

CODE CORNER

EVALUATION REPORTS: SERVE AS VALUABLE TOOLS FOR CODE USERS, POSE CHALLENGES FOR MANUFACTURERS

With constant code changes and the scramble among manufacturers to make sure their products comply with the newer codes, there can be confusion in the specification community as to which products are approved for use in the field.

To help our customers better understand these issues, it's important to first review the product evaluation process and then discuss some of the specific product lines that have been affected by new code changes.

Product Evaluation Process

Products that are not specifically mentioned in building codes must have some mechanism for determining if the products comply with the code. For example, the International Building Code[®] (IBC) does not say "Use an HUS26 to support the ends of joists," but it does say "Connections depending on joist hangers or framing anchors, ties and other mechanical fastenings not otherwise covered are permitted where approved. The vertical load-bearing capacity, torsional moment capacity and deflection characteristics of joist hangers shall be determined in accordance with Section 1715.1."

So in order to approve the hanger, a code official would need to determine if it was tested and evaluated as required in Section 1715. There are two ways code officials can assess this; they can personally review the manufacturer's testing and calculations required by 1715.1, or they can rely on an evaluation report published by a product evaluation agency. Understandably, many code officials choose to rely on evaluation reports.

To achieve an evaluation report, a manufacturer must submit product information and testing to evaluation agencies like ICC-ES and IAPMO ES. These evaluation services evaluate the building products based on Acceptance Criteria. Products that meet the Acceptance Criteria receive an evaluation report, stating that the product either complies with the code or is an alternate to what is specified in the code. Engineers, specifiers and contractors may rely on these reports to determine whether to specify or purchase a particular product while code officials use them to verify approval.

As described above, in some cases the approval criteria for a product is spelled out in the code. For many other types of products though, the code and its referenced standards are not as specific as to how to evaluate a product. In these cases, IBC Section 104.11 states that "An alternative material, design, or method of construction shall be approved where the building official finds that the proposed design is satisfactory and complies with the intent of the provisions of the code."

If the code does not specify how a product is to be evaluated, then it's typically up to the evaluation agency, working in conjunction with manufacturers and interested parties, to develop a specification on how to evaluate a product, which is known as an Acceptance Criteria or an Evaluation Criteria. The challenges for evaluation agencies and manufacturers are first to develop separate evaluation criteria for each type of product and then to revise the criteria whenever the applicable building code changes or when other changes are merited.

Developing the Acceptance Criteria and then providing documentation in accordance with new requirements is a time intensive process and helps explain why some products may have evaluation reports for older codes, but not for newer ones. In many cases, it's not that the product does not comply with the newer code, but more likely that the Acceptance Criteria for the newer code has not been developed; the manufacturer is in the process of submitting their updated product information to the evaluation agency; or the agency has not yet completed their review of the submitted information.

Two Simpson Strong-Tie[®] product lines without specific evaluation criteria in the IBC, include Steel Strong-Wall[®] prefabricated shearwalls and Simpson Strong-Tie Anchor Systems[®] post-installed adhesive anchors for concrete. Changes in the IBC and in ICC-ES Acceptance Criteria have affected the evaluation reports for these products and therefore should be discussed in more detail.

Anchors In Concrete

Our anchor systems products have been affected by changes to referenced standards in the IBC. The 2000 IBC contained new provisions for the strength design of cast-in-place concrete anchors that became part of ACI 318-02 Appendix D. Once ACI 318-02 was completed, it was referenced in the 2003 IBC for the design of concrete. For the first time, that standard contained a mandatory Appendix D that outlined design requirements for both cast-in-place anchors (e.g. headed studs, headed bolts, J-bolts and L-bolts), and post-installed expansion and undercut anchors

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SERVICE UPDATE

VOLUNTEERS TRAVEL TO GULF COAST FOR HABITAT PROJECT

Simpson Strong-Tie volunteers from across the country traveled to the Gulf Coast in May to work alongside former U.S. President and Nobel Peace Prize laureate Jimmy Carter and his wife, Rosalynn. Simpson Strong-Tie employees joined thousands of volunteers to build 30 new homes, rehabilitate 30 existing homes and frame up to 48 more in the host cities of Biloxi, Gulfport and Pascagoula, Mississippi. This weeklong build was part of the 25th annual Jimmy and Rosalynn Carter Work Project hosted by Habitat for Humanity of the Mississippi Gulf Coast.

