QUESTIONS & ANSWERS
New Design Values
for All Sizes and Grades of Visually Graded Southern Pine Dimension Lumber
Effective June 1, 2013

New design values for **all** sizes and grades of visually graded Southern Pine dimension lumber were published in the Southern Pine Inspection Bureau's (SPIB) *Supplement No.13* to the *2002 Standard Grading Rules for Southern Pine Lumber* on February 11, 2013. The new design values become effective June 1, 2013 to provide time for an orderly transition.

As a rules-writing agency, SPIB must follow a rigorous approval process to establish design values for Southern Pine lumber. SPIB and Timber Products Inspection worked cooperatively to complete a full In-Grade testing matrix as required by consensus standard ASTM D1990, *Standard Practice for Establishing Allowable Properties for Visually-Graded Dimension Lumber from In-Grade Tests of Full-Size Specimens*.

More than 7,400 full-size samples of commercially-produced Southern Pine were destructively tested in a two-step process. No.2 2x4s were tested in the first step, resulting in design value changes for Southern Pine sized 2" to 4" wide and 2" to 4" thick in No.2 Dense and lower grades **only** for use on an interim basis. Interim design values for **only** those sizes and grades became effective June 1, 2012, as published by SPIB in *Supplement No.9* to the *2002 Standard Grading Rules for Southern Pine Lumber*.

In the second step, Select Structural (SS) 2x4s, No.2 and SS 2x8s, and No.2 and SS 2x10s were tested to complete the full In-Grade testing matrix.

SPIB and Timber Products began the process for establishing design values by collecting test specimens according to a sampling plan approved by the Board of Review of the American Lumber Standard Committee (ALSC). They conducted the destructive tests in bending, tension and compression, plus gathered stiffness and other property data, all in accordance with ASTM International standards. SPIB then analyzed more than 300,000 data points generated from the complete In-Grade testing matrix. The data analysis was completed in cooperation with the USDA Forest Products Laboratory (FPL) who provided technical review throughout the entire design value approval process. FPL concluded the resulting proposed design values that SPIB submitted to the ALSC Board of Review "...have been developed using ASTM standards or other technically sound criteria and, as such, represent an appropriate estimate of the Southern Pine design values at this time."

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Following a hearing on January 30, 2013, the ALSC Board of Review approved SPIB's design values as submitted.

SPIB's *Supplement No.13* provides new design values for **all** sizes and grades, incorporating *Supplement No.9's* interim design values with minor changes due to rounding effects. This means that interim design values for the sizes and grades in *Supplement No.9* are replaced by the new design values for those sizes and grades in *Supplement No.13* effective June 1, 2013. For more information about *Supplement No.9* interim design values, refer to *Questions & Answers – Interim Design Values for Southern Pine 2x2s through 4x4s in No.2 Dense and Lower Visual Grades Only, Effective June 1, 2012 for Use on an Interim Basis*.

Southern Pine's strength and stiffness remain comparable to other softwood species used in residential and commercial construction. Southern Pine users have many available product options including visually graded dimension lumber and an increasing supply of mechanically graded lumber. From framing a house to building a deck, Southern Pine continues to be a dependable product with superior treatability against decay and termites.

The Southern Forest Products Association (SFPA) facilitated a task group of industry leaders representing key customer groups to develop answers to the most commonly asked questions regarding new design values and their implementation.

Southern Pine design values are published by the Southern Pine Inspection Bureau after approval by the Board of Review of the American Lumber Standard Committee. The Southern Forest Products Association (SFPA) does not test lumber or establish design values. Accordingly, neither SFPA, nor its members, warrant that design values are correct, and disclaim responsibility for injury or damage resulting from the use of such design values.

Reference design values are based on normal load duration and dry service conditions. Because the strength of wood varies with conditions under which it is used, these design values should only be applied in conjunction with appropriate design and service recommendations from the *National Design Specification® (NDS®) for Wood Construction* published by the American Wood Council.

The conditions under which lumber is used in construction may vary widely, as does the quality of workmanship. Neither SFPA, nor its members, have knowledge of the quality of the materials, workmanship or construction methods used on any construction project, and, accordingly, do not warrant the technical data, design or performance of the lumber in completed structures.

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1 **Q: Why do design values change?**

A: Design values have changed multiple times over the years based on available test data. The lumber industry conducts ongoing testing and invests millions of dollars to provide the most accurate and reliable design values for structural lumber. Comprehensive lumber testing is conducted as new technology becomes available or as warranted by changing resource data. The first significant lumber tests began in the 1920s, resulting in design values based on the strength of small clear-wood specimens. The last major change occurred in 1991 when design values for Southern Pine and other North American species were first published based on In-Grade testing of full-size samples of commercially produced lumber. SPIB did not specifically study why a change occurred this time, but a change in the timber resource mix is one of many variables that can affect the strength of structural lumber.

