Design Flexibility
Delivering Customization to Factory-Built Shearwalls

Prefabricated shearwalls from Simpson Strong-Tie are synonymous with high quality and performance. Over the years, we have worked diligently to ensure that our Strong-Wall® line of code-listed shearwalls provide enhanced structural support, allow design flexibility and help lower labor costs through easier installation.

Simpson Strong-Tie introduces the latest enhancements to our customizable and field-trimmable Strong-Wall® Wood Shearwall (WSW) product line. The holdowns installed on the WSW now provide both front and side access, facilitating installation of the anchorage attachment in various framing conditions. The front access opening also allows for easy inspection of the connection to the anchor bolt. The connection from the top of the panel to the framing has also been updated. There are now two options, designed to accommodate different installer preferences.

Simpson Strong-Tie maintains a large group of dedicated engineers and field representatives to support your efforts – because your best chance of creating a long-lasting structure is before you start building it.
Introduction

For 60 years, Simpson Strong-Tie has focused on creating structural products that help people build safer and stronger homes and buildings. A leader in structural systems research and technology, Simpson Strong Tie is one of the largest suppliers of structural building products in the world. The Simpson Strong-Tie commitment to product development, engineering, testing and training is evident in the consistent quality and delivery of its products and services.

For more information, visit the company’s website at www.strongtie.com.

The Simpson Strong-Tie Company Inc. “No Equal” pledge includes:

- Quality products value-engineered for the lowest installed cost at the highest-rated performance levels
- The most thoroughly tested and evaluated products in the industry
- Strategically located manufacturing and warehouse facilities
- National code agency listings
- The largest number of patented connectors in the industry
- Global locations with an international sales team
- In-house R&D and tool and die professionals
- In-house product testing and quality control engineers
- Support of industry groups including AIISI, AITC, ASTM, ASCE, AWC, AWPA, ACI, AISC, CSI, CFSEI, ICFA, NBMDA, NLBMDA, SDI, SETMA, SFA, SFIA, STAFDA, SREA, NFBA, TPI, WDSC, WIJMA, WTCA and local engineering groups.

The Simpson Strong-Tie Quality Policy

We help people build safer structures economically. We do this by designing, engineering and manufacturing “No Equal” structural connectors and other related products that meet or exceed our customers’ needs and expectations. Everyone is responsible for product quality and is committed to ensuring the effectiveness of the Quality Management System.

Karen Colonias
Chief Executive Officer

Getting Fast Technical Support

When you call for engineering technical support, we can help you quickly if you have the following information at hand. This will help us to serve you promptly and efficiently.

- Which Simpson Strong-Tie® catalog are you using? (See the front cover for the catalog number)
- Which Simpson Strong-Tie product are you using?
- What is your design code and building jurisdiction?
- Is your structure residential or commercial?
- What is your application?
- What is your load requirement?

800-999-5099 | www.strongtie.com

We Are ISO 9001-2008 Registered

Simpson Strong-Tie is an ISO 9001-2008 registered company. ISO 9001-2008 is an internationally-recognized quality assurance system which lets our domestic and international customers know that they can count on the consistent quality of Simpson Strong-Tie® products and services.
General Notes

These General Notes are provided to ensure proper design, use and installation of the Simpson Strong-Tie® Strong-Wall® Wood Shearwall and must be followed fully.

a. Install products according to this catalog. Changes in installation methods or modifications to the product and associated systems (other than those indicated in this document) should only be made by a design professional of record. Altered installation procedures and the performance of modified products are the sole responsibility of the design professional of record.

b. The building shall be designed in accordance with the appropriate building code and meet local, state, and federal requirements. Verify design requirements with the local building official. Concrete foundation design remains the responsibility of the design professional of record.

c. Strong-Wall® Wood Shearwalls are part of the overall lateral-force-resisting system of the structure. The design of this system, including a complete load path to transfer lateral forces from the structure to the ground, is the responsibility of the design professional of record.

d. In addition to the information and instructions found in this catalog, all warnings, general notes and instructions, warranty information and terms and conditions of sale contained within the Strong-Wall® Shearwalls catalog apply.

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Delivering Easy-To-Install, Code-Listed Solutions

The Simpson Strong-Tie® Strong-Wall® Wood Shearwall is a specially designed, prefabricated, engineered-wood panel that helps structures resist lateral forces such as those created by earthquakes and high winds. The Strong-Wall® Wood Shearwall has been evaluated to the 2015 International Building Code® (IBC) and can help you resist these forces efficiently and confidently with the following features:

- **Code Listed** – ICC-ES ESR-2652 and City of L.A. RR 25730 evaluated to the 2015 IRC/IBC
- **Field Adjustable** – Can be field-trimmed and drilled
- **Stronger Wall** – Narrow panel widths have significantly higher allowable loads than the original Wood Strong-Wall
- **More Applications** – Suitable for residential, multi-family, and light-frame commercial construction and in balloon-framing applications up to 20 ft.
- **Front Access** – Newly designed front access allows for easier anchor bolt installation and inspection
- **Easy to Install** – Reusable templates locate the required holdown anchor bolts accurately in the foundation
- **Support and Service** – Simpson Strong-Tie provides unmatched engineering technical support and experienced field representation
Strong-Wall® Wood Shearwall Applications

- **Portal Applications**
  - Narrow wall spaces
  - Garages
  - Large windows and doors
  - Increased capacities when used in a portal

- **Standard and Balloon-Framing Applications**
  - Narrow wall spaces
  - Wall heights up to 20’

- **Two-Story Stacked Application**
  - Narrow wall spaces
  - Multi-story installation kit (MSK) required (order separately)
  - Total assembled heights up to 24’

**Product Storage**
Protect product from sun and water

**CAUTION:**
Wrap is slippery when wet or icy
Use support blocks at 10’ on-center to keep bundles out of mud and water
Standard Product Description

All Strong-Wall® Wood Shearwalls are supplied with top-of-wall shear transfer plates, nuts, washers, and installation instructions. Additionally, shearwalls 100 inches or less in height are supplied with four portal straps.
**Strong-Wall® Wood Shearwalls**

**Product and Kit Descriptions**

**Alternative Top Connection Kit**
Required for alternative top connections using a single WSW-TOW plate installed from only one side with Strong-Drive® Connector screws.

**Strong-Wall® Wood Shearwall Alternative Connection Kit**

<table>
<thead>
<tr>
<th>Model No.</th>
<th>Contents</th>
</tr>
</thead>
<tbody>
<tr>
<td>WSW-TOW12KT</td>
<td>(20) #10 x 1½&quot; SD Connector Screws, (2) ¼&quot; x 6&quot; SDS Heavy-Duty Connector Screws</td>
</tr>
<tr>
<td>WSW-TOW18KT</td>
<td>(28) #10 x 1½&quot; SD Connector Screws, (4) ¼&quot; x 6&quot; SDS Heavy-Duty Connector Screws</td>
</tr>
<tr>
<td>WSW-TOW24KT</td>
<td>(40) #10 x 1½&quot; SD Connector Screws, (8) ¼&quot; x 6&quot; SDS Heavy-Duty Connector Screws</td>
</tr>
</tbody>
</table>

1. Use kit fasteners to attach (1) of the (2) WSW-TOWXXKT plates included with the Strong-Wall Wood shearwall. Plate may be installed on either panel face.

**Portal Kits**
*(Included with all panels 100" or less in height)*
Required for portal-frame applications. Kit includes four portal straps and comes standard with all panels that are 100" or less in height. Order the kit separately if using panels that are more than 100" tall in a portal application.

**Model No.:** WSW-PK

**Multi-Story Kits (MSK)**
Required for two-story stacked applications. Kit includes two holdowns with pre-attached bolts and a bearing block. See page 18 for two-story stacked details.

**Model No.:** WSW-MSK12KT, WSW-MSK18KT, WSW-MSK24KT
Strong-Wall® Wood Shearwall

Standard and Balloon Framing on Concrete Foundations

Strong-Wall® Wood Shearwall
First-Story Installation with Wood Floor System
Specify panel height from top of foundation to underside of the top plates or beam.

First-Story Installation with Wood Floor System
Specify panel height from top of foundation to underside of the top plates or beam.

Model No. | W (in.) | H (in.) | Anchor Bolts | Total Wall Weight (lb.)
---|---|---|---|---
WSW12x7 | 12 | 78 | 2 | ¾ | 100
WSW18x7 | 18 | 78 | 2 | ¾ | 145
WSW12x7.5 | 12 | 85¼ | 2 | ¾ | 110
WSW18x7.5 | 18 | 85¼ | 2 | ¾ | 155
WSW12x8 | 12 | 93¼ | 2 | ¾ | 115
WSW18x8 | 18 | 93¼ | 2 | ¾ | 165
WSW24x8 | 24 | 93¼ | 2 | 1 | 225
WSW12x9 | 12 | 105¼ | 2 | ¾ | 130
WSW18x9 | 18 | 105¼ | 2 | ¾ | 185
WSW24x9 | 24 | 105¼ | 2 | 1 | 245
WSW12x10 | 12 | 117¼ | 2 | ¾ | 140
WSW18x10 | 18 | 117¼ | 2 | ¾ | 205
WSW24x10 | 24 | 117¼ | 2 | 1 | 270
WSW12x11 | 12 | 129¼ | 2 | ¾ | 150
WSW18x11 | 18 | 129¼ | 2 | ¾ | 220
WSW24x11 | 24 | 129¼ | 2 | 1 | 295
WSW12x12 | 12 | 141¼ | 2 | ¾ | 165
WSW18x12 | 18 | 141¼ | 2 | ¾ | 240
WSW24x12 | 24 | 141¼ | 2 | 1 | 320
WSW18x13 | 18 | 153¼ | 2 | ¾ | 255
WSW24x13 | 24 | 153¼ | 2 | 1 | 345
WSW24x14 | 24 | 168 | 2 | 1 | 375
WSW24x16 | 24 | 192 | 2 | 1 | 425
WSW18x20 | 18 | 240 | 2 | ¾ | 385
WSW24x20 | 24 | 240 | 2 | 1 | 520

1. For heights not listed, order the next tallest panel and trim to fit. Minimum trimmed height for all panels is 74½”.
2. All panels come with two pre-attached holdowns, two standard hex nuts, two flat washers, two WSW-TOW top-connection plates (width based on panel model), and installation instructions.
3. All panels are 3½” thick.

1¼” x 6” SDS screws (order separately)

1/4

Place Strong-Wall® Wood Shearwall over the anchor bolts and secure with hex nuts and structural washers (provided). Snug tight fit required.
- 1½” wrench required for ¾” nut.
- 1¼” wrench required for 1” nut.

Verify panel is plumb. Use metal shims (Model No. WSW-CS1) at the base if required.

Foundation design (size and reinforcement) by Designer.

Rake Wall Application

Simpson Strong-Tie® LTP4 or A35 framing angles

Shim

Strong-Wall® Wood Shearwall

10
Simpson Strong-Tie® Strong-Wall® Wood Shearwalls combine design flexibility with performance. Field trimmable, they can be customized to accommodate varying heights or rake walls. They are evaluated to the 2015 IRC/IBC and are listed by ICC-ES in ESR-2652 and the City of LA in RR 25730.

Installation
- All panels may be field trimmed to a minimum of 74½". Trim height from top of panel only, do not trim from sides or bottom. Drilling holes in the Strong-Wall® Wood Shearwalls is not allowed except as shown on page 42.
- Anchor-bolt nuts should be snug tight.
- Maximum shim thickness between the shearwall and top plates or header is ⅜".
- Walls may also be used in 2x6 wall framing. Install the panel flush to the outside face of the framing and add furring to the opposite side.
- Standard top-of-wall connections install with nails.

Codes: ICC-ES ESR-2652, City of L.A. RR 25730

Codes: ICC-ES ESR-2652, City of L.A. RR 25730

**Standard Top Connection**
Also applicable for portal applications with a header.

**Alternative Top Connection**
Also applicable for portal applications with a header.

<table>
<thead>
<tr>
<th>Wood Shearwall</th>
<th>Width (in.)</th>
<th>Nominal Height (ft.)</th>
<th>Actual Height (in.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>WSW18x8-93</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

WSW-TOW installs with 10d x 2½" min. length nails.

