A. CODE REQUIREMENT

IBC Section 1911.1 requires that the capacity in tension and shear of anchor bolt cast in concrete due to seismic force shall be determined in accordance with ACI Appendix D.

ACI D.3.3.4 and D.3.3.5 require the attachment that the anchor is connecting to the structure shall be designed so that the attachment will undergo ductile yielding at a force level corresponding to anchor forces no greater than the design strength associated with concrete failure modes.

ACI D.3.3.6 allows an alternative to D.3.3.4 and D.3.3.5 if the design strength of the anchors reduces to 0.5 times of the design strength determined in accordance with D.3.3.3 for anchor of stud bearing wall.

B. INTERPRETATION

The design professional may assume that the attachment will undergo ductile yielding which complies with D.3.3.4 and D.3.3.5 for the cast-in-place anchorage of wood-frame sill plates on structural walls in light-frame construction with small edge distance. The design shear values from table 1 may be used when the following conditions are met.

- Typical cast-in-place “L-bolt,” minimum 7-inch embedment.
- Bolt diameter of nominal ½ inch or ⅝ inch.
- Standard or 3-inch square plate washer with standard nut.
- Bolts assumed to act in pure shear, loaded parallel to wood grain and free edge of concrete, min edge distance of 1.75 inches.
- Bolt corner distance minimum 8 inches.
- Preservative-treated wood sill plate (2x4, 2x6, 3x4, 3x6, etc.).
- Foundation minimum $f'_c=2500$ psi, conventional or pre-stressed concrete.

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<th>Sill Plate</th>
<th>⅛”</th>
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<tr>
<td>2x</td>
<td>1040</td>
<td>1488</td>
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<tr>
<td>3x</td>
<td>1232</td>
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1. Values are shown in lbs. (ASD basis)
2. The values are shown for seismic; no additional increase in value is allowed.

For other conditions, the shear value shall be determined in accordance with ACI appendix D and NDS 11.3.
C. RATIONALE

Based upon the SEAOC Report on Laboratory Testing of Anchor Bolts Connecting Wood Sill Plates to Concrete with Minimum Edge Distances, the connection will yield at the wood sill plate prior to the formation of a concrete limit state when loaded parallel to a concrete edge. In other words, the strength of the concrete exceeds the strength of the wood.

Related Policies and Procedures - BP-CI-039 Sill Anchorage – Plate Washers

Revision History:

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Approved by: Ronald L. Lynn, Director

Concurred by: Gregory J. Franklin, Assistant Director