Re: Alternate Fasteners for Connection Details in AWC DCA6 with Simpson Strong-Tie Strong-Drive® Screws


This letter includes details of fastener connections for beam-to-post, diagonal bracing, and sistered-stair stringer connections that have been designed and analyzed for use as alternates to those included in DCA6 subject to approval by the local building department. Wet service was included in the analysis.

**Beam-to-Post Connection**

DCA6 Figure 8A details the attachment of a beam to a notched post, with two ½”-diameter through-bolts with washers as the connection to resist uplift and lateral displacement.

Simpson Strong-Tie tested beam-to-notched post assemblies fastened with Strong-Drive® Timber screws (SDWS22500DB), Timber-Hex HDG screws (SDWH27400G), and Timber stainless-steel screws (SDWS27500SS) and compared the lateral capacities to the prescriptive bolted connection. Table 1 lists the respective quantities for each Strong-Drive screw type that are equivalent to the two ½”-diameter through-bolts that are shown in DCA6 Figure 8A. Figures 1 through 4 show the screw fastening patterns at spliced and non-spliced connections.

**Table 1: Strong-Drive Screws Equivalent to DCA6 Figure 8A Prescribed Through-Bolts**

<table>
<thead>
<tr>
<th>Size Dia. x Length (in.)</th>
<th>Model No.</th>
<th>Quantity Required</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Spliced</td>
</tr>
<tr>
<td>0.220 x 5</td>
<td>SDWS22500DB</td>
<td>6 / Figure 1</td>
</tr>
<tr>
<td>0.276 x 4</td>
<td>SDWH27400G</td>
<td>6 / Figure 1</td>
</tr>
<tr>
<td>0.276 x 5</td>
<td>SDWS27500SS</td>
<td>8 / Figure 3</td>
</tr>
</tbody>
</table>

- Material: Hem-Fir minimum
- Post Size: If the post size is larger than 6x6 (nominal), substitute longer screw lengths to achieve the same penetration into the post and beam.
- SDWH27400G: Only applies to a 3x beam.

**Figure 1:** Beam-to-Notched-Post Fastened with SDWS22500DB or SDWH27400G Screws (Spliced)
**Figure 2:** Beam-to-Notched-Post Fastened with SDWS22500DB or SDWH27400G Screws (Non-Spliced)

**Figure 3:** Beam-to-Notched-Post Fastened with SDWS27500SS Screws (Spliced)

**Figure 4:** Beam-to-Notched-Post Fastened with SDWS27500SS Screws (Non-Spliced)
Diagonal Brace Connection

DCA6 Figure 10 shows the detail of fastening diagonal bracing to the deck post and beam with a ½”-diameter lag screw and washer at each end of the brace.

Simpson Strong-Tie evaluated diagonal bracing with Strong-Drive® Timber screws (SDWS22400DB), Timber-Hex HDG screws (SDWH27400G), and Timber stainless-steel screws (SDWS27400SS). The connection capacity of the Timber screws was compared to the connection capacity of prescriptive lag screws with washers. Based on the test data and engineering analysis, a direct 1:1 substitution with one SDWS22400DB or one SDWH27400G, or one SDWS27400SS can be used in lieu of prescriptive ½” lag screws with washers. See Figure 5 for details.

Sistered Stair Stringers

DCA6 Figure 28 details the typical stair stringer requirements. The typical stair system consists of three 2x12 cut/notched stringers, which support the minimum width of 36” and a stair span length maximum of 6’-0”. However, when the span is greater than 6’-0” and less than 13’-3”, the stair system does not meet the deflection requirements of L/288 (¼” deflection). To stiffen the notched stair stringer, one solution is to sister a solid (uncut/un-notched) 2x12 to the outside of the cut/notched 2x12 stringers at the ends of the stair treads. The load path is from the tread to the cut stringers and then to the solid stringers by means of screw fastening.

Simpson Strong-Tie evaluated the sistered-stringer connection, and the recommendation for sistering cut stringers to solid stringers is to use one row of SDWS22300DB or SDWS27300SS installed at 18” on-center spacing and staggered as shown in Figure 6.

The information in this letter is valid until 12/31/2020 when it will be re-evaluated by Simpson Strong-Tie. Please visit strongtie.com for additional pertinent information. If you have questions or need further assistance regarding this matter, please contact the Simpson Strong-Tie Engineering Department at (800) 999-5099.

Sincerely,

SIMPSON STRONG-TIE COMPANY INC