



Structural Building Components Association

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December 6, 2011

Mr. James E. Loy
President
Southern Pine Inspection Bureau
P. O. Box 10915
Pensacola, FL 32524-0915

Re: Requesting SPIB's Confirmation of Action to be Taken Regarding SPIB's Southern Pine Lumber Design Value Proposal to ALSC

Dear Jim,

Thank you for our discussion last Thursday December 1, 2011. As discussed in detail during our conversation, SBCA and its members strongly and sincerely believe that the entire lumber producing and consuming industries, including the component manufacturer lumber buyers that we represent, are at a serious decision making tipping point. SPIB and its Board of Governors are in full control of the decision making process with respect to whether or not this tipping point results in a positive outcome for all producers and users of lumber, or an outcome where the outcome will be very negative. In addition, the full extent of the negatives will not be completely known until after January 5, 2012, assuming the SPIB recommended and advocated for lumber design value reduction is approved by ALSC at its hearing on this date.

Given that the start of the negative consequences could begin as early as January 6, 2012, we are requesting an answer from SPIB by Friday December 9 as to whether SPIB is willing to take a positive path for our collective futures or allow the consequences of economic damage to begin as we described in our October 11 document entitled "Southern Pine Lumber Potential Design Value Reductions An End Use Customer's Point of View," the key sections of which are attached and where the pertinent parts are highlighted.

As you are very much aware, SBCA's position on these issues has been consistently stated going back as early as March 2010. Such position has been publically summarized well by SFPA in their soon to be published minutes from the recent SFPA "Southern Pine Design Value Forum" meeting held on November 15 and 16, 2011 as follows:

"Kirk Grundahl, SBCA, summarized observations from testing conducted on behalf of component manufacturers. He described the optimal solution to serve the best interests of both the lumber and lumber-using industries. Kirk suggested optimal alternatives that could include standard visually graded lumber (e.g., use SPIB's proposed design values), enhanced visually graded lumber (e.g., retain SPIB's current design values) and mechanically graded lumber. He stated the suboptimal approach would be to implement SPIB's proposed design values without providing the market with the means to retain the current design values for visually graded Southern Pine lumber. Kirk explained that users need the current design values, plus the test data confirm higher design values are still available for a significant portion of the lumber population. He stated that structural end users buy resistance, and that those end users can find ways to work with a range of grades as long as those grades have accurate material properties. Kirk stressed that an



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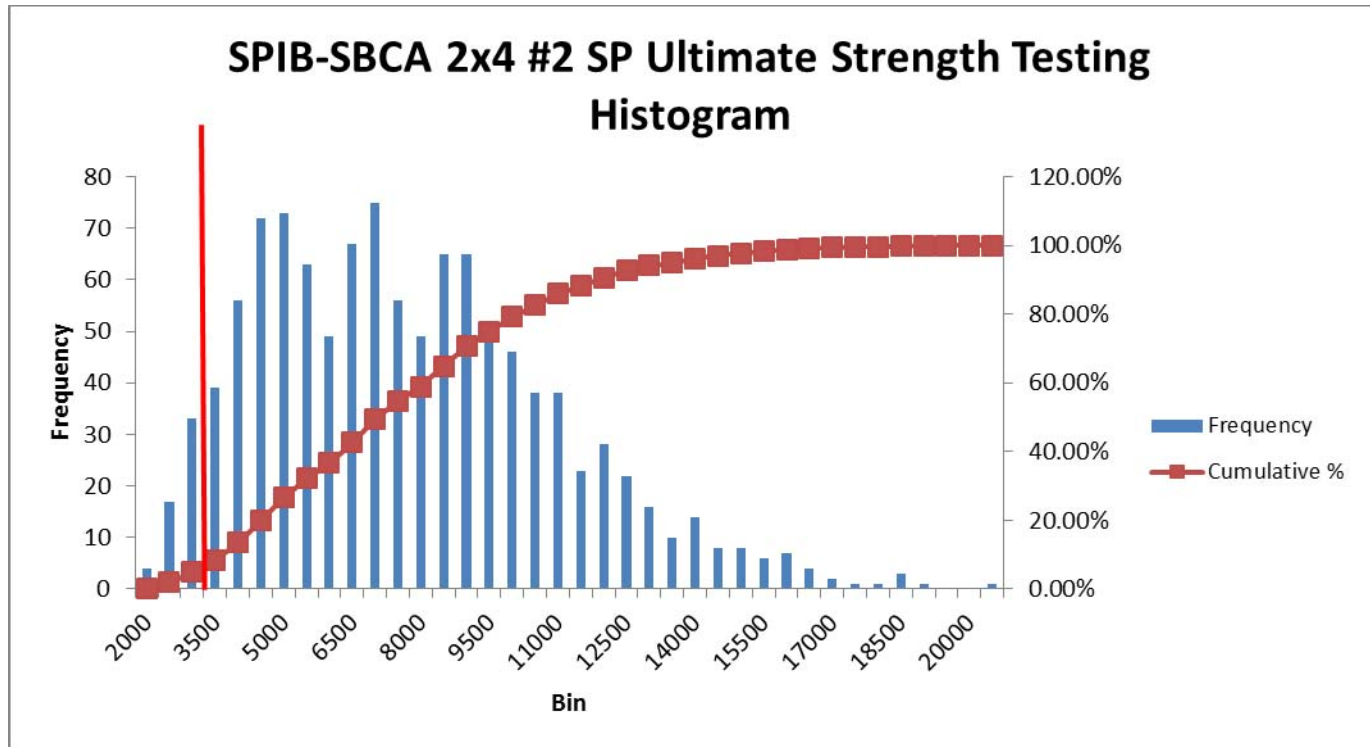
SPIB Southern Pine Design Value Proposal Confirmation