WSW-TOW notches with bottom of top plates.

Align WSW-TOW notches with bottom of top plates.

Max ⅜" shim as necessary for tight fit.

WSW-TOW installs with a combination of ⅜" x 6" SDS
Heavy-Duty Connector screws and #10 x 1½" SD Connector
screws (order separately as WSW-TOWXXX).
### Strong-Wall® Wood Shearwall Standard Application on Concrete Foundation

<table>
<thead>
<tr>
<th>Strong-Wall Wood Shearwall Model&lt;sup&gt;6&lt;/sup&gt;</th>
<th>Allowable Vertical Load, ( P ) (lb.)&lt;sup&gt;2&lt;/sup&gt;</th>
<th>Allowable ASD Shear Load, ( V ) (lb.)&lt;sup&gt;2&lt;/sup&gt;</th>
<th>Drift at Allowable Shear, ( \Delta ) (in.)&lt;sup&gt;2&lt;/sup&gt;</th>
<th>Anchor Tension at Allowable Shear, ( T ) (lb.)&lt;sup&gt;2&lt;/sup&gt;</th>
<th>Allowable ASD Shear Load, ( V ) (lb.)&lt;sup&gt;2&lt;/sup&gt;</th>
<th>Drift at Allowable Shear, ( \Delta ) (in.)&lt;sup&gt;2&lt;/sup&gt;</th>
<th>Anchor Tension at Allowable Shear, ( T ) (lb.)&lt;sup&gt;2&lt;/sup&gt;</th>
<th>Allowable ASD Shear Load, ( V ) (lb.)&lt;sup&gt;2&lt;/sup&gt;</th>
<th>Drift at Allowable Shear, ( \Delta ) (in.)&lt;sup&gt;2&lt;/sup&gt;</th>
<th>Anchor Tension at Allowable Shear, ( T ) (lb.)&lt;sup&gt;2&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>WSW12x7</td>
<td>1,000</td>
<td>1,065</td>
<td>0.31</td>
<td>10,285</td>
<td>1,380</td>
<td>0.43</td>
<td>13,375</td>
<td>1,065</td>
<td>0.31</td>
<td>10,285</td>
</tr>
<tr>
<td></td>
<td>4,000</td>
<td>1,065</td>
<td>0.31</td>
<td>10,285</td>
<td>1,380</td>
<td>0.43</td>
<td>13,375</td>
<td>1,065</td>
<td>0.31</td>
<td>10,285</td>
</tr>
<tr>
<td></td>
<td>7,500</td>
<td>1,065</td>
<td>0.31</td>
<td>10,285</td>
<td>1,380</td>
<td>0.43</td>
<td>13,375</td>
<td>1,065</td>
<td>0.31</td>
<td>10,285</td>
</tr>
<tr>
<td>WSW18x7</td>
<td>1,000</td>
<td>2,475</td>
<td>0.31</td>
<td>13,365</td>
<td>2,980</td>
<td>0.4</td>
<td>16,675</td>
<td>2,475</td>
<td>0.31</td>
<td>13,365</td>
</tr>
<tr>
<td></td>
<td>4,000</td>
<td>2,475</td>
<td>0.31</td>
<td>13,365</td>
<td>2,710</td>
<td>0.36</td>
<td>15,160</td>
<td>2,475</td>
<td>0.31</td>
<td>13,365</td>
</tr>
<tr>
<td></td>
<td>7,500</td>
<td>2,475</td>
<td>0.31</td>
<td>13,365</td>
<td>2,395</td>
<td>0.32</td>
<td>13,395</td>
<td>2,475</td>
<td>0.31</td>
<td>13,365</td>
</tr>
<tr>
<td>WSW24x7</td>
<td>1,000</td>
<td>5,515</td>
<td>0.29</td>
<td>22,710</td>
<td>5,515</td>
<td>0.31</td>
<td>22,710</td>
<td>5,515</td>
<td>0.29</td>
<td>22,710</td>
</tr>
<tr>
<td></td>
<td>4,000</td>
<td>5,515</td>
<td>0.29</td>
<td>22,710</td>
<td>5,400</td>
<td>0.31</td>
<td>22,240</td>
<td>5,515</td>
<td>0.29</td>
<td>22,710</td>
</tr>
<tr>
<td></td>
<td>7,500</td>
<td>5,515</td>
<td>0.29</td>
<td>22,710</td>
<td>4,950</td>
<td>0.29</td>
<td>20,390</td>
<td>5,515</td>
<td>0.29</td>
<td>22,710</td>
</tr>
</tbody>
</table>

See footnotes on page 13.
Strong-Wall® Wood Shearwall Standard Application on Concrete Foundation (cont.)

<table>
<thead>
<tr>
<th>Strong-Wall Wood Shearwall Model</th>
<th>2,500 psi Concrete</th>
<th>3,000 psi Concrete</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Seismic1</td>
<td>Wind</td>
</tr>
<tr>
<td></td>
<td>Allowable Vertical Load, P (lb.)</td>
<td>Anchor Tension at Allowable Shear, T (lb.)</td>
</tr>
<tr>
<td>WSW12x12</td>
<td>1,000</td>
<td>485</td>
</tr>
<tr>
<td></td>
<td>2,000</td>
<td>485</td>
</tr>
<tr>
<td></td>
<td>3,000</td>
<td>485</td>
</tr>
<tr>
<td>WSW18x12</td>
<td>1,000</td>
<td>1,340</td>
</tr>
<tr>
<td></td>
<td>2,000</td>
<td>1,340</td>
</tr>
<tr>
<td></td>
<td>3,000</td>
<td>1,340</td>
</tr>
<tr>
<td>WSW24x12</td>
<td>1,000</td>
<td>2,920</td>
</tr>
<tr>
<td></td>
<td>2,000</td>
<td>2,920</td>
</tr>
</tbody>
</table>

1. Allowable shear loads are applicable to installations on concrete with specified compressive strengths as listed using the ASD basic [IBC Section 1605.3.1] or the alternative basic [IBC Section 1605.3.2] load combinations.
2. Load values include evaluation of bearing stresses on concrete foundations and do not require further evaluation by the Designer. For installations on masonry foundations, bearing capacity shall be evaluated by the Designer.
3. Seismic design based on 2015 IBC using R = 6.5. For other codes, use the seismic coefficients corresponding to light-frame bearing walls with wood structural panels or sheet-steel panels.
4. Allowable vertical load denotes the total maximum concentric vertical load permitted on the panel acting in combination with the allowable shear loads.
5. Allowable shear, drift and anchor tension values may be interpolated for intermediate height or vertical loads. For panels 74"/2"-78" tall, use the values for a 78"-tall panel.
6. High-strength anchor bolts are required for anchor tension forces exceeding the allowable load for standard-strength bolts tabulated on pages 23-24. See pages 22-29 for WSW-AB anchor bolt information and anchorage solutions.
7. All panels taller than 18" require a 2x6 minimum full-height stud attached to each side. Attach using 10d common nails at 16" o.c.
8. See page 14 for allowable out-of-plane and axial capacities.
9. WSW24x7 must be trimmed from a WSW24x8 shearwall, WSW18x14, 16, and 18, and WSW24x18 shearwalls are trimmed from a 20 ft.-tall panel.
10. Drifts at lower design shear may be linearly reduced.
11. Tabulated anchor tension values assume no resisting vertical load. Anchor tension loads at design shear values and including the effect of vertical load may be determined using the following equation:

   \[
   T = \left[ \frac{V \times H}{B} \right] - P/2, \text{ where:} \\
   T = \text{Anchor tension load (lb.)} \\
   V = \text{Design shear load (lb.)} \\
   P = \text{Applied vertical load (lb.)} \\
   H = \text{Panel height (in.)} \\
   B = \text{Moment arm (in.)} \times 8.06^* \text{ for WSW12, } 13.94^* \text{ for WSW18, } 18.94^* \text{ for WSW24.}
   \]

* \[V \times H\] is based on the maximum sectional modulus of the panel.
### Strong-Wall® Wood Shearwall Allowable Out-of-Plane Loads for Single-Story Walls on Concrete Foundations (PSF)

<table>
<thead>
<tr>
<th>Panel Attachment</th>
<th>Strong-Wall Wood Shearwall Model</th>
<th>Nominal Height of Shearwall (ft.)</th>
<th>7</th>
<th>7½</th>
<th>8</th>
<th>9</th>
<th>10</th>
<th>11</th>
<th>12</th>
<th>13</th>
<th>14</th>
<th>16</th>
<th>18</th>
<th>20</th>
</tr>
</thead>
<tbody>
<tr>
<td>Top Plates</td>
<td>WSW12</td>
<td></td>
<td>255</td>
<td>235</td>
<td>215</td>
<td>190</td>
<td>155</td>
<td>115</td>
<td>60</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td></td>
<td>WSW18</td>
<td></td>
<td>230</td>
<td>210</td>
<td>195</td>
<td>170</td>
<td>155</td>
<td>115</td>
<td>90</td>
<td>70</td>
<td>55</td>
<td>35</td>
<td>25</td>
<td>20</td>
</tr>
<tr>
<td></td>
<td>WSW24</td>
<td></td>
<td>250</td>
<td>225</td>
<td>210</td>
<td>185</td>
<td>155</td>
<td>115</td>
<td>90</td>
<td>70</td>
<td>55</td>
<td>35</td>
<td>25</td>
<td>20</td>
</tr>
<tr>
<td>Header</td>
<td>WSW12</td>
<td></td>
<td>280</td>
<td>255</td>
<td>205</td>
<td>150</td>
<td>110</td>
<td>85</td>
<td>60</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td></td>
<td>WSW18</td>
<td></td>
<td>230</td>
<td>170</td>
<td>155</td>
<td>140</td>
<td>110</td>
<td>85</td>
<td>70</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td></td>
<td>WSW24</td>
<td></td>
<td>185</td>
<td>130</td>
<td>120</td>
<td>105</td>
<td>95</td>
<td>85</td>
<td>70</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
</tbody>
</table>

1. Loads shown are at ASD level in pounds per square foot (PSF) of wall with no further increase allowed.
2. Loads consider a maximum deflection limit of H/240.
3. Allowable out-of-plane loads can be applied in combination with the panel allowable vertical loads shown on pages 12–13.
4. Allowable values for header panel attachment assume a maximum header depth of 14”. Use a load reduction factor of 0.88 and 0.78 for 16”- and 18”-deep headers respectively.
5. Allowable values shown for header panel attachment require the use of the portal kit to resist header rotation.
6. N/A = Not Applicable.

### Strong-Wall® Wood Shearwall Axial Capacities for Single-Story Walls on Concrete Foundations (lb.)

<table>
<thead>
<tr>
<th>Strong-Wall Wood Shearwall Model</th>
<th>Nominal Height of Shearwall (ft.)</th>
<th>7</th>
<th>7.5</th>
<th>8</th>
<th>9</th>
<th>10</th>
<th>11</th>
<th>12</th>
<th>13</th>
<th>14</th>
<th>16</th>
<th>18</th>
<th>20</th>
</tr>
</thead>
<tbody>
<tr>
<td>WSW12</td>
<td></td>
<td>32,400</td>
<td>27,700</td>
<td>23,700</td>
<td>19,000</td>
<td>15,400</td>
<td>12,800</td>
<td>10,800</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>WSW18</td>
<td></td>
<td>40,900</td>
<td>40,900</td>
<td>40,900</td>
<td>33,100</td>
<td>26,900</td>
<td>22,300</td>
<td>18,800</td>
<td>16,000</td>
<td>13,300</td>
<td>10,200</td>
<td>8,100</td>
<td>6,600</td>
</tr>
<tr>
<td>WSW24</td>
<td></td>
<td>58,000</td>
<td>56,200</td>
<td>48,100</td>
<td>38,400</td>
<td>31,300</td>
<td>25,900</td>
<td>21,800</td>
<td>18,600</td>
<td>15,500</td>
<td>11,900</td>
<td>9,400</td>
<td>7,600</td>
</tr>
</tbody>
</table>

1. Allowable ASD vertical load is the lesser of the WSW panel buckling capacity and concrete bearing capacity beneath the holdowns assuming a minimum specified concrete compressive strength f'_c = 2,500 psi.
2. Allowable vertical loads assume concentric point load or uniformly distributed load without lateral loads present.
3. For combined lateral and vertical loads, see pages 12–13.
4. N/A = Not Applicable.
**Garage Portal Systems on Concrete Foundations**

The Strong-Wall® Wood Shearwall garage portal system provides higher shear capacity with reduced concrete anchorage requirements. Portal walls may be used in single- or double-portal applications and shall be installed with a minimum 3¼" x 9¼" single- or multiple-ply header depending upon loading and span requirements.

