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"Shear Design Values for Lumber" by John "Buddy" Showalter, P.E.

Shear design values for lumber were recently revised and approved by the American Lumber Standard Committee, in accordance with changes to ASTM Standard D 245, Establishing Structural Grades and Related Allowable Properties for Visually Graded Lumber. These new lumber shear design values are higher than earlier assigned values (see Tables 1-3).

Design provisions, including requirements for shear design of lumber, are published by the American Forest & Paper Association (AF&PA) in the National Design Specification® for Wood Construction (NDS®), an ANSI national consensus standard. NDS shear provisions are being revised in the next edition of the NDS in order to utilize new lumber shear design values. However, until revision of the NDS has been completed, 1997 NDS design provisions are only to be used with design values in the 1997 NDS Supplement: Design Values for Wood Construction, or similar values.

Until appropriate revisions to the NDS can be fully implemented, the AF&PA recommends the following as guidance when using new shear design values with the 1997 or earlier editions of the NDS:

Horizontal Shear Design Values for Visually Graded Dimension Lumber (2" to 4" Thick by 2" and Wider) FOR ALL GRADES	
Species	Horizontal Shear "Fv"
Douglas Fir-Larch	180
Douglas Fir-South	180
Hem Fir	150
Southern Pine	175
Spruce-Pine-Fir (South)	135
Spruce-Pine-Fir	135
Western Woods	135

Table 1.

Horizontal Shear Design Values for Visually Graded Timbers (5"x5" and larger) FOR ALL GRADES	
Species	Horizontal Shear "Fv"
Douglas Fir-Larch	170
Douglas Fir-South	165
Hem Fir	140
Southern Pine	165
Spruce-Pine-Fir (South)	125
Spruce-Pine-Fir	125
Western Woods	125

Table 2.

- The shear stress adjustment factor, CH, for splits, checks and shakes does not apply to the new shear design values.
- Tension-side notching equations (3.4-3, 3.4-4, 3.4-6, & 3.4-7) are only to be applied with 1997 NDS Supplement design values. These equations are being revised to permit the use of higher lumber shear design values. Until these design provisions are approved, tension-side notches should be designed using existing 1997 NDS design procedures and 1997 NDS Supplement design values.
- Provisions in 3.4.5 on shear design for bending members at connections are only to be applied with 1997 NDS Supplement design values. These provisions are being revised to permit the use of higher lumber shear design values. Until these design provisions are approved, shear design for bending members at connections should be in accordance with existing 1997 NDS design procedures and 1997 NDS Supplement design values.
- Alternate design procedures in 4.4.2 do not apply to new shear design values.

Horizontal Shear Design Values for Mechanically Graded Dimension Lumber FOR ALL STRESS LEVELS ¹	
Species	Horizontal Shear "Fv"
Douglas Fir-Larch	180
Douglas Fir-South	180
Hem Fir	150
Southern Pine	175
Spruce-Pine-Fir (South)	135
Spruce-Pine-Fir	135
Western Woods	135

¹A change was also made to the formula used to determine horizontal shear design values for mechanically graded dimension lumber. When a grade is qualified by test and controlled for specific gravity (G), the horizontal shear design value may be calculated from the following formula:

$$F_v = 40 + (266 \times G)$$

Note: Round assigned values to the nearest 5-psi.

Table 3.

For more information on the new shear design values for lumber, contact the AF&PA's American Wood Council (AWC) at 202/463-4713.

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