ICC-ES Evaluation Report

ESR-1679

Reissued June 2024

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This report also contains:

- LABC Supplement

- FBC Supplement

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DIVISION: 05 00 00—METALS **Section: 05 40 19—Cold-Formed Shear Wall Panels** **DIVISION: 06 00 00—WOOD, PLASTICS AND COMPOSITES** **Section: 06 12 19—Shear Wall Panels**	**REPORT HOLDER:** **SIMPSON STRONG-TIE COMPANY INC.**	**EVALUATION SUBJECT:** **STEEL STRONG-WALL SSW SHEAR PANELS AND S/SSW SHEAR PANELS**	

1.0 EVALUATION SCOPE

Compliance with the following codes:

- 2021, 2018, 2015, 2012, and 2009 *International Building Code®* (IBC)
- 2021, 2018, 2015, 2012, and 2009 *International Residential Code®* (IRC)

For evaluation for compliance with codes adopted by the Los Angeles Department of Building and Safety (LADBS), see ESR-1679 LABC and LARC Supplement.

Property evaluated:

- Structural

2.0 USES

The Steel Strong-Wall SSW Shear Panels and S/SSW Shear Panels are prefabricated steel shear panels designed and constructed to resist vertical (gravity) loads and to resist lateral in-plane and out-of-plane loads, resulting from wind or earthquakes, in wood or cold-formed steel light frame construction. The panels are permitted to replace each 4 feet (1219 mm) of braced wall panel length specified in Section 2308.6.4 of the 2021, 2018 and 2015 IBC (Section 2308.9.3 of the 2012 and 2009 IBC, as applicable) and Section R602.10 of the IRC, in accordance with Section 4.1.2 of this report.

3.0 DESCRIPTION

3.1 General:

3.1.1 SSW Shear Panels: SSW model information is provided in Table 1 and Figure 1 of this report. The SSW panels are designed for installation in single-story or multistory buildings of wood light frame construction and may be stacked up to two stories when the lower story is placed on a rigid base such as a concrete foundation. Panels for stud wall heights of 10 feet (3048 mm) or less are provided with preattached vertical wood 2-by-4 studs. SSW panels for stud wall heights greater than 10 feet (3048 mm) are provided with preattached vertical wood 2-by-6 studs. Intermediate height panels are available as noted in Table 1. Model numbers with the suffix

"-STK" are intended as the lower wall panel in balloon framed applications and the lower-story wall panel in two-story stacked applications.

3.1.2 S/SSW Shear Panels: S/SSW model information is shown in Table 2 of this report. The S/SSW panels are designed for installation in the bottom story of buildings of cold-formed steel light frame construction when placed on a rigid base, such as a concrete foundation. The S/SSW series panels are all-steel assemblies and are available with preattached, nonload-bearing, cold-formed steel studs. Intermediate heights are available as noted in Table 2. Where information is provided in this report for the "SSW" panels, the information is also applicable to "S/SSW" panels, unless otherwise noted. The prefabricated S/SSW shear wall panel is Designated Energy Dissipating Mechanism (DEDM). The anchor bolt elements, connection to the top track and cold-formed steel top track (collector) are Capacity Protected Components. See Figure 1.

3.2 Material:

3.2.1 Steel Shear Panel: The proprietary steel shear panels are described in the approved quality documentation and are formed from No. 10 gage (0.134-inch design thickness and 0.1275-inch base-metal thickness) (3.4 and 3.2 mm), zinc-coated steel sheet complying with ASTM A653, Designation SS, Grade 40, with a minimum G60 galvanized coating.

3.2.2 Wood: The wood studs, preattached to the SSW panels, are nominally 2-by-4 and 2-by-6 spruce-pine-fir, stud grade or better, sawn lumber with a minimum average specific gravity of 0.42.

3.2.3 Steel Top Plate: The proprietary steel top plate is described in the approved quality documentation and is die-formed from carbon steel complying with the product material specifications noted in the quality documentation referenced in Section 6.3 of this report.

3.2.4 Steel Base Plate: The proprietary steel base plate is described in the approved quality documentation, and is die-formed from structural carbon steel complying with the product material specifications noted in the quality documentation referenced in Section 6.3 of this report.

3.2.5 Steel-STK Hold-down Element: The proprietary hold-down element is formed from carbon steel and complies with the descriptions and product material specifications noted in the quality documentation referenced in Section 6.3 of this report.

3.2.6 Simpson Strong-Drive® Screw (SDS): The wood screws, supplied by Simpson Strong-Tie, are described in ICC-ES evaluation report ESR-2236.

3.2.7 Anchor Bolts and Rods: For installations on concrete, the SSW12 panels require one $^{3}/_{4}$-inch-diameter (19.1 mm) headed anchor bolt, with geometries consistent with ANSI/ASME B1.1, B18.2.1 and B18.2.6, at each panel end, while the SSW15, SSW18, SSW21 and SSW24-inch panels require one 1-inch-diameter (25.4 mm) headed anchor bolt at each panel end. For installations on concrete where high-strength bolts are specified in the tables, the anchor bolts must comply with the IBC and be high-strength material with a minimum yield stress of 92,000 psi (634 MPa) and a minimum tensile strength of 120,000 psi (826 MPa).

Anchor bolts complying with ASTM A307 or F1554, Grade 36, may be substituted when substantiating calculations are submitted by a registered design professional to the building official for approval. For installations on wood floor framing or balloon framing panel-to-panel connections, bolts and/or rods must comply with ASTM A307 or F1554, Grade 36, minimum. For bolts and/or rods complying with ASTM A307 or F1554, (Grade 36), specifications may be used for the braced wall panel substitutions without substantiating calculations.

SSWAB anchor bolts comply with ASTM F1554, Grade 36. SSWAB-HS anchor bolts with a model number suffix "HS" comply with ASTM A449. SSWHSR extension rods also comply with ASTM A449.

All heavy hex nuts pre-installed on SSWAB anchor bolts comply with ASTM A563 Grade DH or ASTM A194 Grade 2H. The pre-installed SSWAB plate washer complies with ASTM A36 and is $^{1}/_{2}$-inch-thick (12.7 mm) for $^{3}/_{4}$-inch-diameter (19.1 mm) SSWAB anchor bolts and $^{5}/_{8}$-inch-thick (15.9 mm) for 1-inch-diameter (25.4mm) SSWAB anchor bolts.

3.2.8 Shear Transfer Plate: The proprietary Shear Transfer Plate is described in the approved quality documentation and is die-formed from zinc-coated steel sheet complying with the product material specifications noted in the quality documentation referenced in Section 6.3 of this report.

3.2.9 Self-drilling Tapping Screws: Screws supplied by Simpson are hex head, No. 14 by $^{3}/_{4}$-inch long (19.1 mm), self-drilling tapping screws complying with ASTM C954 and SAE Standard J78.

3.2.10 Threaded Rod Couplers: The proprietary $^{3}/_{4}$-inch-(19.1 mm) or 1-inch-diameter (25.4 mm) threaded couplers are $2^{1}/_{4}$ inches (57 mm) or $2^{3}/_{4}$ inches (70 mm) long and have strength and ductility consistent with the connected anchor bolt grades described in Section 3.2.7 of this report.

4.0 DESIGN AND INSTALLATION

4.1 Design:

4.1.1 General: The allowable strength values described in this report are reported at Allowable Stress Design (ASD) level and do not include a one-third stress increase for short-term loading. The tabulated in-plane ASD shear values provided in Table 3 (SSW) and Table 10 (S/SSW) apply to panels supported directly on normal-weight concrete foundations with minimum specified compressive strength, f'_c, of 2,500 psi (17.2 MPa). The tabulated ASD out-of-plane lateral strength values are provided in Table 4 for the SSW panels, and Table 11 for the S/SSW panels. The ASD axial strength values of the panels supported on normal weight concrete foundations are noted in Table 5 for SSW panels, and Table 12 for S/SSW panels.

The tabulated in-plane shear values shown in Table 7 apply to SSW panels installed on wood floor framing in accordance with Figure 4.

For SSW panels used in balloon framing with nominal overall heights from 15 feet to 20 feet, the tabulated in-plane ASD shear values in Table 8 of this report apply to panels installed on concrete foundations in accordance with Figure 6. Full-height studs or posts on each side of the SSW panel must be designed by the registered design professional to resist out-of-plane wind or earthquake effects.

In-plane ASD shear values for two-story stacked SSW panel applications in wood light frame construction are set forth in Table 9 of this report. Two-story stacked applications must consider the effects of cumulative overturning. A sample calculation is represented in Example 2 following the text of this report. The tabulated allowable base moments in Table 9B of this report are for panels supported directly on normal weight concrete foundations with a minimum specified compressive strength of 2,500 psi (17.2 MPa).

Applied vertical gravity loads, when used in combination with the shear loads in Tables 3 and 7 to 10 of this report, must not exceed the corresponding allowable axial loads shown in the tables or stated in the table footnotes.

Allowable ASD in-plane shear values provided in Tables 3 and 7 to 10 are applicable to both ASD basic load combinations in IBC Section 1605.1 (Section 1605.3.1 of the 2018, 2015, 2012 and 2009 IBC) and the alternative basic load combinations in IBC Section 1605.2 (Section 1605.3.2 of the 2018, 2015, 2012 and 2009 IBC).

SSW and S/SSW panels may be used as components within a seismic force–resisting system consisting of light framed load-bearing walls with wood structural panels or sheet steel panels, provided the seismic design coefficients and factors used in design conform to the following values:

SEISMIC FACTOR OR COEFFICIENT	IBC
Response Modification Coefficient	$R = 6½$
System Over-strength Factor	$\Omega_o = 3$[1]
Deflection Amplification Factor	$C_d = 4$

[1]Where shear panels are installed in structures with flexible diaphragms, as determined in accordance with Section 12.3.1 of ASCE/SEI 7, the tabulated value of Ω_0 may be reduced in accordance with Footnote g, Table 12.2-1 of ASCE/SEI 7.

The building height is limited to a maximum of 65 feet (19.8 m) for structures located in Seismic Design Categories D, E, or F, or as limited in Tables 504.3 and 504.4 of the 2021, 2018 and 2015 IBC (Table 503 of the 2012 and 2009 IBC, as applicable) based on construction type. Panels installed in detached one- and two-family dwellings assigned to Seismic Design Categories A, B, or C, or located where the mapped short-period spectral response acceleration, S_s, is less than 0.4 g in accordance with IBC Section 1613.1, exception 1, may be designed using allowable values corresponding to wind.

Steel Strong-Wall Panels may be stacked up to two stories in wood light frame construction only as set forth in Table 9 of this report. Applications on masonry foundations or steel beams may be permitted provided calculations and construction details, substantiating the connection to and adequacy of the supporting masonry or steel member for the loads imposed by the SSW panels, are prepared and submitted by a registered design professional to the code official for approval. When panels are installed on a steel beam, the additional effects due to beam deflection must be added to the overall top-of-panel drift.

Where SSW panels, of the same height but different widths, are combined in the same wall line, design lateral loads must be proportioned based on relative panel stiffness as illustrated in Example 1 following the

text of this report. Where SSW panels are combined in a wall line with other types of shear-resisting systems, design lateral loads must be proportioned based on relative stiffness. Calculations based on known stiffness of all panels must be prepared by a registered design professional and submitted to the code official for approval. Combinations with other lateral-force-resisting systems lacking known stiffness are prohibited.

Allowable shear and drift values for Steel Strong-Wall panels fabricated with heights between those listed in Table 1 and 2 of this report, must be determined by linear interpolation between the corresponding values assigned to panels with lower and higher wall heights of the same axial load.

Tension (uplift) loads to be resisted by anchorage located at each panel end, corresponding to the design shears for panels installed on concrete foundations, may be calculated using the equations shown in Figure 8 of this report. Tension (uplift) forces to be resisted by anchorage, corresponding to the design shears for panels installed on a wood first floor, may be calculated using the equation shown in the appropriate table footnote. Shear loads to be resisted by the anchorage corresponding to the design shears for the panels directly on a rigid base may be calculated by dividing the design shear by the number of anchors (two). Loads corresponding to the design shears for the panels on a wood base must be resisted using the shear transfer plate and other connections, besides the anchorage to complete the load path, based on calculations and details submitted to the code official for approval.

SSW panel wood studs may be connected to framing above to resist vertical tension (uplift) loads provided applied loads are less than or equal to the ASD stud tension loads shown in Table 6. The registered design professional must consider the effects of increased overturning and anchorage forces due to the applied uplift loads.

The concrete, wood, masonry or steel member supporting the panels and their anchorage must have adequate strength and stiffness to resist all imposed loads, including effects of SSW panel overturning. Load values shown in this report include evaluation of bearing stresses on the supporting base materials for the conditions described in this report and do not require further evaluation by the building design professional. The development of continuous load path and interconnection, including collector design, must be the responsibility of the building design professional.

4.1.2 Braced Wall Panels: Steel Strong-Wall panels are permitted to replace each 4 feet (1219 mm) of braced wall panel length specified in Section 2308.6.4 of the 2021, 2018 and 2015 IBC (Section 2308.9.3 of the 2012 and 2009 IBC, as applicable) and Section R602.10 of the IRC, with the following limitations: Installations on a wood floor require a minimum SSW15 panel; and two-story stacked installations require minimum SSW18 panels. The required length of bracing must be based on wood structural panel sheathing (Method WSP in IRC and IBC).

4.1.3 Anchorage to Concrete: Figure 7 of this report provides anchorage-to-concrete details conforming to Sections 1901.3 and 1905 of the 2021 IBC which refer to Chapter 17 of ACI 318-19 (Sections 1901.3 and 1905 of the 2018 and 2015 IBC which refer to Chapter 17 of ACI 318-14; Section 1909 of the 2012 IBC or Section 1912 of the 2009 IBC, as applicable, which refers to ACI 318 Appendix D). Anchorage-to-concrete details shown in Figure 7 that are used for seismic resistance comply with the ductility requirements of ACI 318-19 Section 17.10.5.3 (ACI 318-14 Section 17.2.3.4.3, ACI 318-11 Section D.3.3.4.3). Shear reinforcement in accordance with Figure 7 is not required for panels installed on a wood floor; interior foundation applications (panel installed away from edge of concrete); or braced wall panel applications according to the IRC and Section 2308.6 of the 2021, 2018 and 2015 IBC (Section 2308.9.3 of the 2012 and 2009 IBC, as applicable). As an alternative, anchorage may be designed by a registered design professional and installed to resist tension and shear loads to accommodate the specific condition and critical load demand in accordance with Chapter 19 of the IBC.

Anchorage calculations for shear resistance must be based on edge distances at the top of concrete as detailed in the engineered drawings. Anchorage calculations for tension resistance must be based on edge distances at the embedded end of the anchor where the failure surface projects from the head of the embedded anchor to the nearest top surface of the foundation. The anchorage designs in Figure 7 of this report comply with these provisions.

Post-installed adhesive or mechanical anchors, recognized in a current ICC-ES evaluation report for installation in concrete, may be used in lieu of cast-in-place anchor bolts described in Section 3.2.7 of this report, provided calculations and details prepared by a registered design professional, proving the adequacy of the anchors to resist the imposed loads, are submitted to the code official for approval.

Steel Strong-Wall anchorage solutions for grade beam applications conform to Sections 1901.3 and 1905 of the 2021 IBC which refer to Chapter 17 of ACI 318-19 (Sections 1901.3 and 1905 of the 2018 and 2015 IBC which refer to Chapter 17 of ACI 318-14; Section 1909 of the 2012 IBC refers to ACI 318-11 Appendix D). Anchor reinforcement is required for grade beam applications. Anchor reinforcement described in Figure 7

detail 5SSW1.1 provides a resistance that is equal to or greater than 1.2 times the nominal tensile strength of the steel anchor. Testing has shown that closed-tie anchor reinforcement is critical to maintain the integrity of the reinforced core where the anchor is located. In addition, plastic hinging must be prevented at anchor locations in seismic applications in accordance with ACI 318-19 Section 17.10.2 (ACI 318-14 Section 17.2.3.2; ACI 318-11 Section D.3.3.2) to achieve expected anchor-to-concrete performance. Physical testing was used to validate anchor reinforcement configuration and placement, and has shown that in order to achieve expected performance, concrete member design strength should consider factored anchor demand for wind applications and amplified anchor demand for seismic applications. The amplified LRFD design seismic moments described in Figure 7 detail 5SSW1.1 are based on the lowest of the following:

1. 85 percent of the maximum lateral load resisted by the tested SSW panel when tested in accordance with AC322.
2. SSW panel LRFD lateral strength multiplied by a 2.5 overstrength factor.
3. Lateral shear based on the SSW panel overturning resistance at maximum anchor tension resistance. The SSW panel overturning resistance is based on using 1.2 times the anchor nominal tensile strength, and corresponding LRFD axial compression load, which is 1.2 times the allowable axial load listed in Table 3 of this report.

4.1.4 Anchorage to Masonry: Anchorage to masonry foundations or walls for wall panels described in this report must be designed and detailed by a registered design professional in accordance with Chapter 21 of the IBC.

4.1.5 Connection to Steel: Connections to steel beams for wall panels described in this report must be designed and detailed by a registered design professional in accordance with Section 2204 of the IBC.

4.2 Installation:

4.2.1 General: SSW panels must be installed directly on concrete foundations, wood floor systems, masonry foundations or walls, or steel beams in accordance with the manufacturer's installation instructions, the applicable code, and this report. Installation details shown in Figures 1 through 6 of this report represent typical surrounding framing conditions and connection requirements where referenced in this report. A registered design professional must either confirm appropriateness of these details or establish specific details and specifications, in accordance with the applicable code and subject to the approval of the code official, to accommodate specific conditions and critical load combinations.

4.2.2 Holes in the Panel and Wood Jamb Studs: The SSW walls are prefabricated with holes in the steel panel and wood studs to allow for electrical, plumbing, and mechanical system access. In addition, the walls are prefabricated with $^1/_4$-inch-diameter (6.4 mm) holes for fasteners that may be used to attach adjacent elements. Additional factory-installed holes may be specified through the steel panels, but field-installed holes are not permitted. Factory-installed specified holes may be up to 2.5 inches (63.5 mm) in diameter and must be located a minimum of 22 inches (559 mm) from the base of the panel. A total of two holes may be specified with a minimum clear spacing of 4 inches (102 mm). Holes must be centered in the centermost available web member having a width of at least one and a quarter times the diameter of the hole. Additionally, holes up to $1^1/_8$ inches (28.6 mm) in diameter may be bored through the wood studs at any location corresponding to a hole in the panel flange.

Field replacement of the pre-attached wood studs may be permitted if the replacement stud has the same or greater dimensions, and if the replacement stud is attached to the panels with SDS $^1/_4$-inch-by-$1^1/_2$-inch (6.4 mm by 38.1 mm) screws (described in Section 3.2.6 of this report) at each $^1/_4$-inch-diameter (6.4 mm) flange screw hole location. The wood studs must be spruce-pine-fir, stud grade or better. The studs must fit snugly between the top and bottom plates and along the vertical face.

4.2.3 Installation on Concrete Foundation: The SSW panel must be installed directly on a concrete foundation over two anchor bolts with diameters as noted in Tables 1 and 2. Templates for either interior or exterior wall applications are available from Simpson Strong-Tie to assist in the placement of the anchor bolts. The panel base plate must be secured to the anchor bolts with nuts complying with the specifications set forth for the anchor bolt grade.

4.2.4 Installation on Masonry or Steel: Installation on masonry walls or foundations or steel beams may be permitted, subject to approval of the code official based on calculations and details prepared by the registered design professional.

4.2.5 Installation on Wood Floor: Table 7 and Figure 4 of this report provide installation requirements and details. Wood Floor Connection Kits (SSW_-1KT) are available and include installation instructions, threaded rod extensions, coupler nuts, heavy hex nuts, and a Shear Transfer Plate with No. 14 self-drilling tapping screws.

4.2.6 Installation at Top of Wall: The top of the SSW panel must be attached to wood top plates or a beam with Simpson Strong-Tie SDS $^1/_4$-inch-by-$3^1/_2$-inch (6.4 mm by 89 mm) screws, which are recognized in ICC-ES evaluation report ESR-2236 The number of wood screws for each panel must comply with Table 1 of this report. Figures 1 to 3 provide additional details.

Panels for cold-formed steel light frame construction, which utilize the S/SSW panels without wood studs, must be attached to a minimum 43-mil-thick [0.0428-inch (1.09 mm) minimum base-metal thickness] or minimum 54 mm thick [0.0538-inch (1.37 mm) minimum base-metal thickness] steel framing element, as noted in Table 10, with $^1/_4$-inch-diameter (6.4 mm) or No. 14 self-drilling tapping screws, described in a current ICC-ES evaluation report, with a minimum nominal shear strength (P_{ss}) of 2,000 pounds (8896 N). The number of self-drilling tapping screws must be as noted in Table 2 of this report.

4.2.7 Balloon Framing Installation: The bottom SSW panel in a stacked balloon framing application must be an "-STK" model with factory-installed hold-down elements. The panels must be installed as shown in Figure 6.

4.2.8 Two-Story Stacked Installation: The lower-story SSW panel in a two-story stacked application must be an "-STK" model with preinstalled hold-down elements. The SSW panels must be installed in wood light frame construction as shown in Figure 5 of this report.

Two-Story Stacked Connection Kits (SSW_-2KT) are available and include installation instructions, threaded rods, heavy hex nuts, and a Shear Transfer Plate with No. 14 self-drilling tapping screws.

1.1 Special Inspection:

4.2.9 2021 IBC: Periodic special inspection must be provided in accordance with Sections 1705.1.1, 1705.12.1 and 1705.12.2 or 1705.13.2 and 1705.13.3, as applicable, with the exception of those structures that qualify under Section 1704.2, 1704.3, or 1705.3, and subject to approval of the code official.

4.2.10 2018 and 2015 IBC: Periodic special inspection must be provided in accordance with Sections 1705.1.1, 1705.11.1 and 1705.11.2 or Sections 1705.12.2 and 1705.12.3, as applicable, with the exception of those structures that qualify under Section 1704.2, 1704.3, or 1705.3, and subject to approval of the code official.

