



ERS

Route 5 Chickahominy Bridge

March 4, 2009

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*A partnership of the Virginia Department of Transportation
and the University of Virginia since 1948*

Outline

- ERS
- Pilot Projects
- Chickahominy Bridge
 - Trial batches
 - Control charts

ERS - Goals

- To have long lasting concrete structures
- Provide innovation
- Ensure consistent uniform concrete
- Pay based on the quality of concrete

ERS

Includes

- Prequalification
QC Plan by the Contractor
applicable to preconstruction and
during construction
- Mix design approval
- Acceptance

Differences in Specifications

Item	Current	ERS
Mix Design	Prescriptive	Performance Measures
Testing	VDOT	Contractor and VDOT
Basis of Pay	Minimum	PWL



First Phase Pilot Projects

Salem:

Route 11 over the New River and Norfolk Southern Railroad tracks near Radford University

Culpeper:

Route 28 near Manassas

Salem



03/04/2009

Salem Mix Proportions

Material	Amount (lb/yd ³)
Cement Type I/II	318
Fly ash Class F	159
Slag	159
Fine aggregate	1101
Coarse aggregate	1755
w/cm	0.45

Salem Strength and Permeability

	Average (psi)	Std Dev
Strength	5016	305
Permeability	391	72

N=31

Culpeper



03/04/2009



Second Phase Pilot Projects

- Structures in different districts
- Route 624
- Route 95
- Chincoteague Bridge
- Route 5 Chickahominy bridge

