

ATC-28

**Development of Guidelines
for Seismic Rehabilitation of Buildings**

Phase I:

Issues Identification and Resolution

by
APPLIED TECHNOLOGY COUNCIL
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Preface

In September 1989 the Federal Emergency Management Agency (FEMA) awarded the Applied Technology Council (ATC) a three-year contract to identify and resolve issues that will affect the development of Guidelines for seismic rehabilitation of existing buildings. The project has been identified by FEMA as Phase I of a two-phase effort, with the Guidelines themselves being developed under a separate contract in Phase II. The Guidelines are expected to become the nationally accepted basis for seismic rehabilitation and are intended for use by the design professions, building codes and standards writers and administrators, researchers, and educators.

The two-phase strategy of FEMA is based on the recognition that the writing of the detailed Guidelines will be greatly facilitated by this preparatory study of technical and societal issues. Both of these phases build upon earlier work on existing buildings funded by FEMA as part of the National Earthquake Hazards Reduction Program (NEHRP). Such work has included the development of methods for rapid and detailed evaluation of existing buildings; techniques for seismic rehabilitation of buildings; studies of rehabilitation costs, its societal benefits and methods to minimize its negative effects.

This ATC-28 issues and solutions report, developed over a 15-month period, underwent numerous reviews and revisions by the project participants and Project Advisory Panel prior to the preparation of an Interim Report, which was issued January 8, 1991. An earlier version of this report was also reviewed in a workshop setting by approximately 35 individuals from around the United States representing the various user groups that will eventually be affected by nationally applicable seismic rehabilitation Guidelines. The Users Workshop was organized by the Earthquake Engineering Research Institute.

The Interim version of the ATC-28 report was submitted to the American Society of Civil Engineers (ASCE) in January, 1991 for an 18-month consensus review and approval process. The consensus process was completed in August, 1992, after which ATC revised the Interim version to produce this final report, which incorporates the

ASCE recommended changes verbatim.

Background technical information of this report and a description of the development process are provided in the comparison report, ATC-28-1, *Development of Guidelines for Seismic Rehabilitation of Buildings, Phase I: Issues Selection and Development, Issue Consultant Papers, and ASCE Consensus Approval Process.*

This report was developed through the efforts of numerous individuals. Christopher Arnold and William Holmes served as Co-Principal Investigators of the project and provided the primary technical leadership. Robert Reitherman was the Report Preparation Consultant and was responsible for writing the main body of the report and reflecting the input of the numerous project participants.

The Project Advisory Panel members, who provided overall review and guidance for the project were: S.T. Algermissen, James E. Amrhein, Robert A. Bruce, Craig D. Comartin, Mary Comerio, W. Gene Corley, Donald K. Jephcott, James O. Jirsa, Franklin Lew, H.S. Lew (FEMA Technical Monitor), Charles Lindbergh, Hank Martin, H. Crane Miller, Joseph P. Nicoletti, Chris D. Poland, David Prowler, Lawrence D. Reaveley (ATC Board Representative), Daniel Shapiro, William Sommers, Ted L. Winstead, and Barbara Zeidman.

The consultants to ATC who wrote background issue papers and assisted in drafting material that appears in this report were: Eric Elsesser, Melvyn Green, James O. Jirsa, James Lai, H. Crane Miller, Joseph P. Nicoletti, Joanne Nigg, Roland L. Sharpe, Kathleen J. Tierney, Robert Whitman, and John Wiggins.

Susan Tubbesing, EERI Executive Director, was responsible for organizing the Users Workshop, and Ed Jones, ASCE Director of Codes and Standards, has carried out the responsibility for conducting the ASCE consensus review and approval process.

The affiliations of the above-named project participants are provided in Appendix A. Names

and affiliations of the participants in the EERI-organized Users Workshop are provided in Appendix B. Appendix C lists the individuals who participated in the ASCE consensus approval process.

ATC gratefully acknowledges the valuable assistance, support and cooperation provided by Ugo Morelli, FEMA Project Officer.

Christopher Rojahn (Principal Investigator)
Executive Director
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