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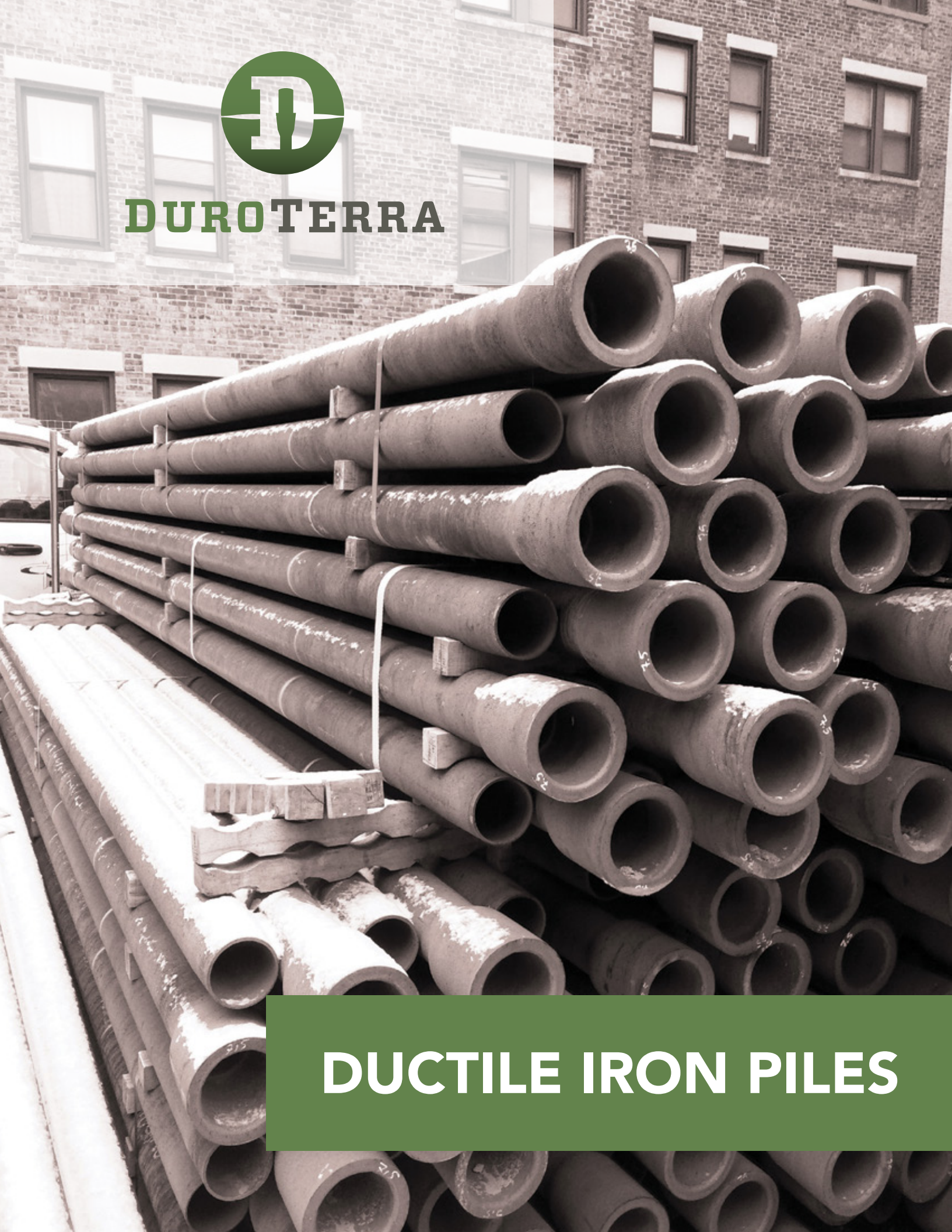


DUCTILE IRON PILES

DUROTERRA

DUCTILE IRON PILES

MODULAR, FAST AND VERSATILE LOW-VIBRATION DRIVEN PILES

Designed to resist both compression and tension loads in either end-bearing or friction, Ductile Iron Piles (DIPs) are a proven, cost-effective solution to support foundation loads in a variety of problematic soil conditions across multiple applications including foundations, floor slabs, tension, tanks, solar, wind and underpinning.

