

# Wood Engineering

Wood Structural Design Data, NFPA (National Forest Products Assn.), 1250 Connecticut Ave., NW, Washington, DC 20036, 1978. 240 pages, \$20.

by Paul Hanke



Wood is becoming an almost unrecognizable product. The contemporary builder is faced with a plethora of "reconstituted" sheets, I-beams, and glulams—all stronger than the original lumber, and making more efficient use of trees that are declining in size and quality.

Each of these products has its own special characteristics, applications, and span ratings, and every year they find a wider share of the market. For those purists—or Neanderthals—among us who still use "real wood," *Wood Structural Design Data* is an essential reference. It will tell you the span capabilities of a remarkable range of timber sizes. (Although some of the pieces, such as 4x14s, are virtually unavailable.) Nonetheless, this book can save you the cost of an occasional engineer—or considerable time with a calculator—for many sizing questions.

Most of the book consists of safe-span tables for spans from 4 to 32 feet, and lumber sizes from the humble 2x4 to an incredible 24x24. All you need to know is the total load, or the load per running foot: the appropriate table will tell you

what size stick you need for various fiber-stress-in-bending, modulus-of-elasticity, and shear ratings.

Suppose you want to design a carrying beam to support a 4,800-pound load over an eight-foot span. Looking at the table, you find that a 3x12 with a fiber-stress-in-bending rating of 900 psi will safely support only 3,955 pounds. Your choices, then, are to reduce the span, go to a stronger species, or go to a 4x12, which will handle up to 5,537 pounds. The final step is to check the induced shear, all of which would probably take less time than it took me to write this.

For those who want a firmer grasp of the engineering principles, the first 60 pages provide a primer on the physical and mechanical properties of wood. This section also covers the structural analysis of simple beams, cantilevers, and other static loads, and the design of wood columns, plank floors, and joists. The only limitation is that built-up beams are not listed, so you have to go by the next larger whole size.

I use my dog-eared copy all the time, and I expect that you might, too. ■

## Specs & Spans

Span Tables for Joists and Rafters, \$10, and Design Values for Wood Construction, NFPA (National 1250 Connecticut Ave., NW, Washington, DC 20036, \$5.

*Span Tables* is another standard reference that I use all the time for sizing joists and rafters.

Included are floor joists (20, 30, and 40 psf live load), ceiling joists, and flat or sloped rafters, plus two-span floor joists. To find out what size joist will span 11'5" with a 50 psf total load, simply turn to page four. Look down the modulus-of-elasticity column where  $E=1.0$ , and you'll find that 2x8s at 13.7 inches

on center (actually a modular spacing) will span 11'7" at a fiber-stress rating of 870 psi. Or you could go to 2x10s at 24 inches o.c. at a higher fiber-stress value. Very simple. Very handy.

*Design Values* gives you the fiber-stress, elasticity, shear, and compressive-strength ratings for visually graded softwoods that you need in order to use either *Span Tables* or *Wood Structural Design Data*. ■

Performance Rated Panels: An American Plywood Association Product Guide, APA, P.O. Box 11700, Tacoma, WA 98411, 1981. 11 pages, single copies free.

Do you know what "Exposure 1" on plywood grade stamps means? Will such panels endure: a) nuclear attack, b) an occasional wetting by rain, or c) long construction delays in protected applications? What's the difference between Exposure 1 and Exposure 2? What distinguishes

plywood, composite board, waferboard, OSB, and particleboard from each other? What is the recommended edge clearance between APA-rated panels? This brief leaflet from the APA will answer these and other basic questions on the current species of panel products, and bring you up to speed on the subject. ■

APA Design/Construction Guide: Residential & Commercial, APA, P.O. Box 11700, Tacoma, WA 98411. 54 pages, single copies free.

This booklet provides a more extensive look at APA-rated panels than the above leaflet. Included are specs for structural and decorative panels, underlayment, HDO, MDO, and marine grades; 39 pages of detail drawings, span tables and nailing schedules for floor, wall, roof, soffit, and stair-tread applications; finishing

and insulation guidelines; and heavy-timber and metal framing applications. In short, virtually everything a panel specifier or user could want to know, all in an attractive glossy format with color photos and clear illustrations. What more could you want? And the price is right, too. ■