Project Profile

Change of Use Design for a Parking Garage in Atlanta, GA.

PROBLEM

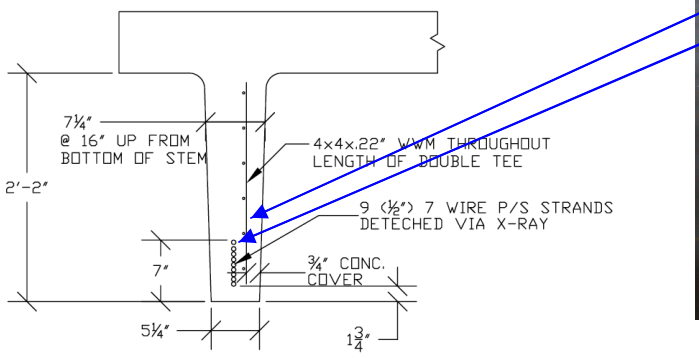
In this project, a parking garage in Atlanta, GA was to be subject to change of use. The name of the facility will remain undisclosed for this project profile. The allowable as-built live loads for the parking garage needed to be calculated by the Structural Engineer of record to determine it's ability to support additional design loads affiliated with the desired change of use. To determine the structural capacity of pre-stressed concrete beams which comprise the parking deck, the construction methods of the beams needed to be verified.

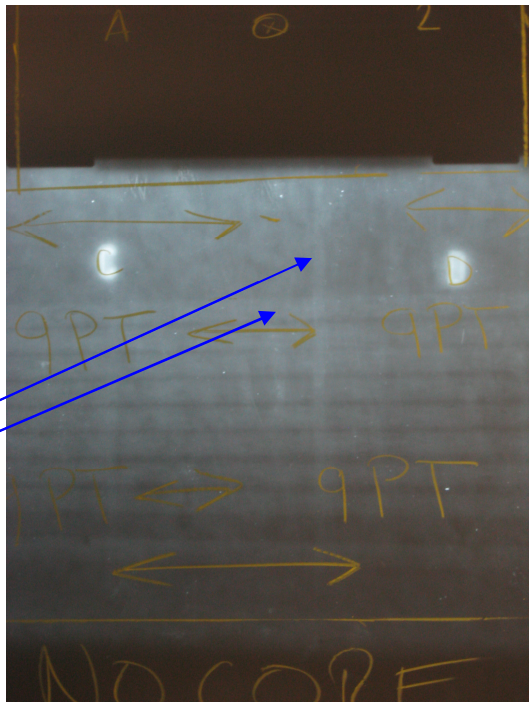
SOLUTION

TCE Services initially performed a cover meter (magnetic field device) survey to determine the shear and flexural reinforcing steel locations in one double tee beam and one inverted tee beam. This method was effective in finding the shear reinforcing steel in the beams, but proved ineffective in confidently finding locations of the flexural reinforcing steel or pre-stressed strands. Ground Penetrating Radar (GPR) testing was employed to locate the pre-stressed strands. GPR verified the locations of shear reinforcing steel in the double tee but was unable to accurately locate the pre-stressed strands. Finally, Radiography (X-ray) Testing successfully located the pre-stressed strands in the double tee beam. This testing would not have been effective on the inverted tee due to congestion of reinforcing steel and the beam's geometry and was, therefore, not used. TCE Services chipped out concrete in four areas of the two beams to verify reinforcing steel size and concrete cover. One end of the inverted tee beam was subject to light chipping which revealed pre-stressed strand locations.

Three concrete core samples from the double tee beam and three core samples from the inverted tee beam were obtained. The nondestructive testing results above were utilized to avoid cutting reinforcing steel. The cores were returned to our Lawrenceville laboratory for compressive strength testing per ASTM C42-04 *Standard Test Method for Testing Drilled Cores and Sawed Beams of Concrete*.

TCE was able to determine the size and location of shear and flexural reinforcing steel in both beams as well as compressive strengths for the concrete used in the beams giving the engineer of record all the information needed to calculated as-build allowable loads for the beams.





Right: X Ray Section of Double Tee Beam. Left: TCE **Services Drawing detailing size and location of Welded Wire Mesh (WWM) and pre-stressed strand reinforcing steel.**