2 **Q: How did design values for the lower-grade 2x4s change?**

The analysis of the full In-Grade testing matrix combined all data from steps one and two to provide the best estimates of design values. This resulted in upward revisions to almost all of the interim design values that became effective June 1, 2012 based only on No.2 2x4 data. For No.2 2x4s for example, bending increased from 1050 to 1100 psi (pounds per square inch), tension increased from 650 to 675 psi, compression increased from 1100 to 1450 psi and modulus of elasticity remained the same at 1.4 million psi.

Table 1 provides generalized adjustments to the June 1, 2012 interim design values for Southern Pine sized 2" to 4" wide and 2" to 4" thick in No.2 Dense and lower grades **<u>only</u>**.

Table 1 – Approximate Design Value Adjustments* for Southern Pine 2x4s (No.2 Dense and lower grades)

Property	Approximate Design Value Adjustments*
Bending	+5% to +10%
Tension	No change to +5%
Compression Parallel	+20% to +40%
Modulus of Elasticity	No change to +100,000 psi

*Compared to interim design values effective June 1, 2012 based only on No.2 2x4 tests.

3 **Q: How did design values for wider widths and higher grades change?**

A: The analysis of the full In-Grade test data showed smaller reductions for the wider widths and higher grades as compared to the No.2 2x4 only analysis, and even some small increases as compared to current design values. These results are encouraging, better-than-expected news for Southern Pine lumber producers and users. Generalized ranges of change for the wider widths and higher grades are provided in Table 2.

Table 2 – Approximate Design Value Changes* for Southern Pine 2x6s through 2x12s (all visual grades) and 2x4s (SS and No.1)

Property	Approximate Design Value Changes*
Bending	-10% to -30%
Tension	-150 psi to +200 psi
Compression Parallel	-10% to -15%
Modulus of Elasticity	-200,000 psi to No change
Shear	No change
Compression Perpendicular	No change

* Compared to current design values that were not changed based only on No.2 2x4 tests.

4 **Q: What property values did not change?**

A: Design values for shear parallel-to-grain and compression perpendicular-to-grain did not change.

5 **Q: Does Southern Pine continue to be a competitive building material?**

A: Yes. Southern Pine lumber is one of the best construction products on the market today. Southern Pine's strength and stiffness remain comparable to other softwood lumber species used in residential and commercial construction. Southern Pine users have many available product options including visually graded dimension lumber and an increasing supply of mechanically graded lumber. From framing a house to building a deck, Southern Pine continues to be a dependable product with superior treatability against decay and termites.

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6 **Q: Do new design values affect existing homes?**

A: No. New design values only apply to new construction, not existing construction. Like other building materials, wood products used in construction must meet building code requirements enforced at the time. The integrity of existing structures designed and built using design values meeting applicable building codes at the time of permitting does not change.

When properly designed and built, light-frame wood construction includes repetitive structural systems for continued performance. Refer to the *Southern Pine Design Value Forum Report* that includes a review of the margin of safety for in-market lumber.

7 **Q: When will new design values for all sizes and grades of visually graded Southern Pine dimension lumber based on the full In-Grade testing matrix become effective?**

A: June 1, 2013, as published in SPIB's *Supplement No.13* to the *2002 Standard Grading Rules for Southern Pine Lumber*.

8 **Q: What should happen during the transition period between now and the June 1, 2013 effective date?**

A: The intent of a transition period is to minimize project delays and supply chain disruptions by providing time to manage design value changes. Producers and key customer groups should use this time to evaluate and prepare for the potential impact on their businesses. Establishing implementation plans will aid in a successful transition to this second set of new design values.

9 **Q: Some of the new design values in *Supplement No.13* are higher than the interim design values in *Supplement No.9* and some are lower. Do I need to wait until the June 1, 2013 effective date to begin using all of the new design values?**

A: No. The new design values have been approved by the ASLC Board of Review and published by SPIB. There is no requirement to wait until the effective date of June 1, 2013 to begin using the new design values.

SFPA will provide span tables and other information based on both current design values and the new design values during the transition period.

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10 **Q: How are design values implemented into the building codes?**

A: Building codes reference design values certified by the ALSC Board of Review in accordance with *American Softwood Lumber Standard DOC PS 20*. The American Wood Council (AWC) publishes these design values in a supplement to the code-referenced *National Design Specification® (NDS®) for Wood Construction,* titled *Design Values for Wood Construction.* AWC will develop addenda and other updates to use with new construction designed in accordance with its standards and design tools.