The build helps further Habitat's mission of providing simple, decent and affordable housing for families in need while raising awareness of the ongoing recovery efforts taking place along the Gulf Coast. Fifteen Simpson Strong-Tie employees and three customers spent the week hammering, painting and landscaping to complete the Habitat houses.

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SAFETY UPDATE

SIMPSON STRONG-TIE RAISES AWARENESS ABOUT DECK SAFETY

Many Americans view adding a deck to their home as a simple, Do-It-Yourself project for a summer weekend. However, over the last ten years, there have been more than 800 reported injuries and 20 deaths as a result of deck collapse. This past June, marked the fifth anniversary of the tragic Chicago deck collapse, which killed 13 and injured 57 people. Causes of deck failure typically are poor construction and improper maintenance.

To help raise awareness about the prevalence of deck collapse, Simpson Strong-Tie teamed up with the North American Deck and Railing Association, the American Society of Home Inspectors and The Home Depot to kick off a deck safety campaign targeting homeowners. Simpson Strong-Tie and The Home Depot hosted several events throughout May to demonstrate safe deck construction techniques and the warning signs of a poorly constructed deck. Two decks, 8 feet wide by 6 feet deep and 7 feet tall, were built side by side – a safe deck and an unsafe deck. Homeowners could see firsthand the key connections on the safe deck and the problems on the unsafe deck. Events were open to the public and held in Long Island, Seattle, Atlanta and Chicago – cities that have had their share of deck failures. The demonstration

concluded with a simulated deck collapse, showcasing the most common type of failure – at the ledger where the deck attaches to the house.

Coincidentally, two actual deck collapses occurred in the Seattle area during the weekend of our event, further emphasizing the need to inspect decks and make the necessary upgrades. Fortunately, no one was seriously injured in either collapse.

“Our goal is to help educate homeowners about proper deck design and construction,” said Ricardo Arevalo, S.E., structural engineer for Simpson Strong-Tie. “We want people to think of their deck as an extension of their home and make sure it’s structurally sound. We stress the importance of building with a continuous load path as well as proper inspection and maintenance.”

Our deck safety message received both local and national media attention, including a story on NBC’s Today Show and in USA Today. To learn more about Simpson Strong-Tie deck safety efforts and to download a copy of the *Deck Framing Connection Guide*, visit www.strongtie.com/safedek. ■



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(excluding adhesive anchors, powder actuated fasteners and specialty inserts). While these new requirements were significantly different and more rigorous than design and analysis methods that had been used in the past, they also significantly reduced the strength of concrete anchors compared with previous methodologies.

Along with ACI 318-02 Appendix D, the American Concrete Institute also published a new test standard, ACI 355.2-01, *Evaluating the Performance of Post Installed Mechanical Anchors in Concrete*. This test standard became the basis for the new ICC-ES Acceptance Criteria AC193 for Mechanical Anchors in Concrete. In addition to AC193, ICC-ES adopted a new Acceptance Criteria AC308 for Post-Installed Adhesive Anchors in Concrete. These new Acceptance Criteria take into consideration the new provisions of Appendix D. Since these new criteria covered strength design and concrete only, the old ICC-ES Acceptance Criteria for adhesive anchors and mechanical anchors (*AC508 and AC01, respectively*) were revised so that they applied only to masonry elements.

Once the new Acceptance Criteria were published, ICC-ES revised manufacturers’ existing evaluation reports to remove recognition for post-installed anchors in concrete. New evaluation reports for post-installed anchors in concrete require extensive testing efforts using the new Acceptance Criteria. For example, tests now have to be performed in cracked and uncracked concrete, in cleaned and partially cleaned holes, and in dry and water saturated holes. Furthermore, anchors have to be creep tested at two temperatures, tested in cracked concrete where the crack width is cycled and tested in cracked concrete under a simulated seismic test. This is in addition to the many embedment depths, spacing and edge distances, and load directions that must be tested for each anchor size.