**Codes:** ICC-ES ESR-2652, City of L.A. RR25730

For product data and naming scheme information, see pages 10–11.

**Garage Header Rough Opening Height**

<table>
<thead>
<tr>
<th>Model No.</th>
<th>H Curb (in.)</th>
<th>Rough Opening Height (in.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>WSW12x7</td>
<td>5½</td>
<td>6'-11½'</td>
</tr>
<tr>
<td>WSW18x7</td>
<td>6</td>
<td>7'-0'</td>
</tr>
<tr>
<td>WSW24x7</td>
<td>0</td>
<td>7'-1½'</td>
</tr>
<tr>
<td>WSW12x8</td>
<td>5½</td>
<td>8'-2½'</td>
</tr>
<tr>
<td>WSW18x8</td>
<td>6</td>
<td>8'-3½'</td>
</tr>
</tbody>
</table>

1. If required rough opening height exceeds table value, specify next taller panel and trim as necessary. The Strong-Wall Wood Shearwalls may be trimmed to a minimum height of 74½".

2. Furring down garage header may be required for correct rough opening height.

3. WSW24x7 and WSW24x7.5 must be trimmed from a WSW24x8 shearwall.

**Installation**

- Portal-frame connection kit is required for portal-frame applications.
- All panels may be trimmed to a minimum of 74½". Trim height from top of panel only, do not trim from sides or bottom. Drilling holes in the Strong-Wall Wood Shearwalls is not allowed except as shown on page 42.
- Anchor-bolt nuts should be snug tight.
- Maximum shim thickness between Strong-Wall Wood Shearwalls and the top plates or header is ¾".
- Standard top-of-wall connections install with nails.
- Walls may also be used in 2x6 wall framing. Install the panel flush to the outside face of the framing and add furring to the opposite side.
- Walls may be installed with solid or multi-ply headers, see page 47 Detail 4, 5/WSW4 for fastening and furring requirements.

**Portal Frame Connection Kit**

<table>
<thead>
<tr>
<th>Model No.</th>
<th>Contents</th>
</tr>
</thead>
<tbody>
<tr>
<td>WSW-PK</td>
<td>4 (10 Gauge) WSW-PS Straps</td>
</tr>
</tbody>
</table>

1. Portal-frame connection kit comes with panels that are 100" or less in height. The kit must be ordered separately for panels over 100" tall.
Portal Design Information

A portal frame under lateral loads causes the portal header to experience internal stresses in addition to those created by the primary loads (live, dead and snow). These additional stresses are called induced forces and must be considered when designing portal headers. To account for the induced forces from lateral loads, a concentrated end moment equal to the top-of-panel moment must be placed at the end of the beam that is connected to the WSW panel. For WSW12 and WSW18 panels, the moment induced into the portal header must be taken as 20% and 10%, respectively, of the total lateral moment. The total lateral moment is calculated as the design shear times the panel height. For headers with typical residential uniform loads, the induced moment and shear forces from a portal-frame system do not control the design. This is due to the 1.60 load duration factor (C_D) used in design and the induced stresses from wind and seismic loads.

The lateral and vertical loads shown on page 17 for portal frames assume that the header size falls within the portal-frame parameters listed in the table.

### Strong-Wall® Wood Shearwall Portal Header Design Parameters

<table>
<thead>
<tr>
<th>Header Design Parameter</th>
<th>Allowable Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Width</td>
<td>3¼&quot; – 5½&quot;</td>
</tr>
<tr>
<td>Depth</td>
<td>9¼&quot; – 18&quot;</td>
</tr>
<tr>
<td>Clear Span</td>
<td>8’ – 18’6&quot;</td>
</tr>
<tr>
<td>K</td>
<td>90 lb./in. – 4,000 lb./in.</td>
</tr>
</tbody>
</table>

1. Single- or multiple-ply header members may be used.
2. Secondary moment, shear and axial forces shall be considered in header design.
3. Header design shall be by Designer and assume gravity loads only induce simple span moments in beam.
4. Header stiffness (K) for use in WSW portal system may be determined using the following equation:
   \[ K = \frac{E \times b \times d^3}{12L^2} \]
   where:
   - E = Header modulus of elasticity (psi)
   - b = Header width (in.)
   - d = Header depth (in.)
   - L = Header clear span (in.)

### Alternative Garage Front Options

These alternative garage-front options may be used for applications when the Strong-Wall® Wood Shearwall is installed at the full height (option 1) or without the additional Portal-Frame Kit (option 2), when higher capacity or reduced concrete anchorage is not needed. Refer to the Standard Application on Concrete Foundations on pages 12–13 for product data and allowable load values.

For Garage Wall Option 2, the Designer shall design for:
1. Shear transfer
2. Out-of-plane loading effect
3. Increased overturning and drift due to additional height
## Strong-Wall® Wood Shearwalls

### Garage Portal Systems on Concrete Foundations

#### Strong-Wall® Wood Shearwall Single-Wall Garage Portal System on Concrete Foundation

<table>
<thead>
<tr>
<th>Strong-Wall Wood Shearwall Model</th>
<th>2,500 psi Concrete</th>
<th>3,000 psi Concrete</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Seismic&lt;sup&gt;1&lt;/sup&gt;</td>
<td>Wind</td>
</tr>
<tr>
<td></td>
<td>Allowable ASD Shear Load, V (lb.)</td>
<td>Drift at Allowable Shear, ( \Delta ) (in.)</td>
</tr>
<tr>
<td>WSW12x7</td>
<td>1,000</td>
<td>1,645</td>
</tr>
<tr>
<td></td>
<td>4,000</td>
<td>1,645</td>
</tr>
<tr>
<td></td>
<td>7,500</td>
<td>1,645</td>
</tr>
<tr>
<td>WSW18x7</td>
<td>1,000</td>
<td>3,225</td>
</tr>
<tr>
<td></td>
<td>4,000</td>
<td>3,225</td>
</tr>
<tr>
<td></td>
<td>7,500</td>
<td>3,225</td>
</tr>
<tr>
<td>WSW12x7.5</td>
<td>1,000</td>
<td>1,520</td>
</tr>
<tr>
<td></td>
<td>4,000</td>
<td>1,520</td>
</tr>
<tr>
<td></td>
<td>7,500</td>
<td>1,520</td>
</tr>
<tr>
<td>WSW18x7.5</td>
<td>1,000</td>
<td>2,955</td>
</tr>
<tr>
<td></td>
<td>4,000</td>
<td>2,955</td>
</tr>
<tr>
<td></td>
<td>7,500</td>
<td>2,945</td>
</tr>
<tr>
<td>WSW12x8</td>
<td>1,000</td>
<td>1,310</td>
</tr>
<tr>
<td></td>
<td>4,000</td>
<td>1,310</td>
</tr>
<tr>
<td></td>
<td>7,500</td>
<td>1,310</td>
</tr>
<tr>
<td>WSW18x8</td>
<td>1,000</td>
<td>2,610</td>
</tr>
<tr>
<td></td>
<td>4,000</td>
<td>2,610</td>
</tr>
<tr>
<td></td>
<td>7,500</td>
<td>2,610</td>
</tr>
</tbody>
</table>

1. Allowable shear loads are applicable to installations on concrete with specified compressive strengths as listed using the ASD basic (IBC Section 1605.3.1) or the alternative basic (IBC Section 1605.3.2) load combinations.
2. Load values include evaluation of bearing stresses on concrete foundations and do not require further evaluation by the Designer. For installations on masonry foundations, bearing capacity shall be evaluated by the Designer.
3. Seismic design based on 2015 IBC using R = 6.5. For other codes, use the seismic coefficients corresponding to light-frame bearing walls with wood structural panels or sheet-steel panels.
4. Allowable values shown apply to Single-Wall Garage Portal Systems. The allowable shear load for a Double-Wall Garage Portal System, which consists of two walls with a header continuous across both panels, may be taken as twice the table value.
5. Allowable vertical load denotes the total maximum concentric vertical load permitted on the panel acting in combination with the allowable shear loads.
6. Allowable shear, drift and anchor tension values may be interpolated for intermediate height or vertical loads.
7. High-strength anchor bolts are required for anchor tension forces exceeding the allowable load for standard-strength bolts tabulated on pages 23–24. See pages 22–29 for WSW-AB anchor bolt information and anchorage solutions.
8. See page 14 for allowable out-of-plane and axial capacities.
9. Drifts at lower design shear may be linearly reduced.
10. Tabulated anchor tension values assume no resisting vertical load. Anchor tension loads at design shear values and including the effect of vertical load may be determined using the following equation:

\[
T = (k \times V \times H) / B - P / 2,
\]

where:
- \( T \) = Anchor tension load (lb.)
- \( V \) = Design shear load (lb.)
- \( P \) = Applied vertical load (lb.)
- \( H \) = Panel height (in.)
- \( B \) = Moment arm (in.); 8.06" for WSW12, 13.94" for WSW18
- \( k \) = Portal factor; 0.80 for WSW12 panels 93¼" or less in height, 0.90 for WSW18 panels 93¼" or less in height, 1.00 for all other panels.

---

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Two-Story Stacked WSW

Product Data – Upper Wall

<table>
<thead>
<tr>
<th>Model No.</th>
<th>W (in.)</th>
<th>H (in.)</th>
<th>Total Wall Weight (lb.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>WSW18x9</td>
<td>18</td>
<td>105¼</td>
<td>185</td>
</tr>
<tr>
<td>WSW24x9</td>
<td>24</td>
<td>105¼</td>
<td>245</td>
</tr>
<tr>
<td>WSW18x10</td>
<td>18</td>
<td>117¾</td>
<td>205</td>
</tr>
<tr>
<td>WSW24x10</td>
<td>24</td>
<td>117¾</td>
<td>270</td>
</tr>
<tr>
<td>WSW18x11</td>
<td>18</td>
<td>129¼</td>
<td>220</td>
</tr>
<tr>
<td>WSW24x11</td>
<td>24</td>
<td>129¼</td>
<td>295</td>
</tr>
<tr>
<td>WSW18x12</td>
<td>18</td>
<td>141¼</td>
<td>240</td>
</tr>
<tr>
<td>WSW24x12</td>
<td>24</td>
<td>141¼</td>
<td>320</td>
</tr>
</tbody>
</table>

1. Order WSW-MSKXXKT separately for two-story stacked applications.
2. See product data table on page 10 for footnotes.
3. The width of the upper wall should match the width of the lower wall.

