KANSAS DEPARTMENT OF TRANSPORTATION

TECHNICAL SUMMARY

LATERAL CAPACITY OF ROCK SOCKETS IN LIMESTONE UNDER CYCLIC AND REPEATED LOADING

Report Number: K-TRAN: KU-09-6

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Publication Date: August 2010

Introduction

Drilled shafts are a type of deep foundation that is capable of supporting very large vertical and lateral loads. Drilled shafts are constructed by drilling a hole from the ground surface to the target depth or formation and filling the hole with reinforcing steel and concrete to create a reinforced concrete column from the surface to the desired depth.

This report contains the results from a full scale lateral load test of two short rock socketed shafts in limestone, and the development of recommendations for p-y analysis using those results. The shafts were tested under cyclic loading (load reversal) at loads up to 400 kips; repeated loading up to 800 kips, and to failure near 1000 kips. A detailed description of the testing, analysis, and p-y curve recommendations is provided.

Project Objective

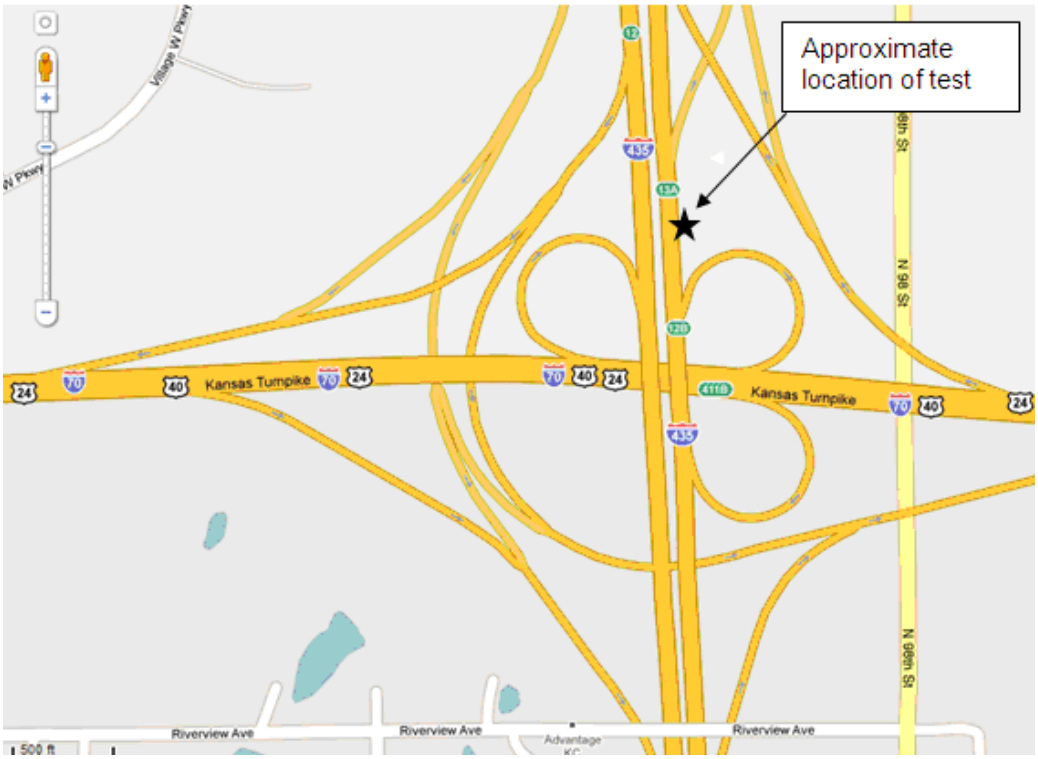
The purpose of this project was to test the lateral capacity and develop p-y curves for limestone in Kansas.

Project Description

Two short shafts 42 inches in diameter were constructed to depths of six to seven feet in limestone in Wyandotte County, Kansas. The shafts were loaded laterally during three separate test events in 2009. During the first event, the shafts were loaded in a cyclic manner (load reversal) at multiple increments up to 400 kips. The shafts were then loaded in one direction to 550 kips. The equipment was then reconfigured and the shafts loaded to 800 kips with repeated loading-unloading cycles at 600 and 800 kips. The loading frame was then reinforced and the shafts were loaded to failure, which occurred near 1000 kips.

Project Results

Analysis of the data showed that commonly used p-y curves included within the LPILE software could be used to develop an accurate model of the static behavior of the shafts. Cyclic loading



of the shafts had little effect on shaft capacity at lower loads; however permanent deformation began to accumulate at loading levels between 40 and 60 percent of ultimate capacity.

Report Information

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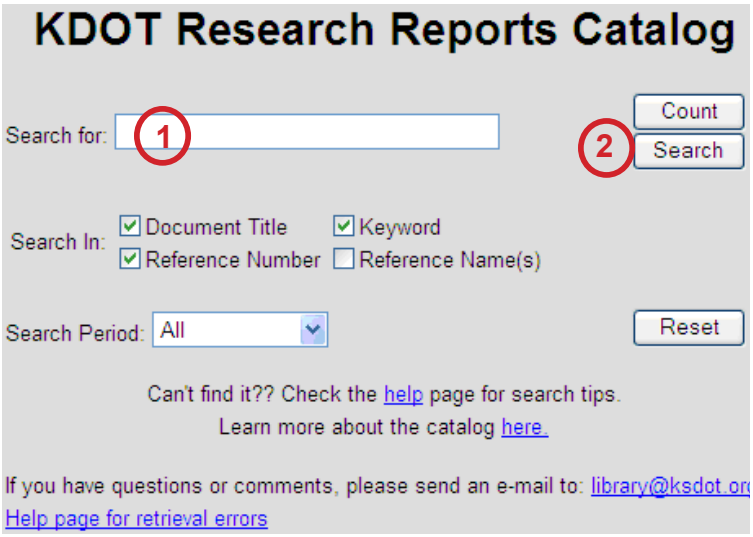

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