

Acceptance Criteria for Special Unbonded Post-Tensioned Precast Structural Walls Based on Validation Testing and Commentary

An ACI Standard

Reported by ACI Innovation Task Group 5



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First printing
March 2008

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ISBN 070-8-87001-870-0

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This document applies to structures in regions of high seismic risk or to structures assigned to high seismic performance or design categories. It defines the minimum experimental evidence that can be deemed to satisfy the use of unbonded post-tensioned precast structural walls (shear walls) for bearing wall and building frame special reinforced concrete shear wall systems, as defined in ASCE/SEI 7-05, when those walls do not fully satisfy the intent of the prescriptive requirements of Chapter 21 of ACI 318-05. This document includes mandatory Acceptance Criteria and nonmandatory Commentary, and has been written in such a form that its requirements can be coordinated directly with the requirements for special precast structural walls in 21.8 of ACI 318-05. Among the subjects covered are requirements for the procedures that shall be used to design unbonded post-tensioned precast test modules and their configurations, as well as requirements for testing, reporting, and assessing satisfactory performance of the test modules.

The references of the Commentary provide documentary evidence, additional to the references of Chapter 21 of ACI 318R-05, that support the acceptance criteria. Consistent with the approach of ACI 318, no comparison is made, either in the body of the Acceptance Criteria or Commentary, of research results for precast test modules satisfying ACI 318 with those for modules that, although not satisfying ACI 318, do satisfy the Acceptance Criteria. Such comparisons, both experimental and analytical, are available in the Commentary references.

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In this document, consistent with the format of ACI 318-05, the word "Section" is not included before a reference to a section of ACI 318-05. To more clearly designate a section in this document, however, the word "Section" is used before any reference to a section of this document.

The section numbering for the Commentary is the same as that for the Standard, with numbers preceded by an "R" and the text in italics to distinguish them from the corresponding section numbers of the Standard.

Keywords: acceptance criteria; coupling element; drift; drift angle; energy dissipation; lateral resistance; post-tensioning; precast concrete; prestressed concrete; seismic design; shear wall; structural wall; test module; toughness.

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ACI ITG-5.1-07 was adopted October 24, 2007 and published March 2008.
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