BY MICHAEL GARDNER

How Big is a 2x4?

For many decades, consensus wallboard application standards have mandated that the surface for the attachment of wallboard be at least "1½ inches wide for wood members." A similar but slightly narrower dimension has historically been specified for the attachment surface for metal studs.

The primary reasons for establishing minimum framing member attachment surface dimensions are reasonably obvious. Using studs that are too narrow tends to create situations where the fasteners used to install the wallboard are not properly seated in the framing member. In addition, narrow studs create the potential for board edge damage when an applicator tries to compensate for a slender stud by installing a fastener immediately on the edge of the board.

Application standards, such as GA-216, *Application and Finishing of Gypsum Panel Products*, mandate that fasteners must be installed at least 3/8ths of an inch from the edge or end of a board. When wood studs with the proper dimension are used, the fasteners can be centered between the edge of the stud and the edge of the wallboard, thus preventing the board edges from being crushed. Their use also permits placement of the shank of the nail or screw in the meat of the stud.

A less obvious reason for the prescriptive dimension for wood framing members relates to the shrinkage characteristic of lumber. Lumber is sized by two different methods. Nominal lumber dimensions apply to "wet" or "green" lumber; material that has not been dried or finish cut. Actual lumber dimensions are used to define the size of a dried and cut member. Because lumber shrinks, a stick of actual-sized lumber is narrower in each dimension than a stick of nominal lumber. A nominal 2x4, for example, is 1½ by 3 ½ inches in actual dimension.

PROBLEMS WITH GREEN LUMBER

Prior to 1961, some consensus standards permitted producers to sell lumber that was sized and graded wet and sold dry. In such an environment, a lumber producer could cut green lumber to a nominal size, grade it and sell it based on its wet dimensions. Because varieties of wood shrink at different rates, this created all types of problems for consumers and builders. Frustrated by such activities, the gypsum industry established minimum attachment surface requirements. In their eyes, it didn't matter what the dimensions of the wet stud were, what mattered were the dimensions of the dry stud. The stud had to be correctly dimensioned to support the attachment of the wallboard.

In 1961, according to the "History of Yard Lumber Size Standards" (1964, U.S. Forest Products Laboratory), a lumber industry Committee on Grade Simplification and Standardization decreed that the standard dry thickness of 2-inch dimensional lumber "be reduced from 1⅝- to 1½-inches." After that date, all lumber was to be sized and graded based on its standard dry (actual) dimensions.

I can attest to this size difference. About 12 years ago, I demol-

ished a portion of a bearing wall in my home. The studs I removed from the wall were beautiful. They were straight like arrows with perfect, knife-like edges. I could have used one to filet a trout. What really caught me, however, were the finished dimensions of the studs. They were at least an eighth of an inch wider and deeper than anything I could obtain from a local retailer.

When I investigated the issue I discovered the 1961 industry agreement. On the basis of that agreement and because my house was built in 1960, it made sense that the studs used in its construction were wider than those sold today.

What I couldn't figure out, however, was why they were more than 3½ inches deep. I originally thought it was because they were specifically hand-cut for use in a bearing wall. However, after closer examination, I found production grading stamps on some of the studs and some subsequent planned demolition in a different part of the house exposed identical studs in non-structural walls. In addition, I've never been able to find any reference to a 1950s-era discussion about a change in the greater dimension of studs. My ultimate conclusion? The deeper dimension related to the kind of wood used to make the studs and their primary use in bearing walls. For structural reasons the studs needed to be a bit deeper than they are now and the builder wisely bought only one size of stud for the entire project to avoid putting the wrong stud in the wrong wall.

Wallboard application standards, as noted above, also incorporate minimum dimensions for the application surface of metal and gypsum framing members. Interestingly, skinny metal studs must have been vogue in the 1960s because the 1965 edition of a predecessor document to GA-216 mandated only a 3/4-inch attachment surface for wallboard applied to metal framing members. That dimension has increased to 1¼ inch, which is identical to the minimum flange width prescribed in the manufacturing standard for nonstructural metal studs, ASTM C 645. Structural studs manufactured to ASTM C 955 are subject to the same requirement.

GYPSUM STUDS

Gypsum studs, rare as they might be, require a 6 inch-wide attachment surface. Gypsum studs are generally field fabricated using cut pieces of wallboard that are laminated together with adhesive or joint compound. The wider dimension provides an adequate surface for adhesive bonding. The 6 inch minimum also helps compensate for potential irregularities in the dimensions of a field-fabricated item.

Even rarer than gypsum studs are plastic or fiberglass studs. Used primarily in institutional construction, they seem to attempt a comeback every decade or so. Because of their limited use to date, wallboard application standards don't contain minimum application surface dimensional requirements.

The requirements contained in wallboard application standards help prevent substandard installations through the establishment of common minimum thresholds. In the instance of bearing surface requirements, the minimum language helps assure that an applicator will have an adequate surface for the installation of the fasteners or adhesive used in the application process. Because the drywall application requirements dovetail with the manufacturing and production requirements for steel and wood studs, compliance for an applicator is rarely a problem. However, damaged or poor quality studs do occasionally make their way to a jobsite. Installed framing members that are not of proper quality should be identified, removed and replaced prior to the application of wallboard. **W&C**

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