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# The Finishing Touch

- Goals
- +Purpose
- +Value
- +Culture
- =Profitability
- (Bottom Line)

## Featured Project: Detroit Diesel Performance Test Cell Upgrade



Renovations and upgrades to the Detroit Diesel Research and Development Lab required construction of a second story penthouse to protect new exhaust emissions and engine performance analyzing equipment from the elements. Constructing the new penthouse and installing the testing equipment would significantly increase the weight of the original structure and thereby overload the soil beneath the existing spread footings. Additional capacity was needed to support the proposed additional weight. Removing the existing steel columns and footings and replacing with new larger footings and columns was not feasible. Shoring of the surrounding roofs and suspended mechanical piping was too costly and time consuming.

The project engineer specified Micro-Piles as the appropriate solution to add increased footing capacity with minor disturbance to the building and adjacent mechanical piping. Micro-Pile installation is performed vibration free and can be done with compact equipment.

This Micro-Pile project was written as a “performance spec.” meaning the exact type of material and process was not specified, but the end result, capacity, was. The project drawings spelled out column locations, existing loading conditions, as well as the total new loads to be supported. It was up to the Micro-Pile contractor (Kent Concrete Lifting) to figure out how to “make it happen”.

Our solution was simple and straightforward. By using the Atlas Plate Pier Brackets and Resistance Pier Pipe the required column capacities were achieved. After demolition of the existing concrete floor and utility trenches, the plate pier brackets were attached to the concrete pedestals between the spread footing and steel column above. After the brackets were bolted to the pedestals, the pier pipes were installed in 3.5’ long sections through 6” diameter holes core drilled through the spread footing. A hydraulic cylinder was used to push the pier pipe sections into the ground to depths of 65 feet to achieve the necessary capacity of up to 60,000 pounds each. Depending on the total load required at each column, two or three plate piers were installed at each column location. After piers were installed to the required capacity, 20’ pieces of number 5 reinforcing bar (re-rod) were lowered into the pier pipe and non-shrink grout was injected to give the pier (Micro-Pile) additional strength and corrosion resistance.

The Resistance Pier Micro-Piles were a perfect solution for the project. The Micro-Pile capacities are immediately verified by driving force. More importantly, the extremely tight working conditions eliminated most of the alternatives. Drill rigs and other types of deep foundation equipment could not have been used on this project. In some areas only 2 feet of space was available to work in. In addition to functioning waste oil drain lines, active steam lines that could not be disconnected had to be worked around. Some work was inside a concrete utility trench at the base of a 3’ wide stairway. The active steam lines were temporarily protected with steel plates to prevent possible breakage by pier installation equipment and more importantly to ensure a safe work area.

Project Success!



Concrete pedestal and steel column as surrounding concrete floor is removed.



A Micro Pile after installation prior to rerod, grout and cap installation.



Top down view of a Micro Pile in a concrete utility trench with an active steam line.



Test Cell area with second story penthouse in the background.

**The bottom line....it starts with me!**