



Timber Bridge Rail Maintenance Kit



Wood is an amazing material that exhibits both strength and durability as a structural material. Nevertheless, wood is subject to deterioration by a variety of agents.

Like any investment, a timber bridge must be inspected and maintained on a regular basis to maximize the investment. Yet most users simply install the structure and walk away, hoping that all will be well. If it is not, they blame the material, when in fact, lack of maintenance is probably a major factor in the decline. Over the life of a timber bridge, deterioration can be minimized by alert inspectors who identify and record information on structure condition and performance. With such information, timely maintenance operations can be undertaken to correct situations that could otherwise lead to extensive repair or even replacement. (Chapter 13, *Timber Bridges: Design, Construction, Inspection and Maintenance*, USDA Forest Service 1990.)

Some of the most visible wood deterioration results from the action of the ultraviolet portion of sunlight, which chemically degrades the lignin near the wood surface. UV degradation typically causes light woods to darken and dark woods to lighten, but this damage penetrates only a short distance below the surface. UV light degradation of the end grain of a guardrail post will allow for minor surface erosion of end grain.

Effective bridge maintenance programs improve public safety, extend the service life of the structure and reduce the frequency and cost of repairs. **Preventative maintenance** involves keeping the structure in a good state of repair. At this stage decay has not yet started. (Chapter 14, *Timber Bridges: Design, Construction, Inspection and Maintenance*, USDA Forest Service 1990.)

Early remedial maintenance is performed when decay or other deterioration is present. At this stage, more severe structural damage is imminent unless corrective action is taken. Moisture control is the simplest, most economical method of reducing the hazard of decay in timber bridges. It can be used as an effective and practical maintenance technique to extend the service life of many existing bridges. When exposure to wetting is reduced, members can dry to moisture contents below that required to support most fungal and insect growth. Moisture control was the only method used for protecting many covered bridges constructed of untreated timber, some of which have provided service lives of over 100 years.



MOISTURE CONTROL

Moisture control is the simplest, most economical method of reducing the hazard of decay in timber bridges. It can be used as an effective and practical maintenance technique to extend the service life of many existing bridges. When exposure to wetting is reduced, members can dry to moisture contents below that required to support most fungal and insect growth (approximately 25%). Although modern timber bridges are protected with preservative treatments, decay can still occur in areas where the preservative layer is shallow or broken. This damage is the major cause of deterioration in timber bridges.

Moisture control involves a common sense approach of identifying areas with visible wetting or high moisture contents, locating the source of water, and taking corrective action to eliminate the source.

COPPER NAPHTHENATE SURFACE TREATMENTS

Originally developed in the 1940's, copper naphthenate is produced by complexing copper with naphthenic acid derived from petroleum. As with pentachlorophenol, it can be blended with several types of oil solvents and has performed well in long-term stake tests. Its primary advantage is that it is considered an environmentally safe preservative and is not currently included on the EPA list of restricted-use pesticides. It is insoluble in water and is leach resistant. It remains permanently "fixed" in the wood cells. It has no measurable vapor reassure and cannot evaporate. Studies on various wood species that have been treated with copper naphthenate formulations show it meets or exceeds the service life of penta and other preservatives.

The American Wood-Preservers' Association Standard M4-84 "Standards for the Care of Preservative-Treated Wood Products" states that copper naphthenate in a P9 solvent at 2% concentration of copper metal is approved for retreatment of wood originally treated with pentachlorophenol, creosote and water-borne preservatives.

