

# ATC-57

## The Missing Piece: Improving Seismic Design and Construction Practices

by

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## PREFACE

In 2001, the Applied Technology Council (ATC) commenced a broadly based effort to define a problem-focused knowledge development, synthesis and transfer program to improve seismic design and construction practices. Input was sought from seismic design and construction industry leaders, and a Workshop was convened in the summer of 2002 to develop the program. THE MISSING PIECE: IMPROVING SEISMIC DESIGN AND CONSTRUCTION PRACTICES is the result of an industrial collaboration. It provides a framework for creating a knowledge bridge and allows the nation to more fully realize its NEHRP (National Earthquake Hazards Reduction Program) investment in practical terms—safer buildings.

THE MISSING PIECE: IMPROVING SEISMIC DESIGN AND CONSTRUCTION PRACTICES had its genesis in the strategic planning process for NEHRP, which was undertaken by the Federal Emergency Management Agency (FEMA) from 1998 to 2001. In the course of that strategic planning process, representatives from the design and construction industry determined and documented, as one of their major findings, that a technology transfer gap has emerged within NEHRP, and that it limits the adaptation of basic research knowledge into practice. To resolve this problem, industry participants recommended that NEHRP agencies develop a much-expanded, problem-focused knowledge development, synthesis and transfer program that will:

1. Develop standards and guidelines that incorporate the best knowledge available in a practical way.
2. Facilitate the development of new mitigation technologies.
3. Improve the productivity of the engineering and construction industries.

Included in this report are:

- A definition of what needs to be done;
- Background information on the impetus for THE MISSING PIECE: IMPROVING SEISMIC DESIGN AND CONSTRUCTION PRACTICES program, on how technology transfer works, and a history of the decline in engineering and construction productivity in the United States; and
- THE MISSING PIECE program plan

THE MISSING PIECE: IMPROVING SEISMIC DESIGN AND CONSTRUCTION PRACTICES program emphasizes two subject areas, with a total of five Program Elements proposed:

- ***Systematic support of the seismic code development process.***
  - Program Element 1** Provide technical support for the seismic practice and code development process.
  - Program Element 2** Develop the technical basis for performance-based seismic engineering by supporting problem-focused, user-directed research and development.
- ***Improve seismic design and construction productivity.***
  - Program Element 3** Support the development of technical resources (e.g., guidelines and manuals) to improve seismic engineering practice.
  - Program Element 4** Make evaluated technology available to practicing professionals in the design and construction communities.

**Program Element 5** Develop tools to enhance the productivity, economy and effectiveness of the earthquake resistant design and construction process.

Also included in this report are six issue papers commissioned to develop the basis for the proposed program, along with a list of project participants and other supplementary information.

ATC gratefully acknowledges the broad range of industry representatives who participated in the process. Charles C. Thiel Jr. served as the report editor and is the principal architect of the report. The project Steering Committee consisted of James E. Beavers, Lloyd Cluff, James M. Delahay, Robert D. Hanson, James Harris, Richard E. Neal, Christopher Rojahn, Paul Somerville, Charles C. Thiel, Jr., and Charles H. Thornton. The issue paper authors consisted of Edwin T. Dean, Ronald T. Eguchi, Ronald O. Hamburger, Roberto Leon and selected Steering Committee members. Workshop participants consisted of the above named individuals as well as Daniel Abrams, Gerald Brady, Joe Brewer, James Cagley, Alan Carr, Gene Corley, Ian Friedland, John Gillengerten, Melvyn Green, Gayle Johnson, H. S. Lew, Lee Marsh, Ed Matsuda, Peter McDonough, Bernadette Mosby, Chris Poland, Maurice Power, Woody Savage, Charles Scawthorn, Tom Schlafly, Paul Senseny, Daniel Shapiro, Shyam Sunder, Susan Tubbesing, and Ray Zelinski. Gail H. Shea served as Production Editor and Michelle Schwartzbach served as the Report Production Specialist.

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Christopher Rojahn  
ATC Executive Director

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