4.2.11 2012 IBC: Periodic special inspection must be provided in accordance with Sections 1705.1.1, 1705.10.1 and 1705.10.2 or Sections 1705.11.2 and 1705.11.3, as applicable, with the exception of those structures that qualify under Section 1704.2, 1704.3, or 1705.3 and subject to approval of the code official.

4.2.12 2009 IBC: Periodic special inspection must be provided in accordance with Sections 1704.15, 1706.2 and 1706.3, or Sections 1707.3 and 1707.4, as applicable, with the exception of those structures that qualify under Section 1704.1, 1704.4, or 1705.3 and subject to approval of the code official.

4.2.13 IRC: In jurisdictions governed by the IRC, special inspections are not required, except where an engineered design according to Section R301.1.3 of the IRC is used. Where an engineered design is used, special inspections in accordance with Section 4.3 must be provided.

5.0 CONDITIONS OF USE:

The SSW Shear Panels described in this report comply with, or are suitable alternatives to what is specified in, those codes listed in Section 1.0 of this report, subject to the following conditions:

5.1 SSW shear panel sizes are limited to the widths and heights set forth in this report, including a maximum of two stories stacked for wood light frame installations and a maximum of one story for cold-formed steel light frame construction.

5.2 ASD design loads and drifts must not exceed the allowable strength values and drifts set forth in this report.

5.3 Calculations and details, justifying that the panel use is in compliance with the applicable code and this evaluation report, must be submitted to the code official for approval, except for braced and alternate braced wall substitutions noted in Section 4.1.2 of this report. The calculations and details must be prepared by a registered design professional where required by the statutes of the jurisdiction in which the project is to be constructed.

5.4 The panels must be installed in accordance with this report, the Simpson Strong-Tie Company instructions, and the building plans approved by the code official. In the event of a conflict between this report and the Simpson Strong-Tie Company instructions, this report governs.

5.5 Design of the concrete foundation, masonry wall or foundation, or steel beam supporting the panels, and other structural elements connected to the panels, must consider the loads imposed by the panels. The design is outside the scope of this report and must comply with the applicable code.

5.6 The panels used in exterior walls must be covered with an approved weather-resistant building envelope in accordance with the applicable code.

5.7 The panels are fabricated at Simpson Strong-Tie Facilities in Riverside, California; Stockton, California; and McKinney, Texas; under a quality-control program with inspections by ICC-ES.

6.0 EVIDENCE SUBMITTED

6.1 Reports of cyclic tests in accordance with the ICC-ES Acceptance Criteria for Prefabricated, Cold-formed, Steel Lateral-force-resisting Vertical Assemblies (AC322), dated August 2018, (editorially revised December 2020).

6.2 Structural calculations in accordance with Chapters 19, 22 and 23 of the IBC.

6.3 Quality documentation.

6.4 Production drawings and details.

7.0 IDENTIFICATION

7.1 The SSW Shear Panels must be identified by the manufacturer's name (Simpson Strong-Tie Company, Inc.), the model number, the evaluation report number (ESR-1679). In lieu of the model number, panels fabricated with intermediate heights are identified by the next tallest standard model number followed by xH1-specified height (in inches). For example: SSW18x9xH1-103.

7.2 The report holder's contact information is the following:

SIMPSON STRONG-TIE COMPANY INC.
5956 WEST LAS POSITAS BOULEVARD
PLEASANTON, CALIFORNIA 94588
(800) 999-5099
www.strongtie.com

Combine SSW walls, of the same height but different width, along the same wall line using stiffness distribution:

Given:
Seismic loading
Concrete f'_c = 2,500 psi
Design Shear (ASD) = 4,500 lbs
Axial load per panel = 1,000 lbs
9 foot foundation to plate height

Try (1) SSW18x9 and (1) SSW21x9

Wall Model	Allow. Shear V (from Table 3) (lbs)	Drift at Allow. V (in)	Stiffness K = Shear/Drift (lbs/in)	Relative Stiffness (RR) RR = K/ΣK
18x9	2,145	0.47	4,564	0.40
21x9	3,145	0.46	6,837	0.60
			11,401	1.00

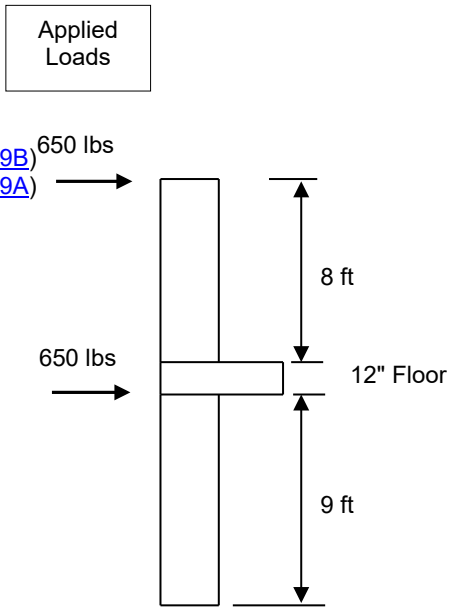
Wall Model	Distributed Shear = V x RR (lbs)		Allow. Shear V (from Table 3) (lbs)		Drift at Design Shear = Distributed Shear / K (in)
18x9	1,800	<	2,145	OK	0.39
21x9	2,700	<	3,145	OK	0.39

>>>> Use (1) SSW18x9 and (1) SSW21x9 along the same wall line

For **SI:** 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 lb = 4.45 N, 1 psi = 6.89 kPa, 1 lb/in = 0.175 N/mm.

EXAMPLE 1—STEEL STRONG-WALL STIFFNESS DISTRIBUTION

Given:
Wind loading, Concrete f'_c = 2,500 psi
$V_{2nd\ story\ wall}$ = 650 lbs
$V_{1st\ story\ wall}$ = 650 lbs
V_{Total} = 650 lbs + 650 lbs = 1,300 lbs
M_{Allow} = Allowable ASD Base Moment (ft-lbs) (See Two-Story Stacked Table 9B)
V_{Allow} = Allowable ASD Shear Load, V (lbs) (See Two-Story Stacked Table 9A)



STEP 1: Select First Story Wall
M_{base} = (650 lbs x 18 ft) + (650 lbs x 9 ft) = 17,550 ft-lbs
Using First Story Wall Table 9B, select a 9-foot wall with $M_{allow} \geq M_{base}$
Select SSW18x9-STK
M_{allow} = 22,685 ft-lbs > 17,550 ft-lbs **OK**

STEP 2: Check Second Story Wall
Using the Second Story Wall Table 9A, check the capacity of an 8-foot wall with the same width as the 1st story wall selected in Step 1:
Select SSW18x8
V_{allow} = 1,315 lbs > 650 lbs **OK**

>>>> Use SSW18x8 over SSW18x9-STK

For **SI:** 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 lb = 4.45 N, 1 psi = 6.89 kPa.

EXAMPLE 2—STEEL STRONG-WALL TWO-STORY DESIGN

TABLE 1—SIMPSON SSW PANEL SIZES & DESCRIPTION[1]

SSW Model No.[3]	Width (in)	Height (in)	Thickness (in)	Anchor Bolts		Number of Screws in Top of Wall[2]	SSW -STK[4] Model No.
				Qty.	Dia. (in)		
SSW12x7	12	80	3½	2	¾	4	-
SSW15x7	15	80	3½	2	1	6	-
SSW18x7	18	80	3½	2	1	9	-
SSW21x7	21	80	3½	2	1	12	-
SSW24x7	24	80	3½	2	1	14	-
SSW12x7.4	12	85½	3½	2	¾	4	-
SSW15x7.4	15	85½	3½	2	1	6	-
SSW18x7.4	18	85½	3½	2	1	9	-
SSW21x7.4	21	85½	3½	2	1	12	-
SSW24x7.4	24	85½	3½	2	1	14	-
SSW12x8	12	93¼	3½	2	¾	4	-
SSW15x8	15	93¼	3½	2	1	6	SSW15x8-STK
SSW18x8	18	93¼	3½	2	1	9	SSW18x8-STK
SSW21x8	21	93¼	3½	2	1	12	SSW21x8-STK
SSW24x8	24	93¼	3½	2	1	14	SSW24x8-STK
SSW12x9	12	105¼	3½	2	¾	4	-
SSW15x9	15	105¼	3½	2	1	6	SSW15x9-STK
SSW18x9	18	105¼	3½	2	1	9	SSW18x9-STK
SSW21x9	21	105¼	3½	2	1	12	SSW21x9-STK
SSW24x9	24	105¼	3½	2	1	14	SSW24x9-STK
SSW12x10	12	117¼	3½	2	¾	4	-
SSW15x10	15	117¼	3½	2	1	6	SSW15x10-STK
SSW18x10	18	117¼	3½	2	1	9	SSW18x10-STK
SSW21x10	21	117¼	3½	2	1	12	SSW21x10-STK
SSW24x10	24	117¼	3½	2	1	14	SSW24x10-STK
SSW15x11	15	129¼	5½	2	1	6	SSW15x11-STK
SSW18x11	18	129¼	5½	2	1	9	SSW18x11-STK
SSW21x11	21	129¼	5½	2	1	12	SSW21x11-STK
SSW24x11	24	129¼	5½	2	1	14	SSW24x11-STK
SSW15x12	15	141¼	5½	2	1	6	SSW15x12-STK
SSW18x12	18	141¼	5½	2	1	9	SSW18x12-STK
SSW21x12	21	141¼	5½	2	1	12	SSW21x12-STK
SSW24x12	24	141¼	5½	2	1	14	SSW24x12-STK
SSW18x13	18	153¼	5½	2	1	9	SSW18x13-STK
SSW21x13	21	153¼	5½	2	1	12	SSW21x13-STK
SSW24x13	24	153¼	5½	2	1	14	SSW24x13-STK

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

[1]SSW panels are manufactured with pre-installed 2 x wood vertical studs.
[2]Top plate screws for the SSW panel are SDS 1/4" diameter x 3 1/2" long wood screws complying with ICC-ES Evaluation Report No. ESR-2236.
[3]Lesser heights are available for models exceeding 80 inches tall when specified by the registered design professional. Add the suffix "X" followed by the required height H1 to the model number. Example specification SSW18x8X H1=84 inches.
[4]SSW -STK panels are manufactured with pre-installed hold-down elements for connection to the top wall in a Balloon Framing or Two-Story Stacked application.

TABLE 2—SIMPSON S/SSW PANEL SIZES & DESCRIPTION[1]

S/SSW Model No.	Width (in)	Height Range[2] (in)	Thickness (in.)	Anchor Bolts		Number of Screws in Top of Wall[3]
				Qty.	Dia. (in)	
S/SSW12X	12	80 ≤ H ≤ 109	3½	2	¾	4
S/SSW15X	15	80 ≤ H ≤ 121	3½	2	1	6
S/SSW18X	18	80 ≤ H ≤ 121	3½	2	1	9
S/SSW21X	21	80 ≤ H ≤ 121	3½	2	1	12
S/SSW24X	24	80 ≤ H ≤ 121	3½	2	1	14

For **SI**: 1 inch = 25.4 mm, 1 foot = 305 mm, 1 lb = 4.45 N.

1. S/SSW series panels are all steel assemblies and are available with pre-attached nonload-bearing cold-formed steel studs.
2. Registered design professional shall specify required height for applicable S/SSW width. Example specification S/SSW12X H = 103 inches.
3. Top plate screws for the S/SSW panel must be ¼" diameter or No. 14 self-tapping screws recognized in an ICC-ES evaluation report complying with the IBC, with a minimum nominal shear strength (P_{ss}) of 2000 lbs.

TABLE 3—ALLOWABLE ASD IN-PLANE SHEAR (LBS) FOR SIMPSON SSW PANEL ON CONCRETE FOUNDATIONS[1,3,4,6]

SSW Model	Allowable Axial Load[2] (lbs)	Seismic			Wind		
		Allowable ASD Shear Load V (lbs)	Drift at Allowable Shear (in)	Maximum Uplift at Allowable Shear [5] (lbs)	Allowable ASD Shear Load V (lbs)	Drift at Allowable Shear (in)	Maximum Uplift at Allowable Shear[5] (lbs)
SSW12x7	1,000	955	0.36	9,840	1,215	0.46	13,620
	4,000	955	0.36	9,840	1,095	0.42	11,765
	7,500	890	0.34	9,010	890	0.34	9,010
SSW15x7	1,000	1,855	0.36	15,655	1,860	0.36	15,715
	4,000	1,665	0.33	13,550	1,665	0.33	13,550
	7,500	1,445	0.28	11,340	1,445	0.28	11,340
SSW18x7	1,000	2,905	0.34	19,660	3,480	0.41	25,805
	4,000	2,905	0.34	19,660	3,250	0.38	23,135
	7,500	2,905	0.34	19,660	2,980	0.35	20,370
SSW21x7	1,000	4,200	0.32	23,755	4,440	0.34	25,710
	4,000	4,200	0.32	23,755	4,440	0.34	25,710
	7,500	4,200	0.32	23,755	4,310	0.33	24,635
SSW24x7	1,000	5,495	0.29	26,270	5,730	0.31	27,835
	4,000	5,495	0.29	26,270	5,730	0.31	27,835
	7,500	5,495	0.29	26,270	5,730	0.31	27,835
SSW12x7.4	1,000	870	0.39	9,515	1,105	0.49	13,070
	4,000	870	0.39	9,515	970	0.43	10,940
	7,500	750	0.33	7,940	750	0.33	7,940
SSW15x7.4	1,000	1,685	0.39	15,035	1,700	0.39	15,215
	4,000	1,500	0.34	12,905	1,500	0.34	12,905
	7,500	1,270	0.29	10,510	1,270	0.29	10,510
SSW18x7.4	1,000	2,700	0.37	19,475	3,255	0.44	25,790
	4,000	2,700	0.37	19,475	3,040	0.42	23,125
	7,500	2,700	0.37	19,475	2,790	0.38	20,390
SSW21x7.4	1,000	3,890	0.35	23,420	4,230	0.38	26,405
	4,000	3,890	0.35	23,420	4,230	0.38	26,405
	7,500	3,890	0.35	23,420	4,035	0.36	24,655
SSW24x7.4	1,000	5,330	0.34	27,610	5,450	0.34	28,485
	4,000	5,330	0.34	27,610	5,450	0.34	28,485
	7,500	5,330	0.34	27,610	5,450	0.34	28,485
SSW12x8	1,000	775	0.42	9,180	985	0.53	12,560
	4,000	775	0.42	9,180	865	0.47	10,550
	7,500	665	0.36	7,630	665	0.36	7,630
SSW15x8	1,000	1,505	0.42	14,515	1,530	0.43	14,835
	4,000	1,345	0.37	12,545	1,345	0.37	12,545
	7,500	1,135	0.32	10,190	1,135	0.32	10,190
SSW18x8	1,000	2,480	0.41	19,525	2,985	0.50	25,795
	4,000	2,480	0.41	19,525	2,790	0.47	23,160
	7,500	2,480	0.41	19,525	2,560	0.43	20,410
SSW21x8	1,000	3,560	0.39	23,360	3,960	0.43	27,240
	4,000	3,560	0.39	23,360	3,960	0.43	27,240
	7,500	3,560	0.39	23,360	3,700	0.41	24,660
SSW24x8	1,000	4,865	0.37	27,435	5,105	0.39	29,370
	4,000	4,865	0.37	27,435	5,105	0.39	29,370
	7,500	4,865	0.37	27,435	5,055	0.39	28,960
SSW12x9	1,000	660	0.47	8,745	840	0.60	11,915
	4,000	660	0.47	8,745	705	0.50	9,485
	7,500	505	0.36	6,380	505	0.36	6,380

TABLE 3—ALLOWABLE ASD IN-PLANE SHEAR (LBS) FOR SIMPSON SSW PANEL ON CONCRETE FOUNDATIONS[1,3,4,6]

SSW Model	Allowable Axial Load[2] (lbs)	Seismic			Wind		
		Allowable ASD Shear Load V (lbs)	Drift at Allowable Shear (in)	Maximum Uplift at Allowable Shear [5] (lbs)	Allowable ASD Shear Load V (lbs)	Drift at Allowable Shear (in)	Maximum Uplift at Allowable Shear[5] (lbs)
SSW15x9	1,000	1,315	0.45	14,250	1,315	0.47	14,250
	4,000	1,130	0.38	11,740	1,130	0.40	11,740
	7,500	925	0.31	9,235	925	0.33	9,235
SSW18x9	1,000	2,145	0.47	18,890	2,645	0.58	25,800
	4,000	2,145	0.47	18,890	2,470	0.54	23,130
	7,500	2,145	0.47	18,890	2,265	0.50	20,370
SSW21x9	1,000	3,145	0.46	23,265	3,590	0.52	28,215
	4,000	3,145	0.46	23,265	3,530	0.51	27,490
	7,500	3,145	0.46	23,265	3,280	0.47	24,680
SSW24x9	1,000	4,285	0.44	27,210	4,605	0.47	30,150
	4,000	4,285	0.44	27,210	4,605	0.47	30,150
	7,500	4,285	0.44	27,210	4,480	0.46	28,970
SSW12x10	1,000	570	0.52	8,345	725	0.67	11,300
	4,000	570	0.52	8,345	570	0.52	8,345
	7,500	360	0.33	4,930	360	0.33	4,930
SSW15x10	1,000	1,110	0.53	13,150	1,145	0.54	13,690
	4,000	960	0.45	10,975	960	0.45	10,975
	7,500	715	0.34	7,775	715	0.34	7,775
SSW18x10	1,000	1,860	0.53	18,030	2,360	0.67	25,545
	4,000	1,860	0.53	18,030	2,215	0.63	23,095
	7,500	1,860	0.53	18,030	2,035	0.57	20,395

(Continued)

TABLE 3—ALLOWABLE ASD IN-PLANE SHEAR (LBS) FOR SIMPSON SSW PANEL ON CONCRETE FOUNDATIONS[1,3,4,6] (CONTINUED)

SSW Model	Allowable Axial Load[2] (lbs)	Seismic			Wind		
		Allowable ASD Shear Load V (lbs)	Drift at Allowable Shear (in)	Maximum Uplift at Allowable Shear [5] (lbs)	Allowable ASD Shear Load V (lbs)	Drift at Allowable Shear (in)	Maximum Uplift at Allowable Shear[5] (lbs)
SSW21x10	1,000	3,045	0.50	25,905	3,265	0.56	28,795
	4,000	3,045	0.50	25,905	3,170	0.54	27,510
	7,500	2,780	0.45	22,780	2,780	0.47	22,780
SSW24x10	1,000	3,835	0.50	27,100	4,205	0.55	30,920
	4,000	3,835	0.50	27,100	4,205	0.55	30,920
	7,500	3,790	0.49	26,660	3,790	0.49	26,660
SSW15x11	1,000	975	0.58	12,625	1,015	0.60	13,285
	4,000	815	0.48	10,135	815	0.48	10,135
	7,500	550	0.33	6,470	550	0.33	6,470
SSW18x11	1,000	1,635	0.58	17,295	2,075	0.73	24,280
	4,000	1,635	0.58	17,295	2,010	0.71	23,110
	7,500	1,635	0.58	17,295	1,730	0.61	18,645
SSW21x11	1,000	2,485	0.58	22,325	2,990	0.70	29,230
	4,000	2,485	0.58	22,325	2,785	0.65	26,220
	7,500	2,305	0.54	20,205	2,305	0.54	20,205
SSW24x11	1,000	3,475	0.57	27,055	3,845	0.63	31,285
	4,000	3,475	0.57	27,055	3,710	0.60	29,680
	7,500	3,205	0.52	24,260	3,205	0.52	24,260
SSW15x12	1,000	815	0.63	11,280	905	0.70	12,855
	4,000	690	0.53	9,245	690	0.53	9,245
	7,500	390	0.30	4,905	390	0.30	4,905
SSW18x12	1,000	1,450	0.63	16,605	1,845	0.80	23,220
	4,000	1,450	0.63	16,605	1,815	0.79	22,650
	7,500	1,435	0.62	16,380	1,435	0.62	16,380
SSW21x12	1,000	2,210	0.63	21,485	2,755	0.79	29,555
	4,000	2,210	0.63	21,485	2,420	0.69	24,335
	7,500	1,900	0.54	17,690	1,900	0.54	17,690
SSW24x12	1,000	3,150	0.63	26,710	3,540	0.71	31,575
	4,000	3,150	0.63	26,710	3,250	0.65	27,890
	7,500	2,705	0.54	21,855	2,705	0.54	21,855
SSW18x13	1,000	1,335	0.68	16,580	1,695	0.87	23,105
	4,000	1,335	0.68	16,580	1,580	0.81	20,830
	7,500	1,180	0.60	14,195	1,180	0.60	14,195
SSW21x13	1,000	1,985	0.68	20,765	2,520	0.87	29,200
	4,000	1,985	0.68	20,765	2,110	0.73	22,530
	7,500	1,555	0.53	15,300	1,555	0.53	15,300
SSW24x13	1,000	2,830	0.68	25,795	3,275	0.79	31,755
	4,000	2,830	0.68	25,795	2,860	0.69	26,165
	7,500	2,280	0.55	19,545	2,280	0.55	19,545

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

[1]Allowable shear loads and uplifts are applicable to installation on concrete with minimum specified compressive strength f'_c = 2,500 psi. No stress increases are included.
[2]Allowable axial load denotes the total maximum vertical downward load permitted on the entire panel acting in combination with the shear load. No stress increases are included.
[3]Allowable shear, drift, and uplift values may be interpolated for intermediate height or axial loads.
[4]High strength anchor bolts are required unless a lower strength grade is justified by the registered design professional. Anchor bolts for the SSW12 shall be high strength when seismic shear (V) x panel height exceeds 61,600 in-lbs. Figure 7 of this report provides SSWAB anchor bolt information and anchorage solutions.
[5]Tabulated anchor tension (uplift) loads assume no resisting axial load. For anchor tension loads at design shear values and including the effect of axial load, refer to the equations in Figure 8 of this report. Drifts at lower design shear may be linearly reduced.
[6]Table 4 of this report describes allowable out-of-plane loads and Table 5 of this report describes allowable axial capacities.

