

ACI 550.4M-18

An ACI Standard

Qualification of Precast Concrete Diaphragm Connections and Reinforcement at Joints for Earthquake Loading (ACI 550.4M-18) and Commentary (ACI 550.4RM-18)

Reported by Joint ACI-ASCE Committee 550



American Concrete Institute
Always advancing

This is a preview. [Click here to purchase the full publication.](#)



Qualification of Precast Concrete Diaphragm Connections and Reinforcement at Joints for Earthquake Loading (ACI 550.4M-18) and Commentary (ACI 550.4RM-18)

Copyright by the American Concrete Institute, Farmington Hills, MI. All rights reserved. This material may not be reproduced or copied, in whole or part, in any printed, mechanical, electronic, film, or other distribution and storage media, without the written consent of ACI.

The technical committees responsible for ACI committee reports and standards strive to avoid ambiguities, omissions, and errors in these documents. In spite of these efforts, the users of ACI documents occasionally find information or requirements that may be subject to more than one interpretation or may be incomplete or incorrect. Users who have suggestions for the improvement of ACI documents are requested to contact ACI via the errata website at <http://concrete.org/Publications/DocumentErrata.aspx>. Proper use of this document includes periodically checking for errata for the most up-to-date revisions.

ACI committee documents are intended for the use of individuals who are competent to evaluate the significance and limitations of its content and recommendations and who will accept responsibility for the application of the material it contains. Individuals who use this publication in any way assume all risk and accept total responsibility for the application and use of this information.

All information in this publication is provided “as is” without warranty of any kind, either express or implied, including but not limited to, the implied warranties of merchantability, fitness for a particular purpose or non-infringement.

ACI and its members disclaim liability for damages of any kind, including any special, indirect, incidental, or consequential damages, including without limitation, lost revenues or lost profits, which may result from the use of this publication.

It is the responsibility of the user of this document to establish health and safety practices appropriate to the specific circumstances involved with its use. ACI does not make any representations with regard to health and safety issues and the use of this document. The user must determine the applicability of all regulatory limitations before applying the document and must comply with all applicable laws and regulations, including but not limited to, United States Occupational Safety and Health Administration (OSHA) health and safety standards.

Participation by governmental representatives in the work of the American Concrete Institute and in the development of Institute standards does not constitute governmental endorsement of ACI or the standards that it develops.

Order information: ACI documents are available in print, by download, through electronic subscription, or reprint, and may be obtained by contacting ACI.

ACI codes, specifications, and practices are made available in the ACI Collection of Concrete Codes, Specifications, and Practices. The online subscription to the ACI Collection is always updated, and includes current and historical versions of ACI's codes and specifications (in both inch-pound and SI units) plus new titles as they are published. The ACI Collection is also available as an eight-volume set of books and a USB drive.

American Concrete Institute
38800 Country Club Drive
Farmington Hills, MI 48331
Phone: +1.248.848.3700
Fax: +1.248.848.3701

www.concrete.org

This is a preview. Click here to purchase the full publication.

Qualification of Precast Concrete Diaphragm Connections and Reinforcement at Joints for Earthquake Loading (ACI 550.4M-18) and Commentary (ACI 550.4RM-18)

An ACI Standard

Reported by Joint ACI-ASCE Committee 550

Larbi M. Sennour*, Chair

Lance Osborne, Secretary

Suzanne Aultman
Roger J. Becker*
Te-Lin Chung
Ned M. Cleland*
Manuel Conde Fuentes
Thomas J. D'Arcy*
William K. Doughty
Semeh Ibrahim El Ashri

Alvin C. Ericson
Mostafa Mohamed Gad Alla
Harry A. Gleich
Neil M. Hawkins*†
Augusto H. Holmberg
L. S. Paul Johal
Jason J. Krohn*
Emily B. Lorenz

Kenneth A. Luttrell
Vilas S. Mujumdar
Clay J. Naito*
Clifford R. Ohlweiler
Victor F. Pizano-Thomen
Charles L. Pizzano
Jose I. Restrepo*
Sami H. Rizkalla

Mario E. Rodriguez*
Joseph C. Sanders*
James Schroder
John F. Stanton
P. Jeffrey Wang
Cloyd E. Warnes
Michael H. Weber

*Diaphragm Subcommittee members who developed this standard

†Diaphragm Subcommittee Chair.

Special thanks to S. K. Ghosh and S. Nakaki for their contributions to this standard.

*ACI 550.4M prescribes testing and evaluation requirements for mechanical connections and reinforcement at joints intended for use under the design provisions of **ASCE/SEI 7** and **ACI 318M** for precast concrete diaphragms subject to earthquake loading. These mechanical connections and reinforcement at joints transfer the vertical and in-plane forces between the precast concrete members that comprise the diaphragm, and between the diaphragm and vertical elements of the seismic-force-resisting system of the structure. The response of precast concrete diaphragms under earthquake loading depends not only on the strength of the connections and the reinforcement at joints, but also on their stiffness and*

*deformation capacities. The seismic forces specified in **ASCE/SEI 7** for the design of precast concrete diaphragms, including chords and collectors, in structures assigned to Seismic Design Category (SDC) C, D, E, or F are tied to the shear overstrength provided by the connections and the reinforcement at joints. This overstrength depends, in turn, on the design methodology, elastic or ductile, used for the diaphragm. **ACI 550.4M** prescribes the experimental procedures needed to assess the stiffness, strength, and deformation capacity of mechanical connections and reinforcement at joints for diaphragm flange-to-flange connections, including chord connections, of double-tee (DT) beams for earthquake loadings and evaluation procedures to categorize connection performance for use with the design procedures specified for precast concrete diaphragms in **ASCE/SEI 7** and **ACI 550.5M**. **ACI 550.4M** does not prescribe experimental procedures for assessing the same information for connections for hollow-core members used in the untopped condition.*

Keywords: connection category; diaphragm connections; precast concrete; qualification criteria; seismic design; test method..

ACI 550.4M-18 was adopted May 9, 2019, and published May 2019.

Copyright © 2019, American Concrete Institute.

All rights reserved including rights of reproduction and use in any form or by any means, including the making of copies by any photo process, or by electronic or mechanical device, printed, written, or oral, or recording for sound or visual reproduction or for use in any knowledge or retrieval system or device, unless permission in writing is granted by the American Concrete Institute.

ACI Committee Reports, Guides, and Commentaries are intended for guidance in planning, designing, executing, and inspecting construction. This document is intended for the use of individuals who are competent to evaluate the significance and limitations of its content and recommendations and who will accept responsibility for the application of the material it contains. The American Concrete Institute disclaims any and all responsibility for the stated principles. The Institute shall not be liable for any loss or damage arising therefrom.

Reference to this document shall not be made in contract documents. If items found in this document are desired by the Architect/Engineer to be a part of the contract documents, they shall be restated in mandatory language for incorporation by the Architect/Engineer.

This is a preview. Click here to purchase the full publication.