DSA BU 17-02

BULLETIN: POWER-DRIVEN FASTENERS ATTACHING WOOD STRUCTURAL PANEL SHEATHING DIAPHRAGMS TO COLD-FORMED STEEL FRAMING

PURPOSE: To inform clients of the Division of the State Architect's (DSA) policy regarding use of power-driven fasteners to attach wood structural panel (WSP) sheathing diaphragms to cold-formed steel (CFS) framing. This bulletin updates and supersedes a December 13, 2013 DSA memo on this topic.

DISCUSSION: The California Building Code (CBC) does not contain design values for power-driven fasteners attaching WSP sheathing diaphragms to cold-formed steel framing. In order to use these fasteners, the alternate materials design provisions indicated in California Administrative Code (CAC) Section 4-304 must be used; these provisions require sufficient testing to demonstrate an equivalent level of safety. Typically, manufacturers will demonstrate equivalency by submitting test data and obtaining a listing through a certified evaluation service (e.g. International Code Council [ICC] Evaluation Services [ES]) in accordance with DSA IR A-5.

Prior to 2004, ICC ES had no published acceptance criteria to uniformly evaluate power-driven fasteners used in such application. In 2004, ICC ES created Acceptance Criteria (AC) 262, "Horizontal Diaphragms Consisting of Wood Structural Panel Sheathing Attached to Cold-Formed Steel Framing," and the testing for power-driven fasteners was based on diaphragm testing in accordance with the American Iron and Steel Institute (AISI) Cold-Formed Steel Design Manual. Diaphragm testing within the 2002 AISI Manual is found in Section VI under the excerpt titled "Cantilever Test Method for Cold-Formed Steel Diaphragms" which specifies a full-scale testing procedure. AC 262 was editorially revised in September 2010 and February 2014, and was re-issued in June 2016. The 2010 and 2014 versions of AC 262 also reference the 2002 AISI Manual for diaphragm testing, while the 2016 version of AC 262 references AISI S213-07 but no longer references a full-scale diaphragm testing procedure.

In public correspondence prior to their June 2016 Evaluation Committee hearing, ICC ES acknowledged that the Cantilever Test Method for Cold-Formed Steel Diaphragms (currently AISI S907) does not provide adequate detail for the construction of WSP sheathing diaphragm - CFS framing test assemblies. ICC ES noted that they considered referencing ASTM E455 in AC262 but ultimately did not receive sufficient input to reach consensus on updating the full-scale diaphragm testing requirements.

However, in 2016, AISI issued a new standard, S240-15, which combines several previously separate publications, including S213, into one document. AISI S240-15 Section B5.4 replaces the former AISI S213-07 Section D. AISI S240-15 Section B5.4 references ASTM E455 for diaphragm testing for cold-formed steel roof or floor assemblies having non-steel sheathing. The upcoming 2018 IBC/2019 CBC will adopt AISI S240-15. Therefore, DSA will accept evaluation reports prepared in accordance with AC 262 which utilize ASTM E455 for diaphragm testing.

Effective with the 2013 CBC, DSA required the listings for power-driven fasteners attaching WSP sheathing to CFS framing to comply with ICC AC 262 or equivalent for horizontal diaphragm application. Effective with the 2016 CBC, DSA will continue to enforce this requirement that evaluation reports comply with AC 262 or equivalent. The diaphragm values listed in the report must be supported by full-scale testing. Acceptable full-scale testing procedures include AISI S907, ASTM E455, or equivalent.

This bulletin is to alert manufacturers and designers to these DSA requirements for all 2013 and 2016 CBC projects and pre-check (PC) designs. If a power-driven fastener manufacturer has not obtained approval by an evaluation service in accordance with ICC AC 262 or equivalent, but has performed such testing and submitted it to the evaluation service, DSA will accept an alternate design submittal to review this test data on a project-by-project basis, provided it demonstrates compliance with the testing and performance requirements equivalent to ICC AC 262 and includes values derived from full-scale diaphragm testing.