

# City of Harper, Kansas

## Historic Water Standpipe

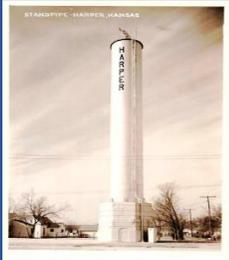
### Foundation

#### Stabilization Project-Case Study

Since 1973



*Dry Out & Foundation Repair*



The 125-foot tall and 135,000-gallon standpipe was constructed in 1887 and has been in continuous operation since 1907. The original foundation base is limestone. In the early 1900's the limestone base was encased in concrete.



This base is octagonal shaped with each side being approximately 10 feet wide and 20 feet high. In the 1950's the concrete base was wrapped with five (5) steel bands to help stop the shifting that was being seen.

Since 2013 the city had been monitoring the rate of deterioration of the foundation in its current state. While no major shifts have occurred, there were signs of the exterior concrete deteriorating.

Lamunyon Dry Out and Foundation Repair was called in to provide a solution. Lamunyon recommended wrapping the concrete base in two layers of 24-inch-wide carbon fiber straps, a horizontal layer followed by a vertical layer. Many hours were spent on prepping the surface for the carbon fiber, attention was given to detail as well as safety.

Logistical issues were overcome as the steel bands were only removed after the carbon fiber had been installed working from the top down and the bottom up. Carbon fiber straps possess a tensile strength of 711 ksi (711,000 psi) upon application and are 10 x stronger than steel.

*Lamunyon Dry Out & Foundation Repair was contacted to assist in stabilizing our historic standpipe water tower. Lamunyon uses a process called Carbon Fiber Strapping and suggested using this on our tower. We worked with Ed who was very attentive and explained the whole process thoroughly. The crew that came to work on the tower kept us well informed during the process. Once completed, a few defects were discovered which Lamunyon handled immediately and professionally. The tower looks amazing and we feel we will get many more years from it now that the work has been completed. We would recommend Lamunyon! - Karen Befort*



The carbon fiber is susceptible to UV light and if installed outside needs to be sealed to be protected.