

AG PARTNERS FEEDMILL LOADOUT EXPANSION

Location: Goodhue, MN

Project Type: Industrial



DUROTERRA™



DUCTILE IRON PILE ADVANTAGES

- Low vibration installation adjacent to existing building
- Easily adapt to varying rock depths
- High-capacity pile solution
- Rapid installation

PROJECT DESCRIPTION

Expansion of the existing Ag Partners Feedmill Facility involved the construction of a new 9-bay Loadout Bin structure. The new structure was located immediately adjacent to the existing Loadout Bin Building. A total of 20 columns with loads of up to 540 kips required support.

GEOTECHNICAL CONDITIONS

Soil conditions explored during a previous nearby expansion consisted of up to 20 feet of fill containing loose silty sand and soft silt and clay. The fill was underlain by weathered sandstone and weathered dolomite. One boring encountered a thin layer of glacial till between the fill and weathered rock. Drilling refusal on competent rock occurred in all borings around 30 feet below grade. No groundwater was encountered.

PROJECT CHALLENGES

Provide a high capacity, low vibration pile option for foundation support immediately adjacent to existing facility.



DESIGN AND CONSTRUCTION SOLUTION

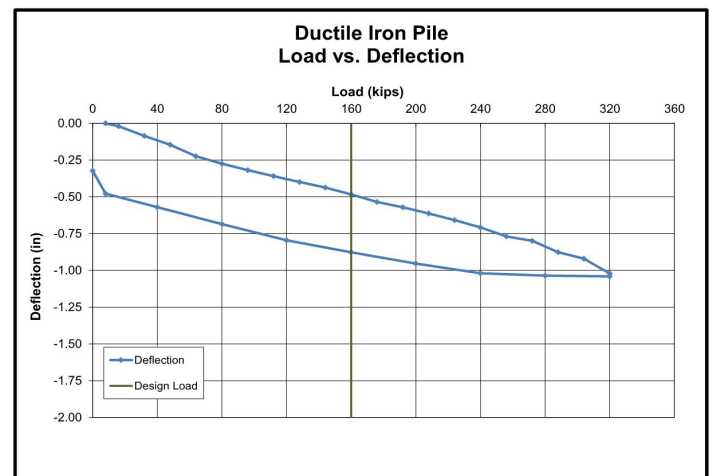
Based on the successful support of foundations for a prior expansion at the same facility, the design team planned to use Ductile Iron Piles for column support. Engineers at VAA and Ground Improvement Engineering arrived at a Ductile Iron Pile design solution. A Series 170/9.0 Ductile Iron Pile (170 mm outer diameter and 9.0 mm wall thickness) was selected to provide a working capacity of 80 tons (compression) for pile cap support. With 3 pile groups supporting each pile cap, a total of 60 Ductile Iron Pile locations were specified.

A Series 170/9.0 test pile was installed through soft soils and terminated by achieving “set” on rock at a depth of 25 feet. The pile was load tested to 160 tons (320 kips) to achieve 200% of the design load. The load test results showed nearly linear deflection to the maximum test load with 1.04 inches of total deflection. The test pile rebounded to 0.32 inch. Full-scale load test results confirmed the acceptable performance of the system to support the 80 ton design loads.



Production pile installation began on the opposite side of the site as the test pile location. Pile depths in this area proved to be significantly deeper. Set was achieved on rock at depths upwards of 55 feet as the bearing layer dipped across the site. The unexpected deeper rock depths were easily handled with the Ductile Iron Pile’s Plug-and-Drive connection that allowed for rapid insertion of additional 5-meter modular pile sections with no delays in production. Termination depths of piles reduced as the crew moved across the site towards the original test pile location.

Even with the increased depth, the Ductile Iron Pile installations proceeded as planned. A total of 60 piles with lengths ranging from about 25 to 55 feet were installed in one week to make short work of the pile scope on the project.



PROJECT TEAM

DIP Installation Partner: Peterson Contractors, Inc.

DIP Design Partner: Ground Improvement Engineering, Inc.

Geotechnical Engineer: Braun Intertec

General Contractor: Lodermeiers Inc.

Structural Engineer: VAA, LLC