

CHANCE[®] UNDERPINNING ANCHORING REPORT

A CASE HISTORY

Project:

Engineering Building East,
University of Missouri
Columbia, MO

Contractors:

Kidwell Construction,
and Pro Services,
Columbia, MO

Structural Engineer:

Structural Engineering
Association,
Kansas City, MO

Job Description:

The University of Missouri-Columbia, MO noted distress in the foundation of its Engineering Building East (built in 1892). The distress was believed to be caused by ex-

pansive soil activity due to changes in the building drainage system. The project required stabilizing the stone foundation by reinforcement extending into stable soil capable of supporting the weight of the structure.

Key issues in design of the repair were to select a system that would allow support of the stone foundation while working in areas of limited access. Also, the building would continue in use for summer classes during the construction period. Soil borings in the area



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showed silty clays, silty sands, weathered rock with limestone between 20 and 36 feet deep.

Design:

The owners' project manager was Eric Peterson of the University of Missouri and the engineer of record was Ralph Jones of Structural Engineering Association, Inc. of Kansas City, Missouri. Engineering Surveys & Services of Columbia, Missouri did the soil surveys of the site. The foundation-deepening method selected was the Chance high strength steel SS175 HELICAL PIER® Foundation Systems anchor. The 1¾"-square shaft twin-helix lead sections with extensions were to be driven to 10,000 ft.-lb. of torque and terminated with the Chance heavy-duty bracket. Once fastened in place, the bracket would be encased in a 2 x 2 x 3½ feet concrete block cast in place.

The anchors would be located both outside and inside the building, staggering their locations to minimize the rotational forces. Spacing between the centerline of the anchors was to be 4 feet except at the bell tower where they would be spaced 2 to 3 feet apart.



Construction:

Kidwell Construction of Columbia, Missouri received the contract for the project and subcontracted Pro Services of Columbia, Missouri for installation of the HELICAL PIER® Foundation Systems. Pro Services, a certified A. B. Chance Company installer in central Missouri, used two types of rotary hydraulic installers to place the foundation anchors. One was a 10,000 ft.-lb. drive head mounted on a skid loader and a similar unit was mounted on a hand-held torque bar using an external hydraulic source.

The skidloader was used for installation of the outside perimeter anchors while the hand-held unit was used inside the building. During construction, several unexpected non-representative areas were encountered requiring foundation upgrade for anchor attachment. The engineer and contractor were able to adjust the construction and the project finished well ahead of the projected schedule. HELICAL PIER® Foundation Systems can be adjusted to site conditions by adding extensions or adding helices to meet the load requirements in different bearing soils. The foundation anchor bracket requires a competent foundation for attachment and to transfer the load to the anchor. This required a concrete block to be cast in place upgrading the foundation for the anchor to attach properly. Once the attachment blocks were cast, the installation of the foundation anchors proceeded rapidly.



Summary:

Several systems were available, but the engineers and the owner selected the HELICAL PIER® Foundation Systems for performance meeting the strict requirements of the project.

Although the project was more difficult and costly than anticipated, it finished ahead of schedule. The HELICAL PIER® Foundation Systems anchors install quickly and their capacity can be correlated to the installing torque, eliminating a quality concern in construction.