

# CHANCE<sup>®</sup>

## A CASE HISTORY

# Helical Pulldown<sup>®</sup> Micropiles Report

<b>Project:</b> TVA Substation Shelby County, TN	<b>Geotechnical Engineer:</b> QORE Property Sciences, Nashville, TN	<b>Structural Consultant:</b> Mesa Associates Chattanooga, TN	<b>Contractor:</b> L. E. Myers Chattanooga, TN	<b>Distributor:</b> Foundation Technologies, Inc. Tucker, GA
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The consultant Mesa Engineering contacted A.B. Chance application engineers during their cost analysis for the Tennessee Valley Authority's new 500kV substation to be built near Memphis, TN.

### Problem Soil Conditions:

Soft silty clay ( $N < 5$ ) extended from the surface to a depth of 30 to 35 feet. This soft layer was underlain by very dense clayey gravel. A deep foundation of some type was required to transfer the loads from the substation structures, through the soft silty clay layer, to the very dense clayey gravel layer below.

Deep foundation options included driven concrete piles, cast-in-place concrete and the Chance<sup>®</sup> Helical Pier Foundation System. The latter proved to be the most economical of these potential solutions.

### On-Site Testing:

An SS175 pile was selected for a test. A.B. Chance application engineers suggested the SS175 pile alone was not adequate for the required ultimate load of 100 kip in this particular soil. However, at the request of the client, an SS175 was installed to 9,500 ft.-lb. by local A.B. Chance certified dealer, Kermit Buck and Sons, and then tested. At a compression load of 60 kip, the anchor buckled in the soft silty clay layer.

A.B. Chance application engineers recommended the Helical Pulldown<sup>®</sup> Micropile (HPM) to significantly increase resistance to buckling in soft soils at a typical cost of only 15 to 20 per cent more than the standard anchor. This HPM consisted of an SS175 lead with 8, 10 & 12 helices, a single 14-inch helical extension and 35 feet of plain extension shafts for a total installed depth of 45 feet. The upper 33 feet was encased with a 5-inch diameter grout column.

A test pile of this HPM was installed by the local A.B. Chance certified dealer within 8 feet of the first test pile (standard SS175). A compression load of 125 kip was applied to the HPM before the reaction anchors started to pull out.

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(A.B. Chance, a Division of Hubbell Power Systems, Inc.)



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**Solution Results:**

A.B. Chance conducted a training seminar for the substation's general contractor, L.E. Myers, and certified that company as qualified to install the Helical Pulldown® Micropile system.

The A.B. Chance civil construction distributor in the area, Foundation Technologies, Inc., had inventory on hand to start the project. A total of 388 HPM were installed with an average production rate of 20 micropiles being completed each day.

This rate of production, ease of installation and comparative economy versus alternative methods reaffirmed TVA's decision to use the Helical Pulldown® Micropile as their deep foundation solution.



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