

## VDOT END RESULT SPECIFICATION (ERS)

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### Steps to Achieve Goal

- Educate VDOT/Industry on End Result Specification
- Incorporate pilot specification on projects
- Revise specification based on pilot projects
- Full implementation of specification



### Goal

- To have long lasting concrete structures
- To ensure consistent uniform concrete prior to handling and placement
- Pay based on the quality of concrete



### End Result Specifications (ERS)

- Contractor: Entirely responsible for supplying a product
- Agency: Responsible for accepting, rejecting, or applying a price adjustment

TRB Circular E-C074, Glossary of Highway Quality Assurance Terms.



### WHAT COULD GO WRONG AT THE SITE?




### WHAT ABOUT AGGREGATE AND CEMENTITIOUS MATERIAL BLENDS?




## Differences in Specifications

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



## Pay Factor - by VDOT

Pay factor based on PWL

- Compressive strength
- Permeability

Pay as in the current spec

- Rideability
- Thickness (pavements)



## ERS

Includes

1. QC Plan by the Contractor
  - Applicable to preconstruction and during construction
2. Mix design approval
3. Acceptance



## First Pilot Projects

Salem:

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

Culpeper:

Route 28 near Manassas



## 3. Acceptance

- Screening tests by the Contractor (slump, air content, unit weight, temperature)
- Pay factor tests by VDOT
- For structural, paving, and miscellaneous concrete
- Accepted on a lot-by-lot basis



## Salem



## Salem Mix Proportions

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



## Proposed Projects

Each District will incorporate the ERS on two (preferred) of the following projects that will be advertised from 10/06 to 7/07



## Salem Strength and Permeability

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

N=31



## ERS PILOT PROJECTS

DISTRICT	PROJECT	STATUS
Bristol	PM07-084-186,C501	Ongoing
Culpeper	TBD	
Fredericksburg	Rte. 608 over Rte. 95 in Spotsylvania Co.	Ongoing
Fredericksburg	Rte. 3 over Plankatank River in Mathews Co.	On Hold
Fredericksburg	Rte. 624 over Cat Point Creek in Richmond	Ongoing
Hampton Roads	Rt. 175 - Chincoteague	Ongoing
Lynchburg	Rte. 734 over Cane Creek	Ongoing
Lynchburg	BR06-041-125, M400	Completed
Lynchburg	Carter Glass Bridge BR06-005-124, M400	Ongoing
Lynchburg	Rte. 652 over Graham Creek	Ongoing
Northern Virginia	Rt. 1 Bridge replacement at Neabsco Creek	Ongoing
Northern Virginia	I-95 - Fourth Lane	Ongoing
Richmond	Rt. 5 over Chickahominy	Ongoing
Salem	Rt. 723 Bridge over Nininger Creek 71610	Ongoing
Staunton	North Oak lane bridge replacement 60982	Completed
Staunton	Rte 340 Bridge	Ongoing



## Culpeper

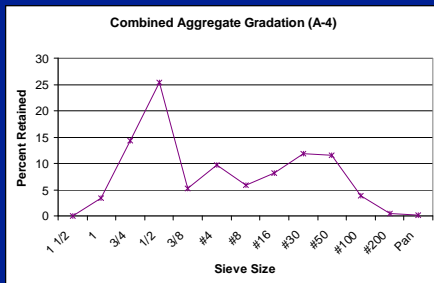


## Rte 5 over Chickahominy

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



## Rte 5 over Chickahominy



## Concerns

- Cost (trial batch, QC)?
- Bids?
- Available materials hinder innovation?
- Contractor (bonus?) producer (penalty?)



Thank You

