

Project Overview



**TESTS OF TIMBER UTILITY POLES RETROFITTED WITH
PILEMEDIC™**
Location: Tucson, AZ
Completed: November 22013

PROBLEM

Over time, climate changes, insect infestation, inadequate maintenance, and other related factors start to deteriorate timber utility poles. The result is a continuous weakening of the poles, leading to a large number of failures every year in storms, tornados, hurricanes, and other natural disasters. Failure of utility poles leads to disruption of service to customers and continues to remain the major concern for utility companies that own and operate these poles.

There are other instances in which additional equipment and distribution lines need to be added to poles and an increase in pole strength is needed. Furthermore, replacing poles under these circumstances involves intensive labor, equipment, and increased safety hazards.

SOLUTION

A class 3, 45-ft wood distribution pole was tested at Tucson Electric Power (TEP) facilities; the pole broke at a load of **1,070 pounds** at a point 5-ft above ground. The broken pole was subsequently repaired up to a height of 20 feet and it was re-tested. Repair consisted of providing QuakeWrap™ GU50C Carbon Laminates along the pole for increased flexural strength. A PileMedic™ Laminate was then used to create a 4ft tall cylindrical seamless shell and was then lowered into the trench. Saturated VB26G glass fabric was wrapped 360 degrees around the pole up to a height of 20 feet above ground.

Low Viscosity Resin was then injected to fill the annular space and to penetrate voids in the pole. This procedure makes the carbon laminates become an integral part of the pole and produces a solid section increasing the flexural (bending) strength of the pole. The repaired pole was tested and broke at a load of **2,400 pounds** at exactly where the repair had stopped (i.e. 20 feet above ground). This was 2 ¼ time more than the original failure load!

Additional tests are planned in collaboration with TEP to develop design guidelines for such repairs.

TECHNICAL HIGHLIGHTS

- Timber poles can be repaired and strengthened in service.
- The strength of a retrofitted timber utility pole is similar to the strength of a steel pole.

CREDITS

Sponsors: QuakeWrap, Inc. and Tucson Electric Power.

To watch a video of the test, please go to this link: goo.gl/vxf1Mx



Original pole failed at 1,070 pounds



Broken pole being repaired with Carbon FRP and PileMedic™



Repaired pole was tested and failed at a load of 2,400 pounds!



“The Future in Pole Renovation”