Two-Story Stacked WSW

Product Data – Bottom Wall

<table>
<thead>
<tr>
<th>Model No.</th>
<th>W (in.)</th>
<th>H (in.)</th>
<th>Anchor Bolts</th>
<th>Total Wall Weight (lb.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>WSW18x8</td>
<td>18</td>
<td>93¼</td>
<td>2 ¾</td>
<td>165</td>
</tr>
<tr>
<td>WSW24x8</td>
<td>24</td>
<td>93¼</td>
<td>2 1</td>
<td>225</td>
</tr>
<tr>
<td>WSW18x9</td>
<td>18</td>
<td>105¼</td>
<td>2 ¾</td>
<td>185</td>
</tr>
<tr>
<td>WSW24x9</td>
<td>24</td>
<td>105¼</td>
<td>2 1</td>
<td>245</td>
</tr>
<tr>
<td>WSW18x10</td>
<td>18</td>
<td>117¼</td>
<td>2 ¾</td>
<td>205</td>
</tr>
<tr>
<td>WSW24x10</td>
<td>24</td>
<td>117¼</td>
<td>2 1</td>
<td>270</td>
</tr>
<tr>
<td>WSW18x11</td>
<td>18</td>
<td>129¼</td>
<td>2 ¾</td>
<td>220</td>
</tr>
<tr>
<td>WSW24x11</td>
<td>24</td>
<td>129¼</td>
<td>2 1</td>
<td>295</td>
</tr>
<tr>
<td>WSW18x12</td>
<td>18</td>
<td>141¼</td>
<td>2 ¾</td>
<td>240</td>
</tr>
<tr>
<td>WSW24x12</td>
<td>24</td>
<td>141¼</td>
<td>2 1</td>
<td>320</td>
</tr>
</tbody>
</table>

1. See product data table on page 10 for footnotes.

Multi-Story Connection Kit

<table>
<thead>
<tr>
<th>Model No.</th>
<th>Contents</th>
</tr>
</thead>
<tbody>
<tr>
<td>WSW-MSK12KT</td>
<td>(2) Holdowns with pre-attached bolts</td>
</tr>
<tr>
<td>WSW-MSK18KT</td>
<td>(2) Standard hex nuts and flat washers</td>
</tr>
<tr>
<td>WSW-MSK24KT</td>
<td>(1) LSL bearing block</td>
</tr>
<tr>
<td></td>
<td>Installation instructions</td>
</tr>
</tbody>
</table>
Installation

- All panels may be trimmed to a minimum of 74½". Trim height from top of panel only, do not trim from sides or bottom. Drilling holes in the Strong-Wall® Wood Shearwalls is not allowed except as shown on page 42.
- Anchor-bolt nuts should be snug tight.
- Maximum shim thickness between the shearwall and the top plates or header is ⅛".
- Walls may also be used in 2x6 wall framing. Install the panel flush to the outside face of the framing and add furring to the opposite side.
- Standard top-of-wall connections install with nails.
- The second-story panel must be the same width as the first-story panel.
- When specifying the height of the second-story panels, add the total floor height, including sheathing, to the wall height, then subtract 2". See \( h_3 \) definition on page 21.

Two-Story Stacked MSK Connection Details

- Hex nuts and structural washers provided with MSK kit. Nuts require a snug tight fit.
- MSK holdown installs with 10d x 2½" min. length nails (fill all holes).
- Align LSL bearing block with first-story panel.
- See page 11 for top-plate connection.

2x6 Framing Installation

2x6 Framing Installation
Alternative top connection recommended. See pages 39 and 44 for details.

2x6 Framing Installation
Cut slots (¼" wide max.) in the top plates to allow the MSK holdown to pass through. Do not notch the double top plates.

First-Story Installation with Wood Floor System
Specify panel height from top of foundation to underside of top plates.

Two-Story Stacked Installation

See page 10 for connection to foundation.

See page 11 for top-plate connection.
### Two-Story Stacked on Concrete Foundations

**Strong-Wall® Wood Shearwalls Second-Story Walls – Stacked Application on Concrete Foundation**

<table>
<thead>
<tr>
<th>Model No.</th>
<th>Allowable Vertical Load, P (lb.)</th>
<th>Stiffness Factor, K x 10^2 (lb.-in.)</th>
<th>Allowable ASD Base Moment (lb.-in.)</th>
<th>Anchor Tension at Allowable ASD Base Moment (lb.)</th>
<th>Drift at Allowable Shear, Δ (in.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>WSW18x9</td>
<td>2,000</td>
<td>1,225</td>
<td>206,550</td>
<td>14,820</td>
<td>0.42</td>
</tr>
<tr>
<td>WSW24x9</td>
<td>2,000</td>
<td>2,165</td>
<td>389,045</td>
<td>23,265</td>
<td>0.47</td>
</tr>
<tr>
<td>WSW18x10</td>
<td>2,000</td>
<td>1,125</td>
<td>199,000</td>
<td>12,350</td>
<td>0.46</td>
</tr>
<tr>
<td>WSW24x10</td>
<td>2,000</td>
<td>1,020</td>
<td>1,020</td>
<td>1,020</td>
<td>0.52</td>
</tr>
<tr>
<td>WSW18x11</td>
<td>2,000</td>
<td>920</td>
<td>920</td>
<td>920</td>
<td>0.57</td>
</tr>
<tr>
<td>WSW24x11</td>
<td>2,000</td>
<td>1,640</td>
<td>1,640</td>
<td>1,640</td>
<td>0.57</td>
</tr>
</tbody>
</table>

See notes below.

### Strong-Wall® Wood Shearwalls First-Story Walls – Stacked Application on Concrete Foundation

<table>
<thead>
<tr>
<th>Model No.</th>
<th>Allowable Vertical Load, P (lb.)</th>
<th>Stiffness Factor, K x 10^2 (lb.-in.)</th>
<th>Allowable ASD Base Moment (lb.-in.)</th>
<th>Anchor Tension at Allowable ASD Base Moment (lb.)</th>
<th>Drift at Allowable Shear, Δ (in.)</th>
<th>Allowable ASD Base Moment (lb.-in.)</th>
<th>Anchor Tension at Allowable ASD Base Moment (lb.)</th>
<th>Drift at Allowable Shear, Δ (in.)</th>
<th>Allowable ASD Base Moment (lb.-in.)</th>
<th>Anchor Tension at Allowable ASD Base Moment (lb.)</th>
<th>Drift at Allowable Shear, Δ (in.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>WSW18x8</td>
<td>4,000</td>
<td>9.7</td>
<td>206,550</td>
<td>14,820</td>
<td>0.42</td>
<td>206,550</td>
<td>14,820</td>
<td>0.42</td>
<td>206,550</td>
<td>14,820</td>
<td>0.42</td>
</tr>
<tr>
<td>WSW24x8</td>
<td>4,000</td>
<td>19.4</td>
<td>413,565</td>
<td>26,350</td>
<td>0.46</td>
<td>413,565</td>
<td>26,350</td>
<td>0.46</td>
<td>413,565</td>
<td>26,350</td>
<td>0.46</td>
</tr>
<tr>
<td>WSW18x9</td>
<td>4,000</td>
<td>10.3</td>
<td>200,500</td>
<td>14,385</td>
<td>0.52</td>
<td>200,500</td>
<td>14,385</td>
<td>0.52</td>
<td>200,500</td>
<td>14,385</td>
<td>0.52</td>
</tr>
<tr>
<td>WSW24x9</td>
<td>4,000</td>
<td>21.5</td>
<td>411,000</td>
<td>21,705</td>
<td>0.57</td>
<td>411,000</td>
<td>21,705</td>
<td>0.57</td>
<td>411,000</td>
<td>21,705</td>
<td>0.57</td>
</tr>
<tr>
<td>WSW18x10</td>
<td>4,000</td>
<td>11.6</td>
<td>202,255</td>
<td>14,190</td>
<td>0.57</td>
<td>202,255</td>
<td>14,190</td>
<td>0.57</td>
<td>202,255</td>
<td>14,190</td>
<td>0.57</td>
</tr>
<tr>
<td>WSW24x10</td>
<td>4,000</td>
<td>22.6</td>
<td>389,855</td>
<td>20,545</td>
<td>0.57</td>
<td>389,855</td>
<td>20,545</td>
<td>0.57</td>
<td>389,855</td>
<td>20,545</td>
<td>0.57</td>
</tr>
<tr>
<td>WSW18x11</td>
<td>4,000</td>
<td>12.8</td>
<td>189,275</td>
<td>13,580</td>
<td>0.57</td>
<td>189,275</td>
<td>13,580</td>
<td>0.57</td>
<td>189,275</td>
<td>13,580</td>
<td>0.57</td>
</tr>
<tr>
<td>WSW24x11</td>
<td>4,000</td>
<td>26.5</td>
<td>380,670</td>
<td>20,100</td>
<td>0.57</td>
<td>380,670</td>
<td>20,100</td>
<td>0.57</td>
<td>380,670</td>
<td>20,100</td>
<td>0.57</td>
</tr>
</tbody>
</table>

1. Allowable ASD base moments and anchor tension values are applicable to installations on concrete with specified compressive strengths as listed using the ASD basic (IBC Section 1605.3.1) or the alternative basic (IBC Section 1605.3.2) load combinations.
2. Load values include evaluation of bearing stresses on concrete foundations and do not require further evaluation by the Designer. Installations on masonry foundations, bearing capacity shall be evaluated by the Designer.
3. Allowable vertical load denotes the total maximum vertical load permitted on the panel acting in combination with the allowable shear load and base moment.
4. Allowable shear, drift, base moment and anchor tension values may be interpolated for intermediate height or vertical loads.
5. Two-story stacked panel combinations may consist of any height combination of equal width panels listed in these tables.
6. Two-story stacked panel combinations may consist of any height combination of equal width panels listed in these tables.
7. A multi-story kit (MSK) is required to attach the second-story panel to the first-story panel.
8. High-strength anchor bolts are required for anchor tension forces exceeding the allowable load for standard-strength bolts tabulated on pages 23–24. See pages 22–29 for WSW-AB anchor bolt information and anchorage solutions.
9. The Designer must verify that the cumulative overturning moment at the base of the first-story panel does not exceed the allowable base moment capacity as shown in the example on page 21. The overturning base moment shall be determined using the following equation:
   \[ M_{OT} = (V_1 \times h_1) + (V_2 \times h_2) \]
   where:
   - \( M_{OT} \) = Overturning base moment
   - \( V_1 \) = Applied shear load to first-story panel
   - \( V_2 \) = Applied shear load to second-story panel
   - \( h_1 \) = Height of first-story panel
   - \( h_2 \) = Total assembly Height (\( h_1 \) + Height of second-story panel + 5 in.)
10. Tabulated anchor tension values assume no resisting vertical load. Anchor tension loads at design shear values and including the effect of vertical load may be determined using the following equation:
    \[ T = M_{OT} \times B - P/2 \]
    where:
    - \( T \) = Anchor tension load (lb.)
    - \( M_{OT} \) = Overturning moment, see Footnote 9
    - \( B \) = Moment arm (in.); 13.94" for WSW18, 18.94" for WSW24
11. First-story panel drift must comply with code drift limits; evaluate drift at the top of the first-story panel using the following equation:
    \[ \Delta = h_1 \times K \times [3 \times V_2 \times h_2] + (2 \times V_{base} \times h_1) \]
    where:
    - \( \Delta \) = First-story panel drift
    - \( K \) = Stiffness factor for first-story panel
    - \( h_1 \) = First-story panel height
    - \( h_2 \) = Second-story panel height
    - \( V_2 \) = Applied shear load to second-story panel
    - \( V_{base} \) = Sum of applied shear loads to first-story panel and second-story panel.
Designing for Cumulative Overturning Forces

In multi-story structures, shear and the associated overturning forces due to seismic and wind requirements must be carried down to the foundation by the building’s lateral-force resisting system. These forces are cumulative over the height of the building, and shear forces applied at the second or third levels of a structure will generate much larger base overturning moments than the same shears applied at the first story. If cumulative overturning is not considered, the design may result in forces several times higher than the capacity of the lower wall, anchor bolts and foundation anchorage.

When specifying two-story stacked applications, analysis should be performed by following these steps.

1. Analyze the structure to determine the shear forces at each floor. The detail to the right illustrates the forces developed in a two-story stacked application. Then calculate the cumulative overturning moment (M_{OT}), based on the story heights and applied shear forces at each story, as follows:

\[ M_{OT} = (V_1 \times h_1) + (V_2 \times h_2) \]

2. Select the first-story panel and ensure that the allowable base moment exceeds the overturning moment (M_{OT}).

3. Check the applicable second-story panel with the same width as the first-story panel and verify that the allowable second-story shear force exceeds the applied second-story shear force.

