

Timber as a Highway Bridge Material

Continued advancement in materials and techniques help provide better bridges. High performance steel, fiber reinforced composites and pre-cast reinforced concrete are becoming common language. The timber industry is not standing still and their innovation should also be recognized.

There are many factors that comprise a good bridge design. This includes choosing a durable material, details for durability and ease of construction, engineering specific for the application and currently a trend toward pre-manufactured components. All of these factors can be incorporated into a properly designed timber bridge.

Timber as a highway bridge material is still dominated by pressure treated products. Domestic species such as Southern Yellow Pine and Coastal Region Douglas Fir are readily available and sustained through forest renew practices. They rely on a variety of preservatives to provide long term durability. Naturally durable species, both native and imported, have seen greater acceptance in the recreation bridge market based on availability and economy for those applications.

The landscape for wood preservatives continues to change. For highway bridge materials oil-borne preservatives are still preferred for their waterproofing qualities. Better treating practices lead by the Western Wood Preservers Institute Best Management Practices (BPM's) have improved the overall product. The BMP's result in wood that is cleaner to the touch with minimal excess preservative coming in contact with the environment. Different preservatives have gained favor including oil-borne Copper Naphthenate. Used by the utility industry for over a decade, Copper Naphthenate is now widely available for highway products. With similar durability and less regulation it is fast becoming the first choice for bridge timbers.

Wood preservatives are only one factor in providing a durable timber bridge. Proper detailing and pre-manufacture help ensure a long lasting structure. Pre-framing of materials before treating and pre-manufacture of components reduce field cutting and drilling that can expose untreated wood. Avoiding areas for debris collection and standing water improve wood performance. Adding a wear course to the driving surface protects the wood from abrasion. Individual deck components should be positively connected to improve the performance of the wear course, especially asphalt. Paying attention to the details promotes a longer service life.

Timber bridges can be designed for all typical loading conditions including those set forth by the American Association of State Highway and Transportation Officials (AASHTO). The strength and flexibility of engineered lumber is balanced with the economy of solid sawn members to provide a competitive bridge package. Standard designs for short and medium span bridges are readily available and provide economy that competes with any bridge material. Long span structures are typically custom designed for landmark bridges.

Pre-manufactured kits allow for bridges to be built quickly under a variety of circumstances. Controlled shop conditions improve quality and reduce the need for site inspection. Treated timber is not temperature sensitive and does not require controlled site conditions for proper curing. Partially assembled components are installed in days instead of weeks.

Commonly chosen for the natural aesthetics of wood, a timber bridge goes beyond the occasional and should be considered as a viable option for many bridge applications. While it may not be considered cutting edge, timber is still a good choice as a highway bridge material.