CHANCE Civil Construction

Atlas Resistance® Pier FOUNDATION REPORT

A CASE HISTORY

Foundation Fails in Corrosive Soil

Job Description:
In Holland, MI, this two year old split level house was constructed on a foundation of 19 wood piles. The lot was built up as much as 8 feet on what was supposed to have been engineered fill. The stem wall was cast-in-place reinforced concrete and the house is of wood frame construction. The construction techniques were found to be rather erratic. Many interior grade beams were either incorrectly located or did not exist. In some locations large "blobs" of concrete were found instead of a formed and reinforced concrete grade beam.

Description of Design:
Soon after construction on the house was complete, the structure suffered massive settlement. The movement was in the form of uniform rotational movement to the rear with a magnitude of 13 inches! The owner chose Kent Concrete Raising and Atlas Resistance® Piers!

Site Conditions:
Soil borings confirmed that there were very poor soil conditions down to approximately 40 feet. Beyond the 40 foot depth, the soil consolidated. The soil also had a resistivity of 2,900 ohm-cm, which would result in a loss of steel by corrosion in the range of 7 oz/ft^2 over a 10 year period.

A technician works to remove rubble along the side of the home. Two Atlas Resistance® Continuous Lift Piers are visible in the foreground.

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PROJECT SUMMARY

Number of Piers:	29
Part Numbers:	AP-2-UF-3500.165 (PA)
	AP-2-PP-3500.165 (PA)
	AP-CL-UF-3500.165 (PA)
	AP-CL-PP-3500.165 (PA)
Avg. Drive Force:	68,000 pounds
Amount of Lift:	Up to 13 inches
Avg. Depth:	50 feet

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Bulletin 01-0712

The Plan:
Atlas Resistance® Piers were specified to be installed along perimeter and interior grade beams. This layout would support the foundation on Atlas Piers rather than the original wood piles. The customer wanted a 50 year life for the steel piers. The engineer specified that each Atlas Resistance® Pier would be attached to a 50-pound Magnesium anode to provide the useful life desired.

The Restoration:
The Plan View shows the pier layout required to lift and support the structure. Several beams were not as specified on the original plans or were not installed. As a result, an additional steel beam was installed in the garage. Helical foundation piers were used for supplemental support of lighter loads on the interior. These piers consisted of an 8 inch diameter plate on a 1-1/2 inch solid shaft. Installation was to 45 feet at 4,500 ft-lb.

Depending upon the location and the structure, one of four different Atlas Resistance® Piers or a Chance® Helical Pile was selected. The Atlas Continuous Lift Pier was used in areas where large lifts were required. The standard Atlas Resistance® 2-Piece Pier design was selected for areas with anticipated lifts that were less than 4 inches.

At the garage,the floor was removed and revealed that concrete beams shown on the original design were not constructed. Steel angles, steel beams and helical foundation piers were used to stabilize the garage during restoration.

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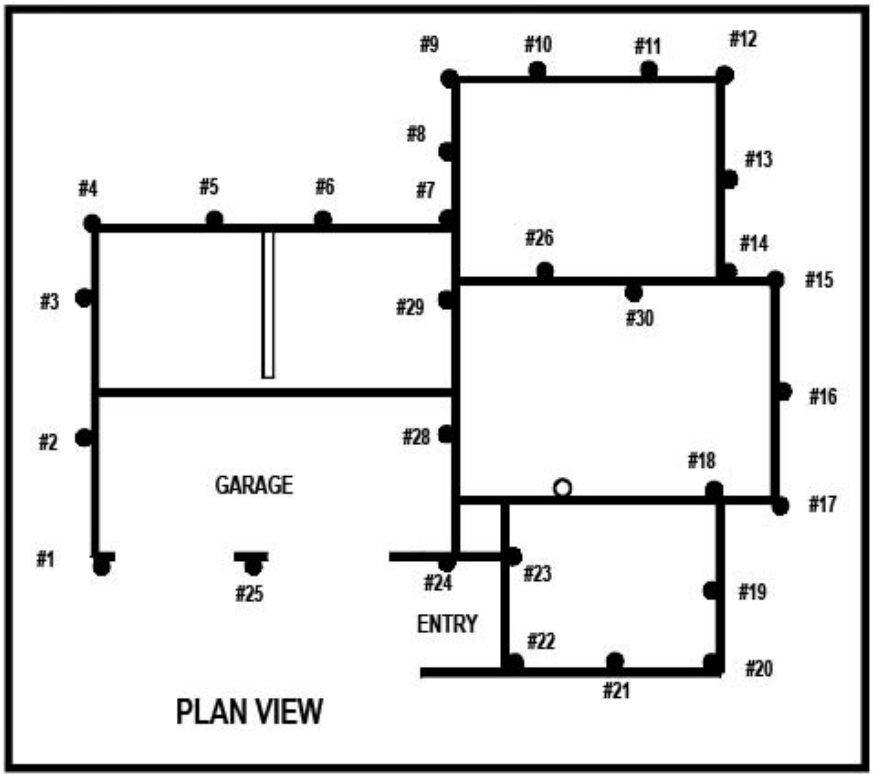

