

CASE HISTORY

ECP HELICAL TORQUE ANCHORS™



Helical Tieback Anchors Protect Passenger Bridge from 150 mph Winds

Airport terminal improvements included the addition of new passenger boarding bridges at a commercial airport in southern Florida. The new bridges were designed to withstand winds up to 90 miles per hour. The engineers determined that supplemental tiedowns were required to boost the wind resistance to 150 miles per hour to withstand hurricane force winds.

The engineers of The LPA Group investigated several methods of securing the passenger bridges. One plan used very large, heavy concrete pads with a hook and chain system to provide resistance against the high wind loads. A less costly method was offered to the engineers by N Square, Inc. They suggested ECP Torque Anchor™ tieback anchors in place of the heavy reaction blocks constructed from concrete. The design proposed by N Square, Inc used helical screw piles installed to an average embedment length of 35 feet into the soil to provide the required 150 mile per hour wind resistance. N Square, Inc. worked closely with Forge Engineering, Inc. to design a specially manufactured connection to attach the Torque Anchors to the tie down cable eyes.

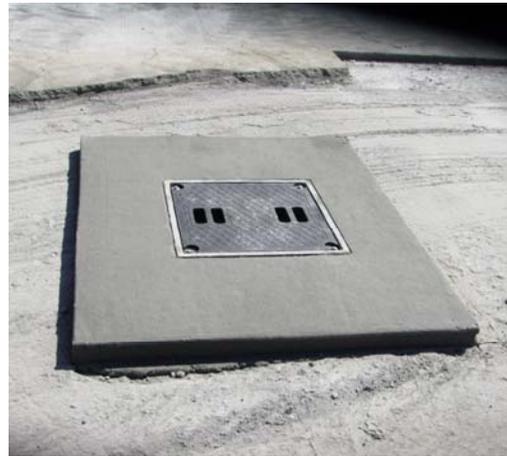
Project Summary	
Project:	Passenger Terminal Bridge Tie Down Anchors
Engineers:	The LPA Group, Inc. Forge Engineering, Inc.
Installing Contractor:	N Square, Inc. P.O. Box 113040, Naples, FL 34108
Products Installed:	TAF-175 Torque Anchor™ Tiebacks 1-3/4" sq. shaft - triple 14" diameter helical plates
Number of Placements:	4 Tieback Anchors
Embedment:	30 to 40 feet
Ultimate Capacity:	45,000 pounds



The soil on the site consisted of four feet of fill that contained rock fragments. The fill was underlain by strata of sand and silty sand. The concrete pavement was cut and removed to provide access for the anchors and to install concrete pads for the Neenah R-2495 frames and covers that protect the tie down connections from vehicle traffic. The Torque Anchor™ tiebacks were installed at a batter angle of 30° from vertical oriented toward the direction of the expected winds. The anchors were embedded into the silty fine sand at consistent shaft torsions of 4,500 to 4,700 foot-pounds to demonstrate design capacity.



The photograph above and on the previous page shows the installation of the ECP Torque Anchors™ at one of the new passenger bridges. The tieback anchor configuration consisted of three 14 inch helical plates attached to a 1-3/4 inch high strength square shaft. The anchors were advanced into the soil using a 12,000 foot-pound hydraulic gear motor shown mounted to a mini-excavator's dipper arm.



The entire project took only two days to complete. Once the tiebacks were installed and accepted, the attachment couplings were installed. Finally, the access frames were cast into a new concrete pad and the covers installed to complete the project. N Square's proposal to use helical screw piles resulted in a substantial savings to the customer, and delivered the finished product in about one-third the time of the alternate design.