4. Check the first-story panel drift.

**Drift Equation for First-Story Shearwalls**

The first-story panel drift must comply with code drift limits. Evaluate drift at the top of the first-story panel using the following equation:

\[ \Delta = \left( \frac{h_1^2}{K} \right) \left( 3V_2h_3 + 2V_{base}h_1 \right) \]

Where:
- \( \Delta \) = First-story panel drift (in.)
- \( K \) = Stiffness factor for first-story panel (lb.-in.?)
- \( h_1 \) = First-story panel height (in.)
- \( h_3 \) = Second-story panel height (in.)
- \( V_1 \) = Applied shear load to first-story panel (lb.)
- \( V_2 \) = Applied shear load to second-story panel (lb.)
- \( V_{base} \) = \( V_1 + V_2 \) (lb.)

**Given**
- Seismic, \( f_c = 2,500 \) psi
- First-story wall height = 9 ft.
- Second-story wall height = 8 ft.
- Joist height = 11\% ft.
- First-story panel shear, \( V_1 = 1,200 \) lb.
- Second-story panel shear, \( V_2 = 1,000 \) lb.

**Solution**

1. Calculate the overturning moment;

\[ M_{OT} = (1,200 \text{ lb.} \times 105.25 \text{ in.}) + (1,000 \text{ lb.} \times 213.25 \text{ in.}) = 339,550 \text{ lb.-in.} \]

2. Select WSW24x9 at the first-story;

\[ M_{allow} = 411,000 \text{ lb.-in.} > M_{OT} \text{ OK} \]

3. Check the capacity of the second-story WSW24x9;

\[ V_{allow} = 2,165 \text{ lb.} > V_2 \text{ OK} \]

4. Verify that the first-story drift does not exceed ASD code drift limit,

\[ \Delta_{allow} = 0.7 \left( \frac{0.025H}{C_d} \right) = H / 228.6 \]

\[ \Delta_{allow} = 105.25 \text{ in.} / 228.6 = 0.46 \text{ in.} \]

\[ \Delta = \frac{105.25^2}{21.5 \times 10^3} \left[ (3 \times 1,000 \text{ lb.} \times 103^3) + (2 \times 2,200 \text{ lb.} \times 105.25^3) \right] \]

\[ \Delta = 0.40 \text{ in.} < \Delta_{allow} \text{ OK} \]
**Anchorage Solutions**

**WSW-AB Anchor Bolts**

WSW-AB anchor bolts in ⅛" and 1" diameters offer flexibility to meet specific project demands. Inspection is easy; the head is stamped with a "No Equal" symbol for identification, bolt length, bolt diameter, and optional "HS" for "High Strength" if specified.

**Material:** ASTM F1554 Grade 36; High Strength (HS) ASTM A449

An additional nut for template installation is provided with each WSW-AB.

<table>
<thead>
<tr>
<th>Strong-Wall Wood Shearwall Width (in.)</th>
<th>Model No.</th>
<th>Dia. (in.)</th>
<th>Total Length (in.)</th>
<th>le (in.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>12 and 18</td>
<td>WSW-AB½x24</td>
<td>⅛</td>
<td>24</td>
<td>20</td>
</tr>
<tr>
<td></td>
<td>WSW-AB½x24HS</td>
<td>⅛</td>
<td>24</td>
<td>20</td>
</tr>
<tr>
<td></td>
<td>WSW-AB½x30</td>
<td>⅛</td>
<td>30</td>
<td>26</td>
</tr>
<tr>
<td></td>
<td>WSW-AB½x30HS</td>
<td>⅛</td>
<td>30</td>
<td>26</td>
</tr>
<tr>
<td></td>
<td>WSW-AB½x36HS</td>
<td>⅛</td>
<td>36</td>
<td>32</td>
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<tr>
<td>24</td>
<td>WSW-AB1x24</td>
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<td>24</td>
<td>20</td>
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<tr>
<td></td>
<td>WSW-AB1x24HS</td>
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<td>24</td>
<td>20</td>
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<td></td>
<td>WSW-AB1x30</td>
<td>1</td>
<td>30</td>
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<td></td>
<td>WSW-AB1x30HS</td>
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<td></td>
<td>WSW-AB1x36HS</td>
<td>1</td>
<td>36</td>
<td>32</td>
</tr>
</tbody>
</table>

**WSW-HSR Extension Kit**

WSW-HSR allows for anchorage in tall stemwall applications where full embedment of a WSW-AB into the footing is required. The head is stamped for identification like a WSW-AB. Kit includes ASTM A449 high-strength rod with heavy hex nut fixed in place and high-strength coupler nut. Do not use in place of WSW-AB.

<table>
<thead>
<tr>
<th>Strong-Wall Wood Shearwall Width (in.)</th>
<th>Model No.</th>
<th>Dia. (in.)</th>
<th>Total Length (in.)</th>
<th>le (in.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>12 and 18</td>
<td>WSW-HSR½x24KT</td>
<td>⅛</td>
<td>24</td>
<td>22</td>
</tr>
<tr>
<td></td>
<td>WSW-HSR½x36KT</td>
<td>⅛</td>
<td>36</td>
<td>34</td>
</tr>
<tr>
<td>24</td>
<td>WSW-HSR1x24KT</td>
<td>1</td>
<td>24</td>
<td>22</td>
</tr>
<tr>
<td></td>
<td>WSW-HSR1x36KT</td>
<td>1</td>
<td>36</td>
<td>34</td>
</tr>
</tbody>
</table>

**Total le = WSW-HSR le + WSW-AB le + 2⅛"**
### Strong-Wall® Wood Shearwall Tension Anchorage Solutions – 2,500 psi Concrete\(^1,5,6\)

<table>
<thead>
<tr>
<th>Design Criteria</th>
<th>Concrete Condition</th>
<th>Anchor Strength(^2)</th>
<th><strong>WSW-AB% Anchor Bolt</strong></th>
<th><strong>WSW-AB1 Anchor Bolt</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>ASD Allowable Tension (lb.)</td>
<td>W (in.)</td>
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<tr>
<td></td>
<td>Cracked</td>
<td>Standard</td>
<td>11,900</td>
<td>27</td>
</tr>
<tr>
<td></td>
<td></td>
<td>High Strength</td>
<td>24,900</td>
<td>43</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Standard</td>
<td>12,500</td>
<td>24</td>
</tr>
<tr>
<td></td>
<td></td>
<td>High Strength</td>
<td>27,100</td>
<td>46</td>
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<tr>
<td>Seismic(^3)</td>
<td>Uncracked</td>
<td>Standard</td>
<td>25,300</td>
<td>38</td>
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<td></td>
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<td>High Strength</td>
<td>27,100</td>
<td>40</td>
</tr>
<tr>
<td>Wind(^4)</td>
<td>Cracked</td>
<td>Standard</td>
<td>5,100</td>
<td>14</td>
</tr>
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<td></td>
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<td>30</td>
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<td></td>
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<td>Standard</td>
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<td>12</td>
</tr>
<tr>
<td></td>
<td></td>
<td>High Strength</td>
<td>19,900</td>
<td>32</td>
</tr>
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</table>

### Strong-Wall® Wood Shearwall Tension Anchorage Solutions – 3,000 psi Concrete\(^1,5,6\)

<table>
<thead>
<tr>
<th>Design Criteria</th>
<th>Concrete Condition</th>
<th>Anchor Strength(^2)</th>
<th><strong>WSW-AB% Anchor Bolt</strong></th>
<th><strong>WSW-AB1 Anchor Bolt</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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<td>ASD Allowable Tension (lb.)</td>
<td>W (in.)</td>
</tr>
<tr>
<td></td>
<td>Cracked</td>
<td>Standard</td>
<td>12,300</td>
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<td></td>
<td></td>
<td>High Strength</td>
<td>25,200</td>
<td>41</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Standard</td>
<td>12,000</td>
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<td>High Strength</td>
<td>27,100</td>
<td>43</td>
</tr>
<tr>
<td>Seismic(^3)</td>
<td>Uncracked</td>
<td>Standard</td>
<td>13,100</td>
<td>24</td>
</tr>
<tr>
<td></td>
<td></td>
<td>High Strength</td>
<td>25,300</td>
<td>36</td>
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<tr>
<td>Wind(^4)</td>
<td>Cracked</td>
<td>Standard</td>
<td>5,000</td>
<td>13</td>
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<tr>
<td></td>
<td></td>
<td>High Strength</td>
<td>16,600</td>
<td>25</td>
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<td></td>
<td>Uncracked</td>
<td>Standard</td>
<td>5,500</td>
<td>12</td>
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<td></td>
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<td>High Strength</td>
<td>19,700</td>
<td>28</td>
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</table>

See footnotes on page 24.
### Strong-Wall® Wood Shearwall Tension Anchorage Solutions – 4,500 psi Concrete

<table>
<thead>
<tr>
<th>Design Criteria</th>
<th>Concrete Condition</th>
<th>Anchor Strength</th>
<th>WSW-AB% Anchor Bolt</th>
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<tbody>
<tr>
<td></td>
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<td>ASD Allowable Tension (lb.)</td>
<td>W (in.)</td>
<td>d_e (in.)</td>
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<tr>
<td>Cracked</td>
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<td>12,600</td>
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<td></td>
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<td>Wind3</td>
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<td>High Strength</td>
<td>13,100</td>
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<td></td>
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<td>24,800</td>
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<td></td>
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<td>27,100</td>
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<td>12</td>
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<tr>
<td>Wind3</td>
<td>Standard</td>
<td>5,400</td>
<td>12</td>
<td>6</td>
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<tr>
<td></td>
<td>High Strength</td>
<td>8,300</td>
<td>16</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td></td>
<td>13,100</td>
<td>22</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td></td>
<td>15,300</td>
<td>24</td>
<td>8</td>
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<tr>
<td></td>
<td></td>
<td>19,300</td>
<td>28</td>
<td>10</td>
</tr>
<tr>
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<td>23,600</td>
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<tr>
<td></td>
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<td>27,100</td>
<td>36</td>
<td>12</td>
</tr>
<tr>
<td>Uncracked</td>
<td>Standard</td>
<td>6,800</td>
<td>12</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>High Strength</td>
<td>9,400</td>
<td>15</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td></td>
<td>13,100</td>
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<td>7</td>
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<td></td>
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<tr>
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<td>10</td>
</tr>
<tr>
<td></td>
<td></td>
<td>27,100</td>
<td>31</td>
<td>11</td>
</tr>
</tbody>
</table>

1. Anchorage designs conform to ACI 318-14 and ACI 318-11 Appendix D with no supplementary reinforcement for cracked and uncracked concrete as noted.
2. Anchor strength indicates required grade of WSW-AB anchor bolt. Standard (ASTM F1554 Grade 36) or high strength (HS) (ASTM A449).
3. Seismic indicates Seismic Design Categories C through F. Detached one- and two-family dwellings in SDC C may use wind anchorage solutions. Seismic anchorage designs conform to ACI 318-14 Section 17.2.3.4.3 and ACI 318-11 Section D.3.3.4.
4. Wind includes Seismic Design Categories A and B and detached one- and two-family dwellings in SDC C.
5. Foundation dimensions are for anchorage only. Foundation design (size and reinforcement) by others.
6. Refer to slab on grade, curb, stemwall and interior footing details for w and d_e as shown on pages 26–27.
Anchorage Solutions

Strong-Wall® Wood Shearwall Shear Anchorage

Foundation shear reinforcement to resist shear forces from Strong-Wall® Wood Shearwalls located at the edge of concrete is shown in the table below. The WSW12 used in wind applications does not require shear reinforcement when the panel design shear force is less than the anchorage allowable shear load shown in the table below.

