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Legacy report on the 1997 Uniform Building Code™, the 2000 International Building Code®, the 2000 International Residential Code®, the BOCA® National Building Code/1999 and the 1999 Standard Building Code®

DIVISION: 06—WOOD AND PLASTICS
Section: 06090—Wood and Plastic Fastenings

PHD HOLDDOWN ANCHORS

SIMPSON STRONG-TIE CO., INC.
4120 DUBLIN BOULEVARD, SUITE 400
DUBLIN, CALIFORNIA 94568

1.0 SUBJECT

PHD Holddown Anchors.

2.0 DESCRIPTION

2.1 General:

The PHD hold-down anchors described in this evaluation report are an alternative method of construction to that specified in Section 2304.3 of the 1997 Uniform Building Code™ (UBC), Section 1715.1 of the 2000 International Building Code® (IBC), Table R602.3(1) of the 2000 International Residential Code® (IRC), Section 2312.0 of the BOCA® National Building Code/1999 (BNBC) and Section 1707.3.1 of the 1999 Standard Building Code® (SBC).

The PHD holddowns may be used to anchor wood members to foundations, as floor-to-floor ties, and as horizontal wall anchors and continuity ties. Each holddown consists of two parts: an anchor body and a base plate. The PHD 2 base plate is used with the PHD 2 and PHD 5 anchor bodies. The PHD 6 base plate is used with the PHD 6 and PHD 8 anchor bodies. Holddown anchor fastener schedule, dimensions and allowable loads are shown in Table 1. See Figure 1 for additional details of holddown anchors.

2.2 Materials:

2.2.1 Holddowns: The PHD base plates are formed from No. 3 gage electro-galvanized steel with a 0.2405-inch (6.11 mm) base metal thickness. The steel complies with ASTM A 570 Grade 33, with minimum yield and tensile strengths of 33 and 52 ksi (228 Mpa and 359 MPa), respectively.

The PHD anchor bodies are formed from galvanized steel complying with ASTM A 653 Structural Quality Grade 40, except the minimum yield and tensile strengths are 42 and 56 ksi (290 and 386 MPa), respectively. The galvanized coating complies with the G60 requirements of ASTM A 653. The base metal thicknesses of the steel, which do not include galvanization thickness, are 0.0721, 0.0721, 0.1026 and

0.1342 inch (1.83, 1.83, 2.61 and 3.41 mm) for the anchor bodies of the PHD 2, PHD 5, PHD 6 and PHD 8 holddown anchors, respectively.

2.2.2 Wood: Lumber must be solid-sawn lumber with a minimum specific gravity of 0.50, such as Douglas fir-larch.

2.2.3 Fasteners: The fasteners attaching the holddowns to the wood must be Simpson Strong-Tie Co., Inc., SDS 1/4 x 3 Strong-Drive S-Series wood screws recognized in ICC-ES evaluation report ER-5268.

2.3 Design:

The connected wood member, grade of anchor bolt and anchor bolt embedment must be designed for each project. The allowable values for the holddown anchors described in this report are for anchors attached to wood seasoned to a moisture content of 19 percent or less, and used under continuously dry conditions. For connection to wood that is unseasoned or partially seasoned, or when holddowns are exposed to wet-service conditions in use, the allowable loads in this report must be adjusted in accordance with the code.

In designing the wood members, the following must be considered:

The wood member must be checked for its design capacity at the critical net section, for combined bending due to eccentricity, and for tensile stresses in accordance with Section 3.9 of the National Design Specification for Wood Construction (NDS), 1991 or 1997 edition, where applicable.

In conjunction with the consideration for eccentricity, the manufacturer has performed cyclic (reversed) racking shear tests of wood panel sheathed, shear wall assemblies utilizing single shear hold-downs connected to wood posts. Results of these tests are available to the structural design professional to aid in assessment of the increased post capacity attributed to sheathing and fastening. (A copy of the report is available by contacting the manufacturer.)

Wood members must be checked for their design capacity for compression parallel and perpendicular to grain.

Allowable stresses and other adjustment factors, as applicable, from the NDS must be used to check the design capacity of the wood member. Design capacities may also be adjusted by a load duration factor (C_D) as specified in the applicable code.

2.4 Installation:

The holddowns shall be attached to the wood member with the number of screws specified in Table 1. The wood screws

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must be fully embedded in the connected wood member and installed in accordance with ER-5268. See Figure 2 for typical installations.

2.5 Identification:

PHD anchor bodies and base plates are identified by the Simpson Strong-Tie Company, Inc., company name and the model number, which are stamped on each part. Simpson Strong-Drive S-Series wood screws are identified as described in ER-5268.

3.0 EVIDENCE SUBMITTED

Reports of structural load tests and calculations in accordance with the ICC-ES Acceptance Criteria for Joist Hangers and Similar Devices (AC13), dated September 2003.

