

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

ACI 550.4M-18



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

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**American Concrete Institute**  
8800 Country Club Drive  
Farmington Hills, MI 48331  
Phone: +1.248.848.3700  
Fax: +1.248.848.3701

# 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

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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.

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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 topped condition.

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

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