

## Model 288 Push Piers

**Project:** Washington University Parking Garage

**Location:** St. Louis, MO

**Date:** March 2013

### Challenge:

The parking garage was supported on drilled shaft foundations. The stonework façade was supported independently from the parking structure on shallow spread footings. A column footing supporting the façade settled approximately four inches, causing the first level facing to vertically separate from the façade above. Plastic shims were continually added at the separation, but a more permanent solution was required to stabilize the footing and prevent further settlement.

The general contractor anticipated relatively shallow, competent bedrock based on previous projects in the area. Retrofit helical piers were originally planned to underpin the footing, stabilize the lower façade, and attempt to lift this section back toward its original elevation. A service load of 40 kips was estimated for the column.

### Solution:

With shallow bedrock expected, a system of hydraulically-driven push piers was selected over retrofit helical piers as the more economical solution to stabilize and lift the settling façade back to its original elevation. Push piers can also be installed at tighter spacing than retrofit helical piers and installation equipment would allow for easier access within the limited work area. Four (4) Model 288 (2.875-inch O.D. by 0.165-inch wall) push piers, two at each end of the rectangular footing, were installed to balance the column load and support the estimated design working load of 10 kips per pier.

A two-foot-deep concrete wall was encountered while excavating for two of the pier locations. The structural engineer determined the wall was a turned-down slab left from an old parking lot. The concrete wall was removed, the excavation made, and the push piers installed at their planned locations.

The piers were driven to refusal (drive force of at least 53 kips) and an average depth of 15 feet below the bottom of the footing. Hydraulic lift cylinders were fitted to the installed pier assemblies and connected in series to apply uniform load and lift the footing. The plastic shims were removed and the settled façade was successfully lifted to make contact with the upper section. The joint was resealed by the general contractor. Both the pier installation and structural lift were completed in just one day.

## Project Summary

**Structural Engineer:** KPFF Consulting Engineers

**General Contractor:** Acme Erectors

**Certified Pier Installer:** Foundation Supportworks® by Woods

**Products Installed:** (4) Foundation Supportworks® PP288 Push Piers, Average Installed Depth of 15 feet Below Bottom of Footing, Design Working Load of 10 kips



Settled façade; separation



Plastic shims at separation



Advancing push piers to bedrock



Connecting hydraulic lift cylinders



Completed Project