4.0 FINDINGS

That the PHD holddown anchors described in this report comply with the 1997 *Uniform Building Code*TM, the 2000 *International Building Code*[®], the 2000 *International*

***Residential Code*[®], the BOCA[®] *National Building Code/1999* and the 1999 *Standard Building Code*[®], subject to the following conditions:**

- 4.1 The connectors are manufactured, identified and installed in accordance with this report and the manufacturer's instructions.**
- 4.2 Maximum allowable loads comply with this report and shall not exceed the capacity of the members to which the anchors are fastened.**
- 4.3 Lumber has a specific gravity noted in Section 2.2.2 of this report, with a moisture content of 19 percent or less, and is used in dry conditions.**
- 4.4 Use of connectors is limited to lumber that has not been treated with wood preservatives or fire-retardant chemicals.**

This report is subject to re-examination in two years.

TABLE 1—PHD HOLDDOWN ANCHORS^{1,2,3,4}

HOLDDOWN DESIGNATION	MATERIAL THICKNESS (gage)		DIMENSIONS (inches)			ANCHOR BOLT DIAMETER (inch)	NO. OF SDS 1/4 × 3 SCREWS	ALLOWABLE UPLIFT (lbf)
	Anchor Body	Base Plate	Width (W)	Height (H)	CL			
PHD2	14	3	2.875	9.3125	1.375	5/8	10	3,610
PHD5	14	3	2.875	11.5625	1.375	5/8	14	4,685
PHD6	12	3	2.9375	13.8125	1.375	7/8	18	5,860
PHD8	10	3	3.000	17.1875	1.375	7/8	24	6,730

For SI: 1 inch = 25.4 mm, 1 lbf = 4.45 N.

¹Refer to Figure 1 for holddown dimensions.

²Allowable uplift load is based on the lowest of (a) the screw values in accordance with ICBO ES Evaluation Report ER-5268, (b) ultimate test loads divided by 3.0 or (c) the test load associated with a 0.125-inch deflection.

³Allowable loads have been increased 33 1/3 percent for wind or earthquake loading in accordance with the code. No further increase is allowed; reduce loads by 25 percent for normal loading conditions.

⁴The holddowns shall be attached to approved anchor bolts of the diameter specified in this table with a capacity equal to or greater than the allowable holddown capacity. Concrete strength, side cover and embedment depth requirements shall be in accordance with the approved anchor bolt requirements.

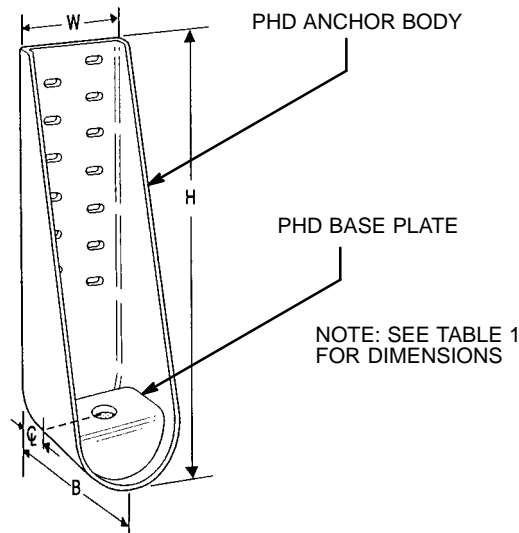
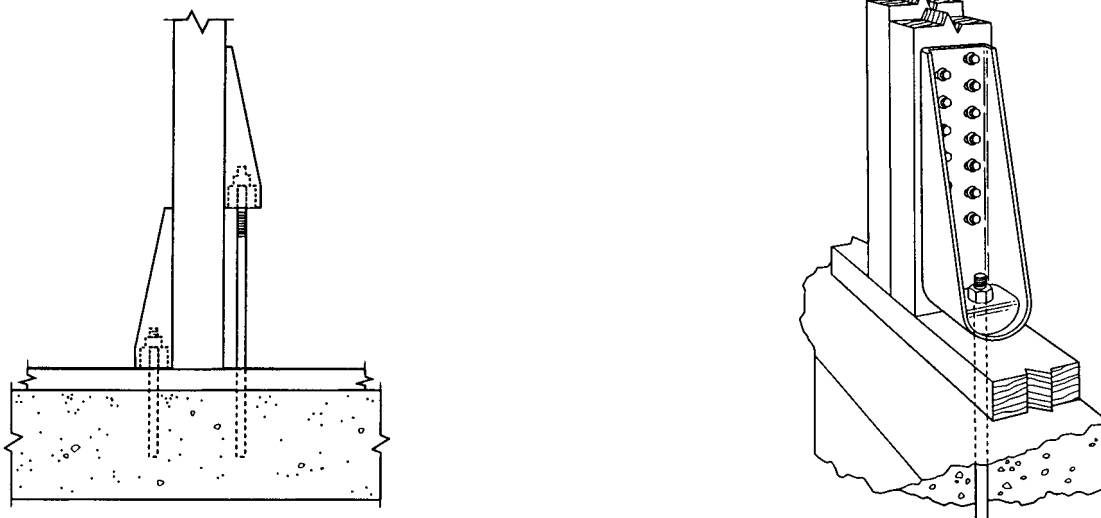


FIGURE 1—TYPICAL PHD HOLDDOWN



For SI: 1 inch = 25.4 mm

FIGURE 2—TYPICAL INSTALLATION DETAIL