Construction and Field Evaluation of an Electrically Isolated Tendon System in the Coplay Bridge

Field Construction Experience

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Coplay/Northampton Bridge Project

- Existing Bridge - 3 Types of structures
- New Bridge - Prestressed/Post Tension (utilize portions of existing structure)
- EIT Demonstration Selection
Existing / New Bridge
EIT Participation

- FHWA searching for a project that fit the criteria for demonstrating the EIT System
- FHWA in conjunction with Pa DOT suggested our project
- After several months of questions and research the project was able to agree to demonstrate the EIT System
- Project concerns about schedule, time and costs were satisfied.
Existing Bridge - Demolition Stage
Existing Bridge
Existing Bridge
Demolition
Construction Stage

- Piers & Abutments
- Beam Delivery
- Beam Erection
- Closure Joint Duct Splices
- Closure Joint & Diaphragm Concrete
- Post Tension Operations
- EIT
Construction Stage
Beam Delivery
Beam Delivery
Beam Erection
Beam Erection
Beam Erection
Beam Erection
Beam Erection
Erection - Drop-Ins
Erection - Drop-Ins
Project Challenges

- Splice Joints - Drop-Ins and Strongbacks
- Causing slight beam alignment issues
- Duct alignment
- Solution - shims underside of beams
- Beam Delivery (Travel Route)
- Mother Nature
Project Challenges
Beam Delivery
Project Challenges
Project Challenges
Construction Arial View
Construction Arial View
Ducts Splices
Closure
Joints
Shrink Wrap
Completed Connections
Continuity Strands
Closure Joints For Drop-ins
Top View Closure Joints
Closure Concrete Placement
Closure
Concrete -
Class A -
9000 psi
Construction Stage

- Piers & Abutments
- Beam Delivery
- Beam Erection
- Closure Joint Duct Splices
- Closure Joint & Diaphragm Concrete
- Post Tension Operations
- EIT
Strands Installed
Strands in Clear Duct
Grouting Apparatus
Mud Balance / Bleed Tests
Grout Mockup Cut Section
Figure 22. Electrical connections to the tendon at both ends [2, 3]
Schematic - Tendon Protection

Figure 23. Schematic detail of the anchorage of EIT [14]. 1) plastic duct, 2) plastic trumpet (green), 3) strands, 4) cast iron anchorage body transferring the load from the anchor head to the concrete, 5) mechanically resistant, electrically isolating plate (red), 6) electrically isolating protection cap (blue), 7) grout in cap, 8) concrete, 9) measuring cable, 10) steel anchor head.
Post Tension Platform
Scaffold for Post Tension
Strand Installation
Strand Installation
Tendon Installed
Anchor Head / Wedge Plate-EIT
EIT Anchor Head / Isolation Plate
Tendon jack
EIT Isolation Plates
EIT Isolation Plates
EIT System
EIT System installed / Readings
Summary - EIT Usage

- Design / Review Cost - Nominal (only need to switch a few components in the post tension system)
- Material Procurement - Nominal (only the increase in cost for EIT components / currently from overseas)
- Beam Production - Nominal (similar components for PT)
- Post Tension Operation - Nominal (basically no differences from standard PT)
Construction Time Lapse