TECHNICAL PRESENTATION
October 11, 2023

Chance Helical Pile Systems
Presented by Mr. Josh Lindberg with Helical Concepts, Inc.

BIO: After graduating from Texas A&M – Commerce, Josh worked on a crew for almost 10 years for Hargrave & Hargrave, Inc. After gaining enough experience, he was hired by Helical Concepts, Inc., as a field technician, and along the way, gained more technical insight into helical piles and various applications. His technical background was provided by Rich Thorsten, P.E., of A.B. Chance Company, and once Rich left to start his own consulting firm, they continued their business relationship up until his passing. Josh has worked on projects of varying scopes, from a single pile for a light pole to multi-million projects involving several thousand helical piles. He continues to do field work which includes load tests, training, and on rare occasions, carrying and installing Chance Helical products. In his spare time, he enjoys physical exercise, waterfowl hunting, and spending time with his three boys.

ABSTRACT: Mr. Josh Lindberg discussed Chance Helical Pile Systems. Chance anchors were invented in 1907 and engineered and developed into helical piles, the first foundation stabilization system designed for remedial repair. Helical piles offer several benefits including limited area disruption, low impact, no vibration, no spoils, flexibility for site restrictions including overhead clearance, reduction of overall time and cost, field measurable torque, relatively low cost with immediate load carrying capacity, and scalability. Square shafts can be used in guying, new construction, foundation repair, and earth retention. Installation equipment is small and efficient with better penetration in dense soil. However, square shafts have a low passive lateral capacity, and buckling in soft soils is a concern. Pipe (round) shafts with low displacement can be used in new construction, foundation repair, substation, and transmission. Advantages of round pipe helicals include lateral load resistance, end-bearing load transfer at the pile tip via helix plates, and stability against columnar buckling or unsupported length. However, there is reduced penetration in firm, hard, and dense soils, and the torque correlation factor is inversely related to shaft diameter. Pipe shafts with medium displacement can be used for higher axial capacity, end-bearing load transfer at pile tip via helix plates, side resistance via skin fraction on the shaft and high lateral resistance increased via battered piles. However, large equipment is required for installation (up to 35-ton machines), penetration is reduced in hard, dense soils, the cost is higher per kip, and the torque correlation is not as well defined. Pipe shafts with large displacement have an increased advantage of high passive lateral capacity and are generally one-piece piles. However, even larger equipment is required (up to 50-ton machines), there is reduced penetration in hard, dense soils, it has the highest cost per kip, and the torque correlation is unknown. The third shaft type is the Combo Pile, combining the advantages of square and pipe shafts. The combo pile increases the correlation factor and can be used in soil profiles with soft or loose overburden.

However, the combo pile torque strength is limited by the lowest rated element. The fourth shaft type is the grouted shaft helical displacement pile. These piles prevent columnar buckling in very soft soil, increase axial capacity, increase axial stiffness of pile shaft, and provide the lowest cost per kip in most situations. They also reduce the pile length required, enable the use of a smaller shaft and therefore small installation equipment, and achieve the required capacity when end bearing is not enough. These shafts also provide corrosion resistance. Disadvantages include refusal in dense soil or obstructions, and more labor with increased cost of grout.

Standard helix diameters include 3” pitch and 6” pitch. Terminations are pile to structure and pile to concrete pad for new construction. Conditions of installation that must be considered for pile shaft design include axial end-bearing capacity, penetration into desired geologic strata, buckling concerns, lateral loading, corrosion potential, tension-only loads, reversing loads, and load-deflection response. HeliCAP v3.0 Helical Capacity Design Software was presented as a way to design helical capacity, collaborate on shared jobs, and input up to 10 soil profiles in a single job. Chance Torque Indicators with wireless smart device app connectivity was presented as a way to remotely monitor and log torque data. Design examples and cases studies were then presented for a more complete understanding of Chance Helical Pile Systems.

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