



**To:** Parties Interested in Post-installed Mechanical and Adhesive Anchors in Concrete

**From:** Kurt Stochlia P.E./Brian Gerber S.E.

**Date:** August 18, 2006

**Subject:** General Questions Regarding Post-installed Mechanical and Adhesive Anchors in Concrete

**MEMO**

ICC-ES has been requested to clarify several issues involving the subject and its relationship to the *International Building Code*® (IBC) and the role ICC-ES plays in the evaluation of anchorage to concrete.

Questions that have been raised are indicated below in italics, and are followed by the ICC-ES response.

*Since the codes in some instances do not provide specific requirements for the anchors, how are these anchors evaluated for code compliance?*

Section 104.11 of the IBC states in part:

***The provisions of this code are not intended to prevent the installation of any material or to prohibit the design or method of construction not specifically prescribed by this code, provided that any such alternatives has been approved.***

In order to show compliance with IBC Section 104.11, manufacturers may provide research reports in accordance with Section 104.11.1 and/or test their products in accordance with Section 104.11.2. Product-specific evaluation service reports (ESRs) issued by ICC-Evaluation Service (ICC-ES) are typically based on both research reports and testing and offer one means of demonstrating compliance with the code. Research reports and test data as submitted by the report applicant are evaluated under acceptance criteria approved by the ICC-ES Evaluation Committee and used by the ICC-ES staff to evaluate products.

*What has recently changed in the way ICC-ES reviews post-installed concrete anchors?*

ESRs for post-installed anchors in concrete have in the past been based on allowable stress design (ASD) criteria (AC01, AC58 and AC106) under the 2000 IBC. A transition period occurred beginning with the 2003 IBC code cycle. New criteria (AC193 and AC308) were developed to address strength design, seismic considerations and cracked concrete. As of January 1, 2007, ICC-ES will be using the 2006 IBC. Therefore, AC01, AC58 and AC106 will no longer be applicable for anchorage to concrete products complying with the 2006 IBC.

## Post-installed Mechanical and Adhesive Anchors in Concrete

New criteria for post-installed anchors in concrete as issued by ICC-ES are as follows:

- AC193, Acceptance Criteria for Mechanical Anchors in Concrete Elements
- AC308, Acceptance Criteria for Post-installed Adhesive Anchors in Concrete

AC193 has as its basis the current evaluation and strength design requirements in ACI 355.2, Qualification of Post-Installed Mechanical Anchors in Concrete; and ACI 318, Building Code Requirements for Structural Concrete.

Section 1913.1 of the 2006 IBC contains the following text (similar text occurs in the 2003 IBC):

***Expansion anchors and undercut anchors installed in hardened concrete shall be designed in accordance with Appendix D of ACI 318 as modified by Section 1908.1.16, provided they are within the scope of Appendix D.***

ACI 318 Section D.2.3 in turn provides the following:

***The suitability of the post-installed anchor for use in concrete shall have been demonstrated by the ACI 355.2 prequalification tests.***

AC308 was developed by interested parties and approved by the ICC-ES Evaluation Committee, to allow adhesive anchors to be an alternative to expansion and undercut anchors (AC318-Appendix D and ACI 355.2) The new acceptance criteria is intended to provide evidence of compliance with code requirements.

*What impact do these new criteria have?*

The qualification and design of anchors under the new requirements and criteria differ substantially from past practice. It should not be assumed that anchors qualified under the older ASD criteria will satisfy the new criteria or that anchor designs prepared on the basis of previous editions of the code will satisfy the requirements of ACI 318 Appendix D.

In addition, note that Section 1704.13 of the 2006 IBC requires special inspection for:

***3. Materials and systems required to be installed in accordance with additional manufacturer's instructions that prescribe requirements not contained in this code or in standards referenced by this code.***

Unlike past criteria which permitted special inspection to be waived in certain circumstances, AC193 requires continuous special inspection for mechanical (expansion, undercut) anchors *in all cases*. Inspection requirements are set forth in the relevant ESR. For adhesive anchors, AC308 offers two options for inspection (periodic inspection or continuous special inspection), based on the test data submitted in accordance with Section 11.24 in AC308. The specific requirements for special inspection are in the relevant ESR.

If you have any questions or concerns regarding the contents of this letter, please contact Kurt Stochlia at (562) 699-0543, extension 3252. You may also reach us by email at [es@icc-es.org](mailto:es@icc-es.org).