Roseburg
A Forest Products Company

Technical Note

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Effects of Moisture on I-Joists and LVL

In general, all wood products will swell with an increase in moisture content and shrink with a decrease in moisture content. The amount of swelling or shrinkage depends on how much the moisture content changes and the characteristics of the wood product. Not only does direct contact with water significantly affect the moisture content, relative humidity and temperature also affect the moisture content of wood which in turn affects the dimensions of the wood.

Roseburg RFPI® Joists and RigidLam® Laminated Veneer Lumber (LVL) products are manufactured at approximately 5-6% moisture content, which is considerably lower than that of kiln-dried solid sawn lumber (generally 15-19%). The interior moisture content of most finished structures across North America is approximately 8-12%. Consequently, I-joists and LVL will likely "grow" a slight amount versus sawn lumber which will likely shrink after equilibrating to the conditions of a closed-in structure. Therefore, during the manufacturing process, the target depths and widths of our RFPI® Joists and RigidLam® Laminated Veneer Lumber are slightly less than the nominal published dimensions to allow for the minimal amount of "growth" expected in the finished application.

Of course, conditions can vary greatly during transportation, storage and installation of the I-joists and LVL. Field conditions may create an environment where the moisture content exceeds the 8-12% of a finished structure, or on occasion, be less than the 5-6% during manufacturing. Thus, the I-joists and LVL may "grow" beyond the nominal published dimensions or even shrink below the target dimensions. The greater the difference between manufacturing and field conditions, the greater the change in dimensions.

If the moisture content in the I-joist or LVL is consistent throughout the member, it will grow or shrink uniformly and remain fairly straight and consistent in cross-section. However, if one side of an LVL member or one flange of an I-joist becomes wetter than the other side or flange, the LVL will cup and the I-joist will likely develop some camber. Similarly, if one end or edge of an LVL member or I-joist becomes wet, it will expand and exhibit larger dimensions than the remaining dry portions of the member. Proper storage will minimize the effects, while direct contact with water will increase the effect. If I-joists or LVL are installed while still wet, they should be dried out prior to the application of sheathing and/or sheetrock.

Prolonged exposure to the elements may cause permanent swelling and/or potentially damage the member. The amount of damage will depend on the duration and severity of the exposure conditions. Excessively weathered material should not be used.

In summary, as the exposure, humidity and temperature conditions vary during transportation, storage and construction, the dimensions of the wood product will vary accordingly. Prolonged exposure may cause permanent damage. However, if handled and stored properly, the wood product will acclimate to the dry, interior conditions of the finished structure and become dimensionally stable at or near the published dimensions.

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