

A CASE HISTORY

Project: ATS Mobile Telephone, Inc. tower Omaha, NE

Geotechnical Engineer: Professional Services Industries, Inc. (PSI), Omaha, NE

Structural Engineer: Steve Moffitt, HGM Associates, Omaha, NE

Contractor: Geotechnical Services Inc. Omaha, NE

Job Description:

Repairs were needed on this 420-ft. tall tower in downtown Omaha for two reasons:

1. Cellular equipment was being added to it for more than one new carrier.
2. Original construction was not performed according to design.

The original design called for concrete supports to go down 35 ft. through 15 ft. of fill and onto glacial till. Instead, the concrete actually went down 15 ft. and onto weak clay soils.

Potential failure included possible toppling of the tower onto an adjacent Interstate highway.

Repair:

Helical Pulldown® Micropiles were selected as deep foundations to attain the 100-kips-per-pile capacity required with minimal disruption and no delays due to the winter season. This solution also was the most economical.

The Helical Pulldown® Micropile size and configuration used was the SS175 (10,000 ft.-lb. maximum torque rating) with a three-helix lead section (8", 10", 12" diameters) and a 14"-diameter single-helix extension. To reach the overall depth of 42 ft., 7-ft. plain extension shafts were added to each pile. To pull down the grout column, the first extension had a 7" displacement disc and all others had a 7" centering disc affixed at each coupling.

This Helical Pulldown® Micropile was considered a composite pile in that its load capacity was a function of both the end-bearing capacity of the helices and frictional capacity of the 7"-diameter grout column. Estimated total ultimate capacity was 140 kips.

At each of the three tower legs, four Helical Pulldown® Micropiles were installed. They were installed at a 10° batter to avoid the down-hole bell on the original concrete supports. This also kept the pile



continued on other side . . .

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tops close together to be tied into the reinforced-concrete caps.

Production Pile Installation:

The piles were installed using a Bobcat 873 skid steer with a 12,500 ft.-lb. drive motor and a pressure gauge torque indicator. The grout mix consisted of 94 lb. of Type I/II Portland cement, 15 lb. of silica fume and 15 oz. of plasticizer, plus 1 lb. of fiber mesh per cubic yard of grout. The grout was mixed on site in a stationary drum cement mixer.



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