

# FROM EXPERIENCE



STRUCTURAL ENGINEERS ASSOCIATION OF SOUTHERN CALIFORNIA

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## ANCHOR BOLT HOLE OVERSIZING IN SILL PLATES

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In designing the number of anchor bolts required to transfer lateral loads from a sill plate to the foundation, engineers typically use the values given in the Uniform Building Code under Table 25-F. This table provides allowable load values for the bolt bearing on the surface of the wood.

It has come to our attention that builders generally will oversize the bolt holes in the sill plates by as much as 1/2". The reason they do this is that they typically fabricate the stud wall on the ground and lift it in place. It is much easier to slip the anchor bolts through the bolt holes if they are oversized, particularly since standard bolt placement practice is to sink them by hand into the wet concrete, causing many of them to end up vertically skewed. In addition, an oversized bolt hole allows the opportunity to forcefully straighten a wall line in cases where the sill plates are not perfectly straight.

Contractors will generally place a washer and nut over the bolt and "cinch down" the sill plate to the concrete. They do this in the mistaken belief that the sill plate transfers lateral load to the foundation by means of friction between the wood and concrete surfaces. In the process, they sometimes crush the washer into the sides of the oversized holes. Building Department Field Inspectors will generally allow the practice of bolt oversizing, although sometimes they will require the Contractor to provide double washers in the misguided belief that this somehow corrects the situation caused by the crushing of the washer into the sides of the bolt hole.

The Uniform Building Code contains no provisions for the specific sizing of bolt holes in sill plates. The Standards only address the general situation of standard wood bolted connections; it requires the bolt size to be a maximum of 1/16" larger than the diameter of the bolt.

The situation, then, is like this: we are designing structural elements using values from the Uniform Building Code that have no relation to what is truly being built in the real world.

There have been only two ways that we have found to comply with the Uniform Building Code once the problem occurs in the field. One is to substitute anchor bolts with drilled wedge anchors. The other is to allow and encourage oversizing of the bolt holes, but to require the Contractor to fill the space around the anchor bolt with a quick-setting, shrinkage resistant drypacking product. Neither of these solutions is popular with builders, who insist on doing "what is standard in the industry" rather than what is required by the Code.

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