INTRODUCTION

A helical pile consists of a central shaft, and one or more formed steel plates (helixes) welded to the shaft. A round shaft diameter varies between 2 7/8" and 36" while a helix diameter varies between 6" to 48".

- Helical piles resist a variety of axial loads ranging from 5 Kips to 500 Kips.
- The advantages of helical piles include their high compressive and uplift capacities; the high speed of their installation (5 – 8 piles per hour); suitability for construction in very limited access conditions; installation in frozen grounds to swampy soils; unlimited pile length; vibration-free process; smaller equipment to install; and their cost effectiveness.
- Helical piles are used to support residential, commercial and industrial facilities.

PILE LOAD TESTING PROGRAM OVERVIEW

- Test site is located at STG yard in Anchorage, Alaska, USA.
- Total of four tests were carried out including two tests for driven steel piles and two tests for screw piles. Both axial compression and tension tests were carried out.
- Soil is very dense sandy gravel soil.
- The axial compression load testing performed using Procedure A for quick tests for piles under axial compressive (ASTM D1143-07). The axial tension load testing followed a Procedure A for quick tests (ASTM D 3689-07).

TEST RESULTS

Helical piles with a relatively small shaft diameter were successfully installed into very dense sandy gravel soil and resisted high compression and tension loads.

- Helical piles provided larger compression capacities compared to driven piles by up to 300%.
- The ultimate uplift resistance of a helical pile was about 430% higher than that of driven steel pipe pile.
- The unit skin friction for both helical piles and driven piles was similar despite the differences in installation techniques.