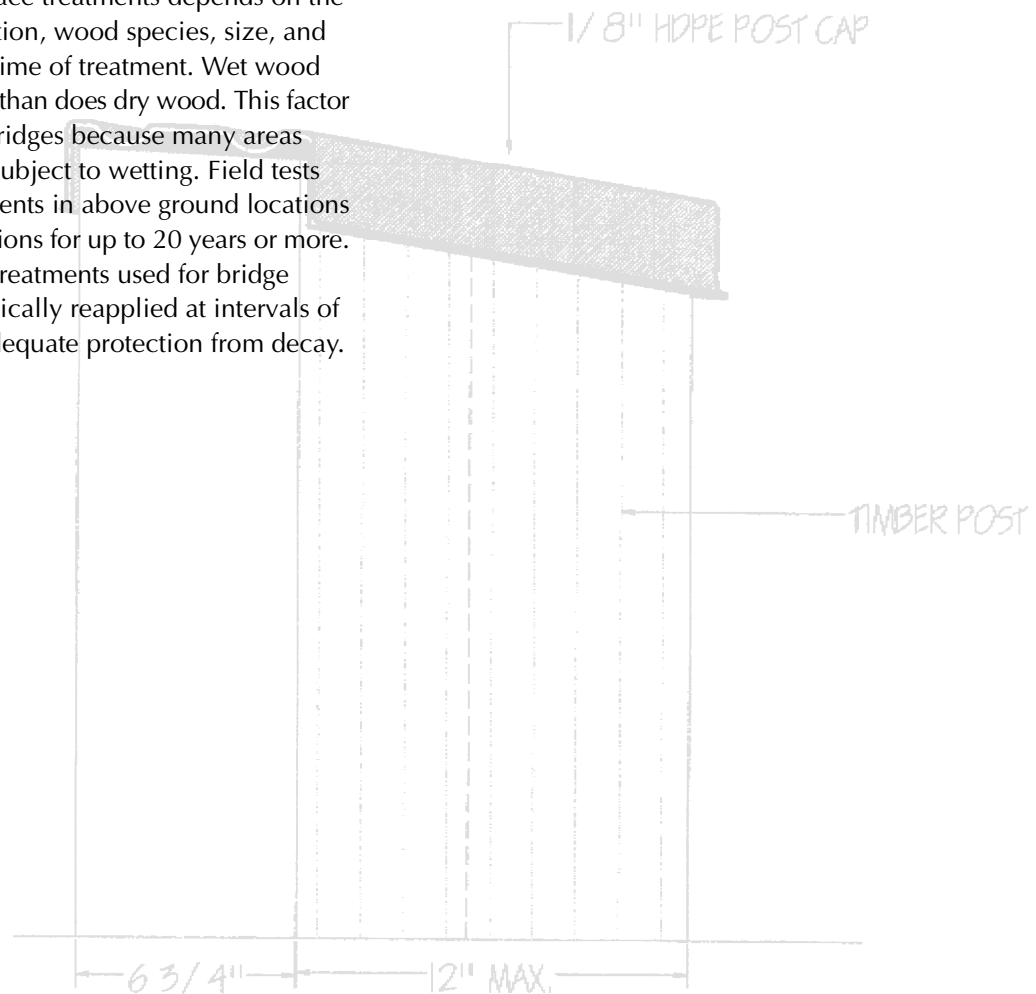
The effectiveness of surface treatments depends on the thoroughness of application, wood species, size, and moisture content at the time of treatment. Wet wood absorbs less preservative than does dry wood. This factor is significant in timber bridges because many areas requiring treatment are subject to wetting. Field tests show that surface treatments in above ground locations can prevent decay infections for up to 20 years or more. It is recommended that treatments used for bridge applications be systematically reapplied at intervals of 3 to 5 years to ensure adequate protection from decay.

TIMBER BRIDGE POSTS

The timber bridge post is very vulnerable to ultraviolet light degradation. The post's exposed end grain also allow for frequent wetting and drying cycles which hasten deterioration.

LCI has developed a post cap which shields the timber post from UV light while sheltering the end grain from wetting at the same time. The LCI post cap has been designed and manufactured to meet the following requirements:

- A. Manufactured from 1/8" high density polyethylene plastic, color black.
- B. Cap configuration shall allow for air circulation to the top of timber posts on all four sides.
- C. Cap connection to the post shall be made so that the fasteners do not allow moisture intrusion to top of post. Connection is made at side of post.
- D. Drip edges shall be provided on cap for the post sides and back.
- E. Water channel on top of cap will facilitate run-off and provide for air circulation beneath cap.
- F. Fasteners shall be provided for connecting cap to post's sides.



SUMMARY

1. Moisture Control is a simple and inexpensive approach assuring long life to your timber bridge railing.
2. Field Treating of timber rails and posts with Copper Naphthenate and installing post caps will provide the corrective action to keep the moisture content low.
3. Both field treating and post cap installation can be accomplished with Town or County Highway Department labor.
4. The costs will prove to be incidental in comparison with replacement costs.

AVAILABILITY

POST CAPS:

- Stock size post caps are available for 6.75" and 8.75" glulam posts.
- Post caps for odd sized posts are available upon request.
- Call for current price list.

FIELD PRESERVATIVES:

- Copper naphthenate is available in pint spray bottle (singles or by case of 24). It is also available in 5 gallon pail.
- Call for current price list.



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