Simpson Strong-Tie is in the process of completing this laborious effort. Currently, our Strong-Bolt® anchor carries a 2006 I-Code evaluation report for concrete that is in compliance with AC193. Our Titen HD® anchor has been tested in accordance with AC193, and a 2006 I-Code evaluation report for this anchor in concrete will be available soon. Our two new adhesive anchor products, SET-XP™ Epoxy-Tie® Adhesive and the IXP™ Adhesive Anchor Insert, have been tested in accordance with AC308 and are expected to have an ICC-ES evaluation report by the end of the year. Check www.simpsonanchors.com for the latest information about our anchor product line.

Prefabricated Shearwalls

Our Steel Strong-Wall® products also have been affected by the Acceptance Criteria process. When first introduced, ICC-ES did not have an Acceptance Criteria for steel prefabricated shearwall panels. In its current ICC-ES evaluation report (ESR-1679), this product was evaluated under the 1997 Uniform Building Codes® and the 2000 I-Codes.

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ADVISORY COMMITTEE WORKS TO IMPROVE ICC-ES PROCESS

While it is incumbent on manufacturers to provide complete, accurate and thorough information to evaluation agencies like ICC-ES and IAPMO ES, it is the responsibility of the evaluation agencies to provide timely service and technical consistency for all evaluation reports. In 2007, the ICC-ES Board of Directors established an industry advisory committee whose purpose is to offer recommendations for improved communication and customer service on the part of ICC-ES and to advise the ICC-ES Board of Directors on matters affecting the working relationships and cooperative efforts between ICC-ES and its report holders and users. This Evaluation Services Advisory Committee has several current initiatives, including:

- To evaluate ways to help ensure consistent application of technical decisions within ICC-ES to all evaluation report applicants.
- To identify ways to improve communications throughout the Acceptance Criteria public comment and approval process and as a result, speed up the process.

There have been instances where evaluation report applications for similar or related products have not been examined with the same consistency resulting in misleading, incomplete and in some cases, incorrect information. Users and those relying on evaluation reports should look at each report to be sure they adequately address all aspects of the use of the product. These are the type of issues the committee hopes to address by providing recommendations to ICC-ES. ■

WORKSHOPS & TRAINING

NORTHEAST

Continuous Load Path – Wood Framed Structures

West Long Branch, New Jersey	Wednesday, August 13
Louisville, Kentucky	Thursday, September 4
Columbia, Maryland	Wednesday, September 17
Portsmouth, New Hampshire	Wednesday, September 24
Grand Rapids, Michigan	Wednesday, October 8
Omaha, Nebraska	Wednesday, October 22

Simpson Strong-Tie Anchor Systems® for Engineers & Architects

Eagan, Minnesota	Wednesday, August 27
Newark, New Jersey	Wednesday, September 10
Dedham, Massachusetts	Wednesday, September 17
Waukesha, Wisconsin	Wednesday, September 17
Blacksburg, Virginia	Wednesday, September 24
Rosemont, Illinois	Wednesday, October 15
King of Prussia, Pennsylvania	Wednesday, October 22

Wall Bracing Seminar

Eagan, Minnesota	Wednesday, October 1
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SOUTHEAST

Builders, Contractors, & Developers Workshop

Jacksonville, Florida	Thursday, August 21
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Introduction to High Wind Design & Construction

Myrtle Beach, South Carolina	Wednesday, October 22
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Construction Using the High Wind Framing Connection Guide

Myrtle Beach, South Carolina	Thursday, October 23
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High Wind Design & Detailing (Two Day Seminar)

McKinney, Texas	Thursday, October 16 and Friday, October 17
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Introduction to Simpson Strong-Tie Anchor Systems®

McKinney, Texas	Thursday, September 11
Jacksonville, Florida	Wednesday, September 24

NORTHWEST

Simpson Strong-Tie Anchor Systems®

Portland, Oregon	Tuesday, September 23
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Authorized Stocking Dealer

Stockton, California	Tuesday, October 28
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Building Officials & Inspectors Workshop

Stockton, California	Tuesday, September 9
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Contractors, Builders, & Developers Workshop

Stockton, California	Thursday, October 16
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Engineers, Architects, & Specifiers Workshop

Stockton, California	Tuesday, September 16
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SOUTHWEST

Connector Workshop For Building Officials & Inspectors

Brea, California	Thursday, August 7
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Connector Workshop For Contractors, Builders, & Developers

Brea, California	Thursday, September 11
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Connector Workshop For Design Professionals

Brea, California	Thursday, October 8
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Simpson Strong-Tie Anchor Systems®

Brea, California	Thursday, September 25
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Virginia Tech University presents Repair Design for New and Existing Wood Trusses on October 15-17.