DIPs are installed using an excavator-mounted, high-frequency hydraulic hammer fitted with a special drive adapter that advances the pile into the ground using a combination of excavator crowd force and percussive energy from the hammer. The high-frequency ramming energy results in minimal vibrations, making the system an ideal deep foundation solution in congested urban areas.

Piles are manufactured in individual 16.4 foot (5 m) lengths and employ a proprietary Plug & Drive friction-locking connection system that ensures rapid pile connections in the field without costly and time-consuming splicing. The rapid connections result in accelerated foundation construction schedules and easily adjust to varying pile lengths to deal with changing bearing layer depths.

Ductile Iron Piles are available in various pile diameters and wall thicknesses; outside diameters are available in 3 ⅞ inch (98 mm), 4 ⅝ inch (118 mm) and 6 ⅝ inch (170 mm) sizes and thicknesses vary from 0.24 inches (6.0 mm) to 0.51 inches (13 mm). A series of manufactured accessories including driving shanks, drive shoes (end caps), couplers, bearing plates and pipeline saddles are also available for use during the installation process.

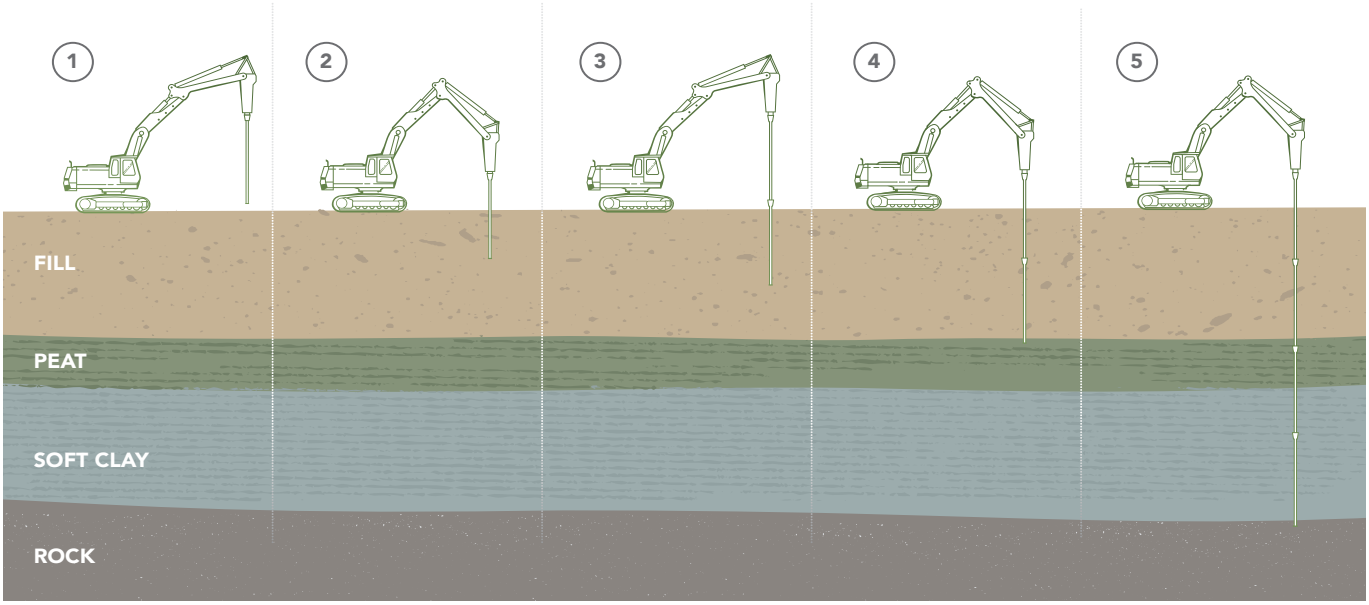
Ductile Iron Pile systems are designed to resist applied compression and tension loads in excess of 120 tons and 50 tons per pile, respectively, in either end bearing or friction. While the same Ductile Iron Piles are used in each system, the installation process and components do vary depending on the method selected for load resistance.

