

MATURITY TESTING AND ACCELERATED CONCRETE FOR BRIDGE DECK RAPID REPLACEMENT

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 **WSP** WALID S. NAJJAR, PHD, PE

I-278 GOWANUS EXPRESSWAY VIADUCT, BROOKLYN, NY, USA:

- Only interstate highway in Brooklyn, NY
- Built in 1941, widened in 1961 to 6-8 lane expressway, extended to Verrazano-Narrows bridge
- 200,000 Average Daily Traffic (ADT), with more than 10% trucks
- 3.7 mile long viaduct with 322 spans
- Over 2,000,000 ft² of concrete deck

PROJECT FEATURES

Original Application of Maturity Testing For Rapid Reconstruction of Bridge Decks

- First application in New York State
- First nationwide ultra-early strength monitoring

Innovative Special Specifications

- Combined performance & prescriptive requirements on mix design, testing, concrete mixing, and curing

Complexity of Project

- Develop low-slump workable concrete that can achieve 3,000 psi strength in 15 hours and has low cracking potential
- Laboratory and field testing using maturity loggers or temperature sensors embedded in concrete
- Rapid deck replacement within limited time constraint (weekend lane closure) while maintaining nearby traffic

Owner Needs Exceeded

- Successful early opening to traffic
- Improved reliability of temperature measurement
- Reliable attainment of design strength in specified time
- Minimized construction time
- Reduced disruption to the public and motorists

Future Value

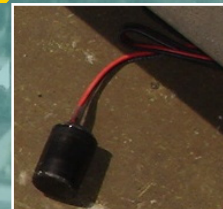
- Statewide and possibly nationwide use of the new maturity application and the new special specifications
- With cold weather requirements, the specifications are potentially applicable to Canadian bridge projects



LOW SLUMP BUT WORKABLE
ACCELERATED CONCRETE

NEW STEEL
REINFORCEMENT

RECONSTRUCTION OF TEST SPAN



MATURITY LOGGER



LOGGERS
EMBEDDED IN
CYLINDERS

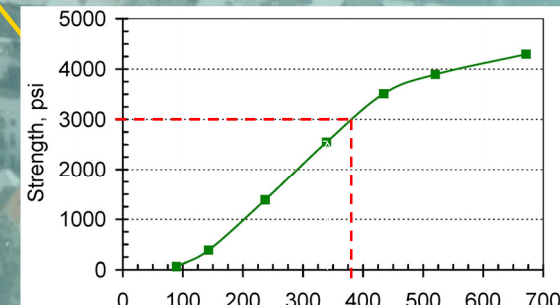


LOGGER
EMBEDDED IN
DECK

MATURITY MONITORING AT TEST SPAN



MATURITY
READER



STRENGTH MATURITY RELATIONSHIP