Oregon Department of Transportation

SECTION 1.8
Timber Bridge Design and Detailing

Revisions for the current edition are highlighted yellow. Deleted text is not marked.

Past editions of the Bridge Design Manual are available through our website.

1.8 TIMBER BRIDGE DESIGN AND DETAILING

1.8.1 Timber Bridge Locations

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1.8.1 Timber Bridge Locations C1.8.1

Timber structures may be considered as an alternate to concrete structures in the following situations:

- On low volume highways.
- Roads with an AADT of less than 500.
- Sites located away from possible concrete sources.

Timber bridges are generally best suited to the drier climate east of the Cascade Mountains.

Consult the region's project development team prior to DAP to determine whether a timber bridge is desired.

1.8.2 Timber Design and Details C1.8.2

Before specifying structural grades for timber members, verify with the fabrication industry for availability.

Consider timber dry for design unless submerged.

Do not design composite wood-concrete structures. There are no corresponding construction specifications.

Do not use timber substructures.

For structures carrying only pedestrian or bicycle traffic,

- The maximum allowable live load deflection is:
  - For simple or continuous spans, $Deflection = span/360$
  - For cantilever arms, $Deflection = arm\ length/135$

Provide adequate slip resistance to meet ADA requirements.

1.8.2.1 Glued Laminated Timber Bridges

Glued laminated timber can be used with limited span ranges.

Consider performance specification for glued laminated timber members.

Use a non-interconnected glued laminated timber deck as opposed to an interconnected glued laminated timber deck.

Consider a longitudinal timber stiffener under the deck between longitudinal beams for transverse deck bridges.

C1.8.2.1

Glued laminated timber bridge single spans are generally feasible up to 50 feet. To achieve longer spans, consider cantilever techniques. The width of glued laminated beams is generally limited to 10 ¾ inch or less, but 12 ¾ inch, 14 ¾ inch, and 16 ¾ inch widths are available for extra cost. Use of standard sizes is recommended whenever possible.

Identifying actual stresses for bending, horizontal shear, etc., is preferred by the fabrication industry instead of specifying an actual glued laminated timber grades.

A stiffener may be beneficial for differential deflection control.

A glued laminated longitudinal deck bridge is a possible solution for short spans (under 25 feet) with a tight freeboard clearance requirement. These deck members could be used in a continuous span arrangement to increase member efficiency.

Include a waterproofing membrane according to *BDM 1.9.3.1.6* when using asphalt concrete pavement.

Specify solid sawn timber for smaller timber members, such as posts, rails, etc..

It is more cost effective to use solid sawn timber for smaller members than glued laminated timber.

1.8.3 Timber Connections

C 1.8.3

Use of the **Weyerhaeuser clip** to connect timber decking to timber beams allow for easy fabrication and installation of the timber members.

Use steel diaphragm beams, as opposed to timber diaphragm beams, between longitudinal glued laminated timber beams.

Use slotted holes whenever possible in the steel connectors.

This allows for shrinkage and expansion of the wood, and for construction tolerances.

1.8.4 Timber Rails

C1.8.4

A crash-tested rail has been completed for a longitudinal glued laminated timber deck bridge. Thrie beam railing can be used as an alternate in lieu of timber.

Several other glued laminated timber bridge configurations will be crash-tested in the near future.

1.8.5 Preservative Treatments

C1.8.5

Pentachlorophenol Type A (heavy solvent) or Pentachlorophenol Type C (light solvent) is recommended for most locations as a preservative treatment.

Eliminate all field cuts and bores when possible. Treat any field modifications with copper napthanate.

1.8.6 Field Installation

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Shop assembly of the timber bridge components immediately after fabrication is recommended to eliminate any possible future field installation problems, especially on more complicated projects.

Field staking of the structure before fabrication is recommended to eliminate any future installation problems.