The joints between panels were taped and finished with joint compound.

The ultimate shear capacities for the tested walls are given in Table 7. Each ultimate shear value is the average of two shear wall tests.

As could be expected, the shear wall with fasteners spaced 16" o.c. had an ultimate capacity significantly less than the 200 plf used by the IRC for interior finishes. The shear walls with fasteners spaced 8" o.c. had an ultimate capacity somewhat greater than the 200 plf NUSC used for Method GB. Also, the shear walls with fasteners spaced 4" o.c. at panel edges had an ultimate capacity that was significantly greater than the 285 plf (200 plf/0.7 = 285 plf) NUSC allowed in the IRC for Method GB with this fastening pattern.

By comparing the number of fasteners in each 4' x 8' gypsum board panel for the different fastening patterns and stud spacings to the ultimate shear capacity, SBCRI’s customer used generally accepted engineering to determine that the shear strength is a function of the number of fasteners. As shown in Figure 2, there is a linear relationship between the number of fasteners in a shear wall and its shear capacity.

**Conclusion**

As can be seen above, the IRC and SDPWS in combination lead to a great deal of confusion over the NUSC for shear walls that use the GWB capacity addition of 200 plf. With current field applications of GWB, it should be clear the expected shear resistance capacity of a typical exterior sheathed wall with an interior GWB applied does not meet the capacity expected by the IRC or SDPWS. In order to do so, galvanized roofing nails or Type W or S screws per Table R602.3(1)11 must be used.

SBCRI’s proprietary customer wanted to know what the typical GWB application was in the field and did the research needed to set a good typical installation foundation. In all the work that this proprietary customer undertakes, the baseline shear wall testing performed uses a 16:16 screw fastening pattern. The reason this is done is so that design values used in the market are accurate from a generally accepted engineering practice point of view. Further, more accurate and reliable engineered design can be performed along with a solid understanding of the engineering boundary conditions that may lead to unintended performance consequences in the field.

Given all of this, and since GWB is included as part of the wall bracing design, even when used only as an interior finish, it is important to verify that it is installed properly per the construction documents, the building code or SDPWS.

Interior finishes should be installed in accordance with IRC Table R702.3.5. Walls that are used as braced wall lines with Method GB bracing should be installed in accordance with Table R602.3(1). Research conducted by SBCRI shows that the fastening pattern is critical to providing adequate bracing.

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