TABLE 4—ALLOWABLE OUT OF PLANE LATERAL LOADS (PSF)[1,3,5] FOR SINGLE STORY SIMPSON SSW PANELS ON CONCRETE FOUNDATIONS

Model Width (in.)	Allowable Axial load (lbs)[2,4]	Nominal Height of Panel (feet)					
		8	9	10	11	12	13
12	1,000	200	140	105	NA	NA	NA
	4,000	150	105	70	NA	NA	NA
	7,500	90	55	25	NA	NA	NA
15	1,000	165	130	100	80	70	NA
	4,000	130	95	70	50	40	NA
	7,500	95	65	45	30	15	NA
18	7,500	310	215	160	120	90	70
21	7,500	260	185	135	100	70	50
24	7,500	275	195	135	105	80	65

For **SI:** 1 inch = 25.4 mm, 1 foot = 305 mm, 1 lb = 4.45 N, 1 psf = 47.88 Pa.

[1]Out-of-plane loads shown are at ASD level in pounds per square foot (psf) of wall with no further stress increase allowed.
[2]Axial load denotes maximum uniformly distributed vertical downward compression load permitted on entire panel acting in combination with the out-of-plane load.
[3]Load considers a maximum deflection limit of h/240.
[4]Allowable out-of-plane loads for the 12 and 15 inch wide walls may be linearly interpolated between the axial loads shown.
[5]Tabulated loads apply only to single-story walls on concrete foundations.

TABLE 5—ALLOWABLE COMPRESSION CAPACITIES FOR SINGLE STORY SIMPSON SSW PANELS ON CONCRETE FOUNDATIONS (lbs)[1,2,3]

Model Width (in.)	Compression Capacity with No Lateral Loads (lbs)							
	Nominal Height of Panel (feet)							
	7	7.4	8	9	10	11	12	13
12	20,200	19,000	17,200	14,500	11,800	NA	NA	NA
15	25,300	24,200	22,600	20,000	17,400	14,900	12,600	NA
18	42,500	40,400	37,500	32,900	28,400	24,100	20,200	17,200
21	43,700	41,100	37,500	32,000	26,700	22,000	18,400	15,700
24	51,600	48,800	44,800	38,700	32,900	27,400	22,900	19,500

For **SI:** 1 inch = 25.4 mm, 1 foot = 305 mm, 1 lb = 4.45 N, 1 psi = 6.89 kPa.

[1]Compression capacity is lesser of steel capacity or uniform bearing strength of concrete with a minimum specified compressive strength f'_c = 2,500 psi. No stress increases are included.
[2]Compression capacity of wall assumes uniformly distributed concentric loading only without lateral loads present. For combined lateral and axial loading conditions, allowable in-plane or out-of-plane load tables apply.
[3]Tabulated loads apply only to single-story walls on concrete foundations.

TABLE 6—ALLOWABLE TENSION (UPLIFT) LOADS FOR SIMPSON SSW WOOD JAMB STUD (lbs)[1,2]

Model Width (in.)	Tension (Uplift) Capacity Per Jamb Stud (lbs)							
	Nominal Height of Panel (feet)							
	7	7.4	8	9	10	11	12	13
12	1,535	1,535	1,845	2,150	2,500	NA	NA	NA
15	1,845	2,150	2,460	2,500	2,500	3,070	3,685	NA
18	1,845	1,845	2,150	2,500	2,500	3,380	3,685	3,980
21	1,845	1,845	2,150	2,500	2,500	3,070	3,685	3,980
24	1,845	1,845	2,150	2,500	2,500	3,070	3,685	3,980

For **SI:** 1 inch = 25.4 mm, 1 foot = 305 mm, 1 lb = 4.45 N.

[1]Allowable tension (uplift) load is based on capacity of the lesser of the connection between the stud and the steel panel or stud tension capacity. The capacity of SSW wall anchor bolt and anchorage to the foundation must be adequate to transfer the additional tension (uplift), as determined in accordance with Sections 4.1.1 and 4.1.3 of this report. NA = not applicable.
[2]Loads include a 1.60 load duration increase for wood subjected to wind or earthquake. Reductions for other load durations must be taken in accordance with the IBC and NDS.

TABLE 7—ALLOWABLE ASD IN-PLANE SHEAR (LBS) FOR SIMPSON SSW PANEL ON 1ST STORY RAISED WOOD FLOOR SYSTEMS[1,2,4,5]

Wall Model	Seismic			Wind		
	Allowable ASD Shear Load V (lbs)	Drift at Allowable Shear (in)	Uplift at Allowable Shear[3] (lbs)	Allowable ASD Shear Load V (lbs)	Drift at Allowable Shear (in)	Uplift at Allowable Shear[3] (lbs)
SSW12x7	525	0.30	6,110	525	0.30	6,110
SSW15x7	1,385	0.35	11,980	1,385	0.35	11,980
SSW18x7	1,830	0.27	11,950	1,830	0.27	11,950
SSW21x7	2,100	0.21	11,015	2,100	0.21	11,015
SSW24x7	2,450	0.17	10,740	2,450	0.17	10,740
SSW12x8	450	0.36	6,105	450	0.36	6,105
SSW15x8	1,185	0.42	11,945	1,185	0.42	11,945
SSW18x8	1,570	0.33	11,950	1,570	0.33	11,950
SSW21x8	1,955	0.27	11,955	1,955	0.27	11,955
SSW24x8	2,340	0.23	11,955	2,340	0.23	11,955
SSW12x9	400	0.42	6,125	400	0.42	6,125
SSW15x9	1,050	0.47	11,945	1,050	0.47	11,945
SSW18x9	1,390	0.38	11,945	1,390	0.38	11,945
SSW21x9	1,735	0.31	11,975	1,735	0.31	11,975
SSW24x9	2,075	0.26	11,965	2,075	0.26	11,965
SSW12x10	360	0.48	6,140	360	0.48	6,140
SSW15x10	885	0.52	11,220	945	0.56	11,980
SSW18x10	1,250	0.44	11,965	1,250	0.44	11,965
SSW21x10	1,555	0.33	11,955	1,555	0.33	11,955
SSW24x10	1,860	0.30	11,950	1,860	0.30	11,950
SSW15x11	780	0.58	10,900	855	0.63	11,945
SSW18x11	1,135	0.50	11,975	1,135	0.50	11,975
SSW21x11	1,410	0.40	11,950	1,410	0.40	11,950
SSW24x11	1,690	0.34	11,970	1,690	0.34	11,970
SSW15x12	670	0.63	10,230	785	0.74	11,985
SSW18x12	1,035	0.55	11,935	1,035	0.55	11,935
SSW21x12	1,290	0.45	11,950	1,290	0.45	11,950
SSW24x12	1,545	0.38	11,960	1,545	0.38	11,960
SSW18x13	955	0.60	11,945	955	0.60	11,945
SSW21x13	1,190	0.50	11,960	1,190	0.50	11,960
SSW24x13	1,425	0.42	11,965	1,425	0.42	11,965

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

[1]Loads are applicable to 1st Story Raised Wood Floor installations supported on concrete or masonry foundations.
[2]Minimum standard strength anchor bolts required. Figure 7 of this report provides SSWAB anchor bolt information and anchorage solutions.
[3]Tabulated anchor tension (uplift) loads assume no resisting axial (vertical downward) load. Anchor rod tension at design shear load and including the effect of axial load may be determined using the following equation:

$T = [(V \times h) / B] - P/2$, where:

T = Anchor rod tension load (lbs)
V = design shear load (lbs)
h = Strong-Wall height described in Table 1 (in)
P = applied axial load (lbs) uniformly distributed
B = Anchor bolt centerline dimension (in)
($6^{7}/_{8}$ inches for SSW12, $9^{1}/_{4}$ inches for SSW15, $12^{1}/_{4}$ inches for SSW18, $15^{1}/_{4}$ inches for SSW21, and $18^{1}/_{4}$ inches for SSW24)

[4]Allowable shear loads assume a maximum first floor joist depth of 12 inches. For allowable shear load with joists up to 16 inches deep, table values must be multiplied by 0.93 for SSW12x models and 0.96 for other SSW widths.
[5]Allowable shear loads are based on 1,000 lbs. total uniformly distributed axial load acting on the entire panel in combination with the shear load. For allowable shear loads at 2,000 lbs. uniformly distributed axial load, table values must be multiplied by 0.92 for SSW12x models, and 0.96 for other SSW widths.

TABLE 8—ALLOWABLE ASD IN-PLANE SHEAR (LBS) FOR SIMPSON SSW PANEL BALLOON FRAMING APPLICATION ON CONCRETE FOUNDATIONS[1,2,4,5,6]

Nominal Wall Height (ft)	Actual Stacked SSW Height[3] (ft - in)	Bottom Wall SSW Model	Top Wall SSW Model	Seismic			Wind		
				Allowable ASD Shear Load V (lbs)	Drift at Allowable Shear (in)	Uplift at Allowable Shear[7] (lbs)	Allowable ASD Shear Load V (lbs)	Drift at Allowable Shear (in)	Uplift at Allowable Shear[7] (lbs)
15-Inch Wide Walls									
15	14 - 5 ¼	SSW15x8-STK	SSW15x7	-	-	-	705	1.00	12,465
16	15 - 6 ½	SSW15x8-STK	SSW15x8	-	-	-	645	1.06	12,105
17	16 - 5 ¼	SSW15x10-STK	SSW15x7	-	-	-	595	1.11	11,820
18	17 - 6 ½	SSW15x10-STK	SSW15x8	-	-	-	555	1.17	11,655
19	18 - 6 ½	SSW15x10-STK	SSW15x9	-	-	-	520	1.23	11,505
20	19 - 6 ½	SSW15x10-STK	SSW15x10	-	-	-	485	1.29	11,260
18-Inch Wide Walls									
15	14 - 5 ¼	SSW18x8-STK	SSW18x7	890	0.79	12,020	1,130	1.00	16,105
16	15 - 6 ½	SSW18x8-STK	SSW18x8	825	0.84	11,875	1,050	1.07	15,945
17	16 - 5 ¼	SSW18x10-STK	SSW18x7	770	0.89	11,770	980	1.13	15,795
18	17 - 6 ½	SSW18x10-STK	SSW18x8	-	-	-	915	1.20	15,585
19	18 - 6 ½	SSW18x10-STK	SSW18x9	-	-	-	860	1.27	15,440
20	19 - 6 ½	SSW18x10-STK	SSW18x10	-	-	-	810	1.33	15,290
21-Inch Wide Walls									
15	14 - 5 ¼	SSW21x8-STK	SSW21x7	1,295	0.78	14,605	1,670	1.00	20,000
16	15 - 6 ½	SSW21x8-STK	SSW21x8	1,220	0.84	14,710	1,550	1.07	19,770
17	16 - 5 ¼	SSW21x10-STK	SSW21x7	1,135	0.89	14,520	1,445	1.13	19,550
18	17 - 6 ½	SSW21x10-STK	SSW21x8	1,065	0.95	14,425	1,350	1.20	19,300
19	18 - 6 ½	SSW21x10-STK	SSW21x9	1,000	1.00	14,285	1,270	1.27	19,145
20	19 - 6 ½	SSW21x10-STK	SSW21x10	940	1.05	14,120	1,195	1.33	18,930
24-Inch Wide Walls									
15	14 - 5 ¼	SSW24x8-STK	SSW24x7	1,680	0.72	16,100	2,295	1.00	23,645
16	15 - 6 ½	SSW24x8-STK	SSW24x8	1,630	0.81	16,790	2,155	1.07	23,730
17	16 - 5 ¼	SSW24x10-STK	SSW24x7	1,545	0.87	16,950	2,005	1.13	23,405
18	17 - 6 ½	SSW24x10-STK	SSW24x8	1,470	0.94	17,115	1,875	1.20	23,130
19	18 - 6 ½	SSW24x10-STK	SSW24x9	1,390	1.00	17,095	1,765	1.27	22,960
20	19 - 6 ½	SSW24x10-STK	SSW24x10	1,310	1.05	16,945	1,660	1.33	22,685

For **SI:** 1 inch = 25.4 mm, 1 foot = 305 mm, 1 lb = 4.45 N.

[1]Allowable shear loads and anchor uplifts are applicable to installation on concrete with minimum specified compressive strength, f'_c = 2,500 psi.
[2]Allowable shear, drift, and uplift values apply to the nominal wall heights listed and may be linearly interpolated for intermediate heights.
[3]Solid shim blocks (12 inches maximum) must be used to attain specified nominal wall height. Figure 6 of this report provides additional details.
[4]Full height studs are required for balloon framed wall installation, which must be designed for out-of-plane loads in accordance with the applicable code. Two 2x6 minimum must be placed on each side and fastened together with 10d common nails at 16 inches on center.
[5]Loads are based on a 1,000 lbs. total uniformly distributed axial load acting on the entire panel in combination with the shear load. For shear loads at 2,000 lbs. uniformly distributed axial load, allowable shears must be multiplied by 0.91 for SSW15x models; no reduction is required for other wall models.
[6] High strength anchor bolts are required unless a lower strength grade is justified by the registered design professional. Figure 7 of this report provides SSWAB anchor bolt information and anchorage solutions.
[7]Tabulated anchor tension (uplift) loads assume no resisting axial load. For anchor tension loads at design shear values and including the effect of axial load, refer to the equations in Figure 8 of this report. Drifts at lower design shear may be linearly reduced.

TABLE 9—ALLOWABLE ASD IN-PLANE SHEAR (LBS) & BASE MOMENT (FT-LBS) FOR SIMPSON SSW PANEL TWO-STORY STACKED APPLICATION[1,2,5]

TABLE 9A—SECOND-STORY WALLS[4,6]

Second-Story Wall Models	Seismic		Wind	
	Allowable ASD Shear Load V (lbs)	Drift at Allowable Shear (in)	Allowable ASD Shear Load V (lbs)	Drift at Allowable Shear (in)
SSW15x7	600	0.21	600	0.21
SSW18x7	1,210	0.24	1,390	0.28
SSW21x7	1,735	0.23	1,815	0.24
SSW24x7	2,330	0.22	2,330	0.22
SSW15x8	550	0.26	550	0.26
SSW18x8	1,130	0.32	1,315	0.37
SSW21x8	1,625	0.30	1,715	0.32
SSW24x8	2,050	0.26	2,050	0.26
SSW15x9	510	0.31	510	0.31
SSW18x9	1,070	0.39	1,220	0.45
SSW21x9	1,520	0.36	1,520	0.36
SSW24x9	1,815	0.30	1,815	0.30
SSW15x10	470	0.37	470	0.37
SSW18x10	1,010	0.47	1,095	0.51
SSW21x10	1,365	0.39	1,365	0.39
SSW24x10	1,630	0.35	1,630	0.35
SSW15x11	440	0.43	440	0.43
SSW18x11	960	0.55	995	0.57
SSW21x11	1,235	0.46	1,235	0.46
SSW24x11	1,480	0.39	1,480	0.39
SSW15x12	405	0.50	405	0.50
SSW18x12	900	0.63	910	0.64
SSW21x12	1,130	0.52	1,130	0.52
SSW24x12	1,355	0.43	1,355	0.43
SSW18x13	830	0.68	840	0.69
SSW21x13	1,045	0.57	1,045	0.57
SSW24x13	1,250	0.48	1,250	0.48

[1]Two-Story Stacked wall installations must be limited to wood light frame construction and may consist of any height combination of equal width wall models listed in these tables.

[2]Loads are based on a 1,000 pound maximum uniformly distributed total axial load acting on the second-story panel and a 2,000 pound maximum uniformly distributed total axial load acting on the first-story panel in combination with the tabulated shear load and base moment.

[3]The designer must verify that the cumulative overturning moment at the base of the first-story Steel Strong-Wall does not exceed the allowable base moment capacity. Example 2 of this report provides an example procedure.

[4]The allowable second-story shear loads assume a maximum floor joist depth of 14". For allowable shear load with up to 18" joists, second-story shear loads must be multiplied by 0.98 for SSW15x models and by 0.94 for other SSW widths. For bottom wall shims greater than $^{7}/_{8}$" thick, see Figure 5 of this report.

[5]Allowable shear, drift, and base moment values may be interpolated for intermediate heights.

[6]Minimum ASTM F1554 Grade 36 threaded rods are required at the second-story wall anchorage.

[7]High strength anchor bolts are required at the first-story wall unless a lower strength grade is justified by the registered design professional. Figure 7 of this report provides SSWAB anchor bolt information and anchorage solutions.

[8]Tabulated anchor tension (uplift) loads assume no resisting axial load. For anchor tension loads at design shear values and including the effect of axial load, refer to the equations in Figure 8 of this report. Drifts at lower design shear or base moment may be linearly reduced.

TABLE 9B—FIRST-STORY WALLS[3,7]

First-Story Wall Models	Seismic			Wind		
	Allowable ASD Base Moment (ft-lbs)	Drift at Allowable Base Moment (in)	Uplift at Allowable Base Moment [8] (lbs)	Allowable ASD Base Moment (ft-lbs)	Drift at Allowable Base Moment (in)	Uplift at Allowable Base Moment [8] (lbs)
SSW15x8-STK	9,665	0.35	11,385	9,665	0.35	11,385
SSW18x8-STK	19,270	0.41	19,520	22,690	0.49	24,875
SSW21x8-STK	27,665	0.39	23,360	30,775	0.43	27,240
SSW24x8-STK	37,805	0.37	27,435	39,670	0.39	29,370
SSW15x9-STK	9,490	0.37	11,130	9,490	0.38	11,130
SSW18x9-STK	18,815	0.47	18,890	22,685	0.57	24,870
SSW21x9-STK	27,585	0.46	23,265	31,310	0.52	27,970
SSW24x9-STK	37,585	0.44	27,215	40,390	0.47	30,150
SSW15x10-STK	9,225	0.45	10,755	9,225	0.45	10,755
SSW18x10-STK	18,175	0.53	18,030	22,585	0.65	24,690
SSW21x10-STK	29,750	0.50	25,905	31,485	0.55	28,210
SSW24x10-STK	37,470	0.50	27,100	40,925	0.55	30,740
SSW15x11-STK	9,025	0.50	10,475	9,025	0.50	10,475
SSW18x11-STK	17,610	0.58	17,295	22,115	0.73	23,880
SSW21x11-STK	26,765	0.58	22,325	30,860	0.67	27,355
SSW24x11-STK	37,430	0.57	27,060	40,260	0.61	30,005
SSW15x12-STK	8,675	0.57	9,990	8,675	0.57	9,990
SSW18x12-STK	17,070	0.63	16,605	21,600	0.80	23,030
SSW21x12-STK	26,015	0.63	21,490	30,195	0.73	26,475
SSW24x12-STK	37,080	0.63	26,710	39,545	0.67	29,235
SSW18x13-STK	17,050	0.68	16,580	21,155	0.85	22,315
SSW21x13-STK	25,350	0.68	20,765	29,505	0.79	25,590
SSW24x13-STK	36,140	0.68	25,790	38,795	0.73	28,450

For **SI:** 1 inch = 25.4 mm, 1 foot = 305 mm, 1 lb = 4.45 N, 1 ft-lb = 1.36 N-m.

TABLE 10—ALLOWABLE ASD IN-PLANE SHEAR (LBS) FOR SIMPSON S/SSW PANEL (NO WOOD STUD) ON CONCRETE FOUNDATIONS[1,3,4,5,7]

S/SSW Model	Applicable Height Range (in)	Height for Given Design Values, H (in)	Allowable Axial Load[2] (lbs)	Seismic				Wind		
				Allowable ASD Shear Load V (lbs)	Drift at Allowable Shear (in)	Uplift at Allowable Shear[6] (lbs)	Ultimate Load, P_{ULT}[8] (lbs)	Allowable ASD Shear Load V (lbs)	Drift at Allowable Shear (in)	Uplift at Allowable Shear[6] (lbs)
S/SSW12X	H ≤ 80	H = 80	1000	845	0.35	8,460	3,850	1,070	0.44	11,405
			4000	845	0.35	8,460		1,060	0.44	11,265
			7500	845	0.35	8,460		885	0.37	8,950
S/SSW15X	H ≤ 80	H = 80	1000	1,645	0.34	13,340	6,140	1,810	0.38	15,135
			4000	1,640	0.34	13,290		1,640	0.34	13,290
			7500	1,440	0.30	11,290		1,440	0.30	11,290
S/SSW18X	H ≤ 80	H = 80	1000	2,800	0.33	18,690	9,265	3,375	0.40	24,545
			4000	2,800	0.33	18,690		3,250	0.38	23,135
			7500	2,800	0.33	18,690		2,980	0.35	20,370
S/SSW21X	H ≤ 80	H = 80	1000	4,050	0.32	22,590	11,845	4,440	0.35	25,710
			4000	4,050	0.32	22,590		4,440	0.35	25,710
			7500	4,050	0.32	22,590		4,310	0.34	24,635
S/SSW24X	H ≤ 80	H = 80	1000	5,250	0.30	24,710	14,865	5,250	0.30	24,710
			4000	5,250	0.30	24,710		5,250	0.30	24,710
			7500	5,250	0.30	24,710		5,250	0.30	24,710
S/SSW12X	80 < H ≤ 97	H = 97	1000	645	0.42	7,710	2,815	820	0.54	10,360
			4000	645	0.42	7,710		775	0.51	9,640
			7500	610	0.40	7,220		610	0.40	7,220
S/SSW15X	80 < H ≤ 97	H = 97	1000	1,280	0.42	12,390	4,490	1,415	0.47	14,090
			4000	1,250	0.41	12,025		1,250	0.41	12,025
			7500	1,070	0.35	9,955		1,070	0.35	9,955
S/SSW18X	80 < H ≤ 97	H = 97	1000	2,140	0.41	16,895	6,450	2,785	0.54	24,565
			4000	2,140	0.41	16,895		2,680	0.52	23,130
			7500	2,140	0.41	16,895		2,460	0.48	20,400
S/SSW21X	80 < H ≤ 97	H = 97	1000	3,265	0.41	21,905	8,665	3,870	0.48	27,930
			4000	3,265	0.41	21,905		3,765	0.47	26,790
			7500	3,265	0.41	21,905		3,460	0.43	23,715
S/SSW24X	80 < H ≤ 97	H = 97	1000	4,540	0.39	26,335	11,125	4,985	0.43	30,045
			4000	4,540	0.39	26,335		4,890	0.42	29,220
			7500	4,540	0.39	26,335		4,555	0.39	26,455

For **SI**: 1 inch = 25.4 mm, 1 foot = 305 mm, 1 lb = 4.45 N.

