



## The “Snowshoe”

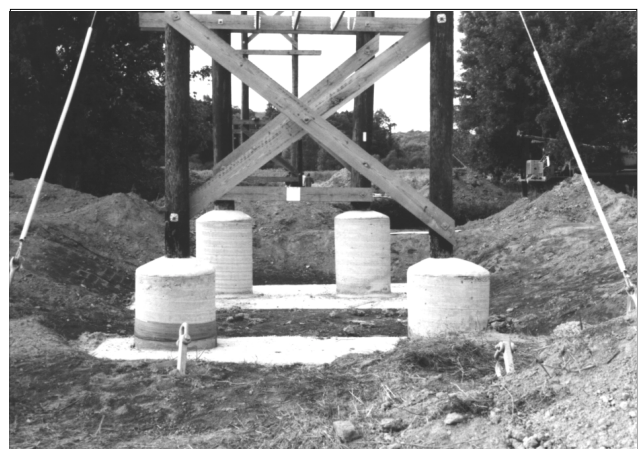
The snowshoe is composed of the following:

- Compacted crushed stone.
- #18 rebar threaded through pole butts.
- Two-way lattice of #6 rebar, with perimeter #3 rebar.
- Chance® Helical Pier anchors with thimble eye ends.
- Tensar® UX-1400 Geogrid to #8 rebar.
- Bituminous waterproofing on poles.
- Spikes and lag screws set into poles.
- Universal pole band and #5 dowel bar connection.

Photos 31 and 32 show the foundation after the 4,000 PSI concrete was placed, but prior to backfill. Three-foot diameter sonotubes were used to form the circular concrete “collars” around the poles, dowels, and cable



**Photo 31.** Foundation after concrete had set, but before backfill. *Photo courtesy of Mr. Tibor Latincsics.*



**Photo 32.** East foundation before backfill. *Photo courtesy of Mr. Tibor Latincsics.*

bands. The concrete was placed by the Mountainview correctional facility detail #11 work crew under the supervision of Mr. Wes Powers. The east tower was accessible by the concrete trucks. The concrete was pumped across the Pochuck Creek for the west foundation. Pea gravel was used for the concrete aggregate in lieu of the normal coarse aggregate to make the pumping easier. The rental cost of the concrete pumper was \$635 as compared to the \$960 value of the concrete it pumped.

As indicated on Plan Sheet 5 and in photos 31-33, the concrete “collar” about the tower poles was extended approximately 2 feet above finished grade and tapered so the top would drain. The concrete collar extension has several purposes. The first is structural. The taller the concrete collar extension, the shorter the Euler effective column length is. As previously discussed, the shorter the effective length is, the stronger a pole of a given cross-section is. There is also more area available for a mechanical, bearing, or friction connection between the pole and concrete. The concrete collar will also contribute to the durability of the poles by elevating the concrete-wood interface above the normal seasonal flood elevation of 395 feet. The transmission poles

meet the American Wood Preservers Association (AWPA) standard C4 for preservative treated poles. The retention for pentachlorophenol treated poles is .38 pounds per cubic foot (PCF). It is generally recognized that such treatment can result in a useful field life of up to 50 years. The last 8 feet of the butt ends of the poles are treated to a higher level due to the incising. The upper portions of the poles will always quickly air dry. Raising the concrete collar-pole interface places the wood-concrete joint 2 feet above the ground line to limit moisture and allows the joint to air dry.

Adding to the durability of this critical location is a phenomenon well-documented by the following photograph. After treatment, transmission poles are stored on their sides. When the poles are installed in the vertical



**Photo 33.** Tower pole and concrete collar connection. Note taper of concrete. Photo courtesy of Mr. Tibor Latincsics.

position, the excess pentachlorophenol solvent migrates down to the base of the poles. This is the discoloration on the concrete collar in photo 33. There are two perspectives to this, the first is “good — that is where the preservative will do the most good,” which is true. This migration also keeps the pole base from shrinking as it dries. The second perspective is an environmental concern. The reader is referred to an excellent reference titled “*Best Management Practices for the Use of Treated Wood in the Aquatic Environments*” by the Western Wood Preservers Institute. This technical reference summarizes that the migration and leaching of preservatives into the aquatic environment is an environmental concern when there are large volumes of treated wood immersed in poorly circulating bodies of water, such as bulkhead lagoons. In the Pochuck Quagmire case, there are eight poles in the floodplain of a creek with a 93 square mile drainage area. This is a very small quantity of treated wood in a location of excessive run-off and circulation. Designers of future projects are advised to consider the aesthetic and environmental impacts of leaching preservatives. One obvious management practice is to store the poles in the vertical position prior to installation.

Photo 33 also shows how the 3-inch by 10-inch cross members were positioned so that the “crest of the cup” is toward the spike grid. If the member continues to “cup,” it shall only embed deeper into the spike grid.

## Backstay Anchorages

A major problem that faced the project was how to secure the backstay of the catenary cables as well as the guylines. The backstay design tension load is when the bridge is fully loaded with 110 people weighing 180 pounds each (60 PSF) during a 30-inch snowstorm (18 PSF) is 23,455 pounds. This topic will be addressed in the cable design portion of this publication. It was determined that a safety factor of 3 against the full design live and dead loads, as is typical for foundation elements, would be appropriate for the anchorages. This would require 70,000 pounds of tension resistance for the backstays.

In normal situations, the backstay anchorages are enormous “deadmen” buried deep in the earth. This is true from colossal spans to simpler footbridges. The Brooklyn Bridge uses a deadman method originally developed