PREAPPROVED MATERIALS FOR BRIDGE CONSTRUCTION – RECENT CHANGES AND ADDITIONS

Leon Flournoy, P.E.
Bridge Division
New Preapproved Materials for Bridge Construction

- Carbon Fiber Reinforced Polymer (CFRP) Material Specification (New)
- Post-tensioning Grout Material Specification
- Polymer Concrete for Expansion Joint Nosing
- Pile Encapsulation Specifications (New)
Need for CFRP repair
Beam Impacts
Carbon Fiber Reinforced Polymer (CFRP)

- **Special Specification 4191**: Carbon Fiber Reinforced Polymer (CFRP) for Strengthening Concrete Structure Members
Ongoing CFRP Research

- **Research Project 0-6783**: Bi-Directional Application of Carbon Fiber Reinforced Polymer (CFRP) with CFRP Anchors for Shear-Strengthening and Design Recommendations/Quality Control Procedures for CFRP Anchors
Introduction of CFRP in our Bridge Standards

Bridge Protective Beam Wrap Standard (BPBW)
Suppliers need a structured procedure to get their materials on our approved list. Due to varying system qualities (Carbon Fiber & Epoxy Bonding Agent) we’ve created a list of testing requirements including material property characteristics.

- CFRP strip widths
- CFRP material thickness
- Carbon Fiber Modulus of Elasticity
- Working Time, etc
Post-tensioning Grout problems
After Grout Removal
Defective Grout
Normal Grout
Defective Grout for Post-tensioning

This has led to changes for grout suppliers and testing requirements.
New Standard Specification Requirements
- Ongoing research as to what’s causing segregation, true limit of chlorides, and sulfates role in corrosion.
- Bleed Characteristics
- Fillers will not be allowed
Polymer Nosing for Bridge Expansion Joints
Polymer Concrete Nosing Material
Polymer Nosing with Silicone seal
Polymer Concrete for Bridge Expansion Joints

- We currently have 4 types of polymer based nosing materials.

\[ \text{Departmental Materials Specification} \quad \text{Polymer Concrete for Bridge Joint Systems} \]

\[ \text{DMS - 6140} \]

\[ \text{Polymer Concrete for Bridge Joint Systems} \]

\[ \text{Effective Date: January 2011} \]

\[ \text{6140.7. Material Requirements.} \] Four types of polymer concrete are described. All types consist of a two-component binder and an aggregate system that when blended will form a mortar for nosing or joint repair.

- Type I is a polyurethane-based polymer concrete.
- Type II is an epoxy-based polymer concrete.
- Type III is a polyester-based polymer concrete.
- Type IV is a vinyl polymer-based polymer concrete.
Current Research: Steel Pile Repair

- TxDOT Project 0-6731: Repair Systems for Deteriorated Steel Bridge Piles
Fiber Reinforced Pile/Column Encasements
Need for a DMS for FRP Jackets

- We currently have 4 Systems approved, but we would like tighter controls.
- Seam connection varies across all types
- Material varies (Glass/Carbon)
Grout Material can either be polymer based or cementitious
A new DMS may be created for the encasement filler.