

VDOT END RESULT SPECIFICATION (ERS)

Celik Ozyildirim, Ph.D., P.E.
Research Council, VDOT

Virginia Concrete Conference, March 2008


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 ³)
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

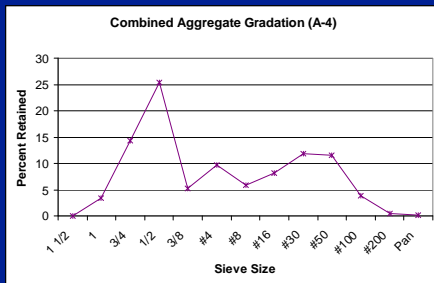


Rte 5 over Chickahominy

- 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

