

Timber Bridge Construction by Bridge Builders USA, Inc. – Why Use Timber?

(Provided by the United States Department of Agriculture Forest Service)

Wood was probably the first material used by humans to construct a bridge. Although in the 20th century concrete and steel replaced wood as the major materials for bridge construction, wood is still widely used for short-and medium-span bridges. Of the bridges in the United States with spans longer than 20 feet, approximately 12 percent of them, (or 71,200 bridges) are made of timber. In the USDA Forest Service, approximately 7,500 timber bridges are in use, and more are built each year. The railroads have more than 1,500 miles of timber bridges and trestles in service. In addition, timber bridges recently attracted the attention of international organizations and foreign countries, including the United Nations, Canada, England, Japan, and Australia. Choose Bridge Builders USA, Inc. for quality timber bridge construction.

Timber Bridge Construction: The Natural Choice

Timber's strength, light weight, and energy-absorbing properties furnish features desirable for bridge construction. Timber is capable of supporting short-term overloads without adverse effects. Contrary to popular belief, large wood members provide good fire resistance qualities that meet or exceed those of other materials in severe fire exposures. From an economic standpoint, wood is competitive with other materials on a first-cost basis and shows advantages when life cycle costs are compared. Timber bridge construction can occur in virtually any weather conditions, without detriment to the material. Wood is not damaged by continuous freezing and thawing and resists harmful effects of de-icing agents, which cause deterioration in other bridge materials. Timber bridges do not require special equipment for installation and can normally be constructed without highly skilled labor. They also present a natural and aesthetically pleasing appearance, particularly in natural surroundings.

The misconception that wood provides a short service life has plagued timber as a construction material. Although wood is susceptible to decay or insect attack under specific conditions, it is inherently a very durable material when protected from moisture. Many covered bridges built during the 19th century have lasted over 100 years because they were protected from direct exposure to the elements. In modern applications, it is seldom practical or economical to cover bridges; however, the use of wood preservatives has extended the life of wood used in exposed bridge applications. Using modern application techniques and preservative chemicals, wood can now be effectively protected from deterioration for periods of 50 years or longer. In addition, wood treated with preservatives requires little maintenance and no painting.

Constructing timber bridges is an economical and practical choice.

Another misconception about wood as a bridge material is that its use is limited to minor structures of no appreciable size. This belief is probably based on the fact that trees for commercial timber are limited in size and are normally harvested before they reach maximum size. Although tree diameter limits the size of sawn lumber, the advent of glued-laminated timber (glulam) some 40 years ago provided designers with several compensating alternatives. Glulam, which is the most widely used modern timber bridge material, is manufactured by bonding sawn lumber laminations together with waterproof structural adhesives. Thus, glulam members are virtually unlimited in depth, width, and length and can be manufactured in a wide range of shapes. Glulam provides higher design strengths than sawn lumber and provides better utilization of the available timber resource by permitting the manufacture of large wood structural elements from smaller lumber sizes. Technological advances in laminating over the past four decades have further increased the suitability and performance of wood for modern highway bridge applications.

Timber Treatment for Solid Timber Bridge Construction

For almost 70 years, a preservative called "Chromated Copper Arsenate" or CCA has been safely used in a wide range of wood products. It has served as the leading wood preservative in the United States and throughout the world for hundreds of building applications ranging from

decks and patios to wood-framed homes to salt water marine structures. Since inception in 1933, CCA has been one of the preferred choices for pressure treating wood products. However, its sound reputation was not without controversy. In the 1970's, environmental groups focused on perceived health dangers to workers in the preservative industry. In the 1980's, environmentalists **questioned the effects of CCA-treated wood** on aquatic environments. But, in that same decade, the Environmental Protection Agency determined the benefits of CCA far outweighed any perceived risks. Then in the 1990's the focus changed to the perceived danger surrounding CCA disposal. By the year 2000, their concerns turned to arsenic exposure from CCA-treated playground equipment. Although the alleged risks were scientifically unfounded, the spotlight never faded.

In response to market perceptions, the leading wood preservative manufacturers voluntarily amended their respective label registrations with the EPA for CCA in 2002, and initiated a transition to the manufacture of a new generation of wood preservatives for use in non-industrial treated wood products by December 31, 2003.

The new generations of preserved wood are primarily three types of products - Ammoniacal Copper Quat (ACQ), Copper Boron Azole (CBA), and Copper Azole (CA-B). They are being marketed under such brands as ACQ Preserve®, Nature Wood® and Wolmanized® Natural Select™ wood. As with CCA, the new preservatives have been approved for use by the EPA and extend the life of wood products from just a few years to decades.

Manufacturers will continue to produce CCA for industrial end use applications such as highway construction, utility poles and pilings.

¹Information provided by the Western Wood Preservers Institute.