Route 624 over Cat Point Creek



03/04/2009



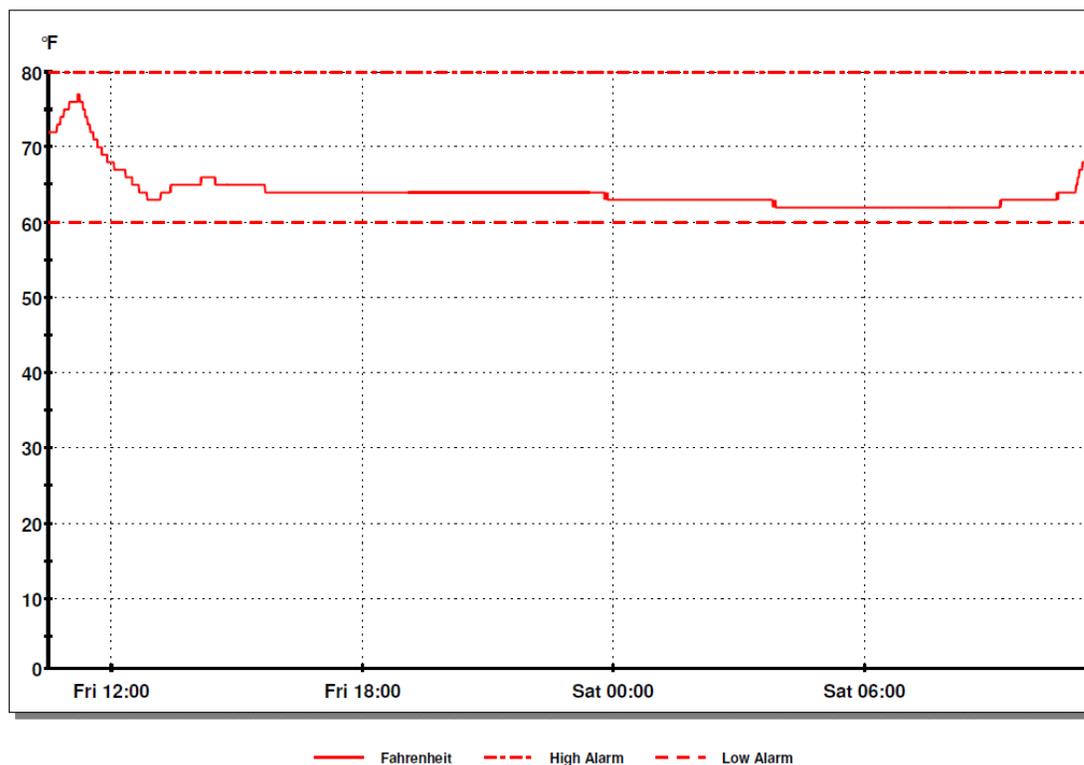
Route 624 over Cat Point Creek

In the same mixture

- Crushed stone and gravel.
- Water reducer and retarding admixture

Route 95 Widening Project

Curing Box with continuous recording



From:- 22 August 2008 10:30:00 To:- 23 August 2008 11:16:20

Chincoteague Bridge Bascule Footings



Chincoteague Bridge

- In A3 Mass Concrete minimum cementitious material content is 588 lb/yd³
- In this project used 539 lb/cy³ of cementitious material content with 30% Class F fly ash

