

**NC Department of Insurance  
Office of the State Fire Marshal - Engineering Division  
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**Engineered Wood Products and Connectors in Marine and Flood Zone Environments**

**Code:** 2018 Residential Code  
**Sections:** R322.1.8 and R4605.5

**Date:** April 10, 2019

**Question 1:**

What are the pressure treatment requirements for engineered wood products subject to intermittent wetting in marine and fresh water flood environments?

**Answer 1:**

Based on Weyerhaeuser (MicroLam) and Louisiana Pacific literature, all indications are that laminated veneer lumber (LVL) beams treated for exterior, marine or submerged applications (AWPA Use Categories 3, 4, and 5) are not readily available, and LVL is probably not appropriate for use in these applications. Likewise, wood I-joists are not available treated for exterior use and should not be used in environments subject to wetting. Weyerhaeuser Parallel Strand Lumber (PSL) is available treated for marine application with chromated copper arsenate (CCA) or creosote. Glu-Lam is also available treated for marine use. Any product subject to submersion in fresh water should be treated for American Wood Preservers Association (AWPA) UC4C, products located above mean high water and subject to frequent wetting should be treated for AWPA UC4B, and products subject to submersion in salt or brackish water should be treated for AWPA UC5B. The local code enforcement official may request weathering test data and treatment certificates on products in question.

**Question 2:**

How should connectors be protected from failure due to corrosion in marine and fresh water flood environments?

**Answer 2:**

Table 4605.5 lists coatings and stainless steel fasteners and connector requirements for coastal areas. Connectors subject to exterior or marine use should always be either hot dip galvanized after fabrication or stainless steel. Depending on bolts alone to transfer gravity loads to the piles is not a prudent practice. Over time, even hot dip galvanized or stainless steel bolts will corrode and require replacement. A better detail when the pile width is 2 inches or more than the girder would be to notch the girder into the side of pile to provide direct bearing on the pile. The girder may then be bolted to the vertical protrusion of the notch to provide uplift resistance, lateral load resistance and torsional stability. Figure 4603.6 in the Residential Code is another possible means of connecting the girder to the pile and providing direct bearing for the girder when the girder is too wide to notch into the pile. However, the disadvantage to this connection is the connection has little resistance to lateral loads perpendicular to the connection plates. In addition, the girder and the pile must be the same width or the connection shimmed in order to

install connection plates on both sides of the girder. Connections for girders bearing on top of the pile with a plate on only one side of the girder do not provide adequate torsional restraint to prevent the girder from rolling.

**Keywords:**

Pressure treated