The professional and practical repair of new metal-plate-connected wood trusses and the repair of existing truss systems are demonstrated in this course (15 hours, 1.5 CEU's). Visit <http://www.cpe.vt.edu/sdww/> for details or call (540) 231-5182.

ICC has selected Simpson Strong-Tie to present two of the 23 Educational Programs that will be offered during the 2008 International Code Council Annual Conference & Final Action Hearings, September 14-23 at the Minneapolis Convention Center.

Monday, September 15, 2008

Session 8: Wall Bracing Using the 2006 IRC

Tuesday, September 16, 2008

Session 21: Inspecting Wood Framed Construction Using the IRC

For more information on the classes and conference, visit <http://abm.iccsafe.org/2008>.

For more information regarding workshop content and for a complete schedule, visit the Workshops and Training section of our website at www.strongtie.com/workshops.

LITERATURE UPDATE

NEW SIMPSON STRONG-TIE ANCHOR SYSTEMS® CATALOG & CD

The new 2008 Simpson Strong-Tie Anchor Systems catalog and CD are now available. The catalog features several new products, such as the SET-XP™ adhesive, the IXP™ anchor, the Titen HD® rod hanger and the Titen HD® mini anchor. Ultimate Strength Design load tables have been included for the SET-XP adhesive, the IXP anchor, the Strong-Bolt™ anchor and the Titen HD anchor. The catalog also lists our line of products that meet the new test criteria for 'cracked concrete' referenced in the 2006 International Building Code®.

The Anchor Systems CD includes a PDF of the catalog along with product fliers, technical bulletins, material safety data sheets, and code report and submittal information. It also features such handy tools as anchor designer software, a crack repair video, an adhesive cartridge estimator, drill bit selector and powder actuated tool operator manuals.

To request a copy of the catalog and CD, visit www.simpsonanchors.com. ■



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came from California, Ohio, Texas, Mississippi, Louisiana, North Carolina and Alabama.

Simpson Strong-Tie provided a cash donation as well as all of the structural connectors for the 30 new homes built during the weeklong project. The company also donated product for homes that will be rehabilitated or built at a later date.

As a long time supporter of Habitat for Humanity, Simpson Strong-Tie reinforced its commitment in 2007 when it announced that it would make a \$1 million donation to the organization – the donation made up of cash and products spans a four-year period. The donation is being used to help underwrite local Habitat for Humanity house projects across North America as well as national programs, such as the Jimmy and Rosalynn Carter Work Project and the Home Builders Blitz. For more information about our Habitat involvement, visit www.strongtie.com and click on About Us – Habitat for Humanity. ■



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Over the past few years, ICC-ES along with industry (*Simpson Strong-Tie, other manufacturers, design engineers, academia, associations, etc.*) have developed new Acceptance Criteria for this type of product, which resulted in the publishing of AC322 in October of 2007 – *Acceptance Criteria For Prefabricated, Cold-Formed, Steel Lateral-Force-Resisting Vertical Assemblies*. Part of the criteria contained in the new AC322 for steel panels was carried into the existing requirements for wood shear panels, AC130. Working under the new AC322 and the revised AC130, which took effect March 1, 2008 and November 1, 2007 respectively, Simpson Strong-Tie is currently completing the testing and analysis required to obtain an evaluation report for these products for the 2006 IBC and IRC. In the meantime, many building departments have developed interim guidelines for acceptance of prefabricated shearwall panels until 2006 IBC/IRC evaluation reports can be obtained. Check with your local code official for their policy.

One other important item regarding ICC-ES Evaluation Reports is the creation of a new report for Simpson Strong-Tie connectors, ESR-2523. This is what's called an "Index Report." It does not contain any technical information, but instead lists every stamped (*automated*) and welded connector that has an ICC-ES evaluation report and the respective report number. Connectors included in ICC-ES Evaluation Reports will be identified by a label or stamp containing this number, which provides an easy-to-use method for building inspectors to verify approval. ■

Code Corner is written by engineer Randy Shackelford, P.E. of Simpson Strong-Tie. When he's not attending code hearings, he can be reached at rshackelford@strongtie.com.



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STRUCTURAL REPORT

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