



Structural Building Components Association

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Structural Building Components Industry Truss and Component Raw Material and Construction Products Design Properties Policy

Approved by the Board of Directors on August 1, 2013

Raw Material and Construction Product Purchasers, Resellers and Users Depend on Design Properties in the Raw Materials and Construction Products to be Accurate and Reliable.

Resistance of load by the structural framework of any building and its assumed factor of safety are predicated on accurate and reliable raw material and construction products fundamental design values, application factors and related engineering properties ("Design Properties"). These Design Properties are in turn used in span tables, lateral resistance tables, connection resistances, and engineering equations utilized through engineering software and otherwise.

Truss and component manufacturers currently purchase billions of board feet of lumber and wood construction products each year. When a manufacturer purchases lumber for use in the manufacture of trusses and components, it is effectively purchasing and relying upon the published lumber Design Properties. This means a purchase of Southern Pine No. 2 grade 2x4 is essentially a purchase of 1050 psi of fiber in bending in addition to other published lumber strength properties (see *Supplement No. 9 to the Southern Pine Inspection Bureau 2002 Grading Rules Effective June 1, 2012*). The same concept holds true for framers, carpenters, builders and other users of lumber who purchase and use lumber to resist loads through traditional building code adopted span tables, which span tables are based on published lumber Design Properties. Therefore, all lumber purchasers and users are purchasing and using lumber for its load resisting Design Properties and depend on the Design Properties to be accurate.

These concepts likewise apply to the purchase and use of other wood construction products that are regularly re-sold by truss and component manufacturers (such as OSB, plywood, LVL, PSL, glulam, and I-joists) as well as with the metal connector plates that are used in the manufacture of trusses and hardware and fasteners that are re-sold by truss and component manufacturers. The Design Properties for such wood and other construction products, through the utilization of engineering software or otherwise, must be accurate and the users of such products are relying on the published Design Properties.

Regular Testing and Analysis of Construction Raw Materials and Construction Products is a Necessity.

Truss and component designs are supported by historical testing and analysis. Likewise, testing of all types of lumber species and grades regularly occurs and ensures that the published Design Properties in the lumber being utilized in the manufacture of trusses and components (and upon which truss and component design software is based) and otherwise in all construction, continue to be accurate. Similarly, the design properties published for OSB, plywood, LVL, PSL, glulam, hardware and other wood and miscellaneous construction products must be accurate as they are input into engineering software programs where the output is expected to represent the safe resistance of all applied loads. Therefore, these types of construction products should be tested regularly as well.

SBCA Councils



Partnering with SBCRI for confidential research and testing.

Where any design is not supported through the use of accurate Design Properties or by engineering mechanics based Design Properties development testing, but rather is deemed to comply based on an industry or committee "judgment" or because the design is prescribed by the building code through tradition and the code consensus process, the load resistance analysis that is provided in the end-use application is neither accurate nor reliable. This view, that because the historical or code based performance has been acceptable and there is therefore no need to otherwise verify through testing and analysis, is simply flawed.

This in fact is the case with certain building code adopted wood product prescriptive applications. If prescriptive designs for these wood and other products are only supported by historical reference and cannot be supported by clear and understandable engineered design or testing, they must be replaced with designs that are in fact supported by transparent and recurring testing and analysis. This fact not only has life safety ramifications, but furthermore potentially places the trusses and components manufactured by SBCA member companies in a non-competitive technical and marketplace position, as their product designs are based on current Design Properties and are otherwise supported by testing and analysis. It is therefore in the best interests of both the construction industry at large, as well as the truss and component manufacturing industry in particular, that engineering and thus construction, be entirely based on tested and accurate raw material load resistance data. This will not only improve construction performance that is based on engineering and is therefore safe, but will further allow for future engineering innovation.

As the use of engineering software becomes more sophisticated and accounts for flow of loads from one structural element to the next and full structure systems effects, the engineering reliability demands on the raw materials and wood or other products that are utilized will certainly increase. By way of example the International Building Code ("IBC"), which becomes law when adopted by a jurisdiction, states the following:

"IBC Chapter 16, Section 1604.4 Load effects on structural members and their connections shall be determined by methods of structural analysis that take into account equilibrium, general stability, geometric compatibility and both short- and long-term material properties.

Members that tend to accumulate residual deformations under repeated service loads shall have included in their analysis the added eccentricities expected to occur during their service life.

Any system or method of construction to be used shall be based on a rational analysis in accordance with well-established principles of mechanics. Such analysis shall result in a system that provides a complete load path capable of transferring loads from their point of origin to the load-resisting elements."

Reliable and safe building performance is predicated upon accurate Design Properties, engineering precision and a complete understanding of raw material engineering considerations needed for successful application or installation. The suppliers of these products are responsible to ensure that there is easy access to this understanding along with any relevant factors that should be considered in that design process. It is furthermore the responsibility of building officials to review and ensure all designs comprehensively comply with the latest published Design Properties that are based on testing and generally accepted engineering practice.

Utilization of Published Design Properties.