Rte 5 over Chickahominy



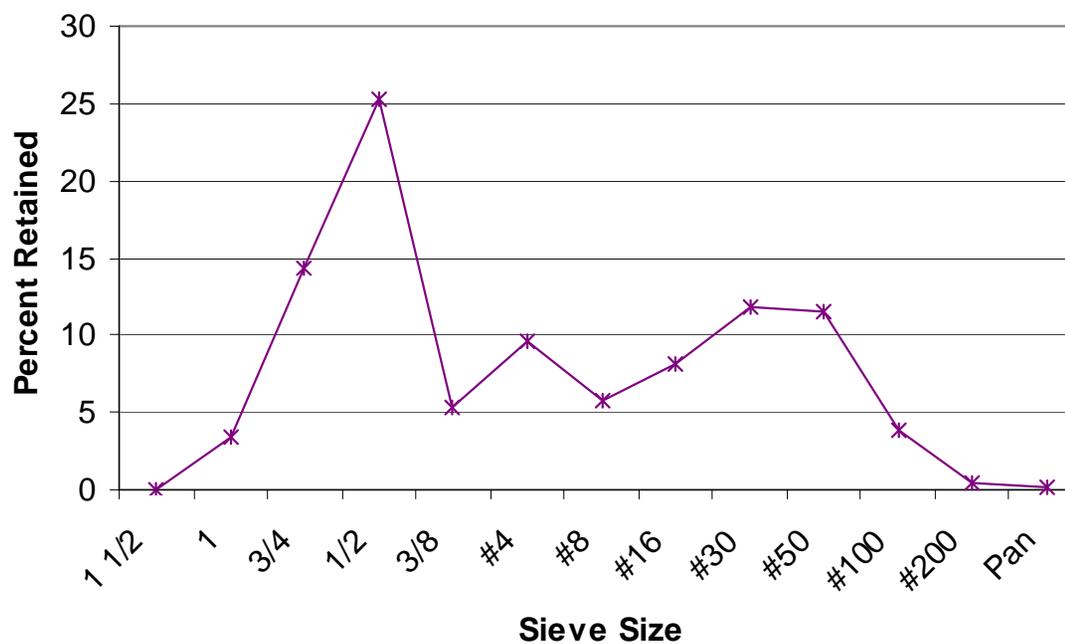
Rte 5 over Chickahominy



Quality coarse aggregate did not meet #57

Rte 5 over Chickahominy

Combined Aggregate Gradation: #57+#78+Sand



Rte 5 over Chickahominy



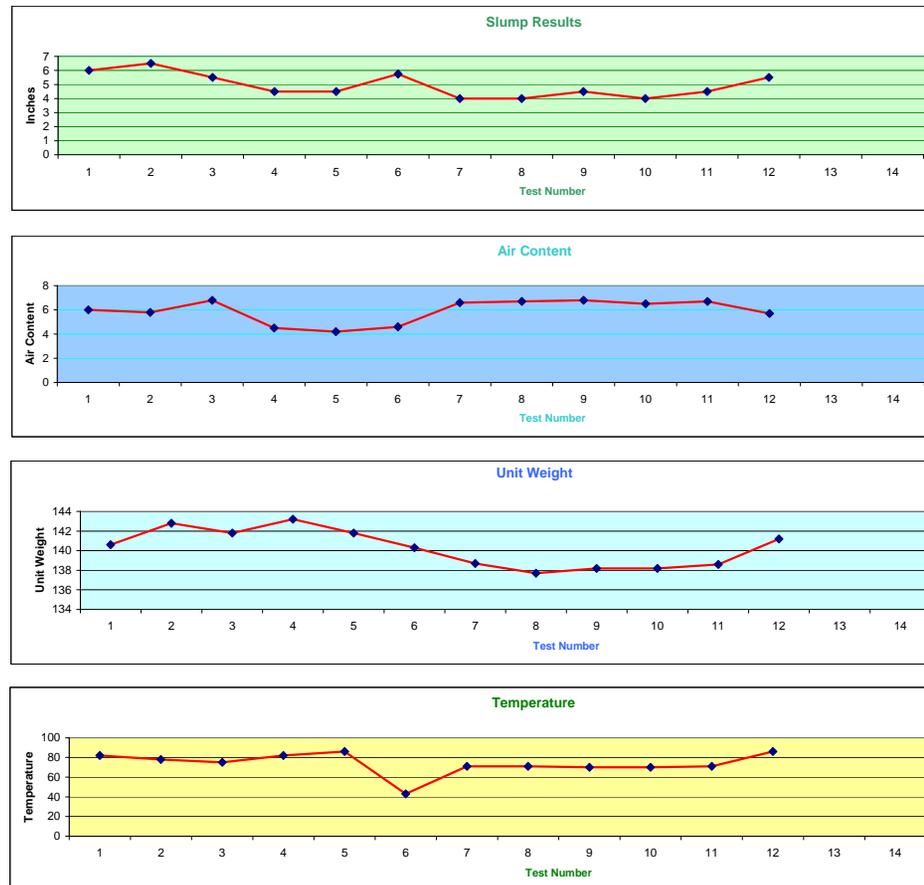
Three trial batches with different
cementitious material and w/cm



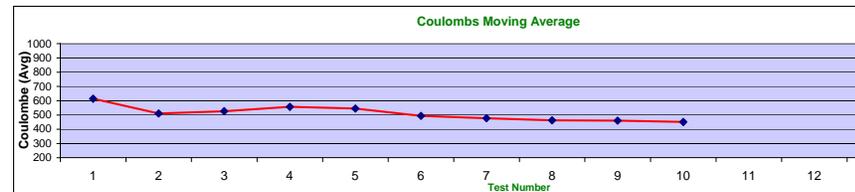
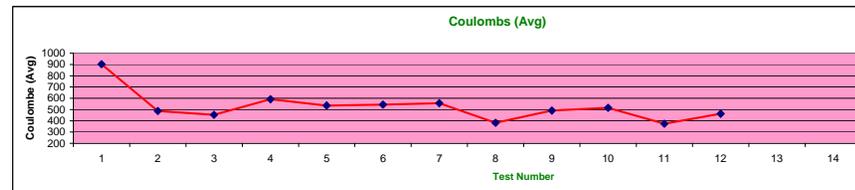
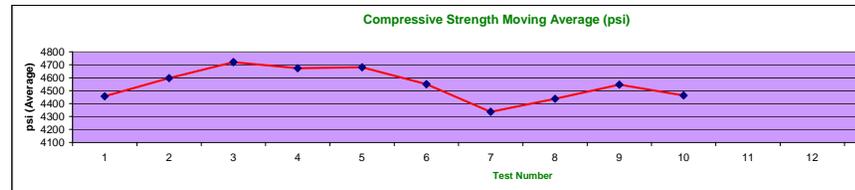
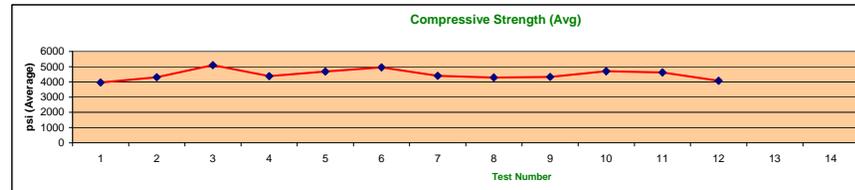
Rte 5 over Chickahominy

Three trial batches with different cementitious material and w/cm
Coarse aggregate does not meet #57; however, combined aggregate is considered.

Control Charts Fresh Concrete



Control Charts Hardened Concrete





THANK YOU

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