orderly timeline and transition period is needed whenever design values are changed. He shared the component industry's perspective on negative impacts due to redesign cost/time, inventory devaluation and eroded consumer confidence. Kirk also reviewed test results from an assembly of five trusses. He stated the assembly performed well with system safety factors, supporting the concept there isn't an immediate life-safety issue."

Clearly, the preferred path and the one that disrupts the market the least would be for the SPIB, under your leadership and through its Board of Governors, to withdraw its request for any changes to the SP design values until the full SPIB test program consisting of multiple grades and sizes as required by the governing standard, ASTM D1990, is completed. We believe that there is absolutely no downside to taking this position in contrast to the serious downside that exists with the current position and path of implementation that SPIB is undertaking.

We believe that there is no downside to taking this positive path for the following reasons:

- A large group of engineering professionals believe that the science that has been used support ultimately creating new SP design values at such time that all testing is complete. However, it is important to recognize that the underlying statistics and logic of the process for establishing design values, combined with similar assumptions in determining design forces and unaccounted for redundancies and load sharing effects in typical light-frame construction, all combine to result in a conclusion that the safety of existing structures DO NOT need reevaluation or where hasty actions need to take the place of an orderly SP design value determination and transition.
- As you are fully aware, the full population SP design values are established at the lower 5th percentile strength, or such that 95% of the pieces are stronger than the assigned value. This lower 5th percentile value is further reduced by a factor of 2.1, composed of two components, 1.6 adjusting from test conditions to standard duration of load and 1.3 as a safety factor accounting for uncertainties ($1.6 \times 1.3 = 2.1$).
- The lumber design values, as currently created, are generated using a very broad scientific technique that causes a very low design value to represent the design values for a very large population of lumber with a wide variety of real design values included. This is best represented by the following histogram of actual 2x4 #2 SP that has been tested for its ultimate strength.



- In simple terms the following concepts apply.
 - This is a listing of 1,108 ultimate strength tests of 2x4 #2 SP.
 - 2x4 #2 has a bending design (Fb) value of 1,500 psi. If we use the recognized lumber factor of safety to define the ultimate strength required to obtain this design value, the minimum ultimate strength needed is 3,150 psi.
 - In this test population, the data is showing that only 64 pieces of tested 2x4 (out of total tested pieces of 1,108) were less than the 3,150 psi ultimate strength.
 - Conversely 1,044 2x4 tested pieces (by definition 95%) had strength in excess of the 3,150 psi.
 - The average strength from this test set was 7,482 psi or 2.37 times better than the minimum number that currently defines the SP #2 design value.
 - On the above graph the **vertical redline** represents 3,150 psi. All the lumber pieces plotted to the right of this line are stronger than this key strength indicator.
 - As an additional point of reference there are 660 pieces or 60% of the lumber in this test set that have an ultimate strength greater than 2 times (i.e. 6300 psi) the ultimate strength that defines the design value for SP #2.
- The key concept that follows from this data assessment is that all SP span tables and engineered designs assume, 2x4 SP 2 has a design value of 1,500 psi. The fact that most of the population of 2x4 SP #2 has a design value that is higher than 2.1 times this minimum value, establishes that the 1,500 psi value level is a safeguard for the unlikely event when a lower design value 2x4 is utilized. This concept enhances safety in that it will be very rare to construct a building with more than a few low design value 2x4 pieces.
- Additionally, SBCA's testing facility, the SBC Research Institute (SBCRI) has done more system testing than any group we are aware of in North America. Structural components

such as floor joists and roof trusses are generally designed as independent elements and then installed and used in floor and roof assemblies. Based on contemporary full scale testing that has measured the complete set of input loads and all output reactions, it is clear that single element design is conservative and by definition cannot account for the load path interactions that take place in a real structure.





- Because of the complexity of system design, the engineering community simplifies the design process and inherent in this simplification is residual load carrying capacity that is unaccounted for. Oregon State's R. Gupta, T.H. Miller & D. Dung written in the *Practice Periodical on Structural Design and Construction*, Vol. 9(1): 54–60 (ASCE, 2004) suggests that this can be as much as 40% more capacity than the single element design suggests is available. This residual capacity provides a level of safety that is present and unaccounted for in the design process.

We are requesting that SPIB withdraw its current written request to ALSC seeking a reduction in Southern Pine design values, and that ALSC acknowledge this withdrawal in writing no later than 12 pm (noon CST) on December 9, 2011. This will then allow a full range of testing to take place utilizing a process that is open and consensus based. We believe that this path is positive and will certainly mitigate further negative consequences with respect to the SP design value issues.

All of our subsequent actions will be made based on the SPIB response or lack thereof. Thank you for sincerely and earnestly considering these requests.

Respectfully Yours,

Kirk Grundahl, P.E.
Executive Director