Accelerated, Effective, and Reliable Construction Practices Consistent with Long Service Life

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A partnership of the Virginia Department of Transportation and the University of Virginia since 1948
Long Service Life depends on the design, materials (quality concrete, corrosion resistant steel), and construction practices for a given environment
Unexpected Events
Unexpected Events
Outline

• Design Details
• Transporting
• Placement
• Finishing
• Curing
Design Details – Construction related issues

Poor design details:
• Shy cover
• Leaking joints

Poor construction practices
• Shy cover
• Leaking joints
• Form dimensions (tolerances)
• Amount and location of steel
• Drainage
Design - Shy Cover
Design – Leaking Joints
Design - Leaking joints
Construction - Shy Cover

Construction related:

• Placement of steel
• Adjustment of screed
Construction - Drainage

• Keep the drainage layer clean.
• Provide proper slope for drainage.
Transporting - Pumping
Pumping

• Loss of air

• Loss of slump
Handling - Difficulty in Finishing
Consolidation
Consolidation
Self-Consolidating Concrete (SCC)
SCC Arch Bridge – 2001

- First SCC application
- Arch length of 45 ft

- 5,000 psi
- 2500 coulombs
Conventional Concrete
Arch Bridge - SCC
Rte 33 Bridge over Pamunkey River
SCC Concerns

Uniformity
Loss of stability, segregation
Air-void system
Increased shrinkage
Formwork pressure and tightness
Delivery
I-95 over James River, VA

Precast composite units: 2 units per span, each unit LWHPC over 3 steel plate girders

Polymer closure joint between units with minimal prestressing eliminated 2/3rd of joints
Coleman Bridge, VA
Finishing - Screeding
Not So!
Curing

• Quality material: burlap, curing compound meeting specifications
• Applied on time
• Proper application, enough coverage
Curing
Curing
Not So!
Cracking Under the Deck
Route 40
Conclusion

Proper construction practices are essential for longevity.
THANK YOU

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