Above, side of the garage showing installed piers No. 1, 2, 3 and 4.

Photo at left illustrates how the contractor stabilized the garage structure with steel during pier installation and restoration.

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Above, a worker demonstrates the void created when the structure was lifted 13 inches at one of the Atlas Resistance® Continuous Lift Piers.

Success:
The structure was carefully lifted and was brought to virtually level. The piers were loaded and the structure lifted using 25 ton hydraulic rams that were connected to manifolds and actuated with hand pumps. One of the features of the Atlas Resistance® Continuous Lift Pier is that hydraulic rams with short strokes may be used in conjunction with the Pier to generate very large lifts.

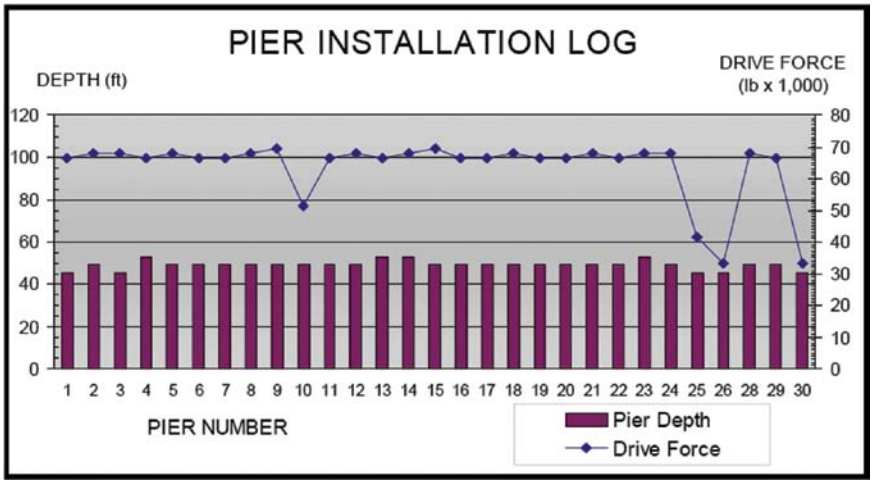
Following the lift, the void was filled with 14 yards of grout!

The owner required that the restoration last in excess of 30 years. The soil analysis showed that there was a moderate corrosion potential on this site. The engineer calculated that the most cost effective solution would be to install a corrosion protection system.

Corrosion Protection:
The engineer recommended that a sacrificial anode system be installed to protect the pier system. Each pier was electrically connected to a 50 pound magnesium anode. Engineering calculations show that this system will provide a useful life in excess of 50 years!

Piers 7, 8, 9 and 10 at the rear of the house near the garage during the lift. Notice the 25-ton hydraulic rams installed on each pier.

Below, an Atlas Resistance® Standard Continuous Lift Pier and a Continuous Lift Plate Pier are shown fully installed, with the load transferred to the pier and with the magnesium anodes attached.



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