

# Drill Displacement Pile & Auger Cast Pile

**DDP**



## Geologic Hazard Application

- Soft/Loose Soil
- Liquefaction
- Contaminated Soil
- Lateral Spread
- Slope Stability

Depth Limit  
85 ft (26 m)

Compatible Soils  
Sand (SP, SM, SC)  
Silt (ML, MH)  
Clay (CL, CH)  
Contaminated Soil  
Undocumented Fill

Bearing Capacity Range  
100 kips (445 kN)  
to  
500 kips (2224 kN)

## Key Advantages

Deep pile with ground improvement  
No vibration  
Low spoil  
High bearing capacity  
16" 18" 24" diameters  
Steel reinforcement

## Key Considerations

Deep Pile  
Grout with low spoil  
Concrete cleanup  
Flat stable pad  
Pile connections

## Comparable To

Concrete piers  
Driven piles  
Stone columns  
Soil-cement columns  
Torque piers

## Overview

**Drill Displacement Pile (DDP)** system is a deep, full displacement, structural pile, and ground improvement method used to support very heavy foundation loads. The DDP offers a well-defined, full displacement, steel-reinforced, concrete pile, with reliable, high capacity support of heavy foundation loads on soft soil. The large cavity expansion effect of the displaced soil produces the higher strength and ground improvement of the system. DDP construction produces low noise and no vibrations with low spoil from the displacement tool. A DDP is used in the same way as a driven pile; to support heavy structures on soft and weak soil at deeper more competent soil. The DDP gains strength at deeper soil for high end bearing capacity and through soil layers to achieve high side friction capacity and end bearing. DDP strength is greatly enhanced by the displacement of soil laterally and the pressure grout effect during construction. DDP is essentially the "spoil-less" and higher capacity version of auger cast pile.

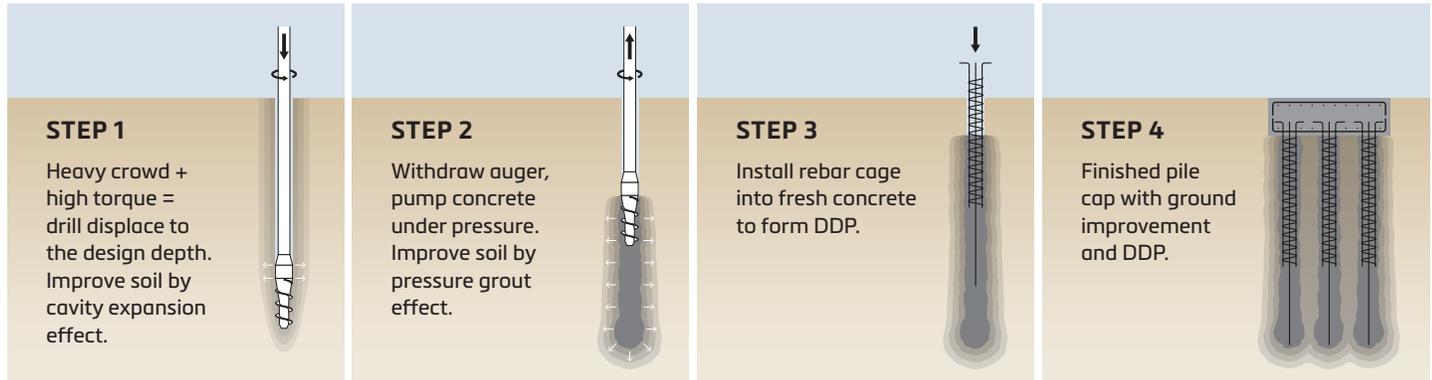
## DDP Applications

Support structural slabs, high load density pile caps, structural mats, slope/embankments, and industrial foundations. The ideal applications for DDP occur at:

- 1) Soft and loose soil sites and bay mud/sensitive soil sites.
- 2) Contaminated soil and undocumented debris fill sites.
- 3) Groundwater protection regions.
- 4) Sensitive project sites near critical structures.
- 5) Sites near occupied offices and in dense urban areas.



## DDP 4-Step Construction Process



## Technical Details

The **Drill Displacement Pile (DDP)** method is a great improvement to common auger cast pile construction. The DDP displacement tool is shaped to laterally displace and compact the soil at the edges into the ground. The displacement tool and the pressure grout effect result in a coarse sided pile with finished diameters greater than 100% of the neat tool diameter. The soil displacement produces cavity expansion effects that 1) increase shear strength, 2) increase density, 3) increase over-consolidation, 4) reduce void ratio, and 5) increase stiffness & modulus of the surrounding soil. These physical benefits of DDP construction result in reliable, high capacity, deep foundation piles.

Engineered steel rebar cages are installed into the structural grout to resist the vertical, lateral, and uplift demands. DDP with an expanded base can achieve much higher end bearing capacity than traditional concrete piers and driven concrete piles. An expanded base is created with displacement and pressure grout methods during installation. Full-scale, instrumented, load tests are performed on DDP to confirm vertical bearing and uplift capacity. Lateral load tests can be performed to confirm lateral pile capacity.

Farrell uses heavy, fixed mast, piling drill rigs to install DDP. Farrell operates Leibherr, Casagrande, and Bauer rigs. These rigs install DDP to depths of 20 to 85 feet (6 to 26m). Farrell installs DDP with full displacement tool diameters of 14" (356mm), 16" (406mm), 18" (457mm), and 24" (610mm). Partial displacement DDP tools are used in dense soil regions. The rigs are equipped with electronic monitoring to record drill torque, drill depth, drill speed, concrete pump pressures, and concrete volume for engineer review.

Drill Displacement Pile DDP is a well-defined, high capacity, deep foundation pile that supports your project to *Go Vertical with Confidence®*

## Testimonial



Archer Hotel  
 Napa, CA

"James and the Farrell team throughout 10 weeks on site kept safety, communication, and a clean site up to date each day in a professional manner. Working with this field crew was a pleasure... and I look for another successful job with Farrell."

**Brian Hansen**  
 DEACON