11 **Q: When will the new design values be enforced?**

A: Building codes are enforced by the state, regional or local jurisdiction, so exactly when enforcement begins can vary by jurisdiction. Users relying on prescriptive code requirements should use new span tables based on the new design values effective June 1, 2013.

12 **Q: How do design value changes affect span tables and other prescriptive requirements in the building codes?**

A: Prescriptive code requirements based on old design values need to be amended to reflect new design values. This includes ceiling joist, rafter and header span tables. AWC will work with the International Code Council to incorporate the new design values into span tables in the *2015 International Building Code* and *2015 International Residential Code*. AWC will also develop recommended revisions to previous code editions. Visit www.awc.org to learn more.

13 **Q: What is the practical impact on joists, rafters and headers?**

A: The impact is smaller than originally projected due to smaller reductions for the wider widths commonly used for joists, rafters and headers. Refer to SFPA's table, *Maximum Span Comparisons by Species,* for sample comparisons.

SFPA continues to update its easy-to-use tables for specific sizes and grades of Southern Pine lumber. Refer to SFPA's span tables for visual, MSR and MEL grades. SFPA will also update its publication *Southern Pine Headers & Beams*, providing simplified span tables for lumber and glulam headers, beams and girders.

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14 **Q: How can I get similar load-carrying capacities as before?**

A: Southern Pine users continue to have many available product options. One option is to specify a larger size and/or higher grade of visually graded Southern Pine lumber. Another option is to specify an increasing supply of mechanically graded lumber which includes Machine Stress Rated (MSR) lumber and Machine Evaluated Lumber (MEL). Refer to SFPA's table, *Southern Pine Mechanically Graded Lumber (MSR & MEL) Grades & Design Values,* for a complete listing from *Supplement No.12* to the *SPIB Standard Grading Rules for Southern Pine Lumber*. Also refer to SFPA's table listing sample Southern Pine grade substitutions for comparable spans.

15 **Q: What happens to existing inventories of lumber in the supply chain on an effective date for new design values?**

A: Visually graded lumber is identified with a grade mark that includes the grade name (e.g. No.2), but not the specific design values associated with that grade name. Therefore, new design values will be associated with **all** sizes and grades of visually graded Southern Pine dimension lumber in inventory on June 1, 2013.

16 **Q: What about Prime lumber grades?**

A: Design values for the Prime grades are tied to their corresponding dimension lumber grade. Therefore, No.2 Prime has new design values identical to No.2 dimension lumber. Similarly, No.1 Prime has new design values identical to No.1 dimension lumber.

17 **Q: Did design values for other Southern Pine lumber products change?**

A: No. Design values for other Southern Pine lumber products covered by the SPIB's Grading Rules – such as mechanically graded lumber, timbers, Radius Edge Decking and other specialty items – are derived differently.

18 **Q: Are design properties for glulam beams affected by a change in lumber design values?**

A: No. Laminating lumber has more stringent grading rules that have not changed. Glulam beams use special grades of laminating lumber evaluated based on more restrictive characteristics, particularly in the critical outer lamination. For more information, refer to the October 12, 2011 white paper, *Changes to Lumber Design Values and Their Effect on Structural Glued Laminated Timber (Glulam)*, published by

the American Institute of Timber Construction and APA – The Engineered Wood Association.

19 **Q: What is the impact of the new design values have on homes built in the future?**

A: Homeowners should not notice much difference, but building designers may configure the individual pieces of lumber differently in the structural system. Building materials used in construction have guidelines for proper use. Wood construction incorporating new design values will continue to include a series of safety factors and checks and balances to ensure that wood products – specifically Southern Pine lumber – are safe and effective when used properly in the construction of a residential or commercial building. Refer to the *Southern Pine Design Value Forum Report* that includes a review of the margin of safety for in-market lumber.

20 **Q: How will I know when updated information on new design values is available?**

A: To aid users in the transition to new design values, the wood products industry will continue to publish helpful design information as it becomes available. Click here to receive update notices from the Southern Forest Products Association. Or visit industry association websites for:

- Southern Pine design values, span tables & product use information from the Southern Forest Products Association
- Codes and Standards from the American Wood Council
- Southern Pine Grading Rules from the Southern Pine Inspection Bureau

21 **Q: Should I continue to use Southern Pine?**

A: Yes. Southern Pine lumber is one of the best construction products on the market today. Southern Pine lumber provides great value in a wide variety of applications. From framing a house to building a deck, Southern Pine continues to be a dependable product with superior treatability against decay and termites.

Southern Pine forests are some of the most productive and sustainable timberlands in the world, capturing large amounts of carbon from the air and storing it in lumber used every day.

Southern Pine is grown and manufactured in the U.S. South, further improving local economies, reducing transportation costs and minimizing impacts on the environment.