Footnotes on following page

TABLE 10—ALLOWABLE ASD IN-PLANE SHEAR (LBS) FOR SIMPSON S/SSW PANEL (NO WOOD STUD) ON CONCRETE FOUNDATIONS (CONTINUED)[1,3,4,5,7]

S/SSW Model	Applicable Height Range (in)	Height for Given Design Values, H (in)	Allowable Axial Load [2] (lbs)	Seismic				Wind		
				Allowable ASD Shear Load V (lbs)	Drift at Allowable Shear (in)	Uplift at Allowable Shear [6] (lbs)	Ultimate Load, P_{ULT} [8] (lbs)	Allowable ASD Shear Load V (lbs)	Drift at Allowable Shear (in)	Uplift at Allowable Shear [6] (lbs)
S/SSW12X	97 < H ≤ 109	H = 109	1000	545	0.48	7,255	2,330	695	0.61	9,735
			4000	545	0.48	7,255		605	0.53	8,210
			7500	445	0.39	5,755		445	0.39	5,755
S/SSW15X	97 < H ≤ 109	H = 109	1000	1,090	0.48	11,725	3,720	1,180	0.52	12,955
			4000	1,025	0.45	10,875		1,025	0.45	10,875
			7500	850	0.37	8,720		850	0.37	8,720
S/SSW18X	97 < H ≤ 109	H = 109	1000	1,835	0.47	16,105	5,340	2,365	0.61	22,835
			4000	1,835	0.47	16,105		2,365	0.61	22,835
			7500	1,835	0.47	16,105		2,150	0.55	19,890
S/SSW21X	97 < H ≤ 109	H = 109	1000	2,800	0.46	20,855	7,175	3,275	0.54	25,900
			4000	2,800	0.46	20,855		3,025	0.50	23,140
			7500	2,735	0.45	20,220		2,735	0.45	20,220
S/SSW24X	97 < H ≤ 109	H = 109	1000	4,005	0.46	26,025	9,210	4,220	0.48	27,970
			4000	3,950	0.45	25,540		3,950	0.45	25,540
			7500	3,630	0.41	22,855		3,630	0.41	22,855
S/SSW15X	109 < H ≤ 121	H = 121	1000	945	0.53	11,185	3,140	990	0.56	11,845
			4000	835	0.47	9,645		835	0.47	9,645
			7500	665	0.37	7,425		665	0.37	7,425
S/SSW18X	109 < H ≤ 121	H = 121	1000	1,605	0.53	15,515	4,505	2,045	0.67	21,490
			4000	1,605	0.53	15,515		1,960	0.64	20,225
			7500	1,605	0.53	15,515		1,715	0.56	16,890
S/SSW21X	109 < H ≤ 121	H = 121	1000	2,440	0.52	19,970	6,055	2,650	0.56	22,275
			4000	2,405	0.51	19,600		2,405	0.51	19,600
			7500	2,120	0.45	16,730		2,120	0.45	16,730
S/SSW24X	109 < H ≤ 121	H = 121	1000	3,425	0.50	24,275	7,775	3,425	0.50	24,275
			4000	3,160	0.46	21,875		3,160	0.46	21,875
			7500	2,855	0.42	19,275		2,855	0.42	19,275

For **SI**: 1 inch = 25.4 mm, 1 foot = 305 mm, 1 lb = 4.45 N.

1. Allowable shear loads and anchor uplifts are applicable to installation on concrete with minimum specified compressive strength f'_c = 2,500 psi. No stress increases are included.
2. The axial load denotes the total maximum uniformly distributed vertical downward load permitted on the entire panel acting in combination with the shear load. No stress increases are included.
3. Top of panel must be connected with screws described in Table 2 of this report to a minimum 43 mil thick steel member except S/SSW18 and wider panels up to 97 inches tall must be connected to a minimum 54 mil thick steel member. When connected to a minimum 43 mil thick steel member, the maximum allowable load must be 2,720 pounds for S/SSW18, 3,625 pounds for S/SSW21, and 4,230 pounds for S/SSW24.
4. Allowable shear, drift, and uplift values may be interpolated for intermediate height or axial loads.
5. High strength anchor bolts are required unless a lower strength grade is justified by the registered design professional. Anchor bolts for the SSW12 shall be high strength when seismic shear (V) x panel height exceeds 61,600 in-lbs. Figure 7 of this report provides SSWAB anchor bolt information and anchorage solutions.
6. Tabulated anchor tension (uplift) loads assume no resisting axial load. For anchor tension loads at design shear values and including the effect of axial load, refer to the equations in Figure 8 of this report. Drifts at lower design shear may be linearly reduced.
7. Table 11 of this report describes allowable out-of-plane loads and Table 12 of this report describes allowable axial capacities.
8. The available strength, R_n/Ω, for CFS collector element (top track or header) design within a seismic force-resisting system shall be greater than or equal to P_{ULT}.

TABLE 11—ALLOWABLE OUT OF PLANE LOADS (PSF) FOR SIMPSON S/SSW PANEL[1,3]

Model Width (in.)	Allowable Axial load (lbs)[2,4]	Nominal Height of Panel (feet)		
		8	9	10
12	1,000	195	140	100
	4,000	145	100	70
	7,500	85	50	25
15	1,000	160	125	100
	4,000	130	95	70
	7,500	90	65	45
18	7,500	300	210	155
21	7,500	255	180	130
24	7,500	265	190	135

For **SI:** 1 inch = 25.4 mm, 1 foot = 305 mm, 1 lb = 4.45 N.

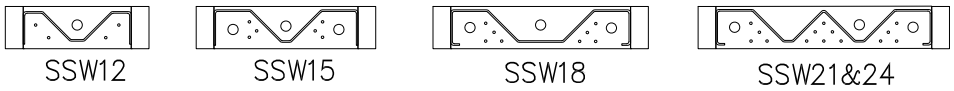
[1]Out-of-plane loads shown are at ASD level in pounds per square foot (psf) of wall with no further stress increase allowed.
[2]Axial load denotes maximum uniformly distributed vertical compression load permitted on entire panel acting in combination with the out-of-plane load.
[3]Load considers a maximum deflection limit of h/240.
[4]Allowable out-of-plane loads for the 12 and 15 inch wide walls may be linearly interpolated between the axial loads shown.

TABLE 12—ALLOWABLE COMPRESSION CAPACITIES FOR SIMPSON S/SSW PANEL ON CONCRETE FOUNDATIONS (lbs)[1,2]

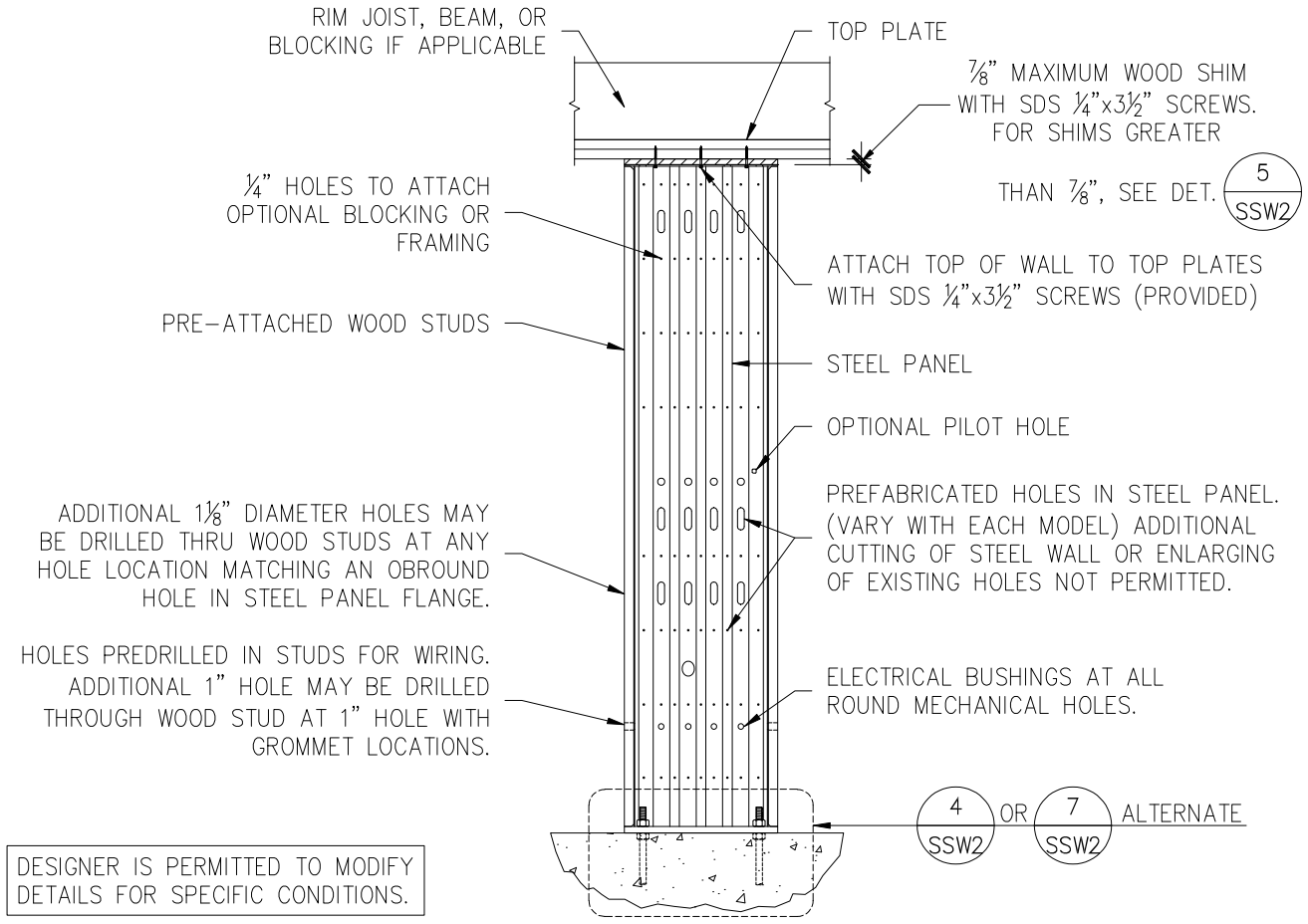
Model Width (in.)	Compression Capacity with No Lateral Load (lbs)			
	Nominal Height of Panel (feet)			
	7	8	9	10
12	20,200	16,300	13,700	11,100
15	25,300	21,800	19,200	16,600
18	42,500	36,000	31,400	27,000
21	43,700	35,800	30,300	25,100
24	51,600	42,900	36,900	31,100

For **SI:** 1 inch = 25.4 mm, 1 foot = 305 mm, 1 lb = 4.45 N.

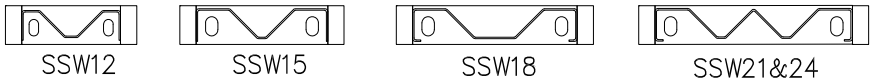
[1]Compression capacity is lesser of steel capacity or uniform bearing strength of concrete with a minimum specified compressive strength f'_c = 2,500 psi. No stress increases are included.
[2]Compression capacity of wall assumes concentric loading only without lateral loads present. For combined lateral and axial loading conditions, allowable in-plane or out-of-plane load tables apply.



PLAN VIEW OF TOP PLATES (STUDS NOT SHOWN FOR CLARITY)



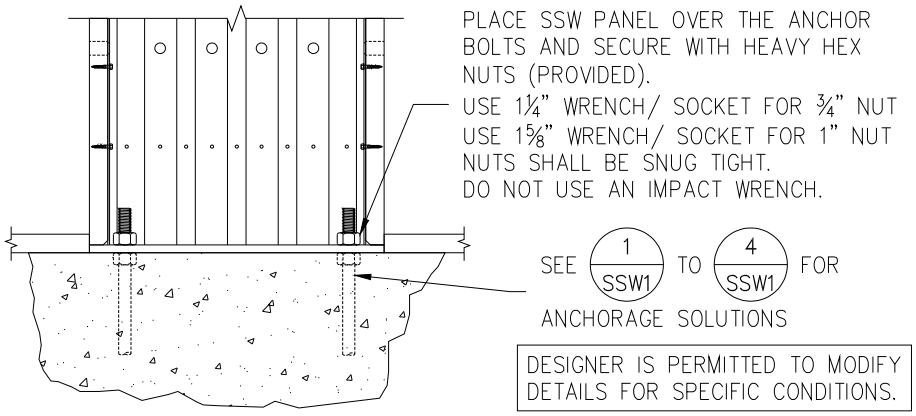
SINGLE-STORY SSW ON CONCRETE 2-SSW2



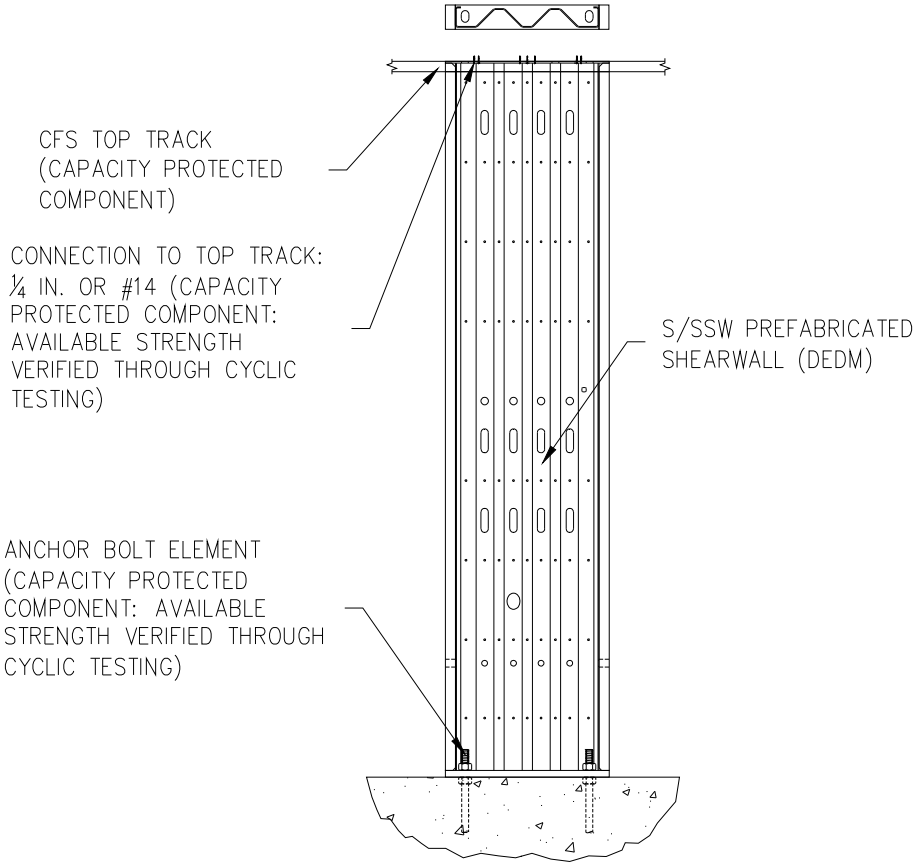
PLAN VIEW OF BASE PLATES (STUDS NOT SHOWN FOR CLARITY)

U.S. Patent 8,281,551
Canadian Patent 2,489,845

FIGURE 1—STEEL STRONG-WALL DETAILS (2/SSW2)

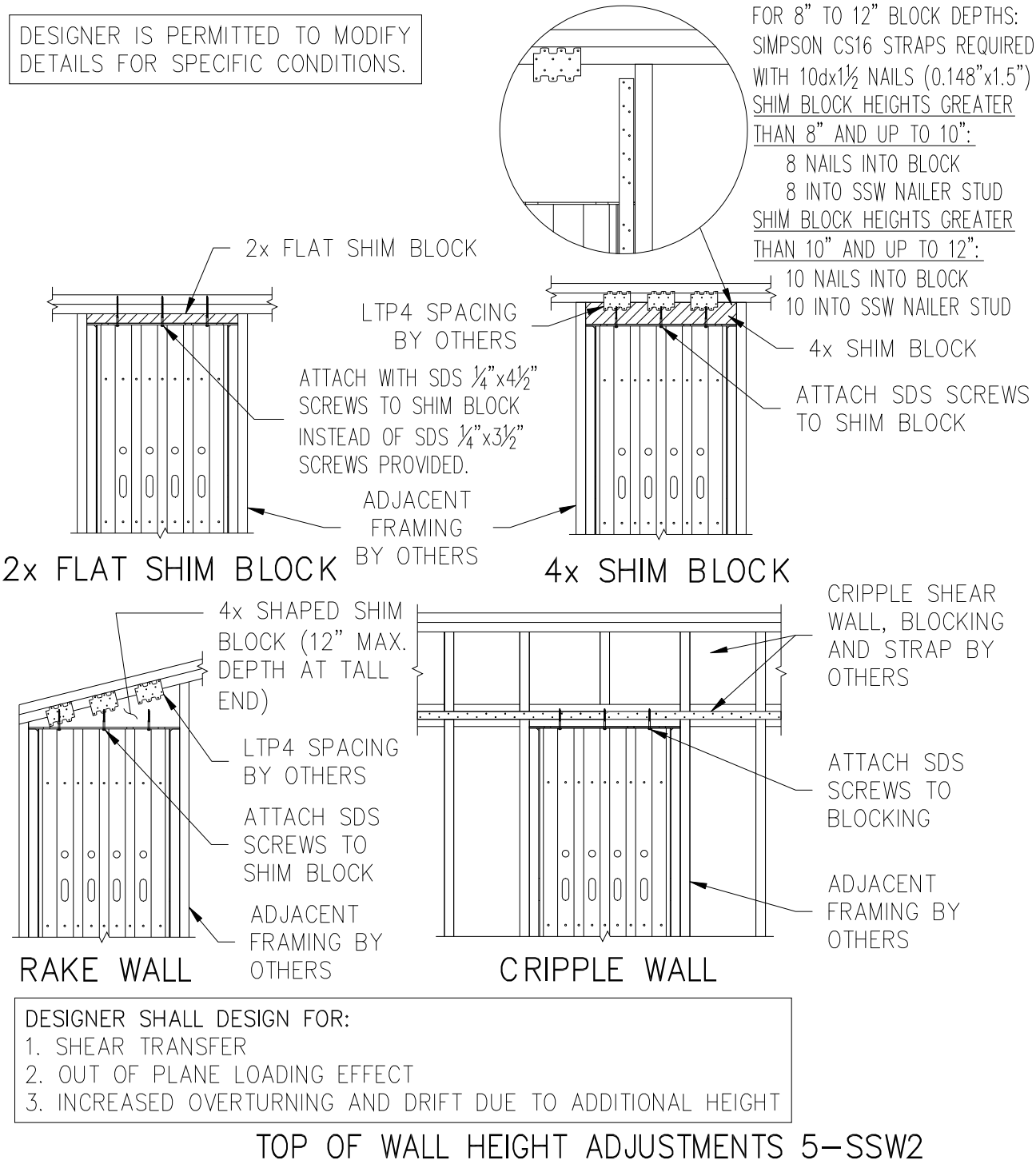


STRONG–WALL ON CONCRETE 4–SSW2



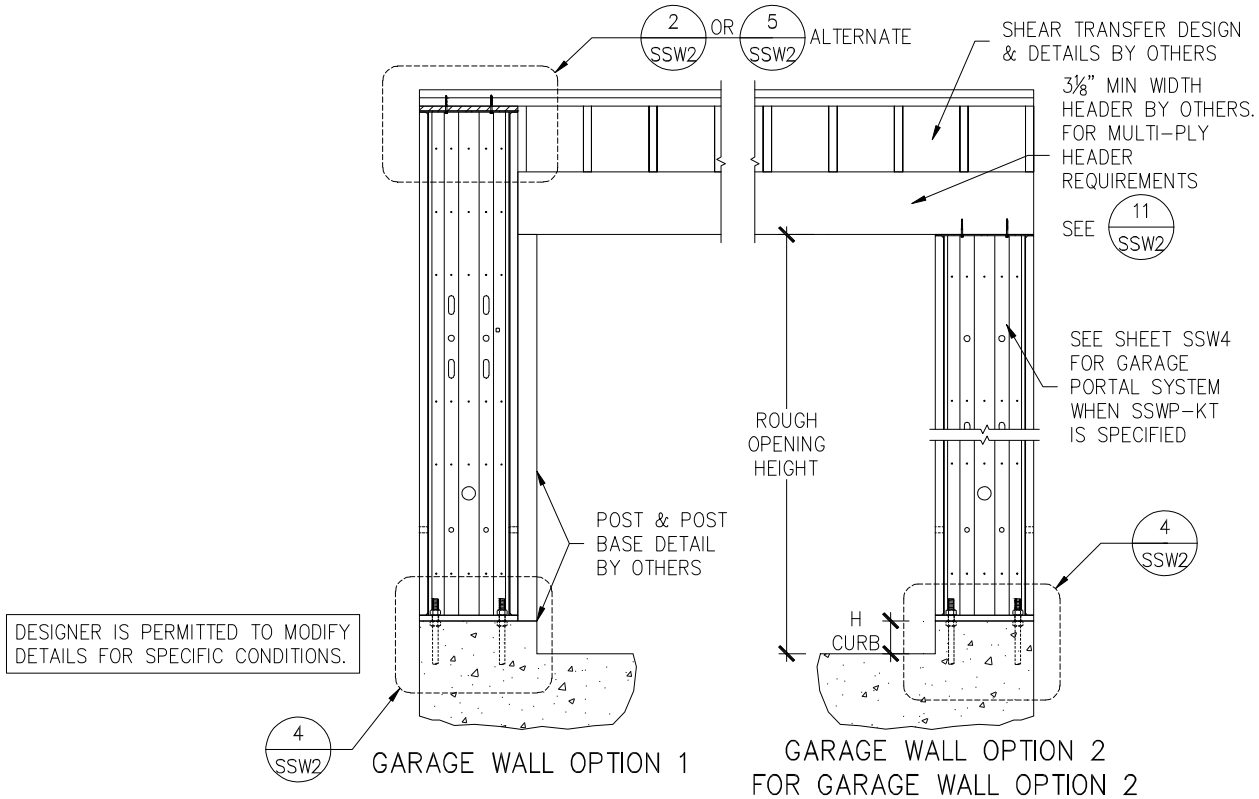
U.S. Patent 8,281,551
Canadian Patent 2,489,845

