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MacLean Power Systems' Excalibur Displacement Piles

MacLean Power Systems (MPS) offers a full product line of displacement piles for high capacity deep foundation applications. These products have been safely and effectively used in a wide range of applications traditionally occupied by micropiles, augercast piles, driven piles, and similar foundation technologies.

The MPS Excalibur Displacement Pile (EDP) system offers the advantages of Displacement Piles with greater load support than other commonly available systems. EDP's can be safely and effectively installed in areas with limited access where specialized equipment for other deep foundation systems may be required and become less economical. Overhead access, limited site availability, low disturbance installations, shorter overall pile lengths, and projects requiring no use of grout/concrete are all situations where the EDP can be a valuable tool for your project. Please see the below load capacity chart for commonly available pipe sizes.

By taking advantage of EDP's long lead and extension section lengths (up to 40') you can drastically reduce the pile's cost per foot (cost per kip). Reducing the number of pile sections/joints also brings down the overall material handling and jobsite labor hours. These advantages make MacLean EDP's an economic solution to many deep foundation applications.

Excalibur Displacement Pile Capacities Chart

Pipe OD (in)	Wall Thickness (in)	Ultimate Compression and Tension Capacity (kips)	Maximum Installation Torque (ft-lbs)	Estimated K_t factor (ft ⁻³)
4.5	0.290	184	35,000	6
5.5	0.415	318	65,000	5
7	0.408	406	122,000	4
7.625	0.500	537	150,000	3.9
9.625	0.545	746	250,000	3.1

EDP's can be utilized in a wide variety of soil conditions. They are fabricated of high strength steel and can withstand large amounts of torsional forces, enabling them to penetrate through tough, dense soils. By increasing the number and size of drive plates and the diameter of the steel shaft in the pile design, EDP's can generate tremendous axial and lateral resistances even in poor, low consistency soil conditions. These piles can greatly reduce or eliminate the amount of concrete in the structure's foundation. As opposed to excavating and disposing of upper non bear strata to pour large amounts of concrete or structural fill, an EDP can be used to bear on deeper, denser soils.

These piles can be modeled using steel-to-ground friction factors and Terzaghi's general bearing formula. The estimated axial capacity of the pile can be determined by recording the average installation torque over the final 3 feet of the installation. This figure can then be multiplied by the shaft's specific torque factor (K_t) shown in the table above. These K_t factors have been studied extensively and are an approximation based on hundreds of pile installations and subsequent load tests. The below table can be used to determine the size of pile required by your project. A review of the geotechnical data for the project should be done to determine the in situ capacity of the pile.

Regardless of your project's specific requirements, the representatives/engineers at MPS will work with you to provide an economical deep foundation solution to fit your needs.



Applications

The EDP has been used successfully in traditional Displacement Pile applications. It is a proven economical solution in the below job types where axial loads exceed the capacities of traditional piles. The larger cross-sectional area and higher-grade steel of the EDP offers much higher lateral and moment capacities along with minimal pile head deflection as compared to traditional Displacement Piles. These benefits, in conjunction with EDP's efficient installation, make it an ideal deep foundation solution.

Sites with and without overhead restrictions:



Bridge abutments:



Transmission tower and monopile pile groups:



New build foundation construction:



Oil and gas pipe racks and tank support:



For more information on the products shown here please visit
macleancivilproducts.com/product/high-capacity