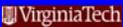
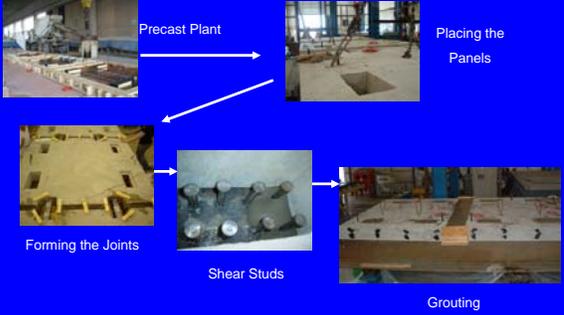


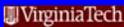
Deck Panel Research at Virginia Tech

Matt Swenty

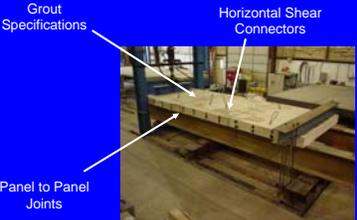



Construction of Full Depth Concrete Bridge Deck Panels





Research Areas

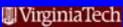


Full Scale Mock-Up

Long Term Behavior- Woodrow Wilson Bridge



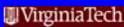
Time Dependent Behavior

Specification for Haunch and Pocket Grout

- Compressive and Tensile Strength
- Low Shrinkage
- Good Flow
- Good Cohesion
- Evaluate through ASTM and mock-up tests



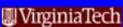


Horizontal Shear Connectors - Push Off Tests

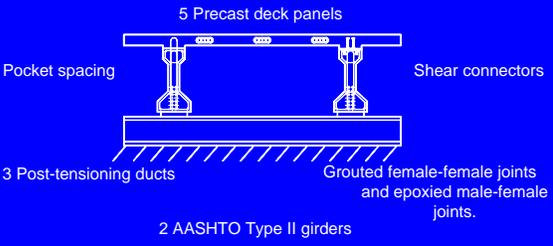


Examined a wide variety of connector details and grout types

AASHTO equation for horizontal shear strength of smooth surfaces was best design equation

Lab Mockup



5 Precast deck panels

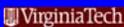
Pocket spacing

3 Post-tensioning ducts

2 AASHTO Type II girders

Shear connectors

Grouted female-female joints and epoxied male-female joints.



Time Dependent Behavior

- Deck panels are post-tensioned and then connected to girders (steel or concrete)
- Over time the deck wants to creep and shrink but is restrained by the girders
- Self-equilibrating stresses develop over time, along with restraint stresses in continuous systems
- Deck loses precompression over time

Design Recommendations

Girder Type	Number of Spans	Required Initial P/T (psi)
Steel	1	200
	2	650
	3 or more	500
PCBT	1	200
	2	200
	3 or more	200
AASHTO	1	200
	2	200
	3 or more	200

Panel to Panel Connections

Female-female narrow keyed grouted post-tensioned joint

Narrow non-prestressed joint with drop-in rebar

Wide cast-in-place joint with interlocking hairpin reinforcement

Woodrow Wilson Bridge Inspection



Continuing and Future Work

- Panel-to-panel joint evaluation
- Shear stud pocket performance
- Field implementation and testing

Thank You