

CHANCE®

HELICAL PULLDOWN™ Micropiles Report

A CASE HISTORY

Project: Railroad over a Watermain, Toronto, ON	Geotechnical Consultant: Soil Mat Engineers and Consultants Hamilton, ON	Consultant: DS-Lea Associates, Ltd. Toronto, ON	Contractor: EBS Engineering Construction Breslau, ON
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The Problem:

A Canadian Pacific Railway track was to be rerouted, crossing a shallow 48-in. diameter watermain at two locations. It was decided to construct a large reinforced-concrete structural slab at each location to bridge the watermain. To support the slab on each side of the watermain, conventional spread footings were chosen at first, but rejected because of the many adjacent underground services.

Caissons were not considered suitable because the fine native soil could create a "boiling" condition in the bottom of the caisson excavation. Furthermore, vibrations from caisson installation and the removal of soil and distressing of the ground around a caisson excavation could cause underground services to settle or be displaced. For similar reasons, also rejected were the uses of drive piles, minipiles and auger press piles.

The Solution:

Chance HELICAL PULLDOWN™ Micropiles were selected for their many advantages, including: The lack of vibration and their low-noise installation, no removal of soil, their ability to be installed in close proximity to underground services and measurement of installation torque confirms the capacity of each pile.

A total of 41 SS200 and seven SS175 HELICAL PULLDOWN™ Micropiles were installed at one location and 28 SS200 at the second location, all terminated with New Construction brackets. All piles consisted of a three-helix configuration. A 6" diameter grout column around the shaft was sleeved with steel pipe above the helices as a precaution against soil being washed away from the pile in the event of the watermain leaking. Installation depths varied from 23 to 30 feet. The SS200 design load of 60 kips and ultimate load of 120 kips was confirmed prior to project startup by a load test per ASTM D1143-S1, 24-hour standard test method for piles under static axial compressive load.



A reinforced-concrete grade beam was constructed over each line of HELICAL PULLDOWN™ Micropiles and a precast-concrete structural slab was placed on the grade beams. The railway tracks can be shut down and the slab removed when the watermain requires servicing in these areas.



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