### Strong-Wall® Wood Shearwall Shear Anchorage Solutions

<table>
<thead>
<tr>
<th>Strong-Wall Wood Shearwall Model</th>
<th>L₁ or L₂ (in.)</th>
<th>Seismic Shear Reinforcement</th>
<th>Wind Shear Reinforcement</th>
<th>Minimum Curb/ Stemwall Width (in.)</th>
<th>Minimum Curb/ Stemwall Width (in.)</th>
<th>ASD Allowable Shear Load, V (lb.)²</th>
</tr>
</thead>
<tbody>
<tr>
<td>WSW12</td>
<td>10½</td>
<td>(1) #3 Hairpin 8³</td>
<td>See Note 6</td>
<td>6</td>
<td>6</td>
<td>1,035 740</td>
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<tr>
<td>WSW18</td>
<td>15</td>
<td>(1) #3 Hairpin 8³</td>
<td>(1) #3 Hairpin 6</td>
<td>6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>WSW24</td>
<td>19</td>
<td>(2) #3 Hairpin 8³</td>
<td>(1) #3 Hairpin 6</td>
<td>6</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1. Shear anchorage designs conform to ACI 318-14 and assume minimum 2,500 psi concrete. See pages 23–24 for tension anchorage.
2. Shear reinforcement is not required for interior foundation applications (panel installed away from edge of concrete), or braced-wall panel applications.
3. Seismic indicates Seismic Design Categories C through F. Detached one- and two-family dwellings in SDC C may use wind anchorage solutions.
4. Wind includes Seismic Design Categories A and B.
5. Where noted, minimum curb/stemwall width is 6" when standard-strength anchor bolt is used.
6. Use (1) #3 tie for WSW12 when panel design shear force exceeds tabulated anchorage allowable shear load.
7. #4 grade 40 shear reinforcement may be substituted for WSW shear anchorage solutions.
8. The registered design professional may specify alternative shear anchorage.

---

**Hairpin Installation**

*(Garage curb shown, other footing types similar)*

**Diagram**

- **Hairpin Shear Reinforcement**
  - #3 Hairpin grade 60 rebar (Min.)
  - Field tie and secure during concrete placement. Overlap varies with bolt spacing.

- **Tie Shear Reinforcement**
  - #3 Tie grade 60 rebar (Min.)
  - Field tie and secure during concrete placement.

---

*(Garage curb shown, other footing types similar)*
Anchorage Solutions

Curb or Stemwall Installation

Slab-on-Grade Installation

Brick Ledge Installation

Anchorage Solutions General Notes
1. The Designer may specify alternate embedment, footing size or bolt grade.
2. Footing dimensions and rebar requirements are for anchorage only.
Anchorage Solutions General Notes
1. The Designer may specify alternate embedment, footing size or bolt grade.
2. Footing dimensions and rebar requirements are for anchorage only.

Strong-Wall® Wood Shearwall Anchor Bolt Layout

<table>
<thead>
<tr>
<th>Wall Model</th>
<th>Distance from Center to Center of WSW-ABs S (in.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>WSW12</td>
<td>8⅛</td>
</tr>
<tr>
<td>WSW18</td>
<td>14</td>
</tr>
<tr>
<td>WSW24</td>
<td>20</td>
</tr>
</tbody>
</table>

Stemwall Extension Installation

- Minimum stemwall width per page 25.
- Shear reinforcement per page 25 when required.
- Stemwall Height = (WSW-AB le + WSW-HSR le + 2¼” - de)
- See page 22 for le dimensions.

Anchorage Graphic

WSW Plan View

Anchorage Graphic

C-L-WSW16  © 2016 SIMPSON STRONG-TIE COMPANY INC.
Anchor Reinforcement Solutions on Grade Beams

Simpson Strong-Tie now provides grade-beam anchorage solutions for the Strong-Wall® Wood Shearwall (WSW), which have been calculated to conform to ACI 318-14. Through funding from the Structural Engineers Association of Northern California, initial testing at Scientific Construction Laboratories Inc. confirmed the need to comply with ACI 318 requirements to prevent plastic hinging at anchor locations. Follow-on testing at the Simpson Strong-Tie Tyrell Gilb Research Laboratory was then used to confirm these findings and validate performance. The testing consisted of specimens with closed-tie anchor reinforcement, specimens with non-closed u-stirrups, and control specimens without anchor reinforcement. Flexural and shear reinforcement were designed to resist amplified anchorage forces and compared to test beams designed for non-amplified strength level forces. The test program has proven the performance of the anchor reinforcement details developed by Simpson Strong-Tie.

Significant Findings from Testing:

Grade-beam flexural and shear capacity is critical to anchor performance and must be designed to exceed the demands created by the attached structure. In wind load applications, this demand includes the factored demand from the Strong-Wall Wood Shearwall (WSW). In seismic applications, testing and analysis have shown that in order to achieve the anchor performance expected by ACI 318 Anchor design methodologies, the concrete member design strength needs to resist the amplified anchor design demand from ACI 318-14 Section 17.2.3.4.3 and ACI 318-11 Appendix D Section D.3.3.4.3. To help Designers achieve this, Simpson Strong-Tie recommends Designers apply the seismic design moment listed in the table below at the WSW location when evaluating the grade-beam design strength under seismic loads. The tabulated moment correlates to the lowest of the anchor-tension design limits defined in the sections listed above as they relate to each WSW model.

Closed-tie anchor reinforcement is critical to maintain the integrity of the reinforced core where the anchor is located. Testing with u-stirrups that did not include complete closed ties showed premature splitting failure of the grade beam.

Strong-Wall® Wood Shearwall Grade-Beam Anchorage Solutions

<table>
<thead>
<tr>
<th>Strong-Wall Wood Shearwall Model</th>
<th>Anchor Bolt Model No.</th>
<th>Anchor Diameter (in.)</th>
<th>Anchor Reinforcement for Wind and Seismic</th>
<th>Amplified LRFD Applied Design Seismic Moment (ft.-lb.)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Standard Strength WSW-AB</td>
<td>High Strength (HS) WSW-AB</td>
</tr>
<tr>
<td>WSW12</td>
<td>WSW-AB1</td>
<td>⅞</td>
<td>(4) #4 Closed Ties / Anchor</td>
<td>75,600</td>
</tr>
<tr>
<td>WSW18</td>
<td>WSW-AB1/4</td>
<td>⅞</td>
<td>(4) #4 Closed Ties / Wall</td>
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<tr>
<td>WSW24</td>
<td>WSW-AB1/HS</td>
<td>⅞</td>
<td>(6) #4 Closed Ties / Wall</td>
<td>44,100</td>
</tr>
</tbody>
</table>

1. Anchor reinforcement conforms to ACI 318-14 Section 17.4.2.9 and ACI 318-11 Section D.5.2.9. Full-scale testing was used to validate anchor reinforcement configuration and placement.
2. Minimum concrete compressive strength, f'_c = 2,500 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 registered design professional 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 amplified 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 318-14 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 WSW lateral load. Minimum moment shall be the lesser of the tabulated moment or the amplified LRFD design moment for seismic; (ASD design demand shear/0.7) x Ω_o x WSW wall height for grade-beam design.
7. Minimum grade-beam design moment for wind and seismic in Seismic Design Category A and B and detached one- and two-family dwellings in SDC C; (ASD design demand shear/0.6) x WSW wall 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/WSW1.1.
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 18”-wall models, and per anchor for the 24” model.
Simpson Strong-Tie has developed a reusable anchor-bolt template for common foundation types for the Strong-Wall® Wood Shearwalls. The templates help to accurately locate the newly-designed WSW-AB preassembled anchor bolts, which simplifies installation and greatly reduces the chances of voids in the concrete.

**Strong-Wall® Wood Shearwall Anchor-Bolt Templates**

<table>
<thead>
<tr>
<th>Strong-Wall Wood Shearwall Model No.</th>
<th>Width (in.)</th>
<th>Strong-Wall Wood Shearwall Template Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>WSW12</td>
<td>12½</td>
<td>Reversible, Panel Form, Brick Ledge</td>
</tr>
<tr>
<td>WSW18</td>
<td>18</td>
<td>Reversible, Panel Form, Brick Ledge</td>
</tr>
<tr>
<td>WSW24</td>
<td>24</td>
<td>Reversible, Panel Form, Brick Ledge</td>
</tr>
</tbody>
</table>

1. Templates are recommended and are required in some jurisdictions.
2. Foundation design by the Designer.

*WSW-RT templates are reversible. Use the same template for interior or exterior applications.*
Anchorage and Installation Details

Simpson Strong-Tie offers complete structural details in order to make the specification and installation easier for the Strong-Wall® Wood Shearwalls. Versions of these details are available three ways:

- **Online at strongtie.com:** Full-size 24" x 36" detail sheets may be downloaded at strongtie.com in DWG, DXF and PDF formats.
- **Call (800) 999-5099:** Full-size, printed sheets may be requested from our regional branches at no charge.
- **In this catalog:** Smaller versions are shown here for easy reference. Details are numbered to coincide with full-size sheets, although some have been left out to eliminate redundancy.

**In This Section:**
Strong-Wall® Wood Shearwall Anchorage and Installation Details
Pages 31–47
(Sheets WSW1, WSW1.1, WSW2, WSW3 and WSW4)
STRONG-WALL® WOOD SHEARWALL – TYPICAL SECTIONS

1/WSW1
## Strong-Wall® Wood Shearwalls

### Installation Details

**SIMPSON STRONG-WALL® WOOD SHEARWALL**

**SEE TABLE BELOW FOR DIMENSIONS**

### FOUNDATION PLAN VIEW

#### WSW ANCHORAGE SOLUTIONS FOR 2,500 PSI CONCRETE

<table>
<thead>
<tr>
<th>DESIGN CRITERIA</th>
<th>CONCRETE CONDITION</th>
<th>ANCHOR STRENGTH</th>
<th>WSW-AB7/8 ANCHOR BOLT</th>
<th>WSW-AB1 ANCHOR BOLT</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>ASD ALLOWABLE TENSION</td>
<td>W (in.)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(lb.)</td>
<td></td>
</tr>
<tr>
<td>SEISMIC CRACKED</td>
<td>STANDARD</td>
<td>13,900</td>
<td>27</td>
<td>9</td>
</tr>
<tr>
<td></td>
<td>STANDARD</td>
<td>13,100</td>
<td>29</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>HIGH STRENGTH</td>
<td>24,900</td>
<td>43</td>
<td>15</td>
</tr>
<tr>
<td></td>
<td>HIGH STRENGTH</td>
<td>27,100</td>
<td>46</td>
<td>16</td>
</tr>
<tr>
<td>UNCRACKED</td>
<td>STANDARD</td>
<td>12,500</td>
<td>24</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td>STANDARD</td>
<td>13,100</td>
<td>25</td>
<td>9</td>
</tr>
<tr>
<td></td>
<td>HIGH STRENGTH</td>
<td>25,300</td>
<td>38</td>
<td>13</td>
</tr>
<tr>
<td></td>
<td>HIGH STRENGTH</td>
<td>27,100</td>
<td>40</td>
<td>14</td>
</tr>
<tr>
<td>WIND CRACKED</td>
<td>STANDARD</td>
<td>5,100</td>
<td>14</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>STANDARD</td>
<td>6,700</td>
<td>20</td>
<td>7</td>
</tr>
<tr>
<td></td>
<td>STANDARD</td>
<td>13,100</td>
<td>27</td>
<td>9</td>
</tr>
<tr>
<td></td>
<td>HIGH STRENGTH</td>
<td>15,900</td>
<td>30</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>HIGH STRENGTH</td>
<td>18,400</td>
<td>33</td>
<td>11</td>
</tr>
<tr>
<td></td>
<td>HIGH STRENGTH</td>
<td>23,100</td>
<td>38</td>
<td>13</td>
</tr>
<tr>
<td></td>
<td>HIGH STRENGTH</td>
<td>27,100</td>
<td>42</td>
<td>14</td>
</tr>
<tr>
<td>UNCRACKED</td>
<td>STANDARD</td>
<td>5,000</td>
<td>12</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>STANDARD</td>
<td>9,300</td>
<td>18</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>STANDARD</td>
<td>13,100</td>
<td>23</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td>HIGH STRENGTH</td>
<td>15,200</td>
<td>25</td>
<td>9</td>
</tr>
<tr>
<td></td>
<td>HIGH STRENGTH</td>
<td>19,900</td>
<td>30</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>HIGH STRENGTH</td>
<td>24,000</td>
<td>34</td>
<td>12</td>
</tr>
<tr>
<td></td>
<td>HIGH STRENGTH</td>
<td>27,100</td>
<td>37</td>
<td>13</td>
</tr>
</tbody>
</table>

**NOTES:**
1. ANCHORAGE DESIGNS CONFORM TO ACI 318-11 APPENDIX D AND ACI 318-14 WITH NO SUPPLEMENTARY REINFORCEMENT FOR CRACKED OR UNCRACKED CONCRETE AS NOTED.
2. ANCHOR STRENGTH INDICATES REQUIRED GRADE OF WSW-AB ANCHOR BOLT. STANDARD (ASTM F1554 GRADE 36) OR HIGH STRENGTH (HS) (ASTM A449).
3. SEISMIC INDICATES SEISMIC DESIGN CATEGORY C - F. DETACHED 1 AND 2 FAMILY DWELLINGS IN SDC C MAY USE WINDanchorage solutions. SEISMIC anchorage designs conform to ACI 318-11 SECTION D.3.3.4.3 AND ACI 318-14 SECTION 17.2.3.4.3.
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 REGISTERED DESIGN PROFESSIONAL MAY SPECIFY ALTERNATE EMBEDMENT, FOOTING SIZE OR ANCHOR BOLT.
6. REFER TO 1/WSW1 FOR $d_e$. 

