

A CASE HISTORY

Project:

Federal Express air structure
Colorado Springs, CO Airport

Geotechnical Engineer:

Commercial Testing Laboratories Inc.
Colorado Springs, CO

Structural Engineer:

Consulting Structural Engineers, Inc.
Colorado Springs, CO

General Contractor:

Copestone Company
Colorado Springs, CO

Chance Anchor Installer:

SCHP, Inc.
Colorado Springs, CO

Job Description: For a temporary air freight cargo facility, Federal Express chose a tent-like building called a Sprung Instant Structure. This type of structure required a temporary foundation to meet the designed pull out load of 4,880 lb. for each of 16 tiedown anchors required.

Commercial Testing Laboratories, a division of CTL-Thompson, Inc., performed tests on three tiedown methods. Testing was performed using a calibrated hydraulic system consisting of a pump, hollow ram jack and calibrated gauge. A 4-ft. length of $\frac{3}{4}$ -dia., threaded rod was placed through a base plate connected to the tiedown anchors. Two 10-ft. lengths of W6 beams were placed adjacent to the base plates and supported on each end by CMUs (concrete masonry units) to act as a reaction assembly. The hollow-core ram jack was placed over the threaded rod and slid onto the top of the reaction beam assembly. A plate washer and nut were used to retain the top of the ram.

1. The initial anchor test was on two $\frac{5}{8}$ " x 3 ft. smooth-steel dowels driven in at 30° from vertical. An ultimate load capacity of 950 lb. was recorded.
2. The second test was performed on four, #5 x 3 ft. rebars driven at 30°. The ultimate load capacity for this system was 2,630 lb.
3. The third test was done on a Chance HELICAL PIER[®] Foundation Systems screw anchor (8"-dia. helix on a 5-ft. x 1½"-square shaft). It was installed to about 500 ft.-lb. and load tested to 5,000 lb.



Chance screw anchors helped speed up the construction of this temporary storage building.

Results: One Chance screw anchor per frame was installed on the inside of the fully constructed structure. An angled connection designed by CSE, Inc. allowed attachment from the structure frame to the screw anchor via a $\frac{3}{8}$ "-dia. steel cable. The 16 anchors and connections were installed in less than eight hours by a skid loader with a 5,000 ft.-lb. hydraulic drive head.

Update: Three years after the anchors were installed, the temporary facility was no longer required. Copestone Company requested SCHP, Inc. to remove the screw anchors. All material recovered was fully intact and completely reusable.