Board of Review

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VIA E-MAIL

TO: ALSC MEMBERS & ALTERNATES & OTHER INTERESTED PARTIES

FROM: THOMAS D. SEARLES

DATE: NOVEMBER 9, 2010

SUBJ: LUMBER DESIGN VALUES FOR VISUALLY GRADED STRUCTURAL LUMBER

Attached is a release requested by the Board of Review that explains how design values are derived and how they are to be used.

TDS:tw

Attachment

Lumber Design Values for Visually Graded Structural Lumber

What design engineers need to know

Current lumber design values for National Grading Rule visually graded lumber have provided satisfactory performance in construction of homes and other structural applications for many years. These design values were derived in accordance with rules written by lumber grading agencies, using consensus ASTM standards, and found appropriate by the U.S. Department of Commerce's National Institute of Standards and Technology, with the advice and counsel of the U.S. Department of Agriculture's Forest Products Laboratory. As the final part of the process, the procedures of the American Lumber Standard Committee's Board of Review provide for an open and transparent review and approval of these lumber design values.

There have been some recent reports that some pieces of lumber, when tested, have shown lower design values than those ascribed to them by the rules-writing agencies and approved by the Board of Review. Although specific test data has not been provided, a variety of steps are being taken to investigate this situation. In the meantime, it is important that design professionals have a full understanding of the nature and application of these design values.

Design values are assigned to six basic properties of visually graded lumber. Values for major strength properties such as bending, tension, and compression parallel to grain, and for stiffness are based on data from destructive testing of samples of commercially produced structural lumber. These samples are representative of the entire growth region of the species or species group population. This data, when processed following the ASTM standards, results in a "global characteristic value", which is a statistical estimate of the overall population. These values are used in designing light-frame construction. Design values provide guidance for designers to calculate the performance of a structural system.

Values for minor strength properties (shear and compression perpendicular-to-grain) are based on published clear wood properties of the species or species group. The ASTM standards provide for development of stiffness and compression stress perpendicular to grain design values that are the expected means for the grade listed. Each estimated mean value has

variability associated with it. Under the ASTM standards, the other properties are determined at a “near minimum” value that accounts for most but not all of the variability – it reflects a global characteristic value exceeded by the strength levels of 95% of the pieces with 75% statistical confidence for the population. These characteristic values are then reduced by a uniform safety factor to produce design values. It should be noted that this reference value is not an absolute minimum value. It is understood that given the inherent variability in the specific natural resource, any given sample may vary to some extent from this global value.

Structural products fabricated using lumber, such as metal plate connected wood trusses, wood I-joists, and structural glued laminated beams may require additional information on the lumber components of the system in order to assure adequate performance of the system. A design professional may decide that reducing the near minimum value level on an ongoing basis may be appropriate. If so, additional requirements of the lumber components may be specified.

In summary, the assigned softwood lumber design values developed by the rules writing agencies and approved by the Board of Review of the American Lumber Standard Committee are based on sampling and testing programs that were designed to represent species groups sampled over an entire growing region. These design values, when properly applied, have been found to give satisfactory results for construction applications when proper design and construction practices are used. For special structural applications and products, additional performance requirements may be appropriate.