STRONG-WALL® WOOD SHEARWALL TENSION ANCHORAGE SCHEDULE
### WSW Anchorage Solutions for 3,000 PSI Concrete

<table>
<thead>
<tr>
<th>Design Criteria</th>
<th>Concrete Condition</th>
<th>Anchor Strength</th>
<th>WSW-AB7/8 Anchor Bolt</th>
<th>WSW-AB1 Anchor Bolt</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Anode Strength</td>
<td>ASD</td>
<td>Allowable Tension (lbs.)</td>
</tr>
<tr>
<td><strong>Seismic</strong></td>
<td>Cracked</td>
<td>Standard</td>
<td>12,300</td>
<td>26</td>
</tr>
<tr>
<td></td>
<td></td>
<td>High Strength</td>
<td>27,100</td>
<td>43</td>
</tr>
<tr>
<td></td>
<td>Uncracked</td>
<td>Standard</td>
<td>12,200</td>
<td>22</td>
</tr>
<tr>
<td></td>
<td></td>
<td>High Strength</td>
<td>27,100</td>
<td>38</td>
</tr>
<tr>
<td><strong>Wind</strong></td>
<td>Cracked</td>
<td>Standard</td>
<td>5,000</td>
<td>19</td>
</tr>
<tr>
<td></td>
<td></td>
<td>High Strength</td>
<td>15,700</td>
<td>28</td>
</tr>
<tr>
<td></td>
<td>Uncracked</td>
<td>Standard</td>
<td>5,500</td>
<td>16</td>
</tr>
<tr>
<td></td>
<td></td>
<td>High Strength</td>
<td>27,100</td>
<td>20</td>
</tr>
</tbody>
</table>

### WSW Anchorage Solutions for 4,500 PSI Concrete

<table>
<thead>
<tr>
<th>Design Criteria</th>
<th>Concrete Condition</th>
<th>Anchor Strength</th>
<th>WSW-AB7/8 Anchor Bolt</th>
<th>WSW-AB1 Anchor Bolt</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Anode Strength</td>
<td>ASD</td>
<td>Allowable Tension (lbs.)</td>
</tr>
<tr>
<td><strong>Seismic</strong></td>
<td>Cracked</td>
<td>Standard</td>
<td>12,600</td>
<td>23</td>
</tr>
<tr>
<td></td>
<td></td>
<td>High Strength</td>
<td>27,100</td>
<td>38</td>
</tr>
<tr>
<td></td>
<td>Uncracked</td>
<td>Standard</td>
<td>12,700</td>
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<tr>
<td></td>
<td></td>
<td>High Strength</td>
<td>27,100</td>
<td>34</td>
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<tr>
<td><strong>Wind</strong></td>
<td>Cracked</td>
<td>Standard</td>
<td>8,300</td>
<td>16</td>
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<tr>
<td></td>
<td></td>
<td>High Strength</td>
<td>23,600</td>
<td>32</td>
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<tr>
<td></td>
<td>Uncracked</td>
<td>Standard</td>
<td>5,400</td>
<td>16</td>
</tr>
<tr>
<td></td>
<td></td>
<td>High Strength</td>
<td>21,600</td>
<td>36</td>
</tr>
</tbody>
</table>

**Notes:**
1. Anchorage designs conform to ACI 318-11 Appendix D and ACI 318-14 with no supplementary reinforcement for cracked or uncracked concrete as noted.
2. Anchor strength indicates required grade of WSW-AB anchor bolt. Standard (ASTM F1554 Grade 36) or high strength (HS) (ASTM A449).
3. Seismic indicates seismic design category C-F. Detached 1 and 2 family dwellings in SDC C may use wind anchorage solutions. Seismic anchorage designs conform to ACI 318-11 Section D.3.3.4.3 and ACI 318-14 Section 17.2.3.4.3.
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 registered design professional may specify alternate embedment, footing size or anchor bolt.
6. Refer to 1/WSW1 for dp.
### Strong-Wall® Wood Shearwalls

#### Installation Details

**Hairpin Shear Reinforcement**

- **Field Tie and Secure During Concrete Placement:** Overlap varies with bolt spacing.
- **Anchor Bolt**

**Tie Shear Reinforcement**

- **Field Tie and Secure During Concrete Placement:**
- **Anchor Bolt**

**Hairpin Installation**

( Garage curb shown. Other footing types similar. )

**Section A-A**

REGISTERED DESIGN PROFESSIONAL IS PERMITTED TO MODIFY DETAILS FOR SPECIFIC CONDITIONS.

### Strong-Wall® Wood Shearwall Shear Anchorage Schedule and Details

#### Table:

<table>
<thead>
<tr>
<th>Model</th>
<th>L/</th>
<th>Seismic</th>
<th>Wind</th>
<th>ASD Allowable Shear Load, V (lb)</th>
</tr>
</thead>
<tbody>
<tr>
<td>WSW12</td>
<td>10½</td>
<td>#3 Hairpin</td>
<td>6</td>
<td>1035</td>
</tr>
<tr>
<td>WSW18</td>
<td>15</td>
<td>#3 Hairpin</td>
<td>6</td>
<td>1035</td>
</tr>
<tr>
<td>WSW24</td>
<td>19</td>
<td>#3 Hairpins</td>
<td>6</td>
<td>1035</td>
</tr>
</tbody>
</table>

**Notes:**

1. Shear anchorage designs conform to ACI 318-11 and ACI 318-14 and assume minimum 2,500 psi concrete.
2. Shear reinforcement is not required for 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 and detached 1 and 2 family dwellings in SDC C.
5. Where noted, minimum curb/ stemwall width is 6 inches when standard strength anchor bolt is used.
6. Use (1) #3 tie for WSW12 when panel design shear force exceeds tabulated anchorage allowable shear load.
7. #4 grade 40 shear reinforcement may be substituted for WSW shear anchorage solutions.
C-L-WSW16  © 2016 SIMPSON STRONG-TIE COMPANY INC.
WSW designed to provide \( \frac{3}{8} \)" gap between LSL at base of WSW and concrete. Ensure concrete is level and smooth beneath panel. Grind or fill as necessary.
**Garage Header Rough Opening Height**

<table>
<thead>
<tr>
<th>Model No.</th>
<th>H Curb</th>
<th>Rough Opening Height</th>
</tr>
</thead>
<tbody>
<tr>
<td>WSW12x4</td>
<td>5½&quot;</td>
<td>8&quot; - 10½&quot;</td>
</tr>
<tr>
<td>WSW16x4</td>
<td>8&quot;</td>
<td>7½&quot; - 10½&quot;</td>
</tr>
<tr>
<td>WSW12x6</td>
<td>0&quot;</td>
<td>7½&quot; - 10½&quot;</td>
</tr>
<tr>
<td>WSW16x6</td>
<td>0&quot;</td>
<td>7½&quot; - 10½&quot;</td>
</tr>
<tr>
<td>WSW12x8</td>
<td>5½&quot;</td>
<td>8&quot; - 10½&quot;</td>
</tr>
<tr>
<td>WSW16x8</td>
<td>8&quot;</td>
<td>7½&quot; - 10½&quot;</td>
</tr>
</tbody>
</table>

1. If required rough opening height exceeds table value, specify next taller panel and trim as necessary. The Strong-Wall® Wood Shearwall may be trimmed to a minimum height of 48".

2. Furring down garage header may be required for correct rough opening height.

---

**Diagram Description**

- **Garage Wall Option 1**
  - Strong-Wall® Wood Shearwall
  - Shear transfer design and details by others

- **Garage Wall Option 2**
  - Strong-Wall® Wood Shearwall
  - Rough opening height

**Alternate WSW Garage Front Options**

For garage wall option 2, registered design professional shall design and detail for:

1. Shear transfer
2. Out-of-plane loading effect
3. Increased overturning and drift due to additional height

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3/WSW2
Strong-Wall® Wood Shearwalls

Installation Details

STANDARD INSTALLATION BASE CONNECTION 4/WSW2

PLACE STRONG-WALL® WOOD SHEARWALL OVER THE ANCHOR BOLTS AND SECURE WITH WASHER AND HEX NUTS (PROVIDED), SNUG TIGHT FIT REQUIRED; DO NOT USE AN IMPACT WRENCH.
- USE 1 7/8" WRENCH FOR 3/8" NUT
- USE 1 1/8" WRENCH FOR 1" NUT

SEEN SHEETS WSW1 AND WSW1.1 FOR ANCHORAGE SOLUTIONS

PULL PLATE ANCHORAGE BY OTHERS

WOOD FLOOR SYSTEM BASE CONNECTION 5/WSW2

PLACE STRONG-WALL® WOOD SHEARWALL OVER THE ANCHOR BOLTS AND SECURE WITH WASHER AND HEX NUTS (PROVIDED), SNUG TIGHT FIT REQUIRED; DO NOT USE AN IMPACT WRENCH.
- USE 1 7/8" WRENCH FOR 3/8" NUT
- USE 1 1/8" WRENCH FOR 1" NUT

SEEN SHEETS WSW1 AND WSW1.1 FOR ANCHORAGE SOLUTIONS

STRONG-WALL® WOOD SHEARWALL HEIGHT TO INCLUDE THE DEPTH OF THE FLOOR SYSTEM AND SHALL BE INSTALLED DIRECTLY ON THE FOUNDATION, SPECIFY PANEL HEIGHT FROM TOP OF FOUNDATION TO UNDERSIDE OF TOP PLATES OR SEAM.
**Strong-Wall® Wood Shearwalls**

**Installation Details**

**STANDARD TOP CONNECTION**  
6/WSW2

**ALTERNATE TOP CONNECTION**  
7/WSW2

---

**WSW-TOW ALTERNATE CONNECTION KIT**

<table>
<thead>
<tr>
<th>MODEL NO.</th>
<th>FASTENER QUANTITY</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>SD #10 x 1 1/2&quot;</td>
</tr>
<tr>
<td>WSW-TOW12KT</td>
<td>20</td>
</tr>
<tr>
<td>WSW-TOW18KT</td>
<td>28</td>
</tr>
<tr>
<td>WSW-TOW24KT</td>
<td>40</td>
</tr>
</tbody>
</table>

*Registered Design Professional is permitted to modify details for specific conditions.*
Installation Details

REGISTERED DESIGN PROFESSIONAL IS PERMITTED TO MODIFY DETAILS FOR SPECIFIC CONDITIONS.

INSTALL SDS 3/4" x 6" SCREWS (ORDER SEPARATELY). INSTALL IN 2 ROWS AS SHOWN AND COUNTERSINK AS REQUIRED.

QTY. OF SDS 3/4" x 6" SCREWS REQ'D.

