Rehabilitation of the Blue Ridge Parkway with FDR and AC Overlay

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HISTORY

• Existing pavement on Parkway very deteriorated
• Repair options were heavy patching and overlay or FDR with AC overlay
• Past FDR projects had issues, were less than successful
• Two alternatives were bid
• FDR option was low bid on contracts 1B6 & 1C4
Existing Road Structure
TEST PIT SAMPLES

• 18” x 36” at design depths
• A minimum of 1 sample per road mile
• From the time the samples are taken and tested and the mix design submitted for approval is about 85 days
TEST PIT SAMPLES
TEST PIT SAMPLES
BEFORE CONSTRUCTION BEGINS

• Any necessary Full Depth Patching is completed
• Existing lane slopes are taken every 100’
• Existing roadway widths are measured
• Slopes and widths are used to maintain control and ensure the roadway is as close as feasible to existing conditions
PRE-CUTTING

• Pre-cutting is performed to get the roadway components mixed together as a single unit.
• It allows the cement to be mixed in to design depths and gives a uniform more stable product.
• The reclaimer makes 2 passes over the lane width, it is rolled by sheeps foot roller, graded and smooth drum rolled, no tests are taken.
PRE-CUTTING cont’d

• Traffic is allowed on the pre-cut surface immediately
• The adjoining lane follows the same pre-cut process
PRE-CUTTING
SPREADING CEMENT

• The center and edge lines are painted to identify the area to be treated
• Cement is spread evenly over the width of the lane to be treated
• If the cement is not spread evenly it will affect the compressive strength test results
SPREADING CEMENT
TREATMENT

• A water truck is attached to the reclaimer to inject moisture into the roadway as the treatment process begins.

• The reclaimer will make 2 passes per lane with an overlap in the center of the lane.

• When the reclaimer begins the second pass, the sheeps-foot roller begins compacting the material.
TREATMENT
TREATMENT
SHEEP’S FOOT ROLLER
TREATMENT cont’d

• The center and edge lines are marked and the grade work begins on the roadway
• The center and edge lines are remarked after every grader pass
• Grading is the most important operation during the treatment process, the fewer passes it makes the better the finished product will be
MOTOR GRADER
WINDROWED MATERIAL
TREATMENT cont’d

• 6 passes or less is optimal to prevent segregation of the materials however more passes may be needed
• Compressive strength test pills are made at this juncture in the process
• The smooth drum roller completes the treatment phase
• Nuclear gauge tests are taken
TREATMENT cont’d

• The area must be maintained at or near optimum moisture during the treatment phase

• After a varying period of time traffic is allowed to run on the area while the adjacent lane is going through the treatment process

• The contractor determines the switch time since they are responsible for the product until the next lift is placed
TREATMENT cont’d

• The contractor will perform their own QC checks during this time, determine any deficiencies, make the necessary repairs and keep the treated areas wet as needed

• The treated area cures for a minimum of 24 hours before paving operations can begin
QC ACCEPTANCE CHECK

• After the minimum cure period of 24 hours the area to be paved is checked by the agency, prime and FDR sub-contractor, and the paving company to determine if the area is in spec and ready to be paved

• Any identified deficiencies during this check must be corrected by the FDR contractor before paving can begin
QC ACCEPTANCE CHECK cont’d

• The area is checked with a straight edge to ensure the contractor has “produced a surface that is smooth, dense, free of compaction planes, ridges or loose material” as well as no soft or wet spots are present.

• When the area has been approved it is wet again and asphalt placement can begin.
QC ACCEPTANCE CHECKS
TESTING

• Current ASTM Standard calls for 1 - 4” diameter pill to be made per day of treatment
• The nominal size of the material after treatment is 1.5”
• After test results with a wide range of numbers FHWA suggested that 4 - 6” pills be made and the break results averaged together for that day's official test result
TESTING cont’d

• After some initial hesitation, understandably, to do so due to the additional associated costs the Contractor agreed to try the suggestion

• The break numbers fell in line with the specifications and were consistent throughout the remainder of the project

• The nuclear gauge tests were consistently at or above the requirements
LESSONS LEARNED/KEYS TO SUCCESS

• Pre-cutting the area before treating
• Even spread of cement
• Maintain control through slopes and roadway widths
• Maintaining control as listed above limits excess material needing removal from the roadside after treatment
• At 8” depth the treated roadway will bridge sub base failures except for extreme cases
KEYS TO SUCCESS

• When a problem arises the ability to think “outside the box” for a viable solution to the problem
• What is written in a spec may need to be changed to achieve a successful product
• The Contractor must be willing to spend some additional time or money, within reason, if needed
KEYS TO SUCCESS cont’d

• Owner/client must train field personnel to determine solutions
• Contractors must be committed to performing the work at the necessary QC levels and train their workers to do so as well
• All parties performing their roles to the best of their abilities will be the key to future FDR work
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