When new Design Properties for lumber are published, they become the current standard or "state of the art" and must be adopted and utilized upon the published effective date by all manufacturers, sellers, specifiers, purchasers and users of such lumber. When Design Properties for wood and other construction products (such as OSB, plywood, LVL, PSL, glulam, metal connector plates, hardware, and fasteners) are likewise published,

they also become the current standard or state of the art and must be adopted and utilized upon the published date by all manufacturers, sellers, specifiers, purchasers and users of such products. Building officials should furthermore monitor and require such utilization.

For example when SPIB issued its *Supplement No. 9* setting forth new design values effective June 1, 2012 for visually graded Southern Pine and Mixed Southern Pine (sized 2" to 4" wide and 2" to 4" thick in No.2 Dense and lower grades), all designs (truss or otherwise) that utilized such Southern Pine grades after June 1, 2012 must have used the new lower Design Properties to be compliant with current standard or the state of the art. Any truss design that utilized the previously published lumber Design Properties prior to June 1, 2012 was compliant and conforming to the then current standard or state of the art. The only exception to the use of the published new lumber Design Properties after June 1, 2012 would be with the consent of the building engineer of record and assurances of no responsibility on the part of the person or entity undertaking such design, as the engineer of record is otherwise intimately aware of the design of the structure of the building and the margins of safety that exist with respect to such building design.

Irrespective of whether a building official chooses to enforce the June 1, 2012 published lumber Design Properties in a particular jurisdiction, if a lumber purchaser or user relies on an outdated lumber span table that was based on lumber Design Properties that existed prior to the June 1, 2012 new published Design Properties, subjects that purchaser of the lumber, the Contractor and the Owner to potential legal responsibility as each are not utilizing the current standard or state of the art.

It would furthermore be an error for a lumber purchaser or user to rely on a specific Building Code reference that studs be of a "minimum No. 3, standard or stud grade lumber" irrespective of the change in lumber Design Properties for No. 3 Southern Pine that resulted in a decrease in compression and bending strength of ___% as of June 1, 2012 because of the SPIB published *Supplement No. 9*. It is difficult to understand how a prudent lumber purchaser or user could rely upon the Building Code reference to a grade mark and ignore the same lumber's new Design Properties without resulting legal responsibility.

For any person or entity to ignore the use of newly published lumber Design Properties or the Design Properties of any other construction product, wood or otherwise, subjects that person or entity and perhaps others in the chain of distribution, as well as building owners, to legal responsibility as the current standard and state of the art is not being followed.

SBCA Design Property Policy Summary:

1. Resistance of load by the structural framework of any building and its assumed factor of safety are predicated on accurate and reliable raw material and construction products fundamental design values, application factors and related engineering properties ("Design Properties").
2. All purchasers and users of products developed to resist applied loads are purchasing and using those products for their load resisting Design Properties and depend on the Design Properties to be accurate.
3. Design properties published for lumber, OSB, plywood, LVL, PSL, LSL, glulam, hardware and other wood and miscellaneous construction products must be accurate as they are input into engineering software programs where the output is expected to represent the safe resistance of all applied loads. Therefore, these types of construction products should be tested regularly to assure accurate Design Properties.
4. Accurate Design Properties should be assured by the manufacturer of the product or by Design Properties developed by testing and calibrated to an engineering mechanics based model. Design Values should not be deemed to comply based on an industry or committee "judgment" or because the design is prescribed by the building code through tradition and/or through the code consensus process. More

often than not these activities are political in nature and the load resistance outcomes provided in the end-use application is neither accurate nor reliable. This view, that because the historical or code based performance has been acceptable and there is therefore no need to otherwise verify through testing and analysis, is simply flawed.

5. Irrespective of whether a building official chooses to enforce effective date published raw material Design Properties in a particular jurisdiction, if a purchaser or user relies on an outdated span table that was based on raw material Design Properties that existed prior to a new effective date published Design Properties, reliance upon the building official choice subjects that purchaser of raw material Design Properties, the Contractor and the Owner to potential legal responsibility as each are not utilizing the current standard or state of the art.
6. Furthermore, it is difficult to understand how a prudent raw material Design Properties purchaser or user could rely upon the Building Code reference to a prior raw material Design Property, such as a grade mark, and ignore the new Design Properties, such as the same grade mark would have given the new properties, without resulting legal responsibility.
7. It is the responsibility of building officials to review and ensure all designs comprehensively comply with the latest published Design Properties that are based on testing and generally accepted engineering practice.
8. Reliable and safe building performance is predicated upon accurate Design Properties, engineering precision and a complete understanding of raw material engineering considerations needed for successful application or installation. The suppliers of these products are responsible to ensure that there is easy access to this understanding along with any relevant factors that should be considered in that design process.
9. It is in the best interests of the construction industry at large, as well as the truss and component manufacturing industry in particular, that engineering and thus construction, be entirely based on tested and accurate raw material load resistance data. This will not only improve construction performance that is based on engineering and is therefore safe, but will further allow for future engineering innovation.

SBCA Mission Statement:

SBCA supports research, development and testing of structural building components – trusses, wall panels, and related structural components – to root the industry in sound engineering and improve the quality, efficiency and cost-effectiveness of our products, for the purpose of achieving greater product acceptance. Therefore, SBCA promotes the consistent, safe, economic, and structurally sound design, construction and use of all structural building components, thereby increasing engineering innovation.