FIGURE 1—STEEL STRONG-WALL DETAILS (Continued) (4/SSW2)



U.S. Patent 8,281,551
Canadian Patent 2,489,845

FIGURE 2—STEEL STRONG-WALL SHIM AND CRIPPLE DETAIL (5/SSW2)



NOTE:
7-FT. HIGH STEEL STRONG-WALL MODELS ARE 80", 2" TALLER THAN 7-FT. HIGH WOOD STRONG-WALL SHEARWALLS

DESIGNER SHALL DESIGN FOR:
1. SHEAR TRANSFER
2. OUT OF PLANE LOADING EFFECT
3. INCREASED OVERTURNING AND DRIFT DUE TO ADDITIONAL HEIGHT

GARAGE HEADER
ROUGH OPENING HEIGHT

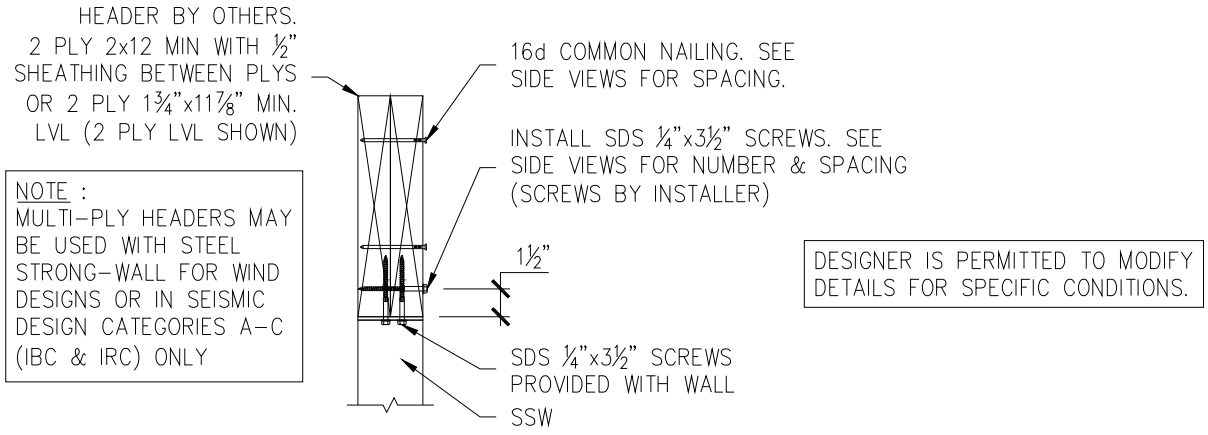
MODEL NO.	H CURB	ROUGH OPENING HEIGHT
SSW12X7 SSW15X7 SSW18X7 SSW21X7 SSW24X7	5½"	7'-1½"
	6"	7'-2"
SSW12X7 SSW15X7 SSW18X7 SSW21X7 SSW24X7	5½"	8'-2¾"
	6"	8'-3¼"

1. THE HEIGHT OF THE GARAGE CURB ABOVE THE GARAGE SLAB IS CRITICAL FOR THE ROUGH HEADER OPENING AT GARAGE RETURN WALLS.
2. SHIMS ARE NOT PROVIDED WITH STEEL STRONG-WALL.
3. FURRING ON UNDERSIDE OF GARAGE HEADER MAY BE NECESSARY FOR LESSER ROUGH OPENING HEIGHTS.

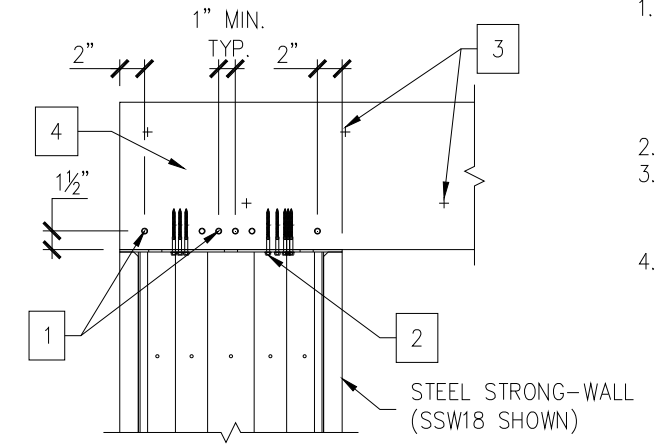
ALTERNATE GARAGE WALL OPTIONS 3-SSW2

U.S. Patent 8,281,551
Canadian Patent 2,489,845

FIGURE 3—STEEL STRONG-WALL GARAGE FRONT DETAILS (3/SSW2)



SSW MULTI-PLY HEADER CROSS SECTION



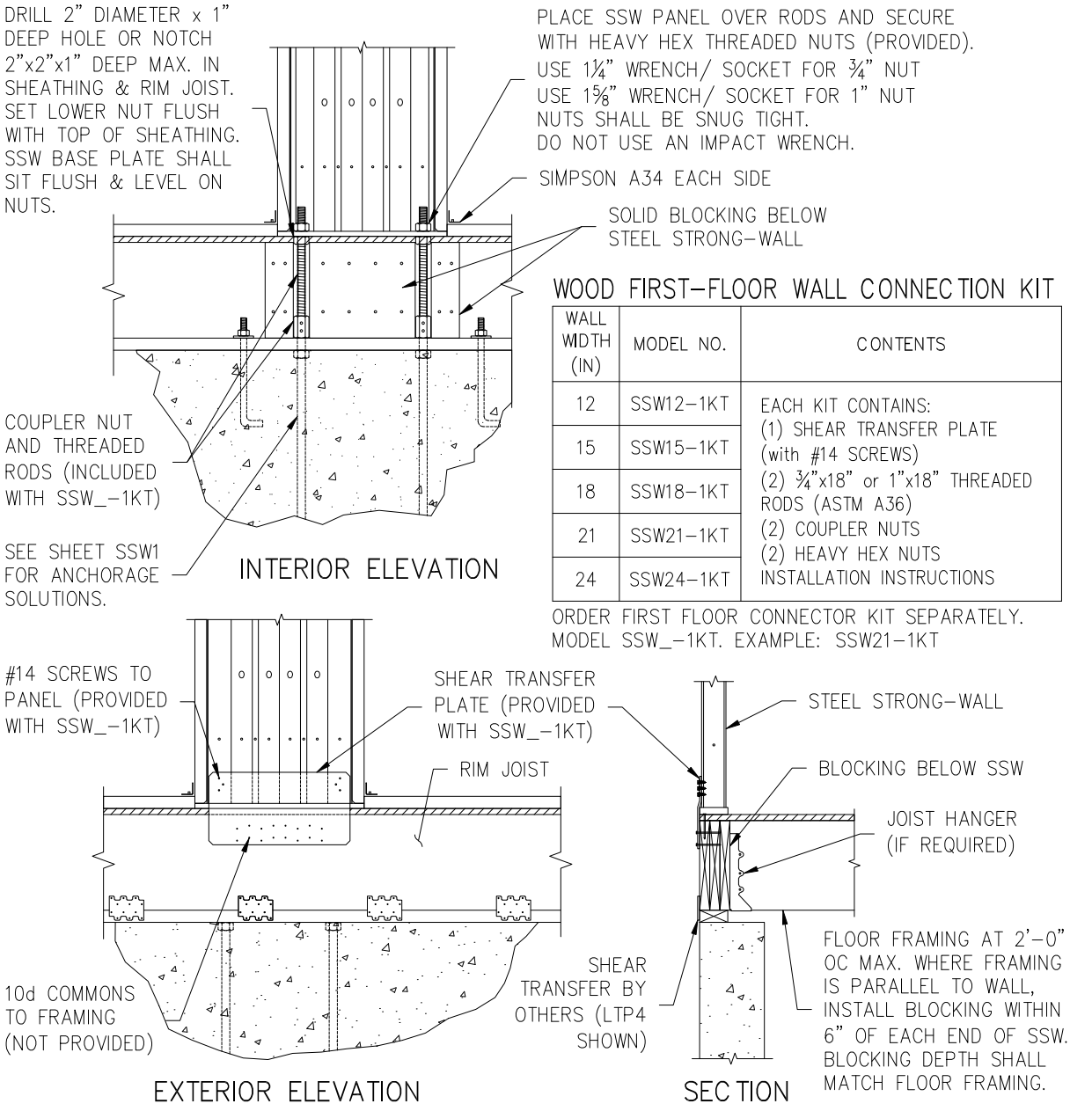
1. INSTALL SDS ¼"x3½" SCREWS HORIZONTALLY THROUGH LVL OR 2x LUMBER HEADER PLYS. 4 SCREWS TOTAL FOR SSW12, 6 SCREWS TOTAL FOR SSW15, SSW18, SSW21 AND SSW24.
2. SDS ¼"x3½" SCREWS PROVIDED WITH WALL
3. FASTEN PLYS TOGETHER WITH 16d COMMON NAILS AT 16" O.C. ALONG EACH EDGE OF BEAM.
4. $^{15}/_{32}$" SHEATHING BETWEEN 2x HEADER PLYS SHALL MATCH HEADER DEPTH AND EXTEND FULL WIDTH OF SSW, MINIMUM.

SIDE VIEW
SSW WITH MULTI-PLY HEADER

MULTI-PLY HEADERS 11-SSW2

U.S. Patent 8,281,551
Canadian Patent 2,489,845

FIGURE 3—STEEL STRONG-WALL GARAGE FRONT DETAILS (Continued) (11/SSW2)



WOOD FIRST-FLOOR WALL CONNECTION KIT

WALL WIDTH (IN)	MODEL NO.	CONTENTS
12	SSW12-1KT	EACH KIT CONTAINS: (1) SHEAR TRANSFER PLATE (with #14 SCREWS) (2) ¾"x18" or 1"x18" THREADED RODS (ASTM A36) (2) COUPLER NUTS (2) HEAVY HEX NUTS INSTALLATION INSTRUCTIONS
15	SSW15-1KT	
18	SSW18-1KT	
21	SSW21-1KT	
24	SSW24-1KT	

ORDER FIRST FLOOR CONNECTOR KIT SEPARATELY. MODEL SSW_-1KT. EXAMPLE: SSW21-1KT

FIRST FLOOR AT WOOD FRAMING NOTES :

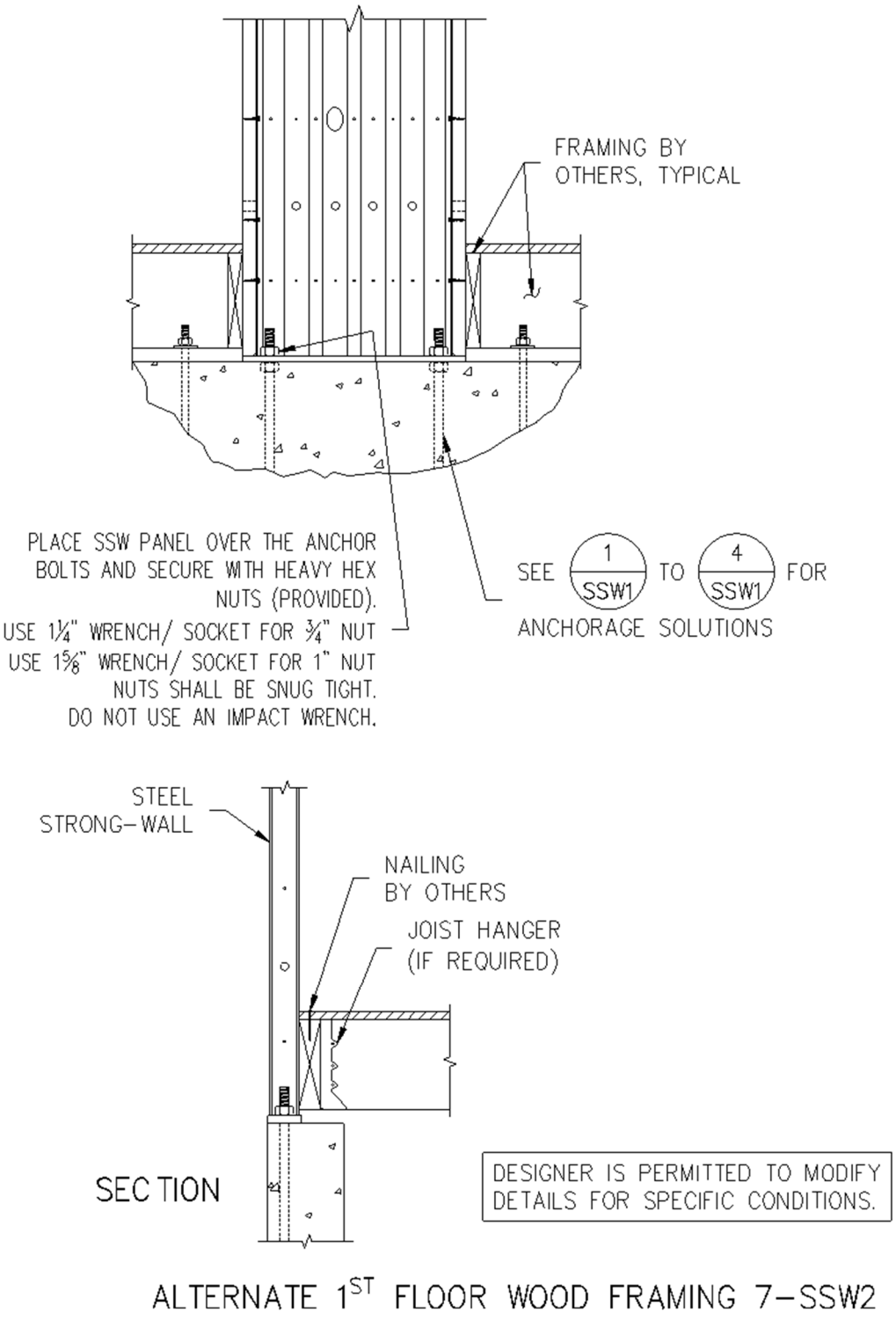
1. USE WOOD FIRST-FLOOR ALLOWABLE LOAD TABLES FROM THE STRONG-WALL CATALOG FOR THIS INSTALLATION.
2. USE ALTERNATE DETAIL 7/SSW2 TO ACHIEVE MAXIMUM ON-CONCRETE ALLOWABLE LOADS.
3. FOR TWO-STORY STACKED STEEL STRONG-WALLS WITH WOOD FIRST FLOOR, USE ALTERNATE DETAIL 7/SSW2
4. DESIGNER SHALL DESIGN FOR SHEAR TRANSFER FROM RIM JOIST TO SILL PLATE AND SILL PLATE TO FOUNDATION.

DESIGNER IS PERMITTED TO MODIFY DETAILS FOR SPECIFIC CONDITIONS.

FIRST FLOOR AT WOOD FRAMING 10-SSW2

U.S. Patent 8,281,551
Canadian Patent 2,489,845

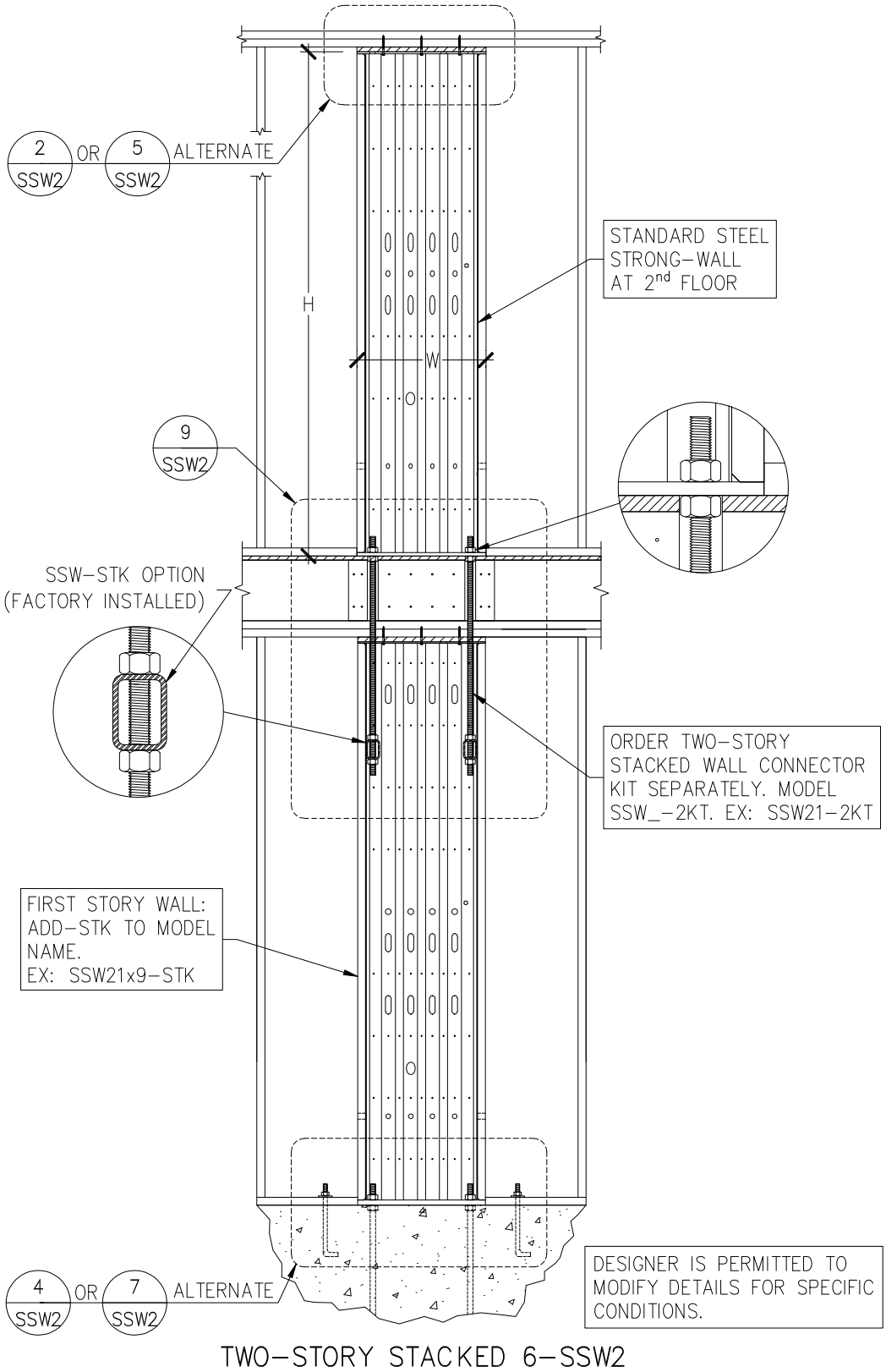
FIGURE 4—STEEL STRONG-WALL WOOD FLOOR DETAILS (10/SSW2)



ALTERNATE 1ST FLOOR WOOD FRAMING 7–SSW2

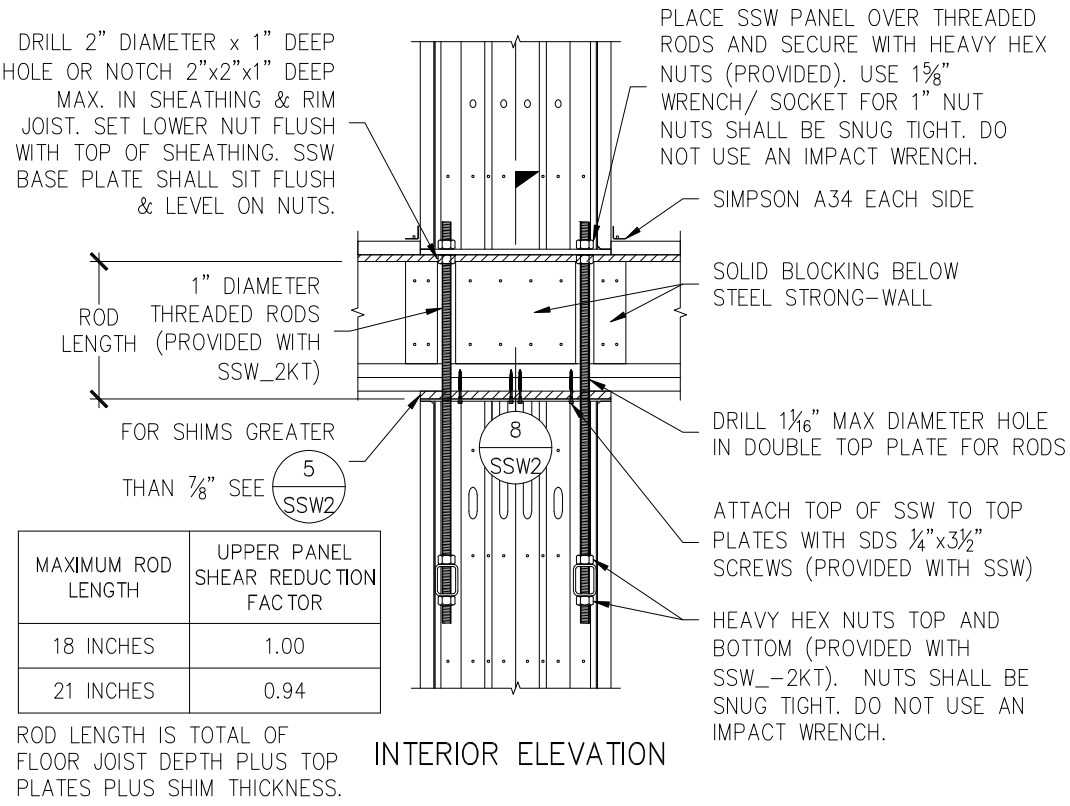
U.S. Patent 8,281,551
Canadian Patent 2,489,845