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>WSW12</td>
<td>4</td>
</tr>
<tr>
<td>WSW18</td>
<td>8</td>
</tr>
<tr>
<td>WSW24</td>
<td>12</td>
</tr>
</tbody>
</table>

EDGE DISTANCE FOR SCREWS

<table>
<thead>
<tr>
<th>SLOPE</th>
<th>A (IN.)</th>
<th>B (IN.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0:12-4:12</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>5:12-8:12</td>
<td>1 1/2</td>
<td>4 1/2</td>
</tr>
<tr>
<td>9:12-12:12</td>
<td>1/2</td>
<td>5 1/2</td>
</tr>
</tbody>
</table>

1. MAINTAIN END DISTANCES TO PREVENT SCREWS FROM PENETRATING THROUGH THE OUTER EDGES.
2. INSTALL SCREWS PERPENDICULAR TO THE TOP PLATE.
3. EDGE DISTANCES ASSUME DOUBLE TOP PLATE.

PLAN VIEW

SDS SCREW SPACING

1" MIN. FROM EDGE
1 1/2" MIN. ROW SPACING
1/2" MIN. AT EDGE
1/2" MIN. SDS TIP TO CHASE
1/8" O.C. MIN.

SECTION VIEW

2X6 OR WIDER FRAMING

INSTALLATION NOTES:

1. ACTUAL CUT LENGTH (L) MUST BE GREATER THAN OR EQUAL TO PANEL WIDTH (W).
2. THIS DETAIL APPLICABLE FOR SLOPES UP TO 12:12.
3. PANELS TALLER THAN 12' MUST BE DESIGNED FOR THE APPLICATION.
Installation Details

FOR 8" TO 12" BLOCK DEPTHS:
ATTACH SIMPSON STRONG-TIE® CS16 STRAPS AT EDGE
OF WSW PANEL (EACH SIDE) USING 10D x 1½" NAILS

SHIM BLOCK HEIGHTS GREATER THAN 8" AND UP TO 10":
• 8 NAILS INTO BLOCK
• 8 NAILS INTO WSW PANEL

SHIM BLOCK HEIGHTS GREATER THAN 10" AND UP TO 12":
• 10 NAILS INTO BLOCK
• 10 NAILS INTO WSW PANEL

INSTALL SDS ¾" x 6" SCREWS (MIN.) FROM THE TOP SIDE OF
THE PLATES PER QTY. AND
SPACING REQUIREMENTS
DETAILED IN 8/WSW2.

LTP4 SPACING
BY OTHERS

FULL-HEIGHT
ADJACENT FRAMING
BY OTHERS

4x SHIM BLOCK

SEE 6 & 7/WSW2 FOR
TOP CONNECTION

STRONG-WALL®
WOOD SHEARWALL

Cripple Shearwall,
blocking and strap
by others

FULL-HEIGHT ADJACENT
FRAMING BY OTHERS

SEE 6 &
7/WSW2
FOR TOP
CONNECTION

CRIPPLE WALL

STRONG-WALL®
WOOD SHEARWALL

4½" TO 12" SHIM BLOCK

1" TO 4" SHIM BLOCK

REGISTERED DESIGN PROFESSIONAL
IS PERMITTED TO MODIFY DETAILS
FOR SPECIFIC CONDITIONS.

REGISTERED DESIGN PROFESSIONAL SHALL DESIGN
AND DETAIL FOR:
1. SHEAR TRANSFER
2. OUT-OF-PLANE LOADING EFFECT
3. INCREASED OVERTURNING AND DRIFT DUE TO
ADDITIONAL HEIGHT
TRIM ZONES AND ALLOWABLE HOLES

EDGES
- Max. three holes in face and three in edge.
- 3/8" diameter holes, max.
- 6" O.C., min.

NO HOLES ALLOWED IN TOP 8" OF PANEL

FACE DRILL ZONE
Maintain 1 1/2" min. edge distance from chase and outside edge, typical.

NO FACE HOLES ALLOWED IN LOWER 40" OF PANEL

FACE DRILL ZONE
Center 4 1/2" of panel face as shown

ALLOWABLE SMALL HOLES
Face and edge drill zones

ALLOWABLE LARGE HOLES
In addition to allowable small holes

HOLES FOR WSW24X7 PANEL ONLY
- Max. of one 4 1/4" x 6" hole
- 8" from top of panel, min.

12" above existing hole, min.

16"

24 1/8"

HOLES
- 4 1/4" diameter holes, max.
- Max. of two 4 1/4" diameter holes or one 4 1/4" x 12" hole
- No min. on-center spacing required

NO EDGE HOLES ALLOWED IN LOWER 26" OF PANEL

C-L-WSW16 © 2016 SIMPSON STRONG-TIE COMPANY INC.
NOTES:

1. 1\textsuperscript{ST} STORY WSW MUST BE THE SAME WIDTH AS THE 2\textsuperscript{ND} STORY WSW.

2. JOIST AND SHEATHING MAY BE ATTACHED TO WSW WITH JOIST HANGER AND LEDGER, LOAD TRANSFER IS THE RESPONSIBILITY OF THE DESIGN PROFESSIONAL OF RECORD.

3. WSW MULTI-STORY KIT (MSK) INCLUDES MSK BEARING BLOCK AND MSK HOLDOWN.

LEGEND:

- \( h_1 \) = 1\textsuperscript{ST} STORY WSW HEIGHT; TOP OF CONCRETE TO Underside OF 1\textsuperscript{ST} STORY TOP PLATES (IN.)
- \( h_2 \) = TOTAL ASSEMBLY HEIGHT; TOP OF CONCRETE TO Underside OF 2\textsuperscript{ND} STORY TOP PLATES (IN.)
- \( h_3 = h_2 - h_1 \) = 2\textsuperscript{ND} STORY WSW HEIGHT; TOP OF BEARING BLOCK TO BOTTOM OF 2\textsuperscript{ND} STORY TOP PLATES (IN.)
- \( h_4 = \) TOP OF 1\textsuperscript{ST} STORY TOP PLATES TO Underside OF 2\textsuperscript{ND} STORY TOP PLATES (IN.)

REGISTERED DESIGN PROFESSIONAL IS PERMITTED TO MODIFY DETAILS FOR SPECIFIC CONDITIONS.
FOR 2X6 AND WIDER WALL FRAMING, CUT SLOTS IN TOP PLATES TO ALLOW MSK HOLDOWN TO PASS THROUGH. DO NOT NOTCH DOUBLE TOP PLATE.

PLACE 2ND STORY WSW OVER THE MSK HOLDOWN BOLT AND SECURE WITH HEX NUTS (PROVIDED), SNUG TIGHT FIT REQUIRED; DO NOT USE AN IMPACT WRENCH;
- USE 1½" WRENCH FOR ¾" NUT
- USE 1½" WRENCH FOR 1" NUT

ATTACH MSK HOLDOWN TO FIRST STORY WSW PANEL USING 10d x 2½" NAILS MIN.

2ND STORY STRONG-WALL® WOOD SHEARWALL

1ST STORY STRONG-WALL® WOOD SHEARWALL

MSK BEARING BLOCK

HEX NUT AND STRUCTURAL WASHER

SECTION
4x FRAMING: SEE 6 & 7/WSW2 FOR CONNECTION DETAILS

SECTION
6x FRAMING: SEE 7/WSW2 FOR CONNECTION DETAILS

PLAN VIEW
6x FRAMING

REGISTERED DESIGN PROFESSIONAL
IS PERMITTED TO MODIFY DETAILS
FOR SPECIFIC CONDITIONS.
Installation Details

- **TOP PLATES**
- **WSW-TOW SHEAR TRANSFER PLATE**
- **7/8" MAXIMUM WOOD SHIM. FOR SHIMS GREATER THAN 7/8", SEE 9/WSW2.**
- **2x6 MINIMUM FULL-HEIGHT STUD REQUIRED EACH SIDE FOR PANELS OVER 18 FT. TALL, ATTACH WITH 10d COMMON NAILS AT 16" O.C.**
- **SEE 10/WSW2 FOR ALLOWABLE EDGE AND FACE DRILL ZONES**
- **STRONG-WALL® WOOD SHEARWALL**
- **WSW HOLDOWN**
- **HEX NUT AND STRUCTURAL WASHER**

**WSW DESIGNED TO PROVIDE 3/8" GAP BETWEEN LSL AT BASE OF WSW AND CONCRETE. ENSURE CONCRETE IS LEVEL AND SMOOTH BENEATH PANEL. GRIND OR FILL AS NECESSARY.**

**REGISTERED DESIGN PROFESSIONAL IS PERMITTED TO MODIFY DETAILS FOR SPECIFIC CONDITIONS.**

**BALLOON FRAMING PANELS OVER 18 FT. TALL 4/WSW3**
STRONG-WALL® WOOD SHEARWALL SINGLE PORTAL ASSEMBLY 1/WSW4

ALIGN PORTAL STRAP ARROWS WITH BOTTOM OF HEADER

W 8 OR 7

ALTERNATE

OR WSW2

3/8" MAXIMUM WOOD SHIM BETWEEN PANEL AND BEAM

PORTAL STRAPS INCLUDED WITH WSW PANELS UNDER 102". FOR TALLER PANELS, ORDER WSW-PK SEPARATELY.

PORTAL STRAP EDGE DISTANCE

3/4" PORTAL STRAP EDGE DISTANCE


FIELD NAIL PORTAL STRAPS TO FRAMING AND WSW PANEL BOTH SIDES (4 TOTAL) USING 10d x 2½" NAILS MIN.

PORTAL TOP CONNECTION 3/WSW4

LOAD PATH DESIGN AND DETAILS ABOVE HEADER TO BE PROVIDED BY OTHERS.

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GARAGE HEADER ROUGH OPENING HEIGHT

<table>
<thead>
<tr>
<th>MODEL NO.</th>
<th>H CURB</th>
<th>ROUGH OPENING HEIGHT</th>
</tr>
</thead>
<tbody>
<tr>
<td>WSW2-247</td>
<td>2&quot;</td>
<td>8 1/2&quot;</td>
</tr>
<tr>
<td>WSW2-247</td>
<td>6&quot;</td>
<td>7 3/4&quot;</td>
</tr>
<tr>
<td>WSW2-367</td>
<td>6&quot;</td>
<td>6 3/8&quot;</td>
</tr>
<tr>
<td>WSW2-487</td>
<td>6&quot;</td>
<td>6 9/16&quot;</td>
</tr>
</tbody>
</table>

1. IF REQUIRED ROUGH OPENING HEIGHT EXCEEDS TABLE VALUE, SPECIFY ROD TALLER PANEL, AND TRIM AS NECESSARY. THE STRONG-WALL® WOOD SHEARWALL MAY BE TERMINATED TO A MINIMUM HEIGHT OF 102".
2. Furring down Garage Header may be required for CORRECT ROUGH OPENING HEIGHT.

REGISTERED DESIGN PROFESSIONAL IS PERMITTED TO MODIFY DETAILS FOR SPECIFIC CONDITIONS.

WSW DESIGNED TO PROVIDE 3/8" GAP BETWEEN LEVELS AT BASE OF WSW AND COMPLIANCE, accommodation for branches cross level and smooth beneath panel, ground detail as necessary.

PORTAL STRAP PLUS STRONG-WALL® WOOD SHEARWALL
Strong-Wall® Wood Shearwalls

Installation Details

FURRING FOR 3 1/8" HEADER

SECTION
STANDARD TOP CONNECTION
(FURRING BLOCK NOT REQUIRED FOR WSW12)

SECTION
ALTERNATE TOP CONNECTION
(BLOCK NOT REQUIRED)

FURRING FOR 5 1/8" TO 5 1/2" HEADER

FURRING FOR 3 1/8" HEADER

REGISTERED DESIGN PROFESSIONAL IS PERMITTED TO MODIFY DETAILS FOR SPECIFIC CONDITIONS.
Every day we work hard to earn your business, blending the talents of our people with the quality of our products and services to exceed your expectations. This is our pledge to you.

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