

## Testing Post Tensioning Ducts for Voids

*Paul S. Fisk, President NDT Corporation*

### Testing Post Tensioning Ducts for Voids

Grout voids in post tensioning ducts create the potential for corrosion and failure of tendons. Sonic/ultrasonic impact echo testing is used to locate grout voids. Voids are verified with a small drill hole and tendon corrosion conditions documented with a bore-scope video. NDT Corporation has completed PT duct testing projects for the I-93 Boston, MA Central Artery, Jamestown Verrazano RI, and S 54 Kellogg Wichita KS Bridges.

### Inspection and Rehabilitation of Jamestown-Verrazzano Segmental Concrete Bridge

The Jamestown-Verrazzano Bridge over Narragansett Bay, Rhode Island is a 4,950-foot-long prestressed varying in length from 109 to 636 feet. NDT Corporation acquired over 93,000 linear feet of nondestructive sonic/ultrasonic impact-echo (sonic/ultrasonic) measurements on the main bridge's concrete top slab, webs and bottom slab containing the tendons to evaluate the grouted tendon ducts for voids. Of the approximately 1,520 tendon ducts tested, 114 tendon ducts were determined to have voids. Void lengths ranged from over 314 feet to 1 foot. In most cases the tendons were grout covered but some of the tendons were exposed and corroded. The nondestructive testing for void detection in the grout consists of two elements: Ground Penetrating Radar (GPR) to locate the duct and sonic/ultrasonic testing to detect voided tendon grout. Confirmation of nondestructive test results for the tendon ducts was accomplished by drilling a 1-inch diameter hole



Void PT duct at Anchorage.



The Jamestown-Verrazzano Bridge over Narragansett Bay, RI.



NDT technician attaching sensors to a timber pile for pulse echo measurements to determine pile length and length of embedment.

- ▶ BRIDGE TESTING
- ▶ PIPE TESTING
- ▶ TUNNEL TESTING
- ▶ SOIL & BEDROCK TESTING
- ▶ BUILDING TESTING
- ▶ PILES & DRILL SHAFT TESTING
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- ▶ TANK TESTING



to the duct and using a 7/8- inch diameter hole saw or a modified screwdriver to open the duct. Video observations inside the duct and photo documentation are made using a bore-scope with a flexible shaft and articulating head.

### About NDT

Since our inception 20 years ago NDT Corporation has been providing specialized testing services to help bridge engineers evaluate, understand and rate bridges. The testing services include geophysical seismic refraction and cross-hole measurements and nondestructive GPR and sonic/ultrasonic impact velocity and echo measurements. Individually and combined these testing techniques can provide information to determine construction details, locate construction defects, evaluate the current condition, and provide soil and bedrock properties.



NDT crew conducting seismic refraction testing to profile bedrock at the abutments of a bridge with an unknown foundation.



### NDT Corporation

We are nondestructive and geophysical testing experts with more than 700 projects across the US to our credit. Our geophysical tests assess soil and bedrock conditions to identify sinkholes, subsidence, shear zones and voiding. Our non-destructive concrete tests provide documented, cost-effective assessments of the integrity, as-built details and weakness or deterioration of concrete structures.



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