**," which will allow discussions to include hazards other than earthquakes to help create a synergistic approach to protective systems.

The Federal Highway Administration (FHWA) is proud to continue co-sponsoring the *National Seismic Conference* to provide a dedicated forum for seismic issues related to bridges and highways. In keeping with this year's theme, we have invited keynote speakers for plenary sessions each morning that are nationally and internationally renowned experts in bridge engineering for both seismic and other natural hazards. They will be followed by fourteen technical sessions over three days, where the latest research and practical information on earthquake engineering and other hazards for bridges and highways will be presented.

In late 2006, FHWA, in cooperation with MCEER, published the latest "Seismic Retrofitting Manual for Highway Structures." The manual consists of two volumes: "Part 1 – Bridges," and "Part 2 - Retaining Walls, Tunnels, Culverts, Slopes and Pavements." Both are available through FHWA or MCEER. On Sunday July 27, a one-day workshop will be held as part of this conference for participants interested in Part 1 of the manual and new seismic design specifications.

Funded by the National Science Foundation (NSF), the Network Earthquake Engineering Simulation (NEES) system has provided better facilities for advancing seismic engineering technologies and increasing seismic performance. Many technical papers presented at this conference have benefited from NEES support. For example, in cooperation with Japan, FHWA is working together with NSF/NEES, Caltrans, and other State DOTs to conduct a full-scale bridge column test on the world's largest shake table in Kobe, Japan. We hope that this test will increase our understanding of the impact of scale effects in experimental testing.

Since our 2006 conference in San Francisco, many more deadly earthquakes have occurred around the world. Most recently, the great Wenchuan earthquake struck the Sichuan province of China, where more than 70,000 people died in an 8.0 magnitude earthquake. During the opening ceremonies, I would like to invite you to join me in a one-minute silent prayer to remember the people who have lost their lives in these devastating earthquakes.

I would like to express my sincere appreciation to the Steering Committee, Technical Committee, Local Organizing Committee (SCDOT) and MCEER staff for their guidance and assistance in organizing this conference. Particularly, I appreciate the dedication of Mr. Jerome O'Connor (Conference Coordinator), and Mr. Michael Keever and Ms. Lucero Mesa (co-chairs of the Technical Committee), who have spent a great deal of time working on this conference. Without them, this conference could not have been successfully accomplished.

My very special thanks go to our honorary chairman, Mr. King Gee, and Mr. Myint Lwin, FHWA's Chief Bridge Engineer, for their leadership, guidance and support. I would like to express my appreciation to our host agency, South Carolina Department of Transportation and to all the individuals listed on the Acknowledgements page of this program for all their hard work.

I would also like to thank all the presenters, session chairs and exhibitors for their support in helping to make this conference a success. Last, but not least, I thank all the participants who have traveled from near and far to attend this conference. I hope you will all have an excellent time in the Charleston area, while gaining valuable technical knowledge and making lasting friendships through the activities of this conference.

Finally, I am pleased to announce that FHWA is working together with other countries to establish an international bridge seismic engineering committee, and to continue to use this conference as a vehicle to exchange and disseminate up-to-date technology. The next national seismic conference on bridges and highways will expand this international involvement, and is planned for late 2010. The specific date and location will be announced soon.

W. Phillip Yen, Ph.D., P.E.
Office of Infrastructure, R&D
Federal Highway Administration

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ACKNOWLEDGEMENTS

HONORARY CONFERENCE CHAIRMAN

King Gee, Federal Highway Administration, Associate Administrator for Infrastructure

STEERING COMMITTEE

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Jerome O'Connor, MCEER, University at Buffalo (Conference Coordinator)

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Kevin Thompson, California Department of Transportation

Ed Wasserman, Tennessee Department of Transportation

PREVIOUS NATIONAL SEISMIC CONFERENCE CHAIRS

Roland Nimis, California Department of Transportation

San Diego, California, 1995 (First Conference)

Sacramento, California, 1997 (Second Conference)

Portland, Oregon, 2002 (Third Conference)

Ed Wasserman, Tennessee Department of Transportation and

Paul Sharp, Federal Highway Administration

Memphis, Tennessee, 2004 (Fourth Conference)

W. Phillip Yen, Federal Highway Administration and Kevin Thompson, California Department of Transportation

San Mateo, California, 2006 (Fifth Conference)

TECHNICAL COMMITTEE

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Juan Caicedo, University of South Carolina

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E.V. Leyendecker, United States Geological Survey

Derrell Manceaux, Federal Highway Administration

Richard Pratt, Alaska Department of Transportation

J. Jerry Shen, Federal Highway Administration

Li-Hong Sheng, California Department of Transportation

Paul Somerville, URS Corp.

Daniel H. Tobias, Illinois Department of Transportation

Joe Wang, Parsons Brinkerhoff Quade & Douglas, Inc.

Saiying Zhou, South Carolina Department of Transportation

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Tina Hembree, South Carolina Department of Transportation (Co-Chair)

Ken Johnson, Federal Highway Administration, South Carolina Division

Lucero Mesa, South Carolina Department of Transportation

Nathalia Rodriguez, South Carolina Department of Transportation

Saiying Zhou, South Carolina Department of Transportation

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(Steering Committee Liaison)

Juan Caicedo, University of South Carolina (Event Coordinator)

John Walsh, South Carolina Department of Transportation

Nathalia Rodriguez, South Carolina Department of
Transportation

Saiying Zhou, South Carolina Department of Transportation

Genda Chen, Missouri University of Science & Technology
(Judge)

Derrell Manceaux, Federal Highway Administration (Judge)

Stephen Maher, Transportation Research Board (Judge)

SPECIAL EVENTS COORDINATORS

AASHTO T3 Q&A Session
Kevin Thompson, California Department of Transportation

AASHTO T5 Q&A Session
Hossein Ghara, Louisiana Department of Transportation

Companion Activities
Susan Johnson, South Carolina Department of Transportation

Exhibition
Tina Hembree, South Carolina Department of Transportation

On-site Registration
Shirley Jeffcoat, South Carolina Department of Transportation

Poster Session
Reginald DesRoches, Georgia Institute of Technology

Pre-Conference Workshop
Reggie Holt, Federal Highway Administration
Derrell Manceaux, Federal Highway Administration

Technical Boat Tour
Daniel Burton, South Carolina Department of Transportation
Tina Hembree, South Carolina Department of Transportation

Transportation Coordinator
Cal Murray, South Carolina Department of Transportation



A Charleston Landmark!

Parsons Brinckerhoff (PB) was the lead design firm and engineer of record for the design-build team that delivered Charleston's Arthur Ravenel, Jr. Bridge on behalf of the South Carolina Department of Transportation. PB designed the majestic cable-stayed crossing of the Cooper River to accommodate a 2,500-year seismic event and to withstand ship collisions and hurricane-force winds.

The result is a landmark bridge that is beautiful, functional—and safe.

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