FIGURE 4—STEEL STRONG-WALL WOOD FLOOR DETAILS (Continued) (7/SSW2)



U.S. Patent 8,281,551
Canadian Patent 2,489,845

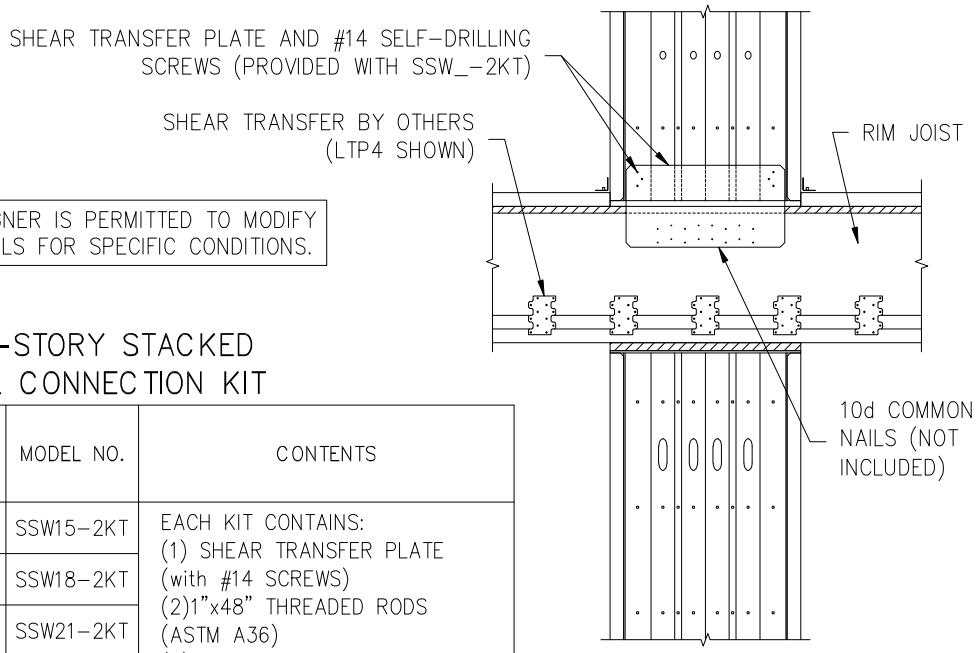
FIGURE 5—STEEL STRONG-WALL TWO-STORY STACKED DETAILS (6/SSW2)



MAXIMUM ROD LENGTH	UPPER PANEL SHEAR REDUCTION FACTOR
18 INCHES	1.00
21 INCHES	0.94

ROD LENGTH IS TOTAL OF FLOOR JOIST DEPTH PLUS TOP PLATES PLUS SHIM THICKNESS.

INTERIOR ELEVATION



DESIGNER IS PERMITTED TO MODIFY DETAILS FOR SPECIFIC CONDITIONS.

TWO-STORY STACKED WALL CONNECTION KIT

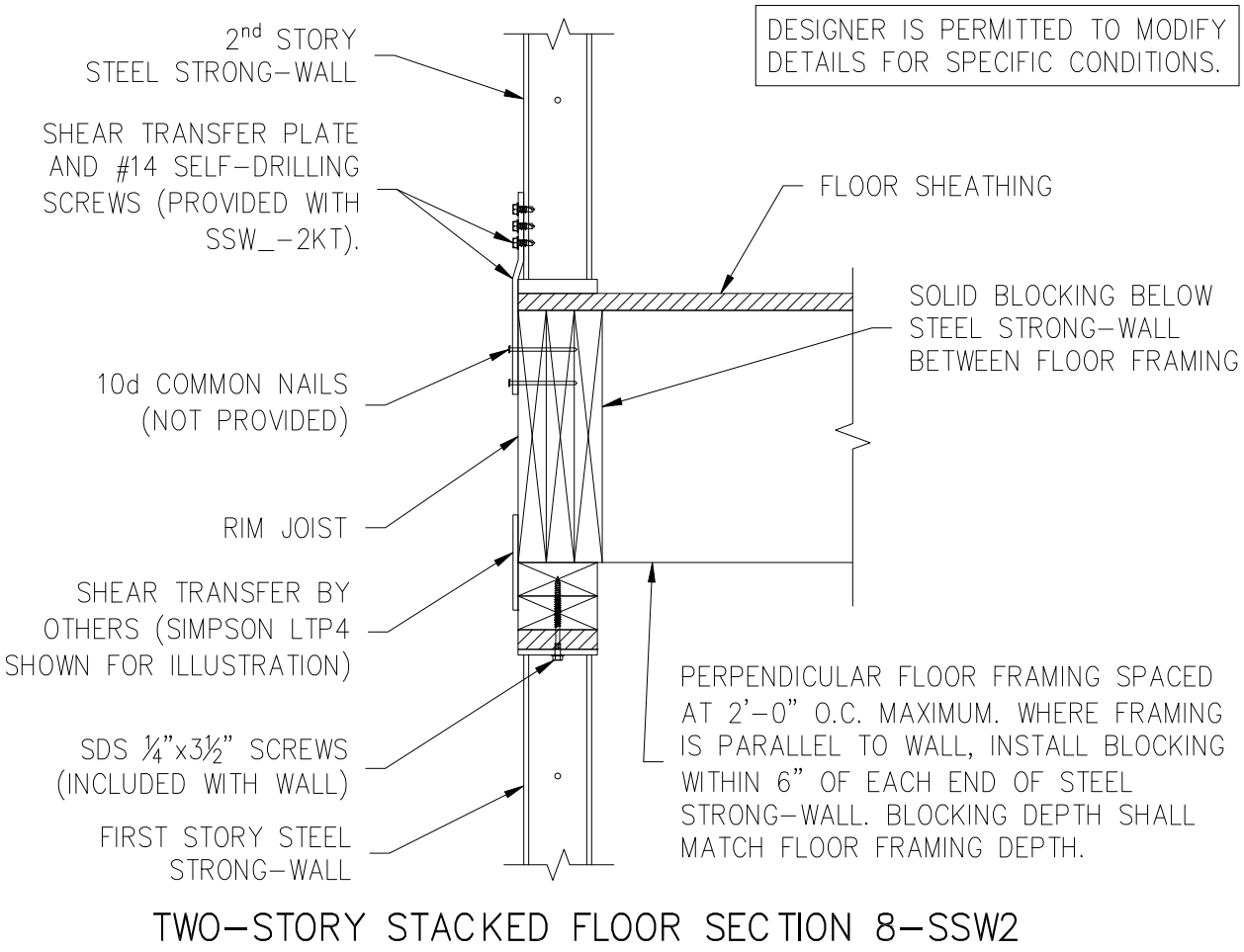
WALL WIDTH (in)	MODEL NO.	CONTENTS
15	SSW15-2KT	EACH KIT CONTAINS: (1) SHEAR TRANSFER PLATE (with #14 SCREWS) (2)1"x48" THREADED RODS (ASTM A36) (6) HEAVY HEX NUTS INSTALLATION INSTRUCTIONS
18	SSW18-2KT	
21	SSW21-2KT	
24	SSW24-2KT	

EXTERIOR ELEVATION

TWO-STORY STACKED FLOOR FRAMING 9-SSW2

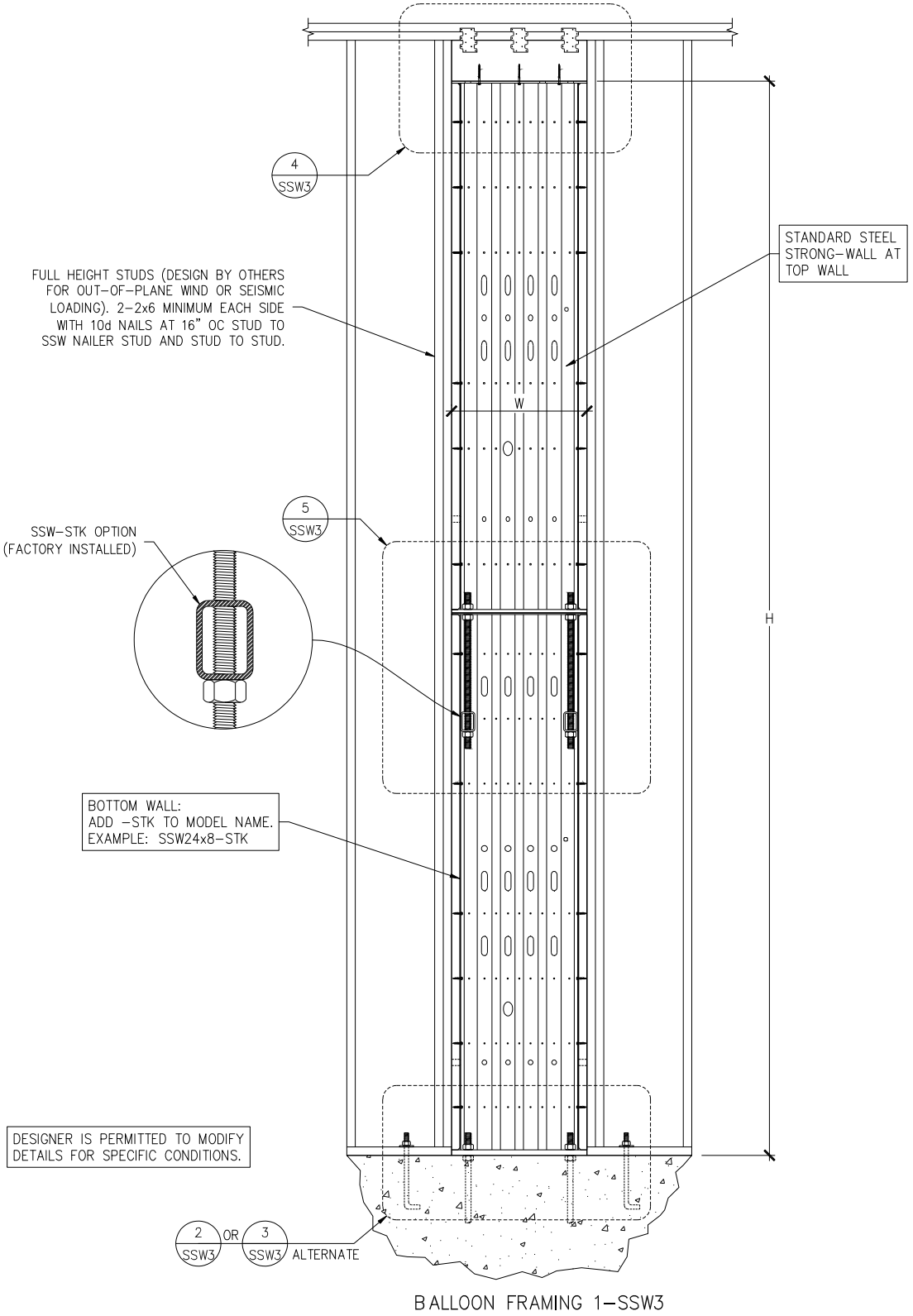
U.S. Patent 8,281,551
Canadian Patent 2,489,845

FIGURE 5—STEEL STRONG-WALL TWO-STORY STACKED DETAILS (Continued) (9/SSW2)



U.S. Patent 8,281,551
Canadian Patent 2,489,845

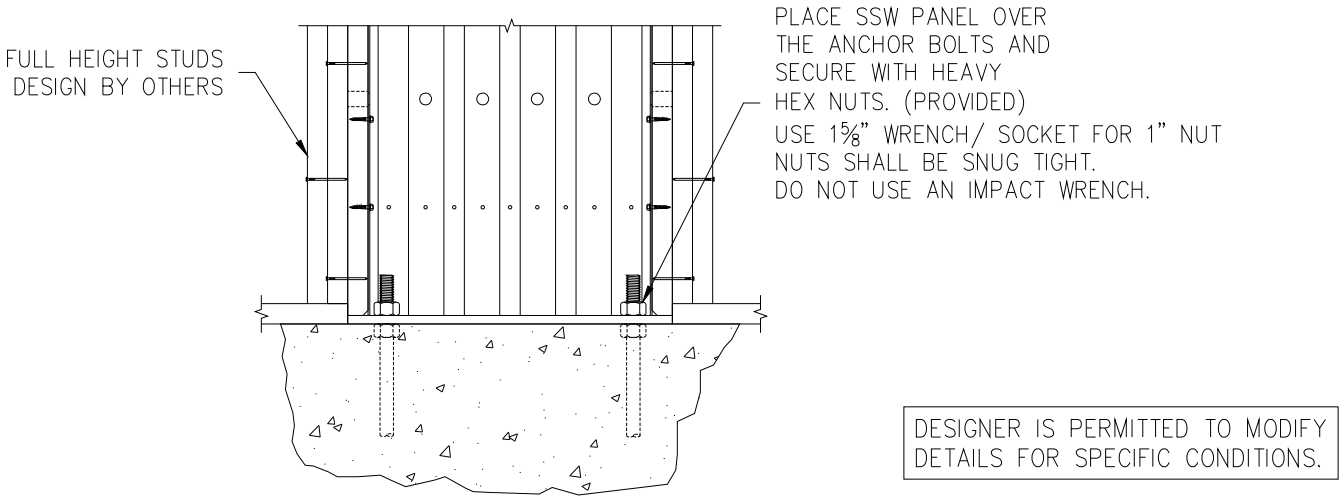
FIGURE 5—STEEL STRONG-WALL TWO-STORY STACKED DETAILS (Continued) (8/SSW2)



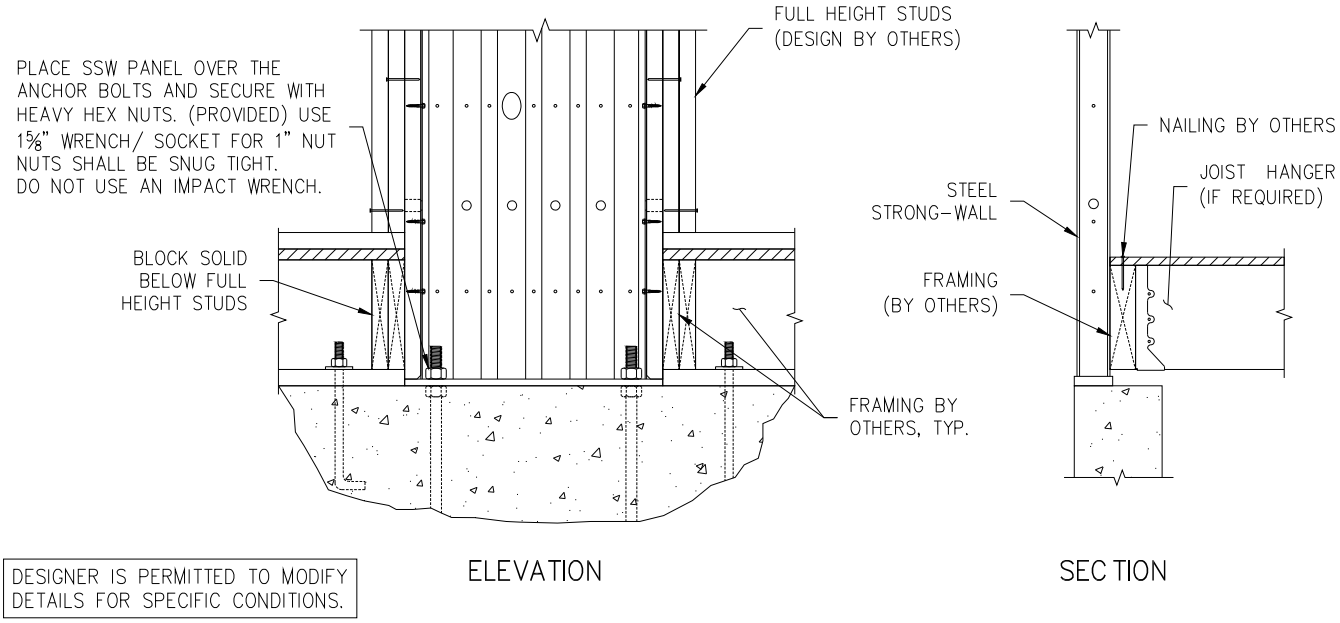
BALLOON FRAMING 1-SSW3

U.S. Patent 8,281,551
Canadian Patent 2,489,845

FIGURE 6—STEEL STRONG-WALL BALLOON FRAMING DETAILS (1/SSW3)



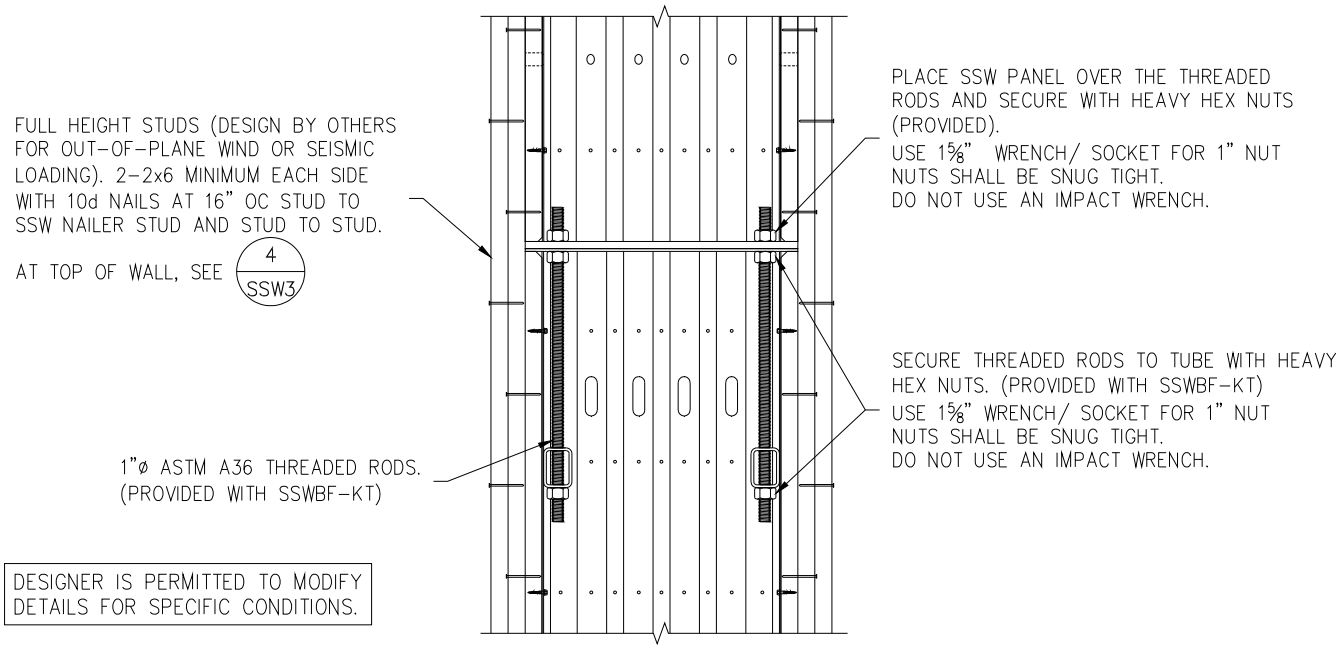
BALLOON FRAMING BASE PLATE CONNECTION 2–SSW3



BALLOON FRAMING AT WOOD FLOOR 3–SSW3

U.S. Patent 8,281,551
Canadian Patent 2,489,845

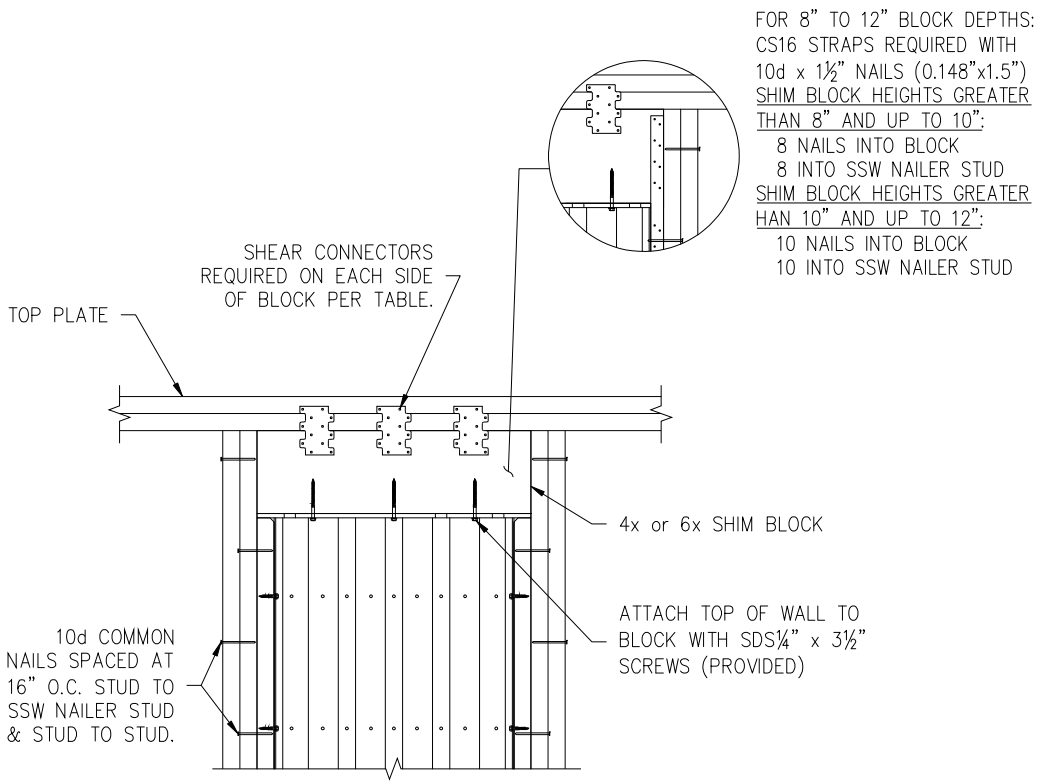
FIGURE 6—STEEL STRONG-WALL BALLOON FRAMING DETAILS (Continued) (2, 3/SSW3)