A COST-EFFECTIVE SOLUTION THAT CAN ADDRESS A WIDE-RANGE OF GEOTECHNICAL AND CONSTRUCTION CHALLENGES

INSTALLATION

Ductile Iron Pile installations are simple, fast and versatile. Using the Plug & Drive bell-spigot connection system to eliminate welding and splicing, piles are installed at rates of 600 to 1,400 linear feet per day. The modular 5 meter long piles are transported to sites with ease and require only limited room for laydown and stocking. The mobile equipment permits DIP installations in congested urban areas or commercial/industrial projects where site constraints and access are critical. Variable site grades or elevations are easily handled with DIP installations within footing excavations or at grade changes. With installations in a variety of soil conditions using End-Bearing or Friction techniques to develop capacity, the Ductile Iron Pile system exemplifies versatility.

END-BEARING PILES



1) End-bearing Ductile Iron Piles are installed by first inserting a flat or pointed driving shoe over the end of the hollow pile.

2) The pile is then driven into the ground using high-frequency impact energy (hydraulic hammer) until the belled Plug & Drive socket end is nearly at the working grade. The driving resistance (time required to drive each meter increment) is observed during driving.

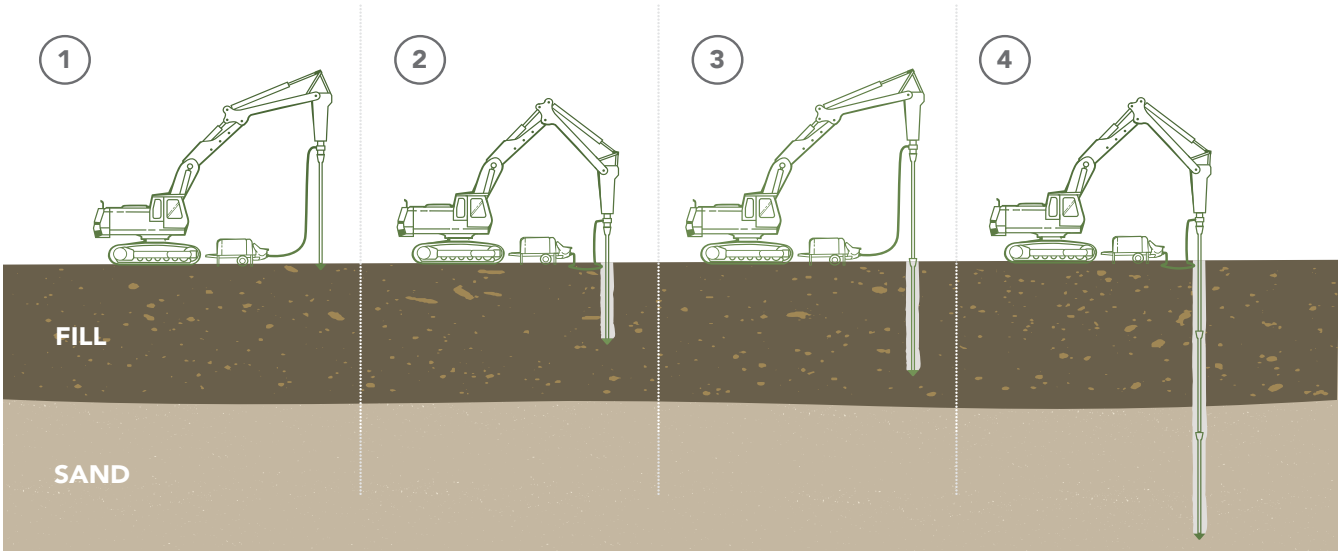
3) The spigot end of the second DIP is then inserted into the socket end of the existing pile.

4) The driving process is repeated.

5) This process continues until the pile terminates on refusal or achieves a required driving criteria (typically 1 inch in 50 seconds). If interior grout is being used, the grout is placed either after the pile achieves the required set or later in the process after multiple piles have been installed.

