LETTERS

Brick Veneer Concerns

To the Editor:

Authors Cowie and Wilson clearly illustrate the results of improper design and construction of brick veneer backed by steel studs ("Brick Veneer and Steel Studs: Performance Questions," 4/91). The problems they document are, perhaps, exacerbated by the severe climate exposure in the Maritime Provinces of Canada. However, such occurrences are not new to the Brick Institute of America. We have been concerned about this construction system since it was introduced and we are not alone in this concern.

Brick veneer and steel studs may not be the best wall system available, but other factors often lead to its use. Our literature, referenced by the authors, is an attempt to improve the performance of this wall system. We feel we should supply appropriate guidance since the brick veneer/steel stud wall will be chosen by some owners and designers. An understanding of the performance and limits of the system is essential in making that choice.

As Cowie and Wilson indicate, there has been considerable research into the performance of brick veneer with steel stud backing. As the industry learns more, the recommendations from the Brick Institute on the use of this system will be modified. Many of the suggested changes will make the wall system more expensive, but will improve its performance. Included are:

- use of an air-barrier on the outside of the sheathing;
- crack control joints, closed with sealants to reduce water penetration;
- stiffer stud system to limit cracking.

Proper construction will still be necessary for proper performance.

J. Gregg Borchelt, P.E.
Brick Institute of America
Reston, Va.

Stiff Floor Calculations

To the Editor:

The article "Taking the Bounce Out of Floors and Beams" (4/91) contains a paragraph that implies that wood has a higher safety factor than steel. This might lead to misuse of wood products if not clearly understood.

The bending strength, quoted as 6,000 to 9,000 psi for spruce, is the average breaking strength of small, clear, straight-grained test specimens. We don't build much with little pieces of this quality. When the effects of knots, slope of grain, and all the other things that effect the strength of wood are taken into account, the factor of safety of the lower-strength pieces is in the range of one to two, probably closer to one.

To leave the reader with an impression that there is a true factor of safety of five on any real structural wood member only encourages the misuse of a fine engineering material.

Paul T. Nicholas, P.E.
Trus Joist Corporation
Englewood, Colo.

To the Editor:

I agree with Mr. Hyman ("Taking the Bounce Out of Floors & Beams," 4/91) that bouncy floors can be a major annoyance with homeowners. It's a problem that is noticed every time they walk across the floor. It's also a problem that is very difficult for a builder to fix after the fact. However, there are a few points of the article that need clarification.

The Uniform Building Code (UBC), which is used on the West Coast, limits the maximum allowable deflection of structural members to *l* /360 of the "applied live load." The American Institute of Timber Construction…recommends limiting deflections to *l* /480 for floor joists and girders where increased stiffness is desired.

The author's method of using 100 psf for sizing floor joists has the same effect as limiting deflection to *l* /875 at code-prescribed loads. This yields a very stiff floor indeed (almost 2.5 times the code minimum), and I'll bet no homeowner will ever complain about bouncy floors!

Also, the table for multiple joists used as a girder has several problems. First, the load spans listed appear to be twice as wide as they should be. Secondly, the table only applies to one grade and species of lumber, which is not listed. And third, at 100 psf total load and a large tributary width, the girder span may be controlled by shear stress, which needs to be checked in addition to bending and deflection.

David Gardner, P.E.
Anchorage, Alaska

Harris Hyman Responds:

Mr. Gardner raises several points:

(1) The girder table uses an E = 1,300,000 psi, useful for either hem-fir or spruce-pine-fir, which are common framing materials. Despite the specs, the reality is that most contractors buy whatever is available at the yards and most architects accept it.

(2) The girder table considers only deflection as the controlling variable, with the "excessive" live load of 100 psf. For bending and shear, the code load of 40 psf should be used. This apparent inconsistency may make some uncomfortable, but it is an effective design strategy.

(3) Forty or 50 or even 100 psf is hardly a realistic "applied live load." More true-to-life is a 250-pound load (a large person) dropped from 0 inches (as when the person stands up), 1 inch, or 2 inches (as when the person takes a step). Applying these impact loads to a properly blocked 2x12 joist system spanning 15 feet (blocking would cause loads to be shared over three joists) would give equivalent distributed loadings of 89 psf, 337 psf, or 435 psf, and would cause bending in the floor of 0.10 inch, 0.36 inch, or 0.49 inch — i.e., deflections of l /1,800, l /500, or l /367. This physical reality suggests that a deflection of l /875 under code loadings is neither far-fetched nor extremely stiff. Granted, these calculations take a lot of work and I do not know of convenient tables. Code calculations are a lot easier, but don't satisfactorily address design for deflection.

As for the point that Mr. Nicholas raises: If every one of the boards from the bundles of lumber I've seen over the past few years was used for framing, the low safety factor asserted by Mr. Nicholas would be reasonable. However, most responsible contractors do a fair amount of culling of the twisted and really knotty garbage. Further, with little scientific control, I've had students load clean 8-foot 2x4s to destruction; most required stresses of 4,000 psi to 8,000 psi. A final argument for a relatively high safety factor is the exceptionally low incidence of fracture failure of wood frame structures. Over 20 years I've never seen one in a new building, with most problems being deflection-related. This is, of course, my personal speculation. The raw data from the In-Grade testing program (see "New Numbers for Dimensional Lumber," 7/91) could provide some solid evidence to show us where we are.

Overall, we should never forget that there are at least three design criteria: code, conventional practice, and physical reality. They occasionally differ and conflict. To defy code brings potential lawsuits, to defy conventional practice brings headaches for the contractors, and to defy physical reality brings the real perils: bad design and building failure.

Design Is Natural Part of Craft

To the Editor:

In reference to the letter headed "Warning to Non-Licensed Designers" (Letters, 1/91): I'd like to know where, besides Maine, the practice [of design without a license] is illegal. Beyond knowing what the law is in various states, I'd like to hear the voices of others on whether the law is right where it prevents builders and carpenters from exercising a traditional aspect of their craft and business.

Since the invention of the architecture profession in the mid-19th century, that profession has tried to claim the area of design as its exclusive territory.

In practice, there are very few remodeling projects so simple as to not need the exercise of some design intelligence. A remodeler takes on the design work as part of getting the project built. If all work needing design were referred to accredited architects as the only responsible professionals, the cost to consumers as well as the cost, both economic and creative, to the unaccredited would be immense.

Brent Harold
Homestead Designers & Builders
Hartford, Conn.

Editor's Note: *Designing buildings without an architectural license is illegal or highly restricted in several states. For a listing of these states and a full discussion of design/build regulations, see "The Perils of Design/Build," in our May 1991 issue.*

Keep'em coming…We welcome letters, but they must be signed and include the writer's address. *The Journal of Light Construction* reserves the right to edit for grammar, length, and clarity. Mail letters to *JLC*, RR#2, Box 146, Richmond, VT 05477.