BALLOON FRAMING WALL TO WALL CONNECTION 5-SSW3

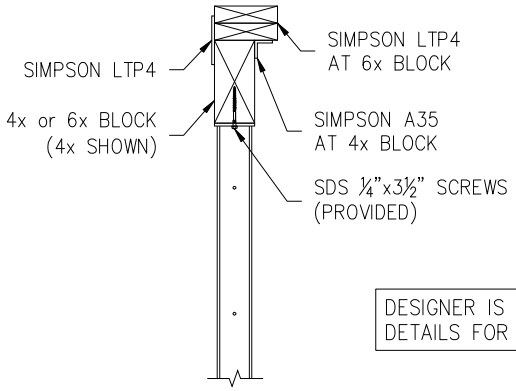
U.S. Patent 8,281,551
Canadian Patent 2,489,845

FIGURE 6—STEEL STRONG WALL BALLOON FRAMING DETAILS (Continued) (5/SSW3)



ELEVATION

WALL MODEL	TOTAL CONNECTORS	BLOCK TO TOP PLATE SHEAR CONNECTORS
15" WALL	4 (2 each side)	LTP4 OR A35
18" WALL	4 (2 each side)	LTP4 OR A35
21" WALL	6 (3 each side)	LTP4 OR A35
24" WALL	6 (3 each side)	LTP4 OR A35



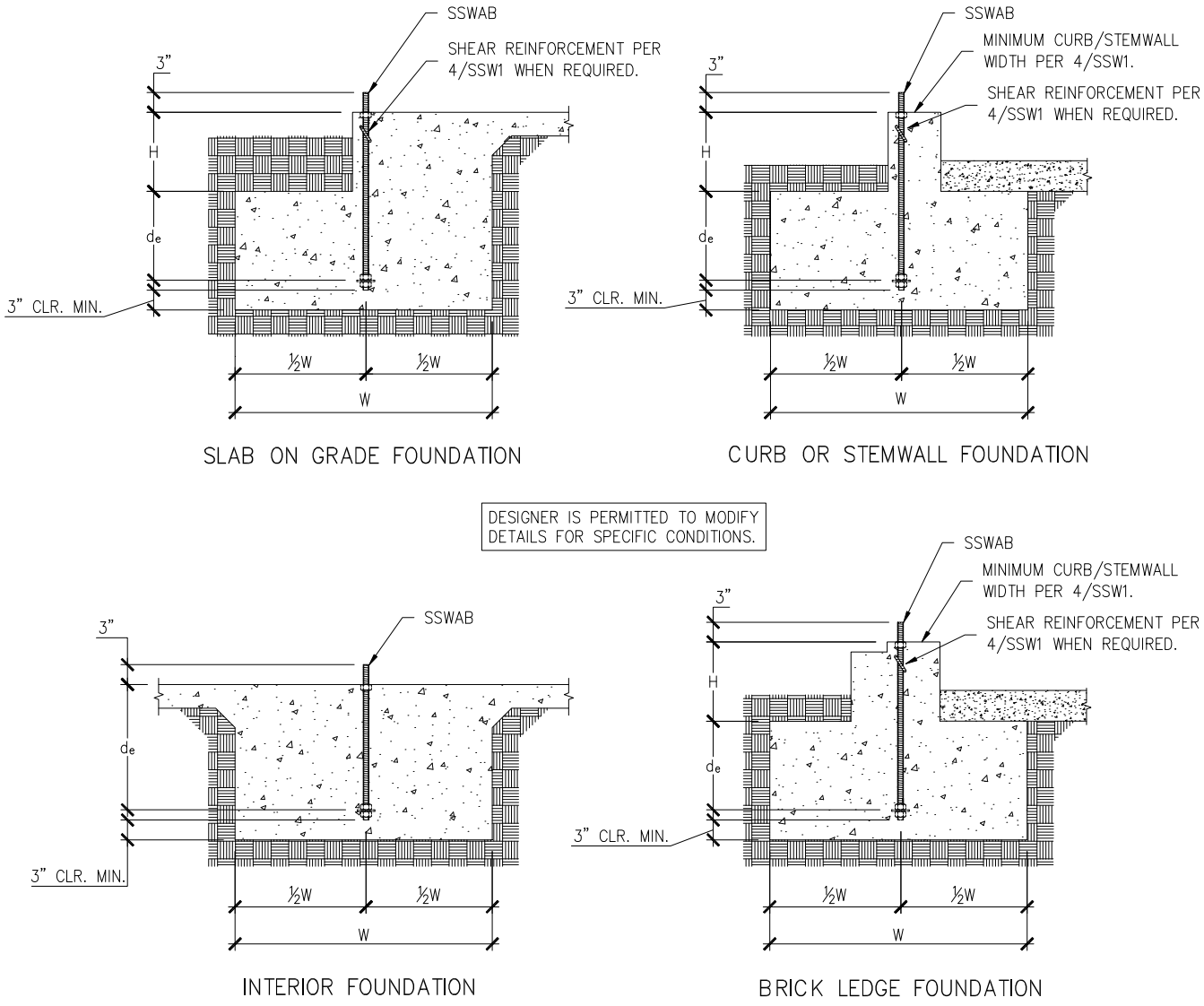
DESIGNER IS PERMITTED TO MODIFY DETAILS FOR SPECIFIC CONDITIONS.

SECTION

BALLOON FRAMING TOP OF WALL CONNECTION 4–SSW3

U.S. Patent 8,281,551
Canadian Patent 2,489,845

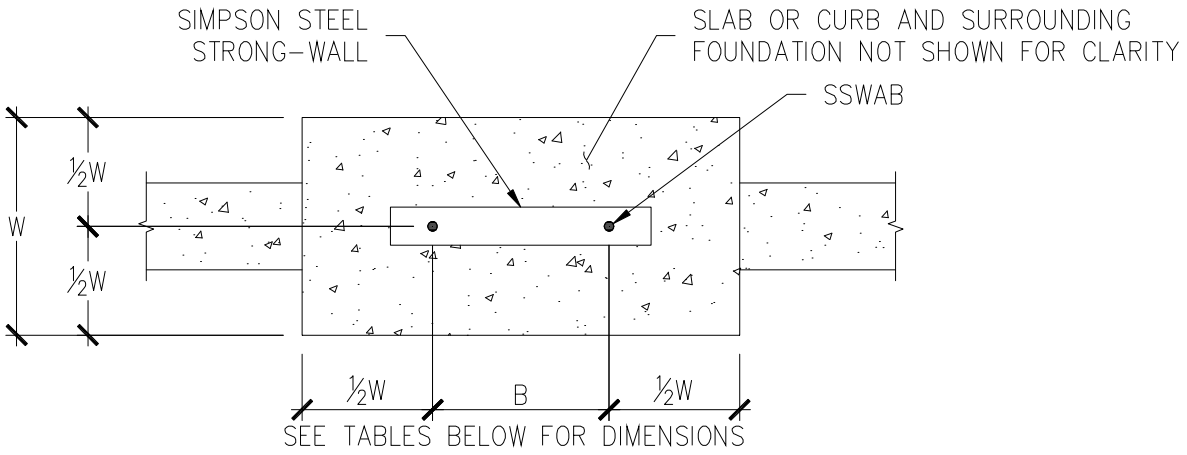
FIGURE 6—STEEL STRONG-WALL BALLOON FRAMING DETAILS (Continued) (4/SSW3)



NOTES :
1. SEE 2/SSW1 AND 3/SSW1 FOR DIMENSIONS AND ADDITIONAL NOTES.
2. SEE 4/SSW1 FOR SHEAR REINFORCEMENT WHEN REQUIRED.
3. MAXIMUM H = l_e – d_e. SEE 5/SSW1 AND 6/SSW1 FOR l_e.

STEEL STRONG–WALL ANCHORAGE – TYPICAL SECTIONS 1–SSW1

FIGURE 7—STEEL STRONG-WALL ANCHORAGE DETAILS (1/SSW1)



FOUNDATION PLAN VIEW

STEEL STRONG–WALL ANCHORAGE SOLUTIONS FOR 2500 PSI CONCRETE								
DESIGN CRITERIA	CONCRETE CONDITION	ANCHOR STRENGTH	SSWAB ¾" ANCHOR BOLT			SSWAB 1" ANCHOR BOLT		
			ASD ALLOWABLE UPLIFT (lbs)	W (in)	d_e (in)	ASD ALLOWABLE UPLIFT (lbs)	W (in)	d_e (in)
SEISMIC	CRACKED	STANDARD	8,800	22	8	16,100	33	11
			9,600	24	8	17,100	35	12
		HIGH STRENGTH	18,500	36	12	33,000	51	17
			19,900	38	13	35,300	54	18
	UNCRACKED	STANDARD	8,800	19	7	15,700	28	10
			9,600	21	7	17,100	30	10
		HIGH STRENGTH	18,300	31	11	32,300	44	15
			19,900	33	11	35,300	47	16
WIND	CRACKED	STANDARD	5,100	14	6	6,200	16	6
			7,400	18	6	11,400	24	8
			9,600	22	8	17,100	32	11
		HIGH STRENGTH	11,400	24	8	21,100	36	12
			13,600	27	9	27,300	42	14
			15,900	30	10	31,800	46	16
			19,900	35	12	35,300	50	17
	UNCRACKED	STANDARD	5,000	12	6	6,400	14	6
			7,800	16	6	12,500	22	8
			9,600	19	7	17,100	28	10
		HIGH STRENGTH	12,500	22	8	21,900	32	11
			14,300	24	8	26,400	36	12
			17,000	27	9	31,500	40	14
			19,900	30	10	35,300	43	15

FIGURE 7—STEEL STRONG-WALL ANCHORAGE DETAILS (Continued) (2/SSW1)

STEEL STRONG–WALL ANCHORAGE SOLUTIONS FOR 3500 PSI CONCRETE								
DESIGN CRITERIA	CONCRETE CONDITION	ANCHOR STRENGTH	SSWAB 3/4" ANCHOR BOLT			SSWAB 1" ANCHOR BOLT		
			ASD ALLOWABLE UPLIFT (lbs)	W (in)	d_e (in)	ASD ALLOWABLE UPLIFT (lbs)	W (in)	d_e (in)
SEISMIC	CRACKED	STANDARD	9,000	20	7	15,700	29	10
			9,600	21	7	17,100	31	11
		HIGH STRENGTH	18,200	32	11	33,000	46	16
			19,900	34	12	35,300	48	16
	UNCRACKED	STANDARD	8,800	17	6	15,700	25	9
			9,600	19	7	17,100	27	9
		HIGH STRENGTH	18,600	28	10	32,600	40	14
			19,900	30	10	35,300	42	14
WIND	CRACKED	STANDARD	6,000	14	6	7,300	16	6
			7,300	16	6	13,500	24	8
			9,600	20	7	17,100	29	10
		HIGH STRENGTH	11,800	22	8	22,700	34	12
			13,500	24	8	27,400	38	13
			17,000	28	10	32,300	42	14
			19,900	32	11	35,300	45	15
	UNCRACKED	STANDARD	6,000	12	6	7,500	14	6
			7,500	14	6	12,800	20	7
			9,600	17	6	17,100	25	9
		HIGH STRENGTH	12,800	20	7	21,300	28	10
			14,800	22	8	26,000	32	11
			16,900	24	8	31,300	36	12
			19,900	27	9	35,300	39	13

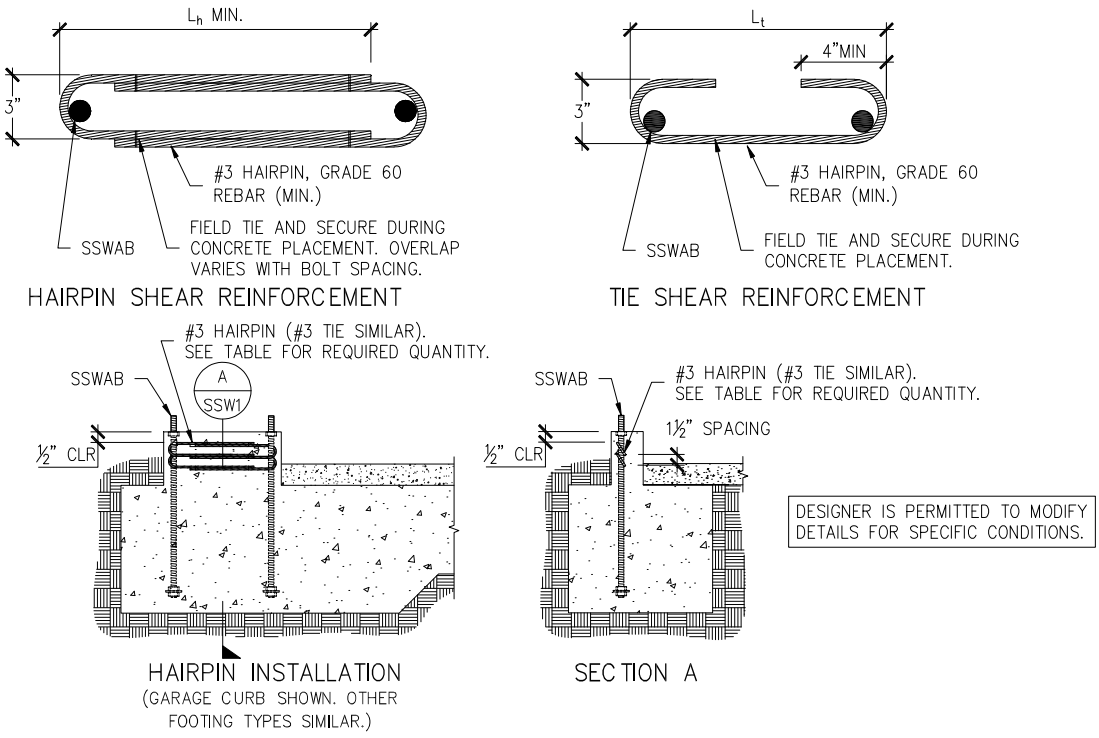
STEEL STRONG–WALL ANCHORAGE SOLUTIONS FOR 4500 PSI CONCRETE								
DESIGN CRITERIA	CONCRETE CONDITION	ANCHOR STRENGTH	SSWAB 3/4" ANCHOR BOLT			SSWAB 1" ANCHOR BOLT		
			ASD ALLOWABLE UPLIFT (lbs)	W (in)	d_e (in)	ASD ALLOWABLE UPLIFT (lbs)	W (in)	d_e (in)
SEISMIC	CRACKED	STANDARD	8,700	18	6	16,000	27	9
			9,600	20	7	17,100	29	10
		HIGH STRENGTH	17,800	29	10	32,100	42	14
			19,900	32	11	35,300	45	15
	UNCRACKED	STANDARD	9,100	16	6	15,700	23	8
			9,600	17	6	17,100	25	9
		HIGH STRENGTH	17,800	25	9	32,500	37	13
			19,900	27	9	35,300	39	13
WIND	CRACKED	STANDARD	5,400	12	6	6,800	14	6
			8,300	16	6	11,600	20	7
			9,600	18	6	17,100	26	9
		HIGH STRENGTH	11,600	20	7	21,400	30	10
			13,400	22	8	25,800	34	12
			17,300	26	9	31,000	38	13
			19,900	29	10	35,300	42	14
	UNCRACKED	STANDARD	6,800	12	6	6,800	12	6
			8,500	14	6	12,400	18	6
			9,600	16	6	17,100	23	8
		HIGH STRENGTH	12,400	18	6	21,600	26	9
			14,500	20	7	26,700	30	10
			16,800	22	8	32,200	34	12
			19,900	25	9	35,300	36	12

NOTES :

1. ANCHORAGE DESIGNS CONFORM TO ACI 318–19, ACI 318–14 AND ACI 318–11 APPENDIX D WITH NO SUPPLEMENTARY REINFORCEMENT FOR CRACKED OR UNCRACKED CONCRETE AS NOTED.
2. ANCHOR STRENGTH INDICATES REQUIRED GRADE OF SSWAB ANCHOR BOLT. STANDARD (ASTM FI554 GRADE 36) OR HIGH STRENGTH (HS) (ASTM A449).
3. SEISMIC INDICATES SEISMIC DESIGN CATEGORY C THROUGH F. DETACHED 1 AND 2 FAMILY DWELLINGS IN SDC C MAY USE WIND ANCHORAGE SOLUTIONS. SEISMIC ANCHORAGE DESIGNS CONFORM TO ACI 318–19 SECTION 17.10.5.3, ACI 318–14 SECTION 17.2.3.4.3 AND ACI 318–11 SECTION D.3.3.4.
4. WIND INCLUDES SEISMIC DESIGN CATEGORY A AND B AND DETACHED 1 AND 2 FAMILY DWELLINGS IN SDC C.
5. FOUNDATION DIMENSIONS ARE FOR ANCHORAGE ONLY. FOUNDATION DESIGN (SIZE AND REINFORCEMENT) BY OTHERS. THE DESIGNER MAY SPECIFY ALTERNATE EMBEDMENT, FOOTING SIZE OR ANCHOR BOLT.
6. SEE 1/SSW1 AND 2/SSW1 FOR W AND d_e.

SSWAB TENSION ANCHORAGE SCHEDULE 3,500/4,500 PSI 3-SSW1

FIGURE 7—STEEL STRONG-WALL ANCHORAGE DETAILS (Continued) (3/SSW1)



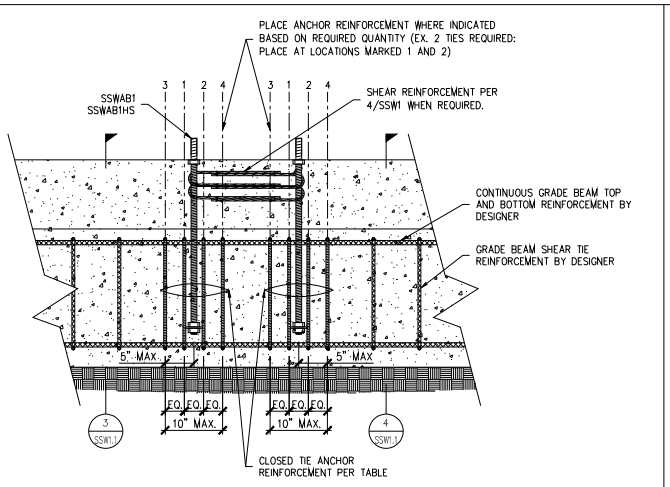
STEEL STRONG-WALL SHEAR ANCHORAGE									
MODEL	SEISMIC[3]			WIND[4]					
	L_t OR L_h (in.)	SHEAR REINFORCEMENT	MIN. CURB/ STEMWALL WIDTH (in.)	SHEAR REINFORCEMENT	MIN. CURB/ STEMWALL WIDTH (in.)	ASD ALLOWABLE SHEAR LOAD V (lbs.)[6]			
						6" MIN CURB/STEMWALL		8" MIN CURB / STEMWALL	
						UNCRACKED	CRACKED	UNCRACKED	CRACKED
SSW12	9	(1) #3 TIE	6	NONE REQUIRED	–	1230	880	1440	1030
SSW15	12	(2) #3 TIES	6	NONE REQUIRED	–	1590	1135	1810	1295
SSW18	14	(1) #3 HAIRPIN	8[5]	(1) #3 HAIRPIN	6	HAIRPIN REINFORCEMENT ACHIEVES MAXIMUM ALLOWABLE SHEAR LOAD OF THE STEEL STRONG-WALL PANEL			
SSW21	15	(2) #3 HAIRPIN	8[5]	(1) #3 HAIRPIN	6				
SSW24	17	(2) #3 HAIRPIN	8[5]	(1) #3 HAIRPIN	6				

NOTES :

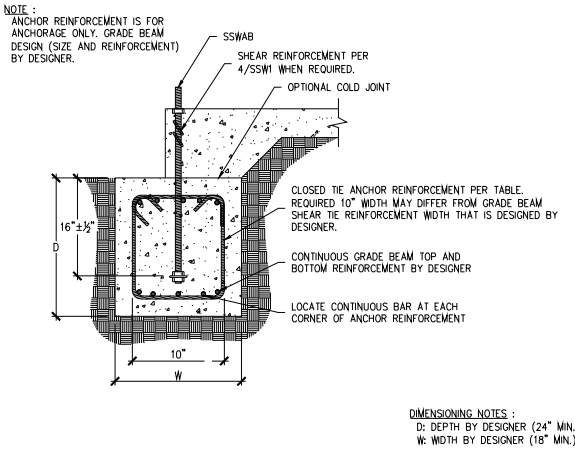
1. SHEAR ANCHORAGE DESIGNS CONFORM TO ACI 318-19, ACI 318-14 AND ACI 318-11 AND ASSUME MINIMUM f'_c=2,500 PSI CONCRETE. SEE DETAILS 1/SSW1 TO 3/SSW1 FOR TENSION ANCHORAGE.
2. SHEAR REINFORCEMENT IS NOT REQUIRED FOR PANELS INSTALLED ON A WOOD FLOOR, INTERIOR FOUNDATION APPLICATIONS (PANEL INSTALLED AWAY FROM EDGE OF CONCRETE), OR BRACED WALL PANEL APPLICATIONS.
3. SEISMIC INDICATES SEISMIC DESIGN CATEGORY C THROUGH F. DETACHED 1 AND 2 FAMILY DWELLINGS IN SDC C MAY USE WIND ANCHORAGE SOLUTIONS.
4. WIND INCLUDES SEISMIC DESIGN CATEGORY A AND B.
5. MINIMUM CURB/STEMWALL WIDTH IS 6" WHEN STANDARD STRENGTH SSWAB IS USED.
6. USE (1) #3 TIE FOR SSW12 AND SSW15 WHEN THE STEEL STRONG-WALL PANEL DESIGN SHEAR FORCE EXCEEDS THE TABULATED ANCHORAGE ALLOWABLE SHEAR LOAD.
7. CONCRETE EDGE DISTANCE FOR ANCHORS MUST COMPLY WITH ACI 318-19 SECTION 17.9.2, ACI 318-14 SECTION 17.7.2 AND ACI 318-11 D.8.2.

