

## A CASE HISTORY

**Project:**  
Montrose High School  
Montrose, CO

**Geotechnical Engineer:**  
Buckhorn Geotechnical  
Montrose, CO

**Underpinning Contractor:**  
D & B Drilling  
Wheat Ridge, CO

**Job Description:**

This 50 year old high school was supported by piles embedded in a dense gravel layer on top of shale. A floating slab inside the building had been settling for many years due to a compressible silty clay layer about 30' thick. With a complete remodeling of the building, a new 7" structural slab on piles was designed. Three pile design alternatives were proposed: 1. Auger-cast piles. 2. Screw anchors. 3. Small dia. pipe piles. The costs for auger-cast piles and screw anchors were very close. The deciding factor that tipped the scales to screw anchors was the time factor. Also, the lack of spoils removal with Chance HELICAL PIER® Foundation Systems anchors was another plus in the confined working area. The general contractor was allowing only two weeks for the completion of the anchors while construction was going on in the building.

**Repair:**

The new structural slab was supported by 179 anchors on 10' grids installed to depths of 40' to 50'. Type SS5 anchors with a single 10" helix were used to develop the design load of 20 KIPS with a 2 to 1 safety factor. Two skid loaders with 6,000 ft.-lb hydraulic motors mounted on short booms were used to drive the **7800' of anchors in less than five days**. A locally fabricated mounting plate was slipped onto the top of the anchors to support the rebar mat. Around the inside perimeter of three walls a utility vault that required the use of 60 Chance underpinning brackets. To allow for more bearing area for the structural slab, a 3" dia. pipe with a flange on top was welded onto the top of the underpinning bracket's T-pipe and coated with a bitumastic material.



**Screw anchors and extensions being moved into the Montrose High School**



**5,000 ft.-lb. hydraulic drive attached to skid loader installs screw anchor along side a utility vault**



**Underpinning bracket being assembled onto Chance HELICAL PIER® Foundation Systems anchor and under utility vault**

**Pipe and flange assembly was welded onto the underpinning bracket's T-pipe to give added bearing area for the new 7" structural slab**



**Chance anchor being installed in slab area on a 10' grid**



**Fabricated cap with bolt allowed for precise adjustment with a laser level providing a reference point**