INSTALLATION

FRICTION PILES



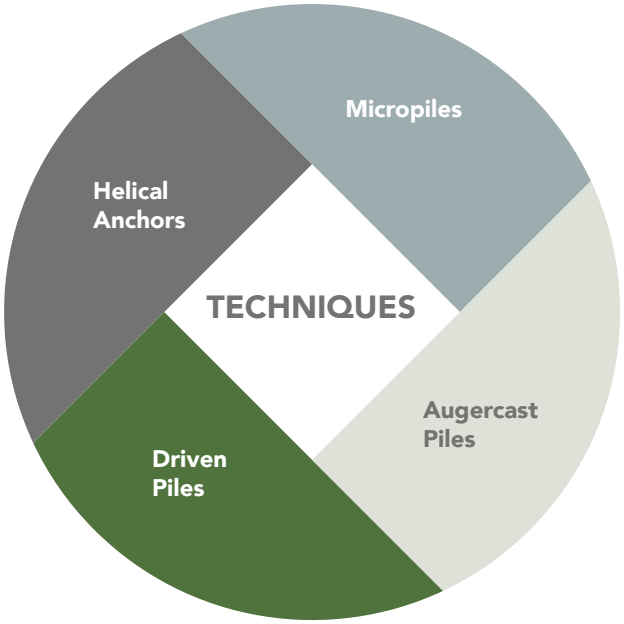
1) Friction Ductile Iron Piles are installed by first inserting a specially-designed patented conical end cap over the end of the pile. The conical end cap is designed specifically for grouting applications and is larger diameter than the outside pile diameter to facilitate grouting exterior to the pile.

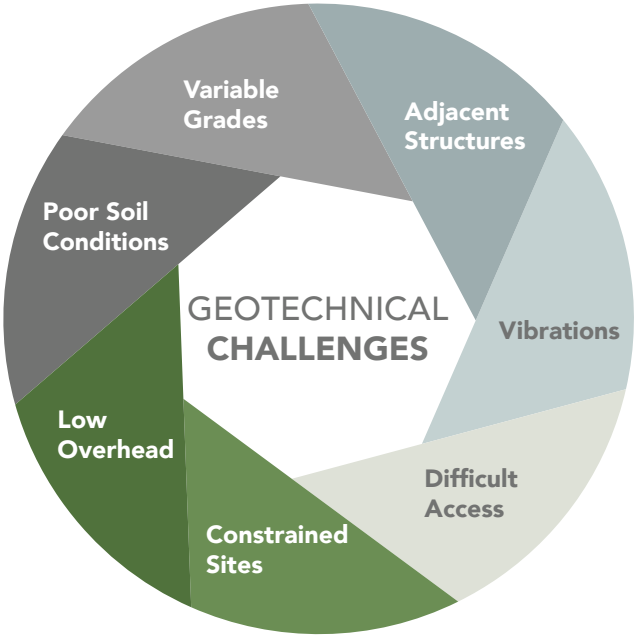
2) The pile is then driven into the ground using high-frequency impact energy (hydraulic hammer) with a specially-designed grout driving shank for the simultaneous pumping of grout. The grout fills the interior of the pile and travels out the conical end cap and alongside the DIP. The grout is pumped to maintain a grount return wile creating the grout/soil interface to provide efficient skin friction along the friction DIP.

3) The pile is driven and grout is pumped continuously until the Plug & Drive socket end is nearly at the working grade. The driving resistance (time required to drive each meter increment) is observed during driving. The spigot end of the second DIP is then inserted into the existing pile and the driving / grouting process is repeated.

4) This process continues until the pile extends to a sufficient design depth in the terminating layer to develop the required capacity from a friction bond zone.

WHEN TO CONSIDER DUCTILE IRON PILES





BENEFITS

Cost Effective

Often provide a 15-25% cost savings over traditional driven piles or drilled micropiles.

Rapid Installation

Daily production rates range from 600 to 1,400 feet.

Low Vibration

High-frequency driving process results in very low vibrations allowing installation to occur.

High Load-Carrying Capacity

Working capacities range from 25 to 125 tons in compression, and 20 to 50 tons in tension.

Flexibility

The Plug & Drive system allows for easy length adjustments in the field when faced with fluctuating bearing layer depths.

Easy Access

Mobile equipment and short pile sections allow for rapid work in constrained areas, sloping gound and limited lay-down areas.

Minimal Waste

The pile is cut-off once the design depth has been reached and the excess is used as the starter pile for the next location yielding virtually no waste.

Quality Installation

Load-bearing capacity and pile length are determined on-site through load testing and monitoring of penetration resistance and driving.

DUCTILE IRON PILE ACCESSORIES

Flat End Point

Rock Point

Conical Grout Shoe

Coupler

Pipeline Saddle

Bearing Plate

Driving Shanks and Grout Box

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FOR MORE INFORMATION VISIT WWW.DUROTERRA.COM
OR CONTACT YOUR REGIONAL PARTNER