SSWAB SHEAR ANCHORAGE 4-SSW1

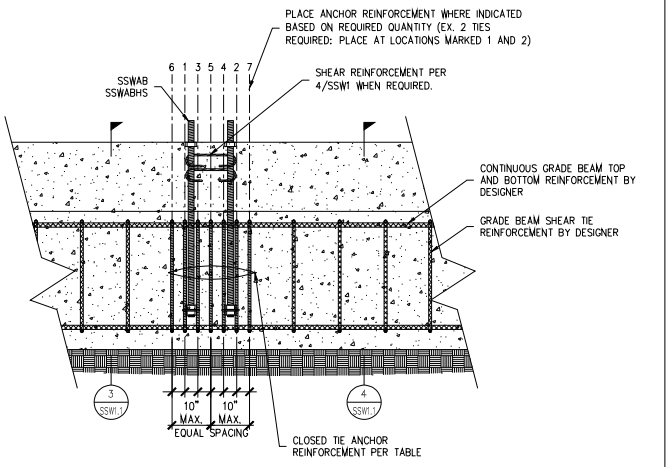
FIGURE 7—STEEL STRONG-WALL ANCHORAGE DETAILS (Continued) (4/SSW1)



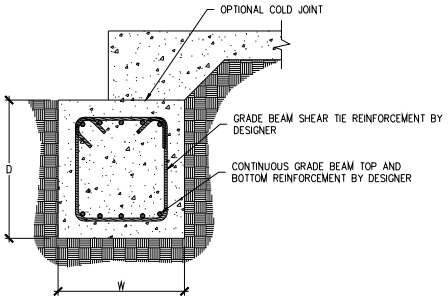
GRADE BEAM ELEVATION AT 18", 21" AND 24" WALL MODELS | 1



GRADE BEAM SECTION AT ANCHOR REINFORCEMENT | 3



GRADE BEAM ELEVATION AT 12" AND 15" WALL MODELS | 2



GRADE BEAM SECTION AWAY FROM ANCHOR REINFORCEMENT | 4

SSW GRADE BEAM ANCHOR REINFORCEMENT

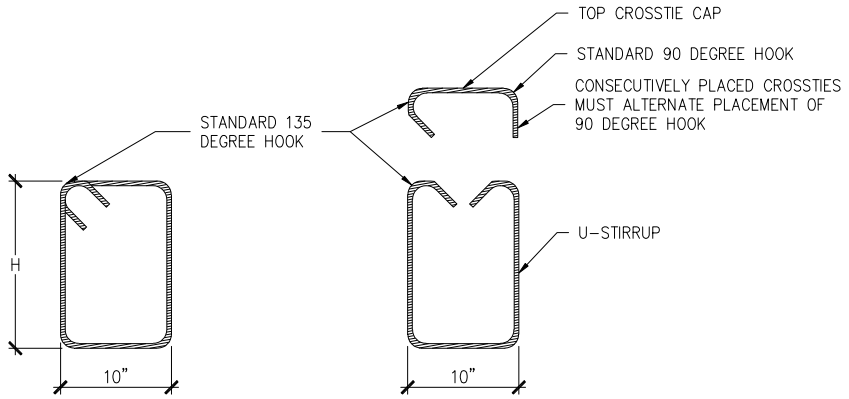
STEEL STRONG-WALL WIDTH (in.)	ANCHOR MODEL NO.	ANCHOR DIAMETER (in.)	ANCHOR REINFORCEMENT FOR WIND AND SEISMIC[3,8,9]		LRFD APPLIED DESIGN SEISMIC MOMENT (ft.-lbs.)[4,5,6,7]	
			STANDARD STRENGTH SSWAB	HIGH STRENGTH (HS) SSWAB	STANDARD STRENGTH SSWAB	HIGH STRENGTH (HS) SSWAB
12" MODEL	SSWAB3/4 SSWAB3/4HS	¾	2- #4 CLOSED TIES PER 2/SSW1.1	5- #4 CLOSED TIES PER 2/SSW1.1	16,700	23,000
15" MODEL	SSWAB1 SSWAB1HS	1	4- #4 CLOSED TIES PER 2/SSW1.1	7- #4 CLOSED TIES PER 2/SSW1.1	37,000	44,000
18" MODEL			2- #4 CLOSED TIES PER 1/SSW1.1	4- #4 CLOSED TIES PER 1/SSW1.1	48,700	61,000
21" MODEL					60,300	77,000
24" MODEL					72,000	87,000

NOTES :
1. ANCHOR REINFORCEMENT CONFORMS TO ACI 318-19 SECTION 17.5.2, ACI 318-14 SECTION 17.4.2.9 AND ACI 318-11 SECTION D.5.2.9 AND PERFORMANCE WAS VALIDATED THROUGH FULL SCALE TESTING.
2. MINIMUM CONCRETE COMPRESSIVE STRENGTH, f'_c = 2500 psi.
3. CLOSED TIE ANCHOR REINFORCEMENT TO BE ASTM A615 GRADE 60 (MIN) #4 REBAR.
4. GRADE BEAM LONGITUDINAL AND TIE REINFORCEMENT SHALL BE SPECIFIED BY THE DESIGNER FOR FLEXURE AND SHEAR LOADING. DESIGN SHOULD CONSIDER PROJECT SPECIFIC DESIGN LOADS AND ALLOWABLE SOIL PRESSURE.
5. SIMPSON STRONG-TIE RECOMMENDS USING THE TABULATED MINIMUM LRFD APPLIED SEISMIC DESIGN MOMENT TO ENSURE GRADE BEAM DESIGN FLEXURE AND SHEAR STRENGTH IS ADEQUATE TO PREVENT PLASTIC HINGE FORMATION UNDER DEMANDS ASSOCIATED WITH ANCHORAGE FORCES CORRESPONDING TO ACI 318-19 SECTION 17.10.5.3, ACI 318-14 SECTION 17.2.3.4.3 AND ACI 318-11 SECTION D.3.3.4.3.
6. DESIGNER MAY USE REDUCED MOMENT DUE TO APPLIED SSW LATERAL LOAD. MINIMUM MOMENT SHALL BE THE LESSER OF THE TABULATED MOMENT OR THE AMPLIFIED LRFD DESIGN MOMENT FOR SEISMIC: (ASD SHEAR/0.7) x Ω_0 x SSW HEIGHT FOR GRADE BEAM DESIGN.
7. MINIMUM GRADE BEAM DESIGN MOMENT FOR WIND AND SEISMIC IN SEISMIC DESIGN CATEGORY A AND B AND DETACHED 1 AND 2 FAMILY DWELLINGS IN SDC C: (ASD SHEAR/0.6) x SSW HEIGHT.
8. CLOSED TIE MAY BE SINGLE PIECE HOOP OR TWO PIECE ASSEMBLY WITH A U-STIRRUP WITH STANDARD 135 DEGREE HOOKS AND A TOP CROSS TIE CAP. SEE DETAIL 6/SSW1.1.
9. SEE DETAILS FOR GRADE BEAM ANCHOR REINFORCEMENT PLACEMENT, INSTALLATION AND SPACING REQUIREMENTS. CLOSED TIE ANCHOR REINFORCEMENT QUANTITY IS PER WALL FOR THE 12" AND 15" WALL MODELS, AND PER ANCHOR FOR THE 18", 21" AND 24" MODELS.

SSWAB ANCHOR GRADE BEAM REINFORCEMENT AND DESIGN MOMENTS | 5

SSWAB ANCHOR GRADE BEAM REINFORCEMENT AND DESIGN MOMENTS

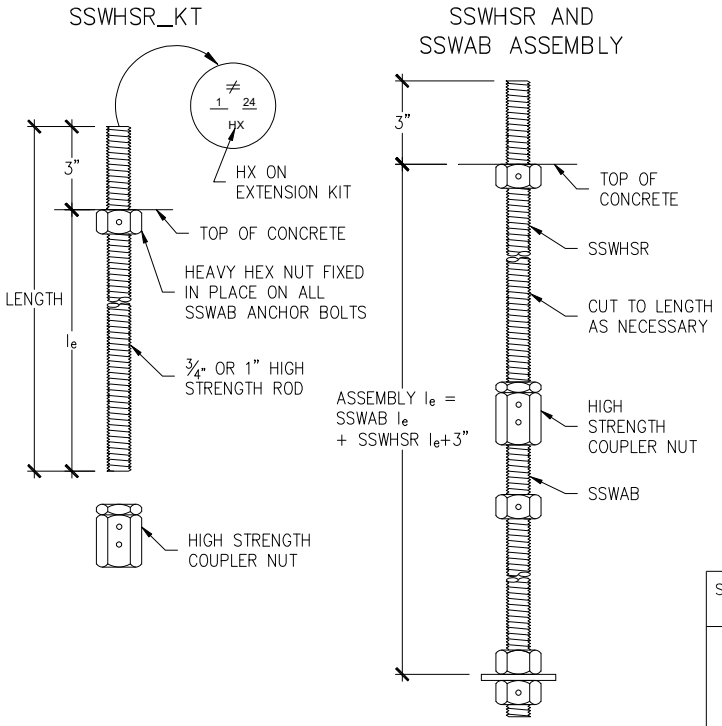
FIGURE 7—STEEL STRONG-WALL ANCHORAGE DETAILS (Continued) (1, 2, 3, 4, 5/SSW1.1)



#4 SINGLE PIECE HOOP #4 TWO PIECE ASSEMBLY

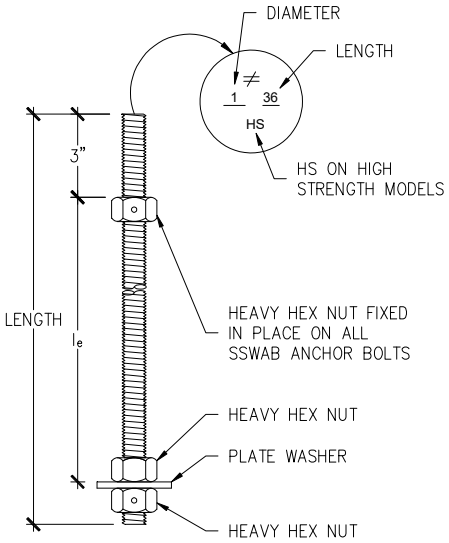
DIMENSIONING NOTES :
H: HEIGHT OF ANCHOR REINFORCEMENT ASSEMBLY BY DESIGNER

CLOSED TIE ANCHOR REINFORCEMENT 6–SSW1.1



SSW WIDTH	MODEL NO.	DIAMETER	TOTAL LENGTH	l_e
12" MODEL	SSWHSR3/4–2KT	¾"	24"	21"
	SSWHSR3/4–3KT	¾"	36"	33"
15", 18", 21" AND 24" MODELS	SSWHSR1–2KT	1"	24"	21"
	SSWHSR1–3KT	1"	36"	33"

SSW ANCHOR BOLT EXTENSION 6–SSW1



STEEL STRONG–WALL WIDTH	MODEL NO.	DIAMETER	LENGTH	l_e
12" MODEL	SSWAB3/4x24	¾"	24"	19"
	SSWAB3/4x24HS	¾"	24"	19"
	SSWAB3/4x30	¾"	30"	25"
	SSWAB3/4x30HS	¾"	30"	25"
	SSWAB3/4x36HS	¾"	36"	31"
15", 18", 21" AND 24" MODELS	SSWAB1x24	1"	24"	19"
	SSWAB1x24HS	1"	24"	19"
	SSWAB1x30	1"	30"	25"
	SSWAB1x30HS	1"	30"	25"
	SSWAB1x36HS	1"	36"	31"

SSW ANCHOR BOLTS 5–SSW1

FIGURE 7—STEEL STRONG-WALL ANCHORAGE DETAILS (Continued) (5,6/SSW1, 6/SSW1.1)

2.5 ksi concrete

12 in. wall $T = \left[28.1 - \sqrt{788 - 5.95(3.4P + Vh)}\right] - P$

15 in. wall $T = \left[36.1 - \sqrt{1301 - 5.95(4.6P + Vh)}\right] - P$

18 in. wall $T = \left[45.0 - \sqrt{2025 - 5.95(6.1P + Vh)}\right] - P$

21 in. wall $T = \left[53.9 - \sqrt{2908 - 5.95(7.6P + Vh)}\right] - P$

24 in. wall $T = \left[62.8 - \sqrt{3950 - 5.95(9.1P + Vh)}\right] - P$

3.0 ksi concrete

12 in. wall $T = \left[33.7 - \sqrt{1135 - 7.14(3.4P + Vh)}\right] - P$

15 in. wall $T = \left[43.3 - \sqrt{1874 - 7.14(4.6P + Vh)}\right] - P$

18 in. wall $T = \left[54.0 - \sqrt{2916 - 7.14(6.1P + Vh)}\right] - P$

21 in. wall $T = \left[64.7 - \sqrt{4187 - 7.14(7.6P + Vh)}\right] - P$

24 in. wall $T = \left[75.4 - \sqrt{5688 - 7.14(9.1P + Vh)}\right] - P$

4.5 ksi concrete

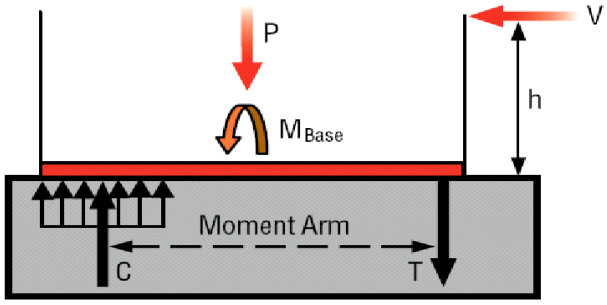
12 in. wall $T = \left[50.5 - \sqrt{2554 - 10.71(3.4P + Vh)}\right] - P$

15 in. wall $T = \left[64.9 - \sqrt{4216 - 10.71(4.6P + Vh)}\right] - P$

18 in. wall $T = \left[81.0 - \sqrt{6560 - 10.71(6.1P + Vh)}\right] - P$

21 in. wall $T = \left[97.1 - \sqrt{9421 - 10.71(7.6P + Vh)}\right] - P$

24 in. wall $T = \left[113.1 - \sqrt{12{,}797 - 10.71(9.1P + Vh)}\right] - P$



FORCES AT BASE OF WALL

T = resulting anchorage tension (uplift) force (kips)
V = design shear (kips)
P = total vertical load (kips)
h = wall height (inches)

For two-story stacked applications, substitute M_{Base} for Vh:

$$Vh = M_{Base}\left(\frac{12}{1000}\right)(\text{kip-in})$$

Where M_{Base} = Design moment at base of wall (ft-lbs)

For SI use the following adjustments:

V = design shear (kN) / 4.45
P = total vertical load (kN) / 4.45
h = wall height (mm) / 25.4
T x 4.45 = resulting anchorage tension (uplift) force (kN)

For two-story stacked applications, substitute M_{Base} for Vh:

$$Vh = \frac{M_{Base}\,(\text{N-m})}{113.0}$$

Where M_{Base} = Design moment at base of wall (N-m)

For **SI**: 1 inch = 25.4 mm, 1 kip = 4.45 kN, 1 ft-lb = 1.36 N-m

Notes:
1.) Equations may be used to calculate uplift forces at the base of first-story walls on concrete foundations.
2.) Equations are based on limiting concrete bearing on a 3-1/2" wide base plate at the edge of concrete.

EXAMPLE 3 (Single-Story SSW):

Given:
SSW18x9 wall on 2.5 ksi concrete
Seismic Loading
Design Shear (V) = 2.0 kips < 2.15 kips ($V_{Allowable}$)
P (Vertical Load) = 1.0 kip
h = wall height = 105.25"

$$T = \left[45.0 - \sqrt{2025 - 5.95(6.1P + Vh)}\right] - P$$

$$T = \left[45.0 - \sqrt{2025 - 5.95(6.1\times 1 + 2.0\times 105.25)}\right] - 1.0 = \underline{16.9\,\text{kips}}$$

EXAMPLE 4 (2-Story Stacked SSW Condition):

Given:
See Example 2 – Two Story Application.
SSW18x9-STK wall on 2.5 ksi concrete
Wind Loading
M_{Base} = 17,550 ft-lbs (Moment at base of 2-story, stacked wall)

$$Vh = 17{,}550 \times \left(\frac{12}{1000}\right)\text{kip-in} = 210.6\ \text{kip-in}$$

P (Vertical Load) = 2.0 kips

$$T = \left[45.0 - \sqrt{2025 - 5.95(6.1P + Vh)}\right] - P$$

$$T = \left[45.0 - \sqrt{2025 - 5.95(6.1\times 2 + 210.6)}\right] - 2 = \underline{16.6\,\text{kips}}$$

FIGURE 8—EQUATIONS FOR CALCULATING UPLIFT FORCES AT BASE OF FIRST-STORY WALL

ICC-ES Evaluation Report ESR-1679 LABC and LARC Supplement

Reissued June 2024

This report is subject to renewal June 2025.

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DIVISION: 05 00 00—METALS
Section: 05 40 19—Cold-Formed Shear Wall Panels

DIVISION: 06 00 00—WOOD, PLASTICS AND COMPOSITES
Section: 06 12 19—Shear Wall Panels

REPORT HOLDER:

SIMPSON STRONG-TIE COMPANY INC.

EVALUATION SUBJECT:

STEEL STRONG-WALL SSW SHEAR PANELS AND S/SSW SHEAR PANELS

1.0 REPORT PURPOSE AND SCOPE

Purpose:

The purpose of this evaluation report supplement is to indicate that Steel Strong-Wall SSW Shear Panels and *S/SSW Shear Panels*, described in ICC-ES evaluation report ESR-1679, have also been evaluated for compliance with the codes noted below as adopted by the Los Angeles Department of Building and Safety (LADBS).

Applicable code editions:

- 2023 *City of Los Angeles Building Code* (LABC)
- 2023 *City of Los Angeles Residential Code* (LARC)

2.0 CONCLUSIONS

The Steel Strong-Wall SSW Shear Panels and S/SSW Shear Panels, described in Sections 2.0 through 7.0 of the evaluation report ESR-1679, comply with the LABC Chapters 19, 22 and 23, and the LARC, and are subjected to the conditions of use described in this supplement.

3.0 CONDITIONS OF USE

The Steel Strong-Wall SSW Shear Panels and S/SSW Shear Panels, described in this supplement, must comply with all of the following conditions:

- All applicable sections in the evaluation report ESR-1679.
- The design, installation, conditions of use and identification are in accordance with the 2021 *International Building Code®* (IBC) provisions noted in the evaluation report ESR-1679.
- The design, installation and inspection are in accordance with additional requirements of LABC Chapters 16,17 and 93, as applicable.
- Under the LARC, an engineered design in accordance with LARC Section R301.1.3 must be submitted.
- When Steel Strong-Wall SSW Shear Panels and/or S/SSW Shear panels are used in line with other types of lateral-force-resisting systems, only one system type shall be considered as the lateral resistance element, except where approved by LADBS on a case-by-case basis.
- Braced wall panel provisions in Section 4.1.2 of the evaluation report ESR-1679 are replaced with the following: When braced wall panels are required by Section 2308 of the LABC, Steel Strong-Wall SSW Shear Panels and S/SSW Shear Panels can be used only if engineering calculations are provided.
- The seismic design provisions for hillside buildings referenced in LABC Section 2301.1 have not been considered and are outside of the scope of this supplement.

This supplement expires concurrently with the evaluation report ESR-1679, reissued June 2024.

ICC-ES Evaluation Report

ESR-1679 FBC Supplement

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Section: 06 12 19—Shear Wall Panels

REPORT HOLDER:

SIMPSON STRONG-TIE COMPANY INC.

EVALUATION SUBJECT:

STEEL STRONG-WALL SSW SHEAR PANELS AND S/SSW SHEAR PANELS

1.0 REPORT PURPOSE AND SCOPE

Purpose:

The purpose of this evaluation report supplement is to indicate that the Steel Strong-Wall SSW Shear Panels and S/SSW Shear Panels, described in ICC-ES evaluation report ESR-1679, have also been evaluated for compliance with the codes noted below.

Applicable code editions:

- 2023 *Florida Building Code—Building*
- 2023 *Florida Building Code—Residential*

2.0 CONCLUSIONS

The Steel Strong-Wall SSW Shear Panels and S/SSW Shear Panels, described in Sections 2.0 through 7.0 of ICC-ES evaluation report ESR-1679, comply with the *Florida Building Code—Building* or the *Florida Building Code—Residential*. The design requirements must be determined in accordance with the *Florida Building Code—Building* or the *Florida Building Code—Residential,* as applicable. The installation requirements noted in ICC-ES evaluation report ESR-1679 for the 2021 *International Building Code®* meet the requirements of the *Florida Building Code—Building* or the *Florida Building Code—Residential,* as applicable.

Use of the Steel Strong-Wall SSW Shear Panels and S/SSW Shear Panels have also been found to be in compliance with the High-Velocity Hurricane Zone provisions of the *Florida Building Code—Building* and the *Florida Building Code—Residential*.

For products falling under Florida Rule 61G20-3, verification that the report holder's quality assurance program is audited by a quality assurance entity approved by the Florida Building Commission for the type of inspections being conducted is the responsibility of an approved validation entity (or the code official when the report holder does not possess an approval by the Commission).

This supplement expires concurrently with the evaluation report, reissued June 2024.