SCDOT’s Concrete Preservation Program

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Richmond, VA
SCDOT has the 4th largest state maintained highway system in the US behind TX, NC, and VA
- 41,444 centerline miles
- 851 centerline miles of interstate
SC Interstate pavement composition - 2018

- Asphalt Surfaced: 77%
- Continuously Reinforced Concrete: 16%
- Jointed Plain Concrete: 7%
SCDOT increased gas tax for the first time since 1987 in 2017

- State motor user fee was increased by 5¢/gallon in 1987 to 16.75¢/gallon.
- 1987 increase was supposed to fund a widening program for rural routes.
- When roads didn’t magically appear, 5¢ increase was “temporarily” diverted to the general fund in 1990, ostensibly to pay for Hurricane Hugo cleanup.
- Temporary = about 15 years
- New tax was 12¢/gallon, phased in 2¢ per year for six years.
- Full 12¢ will take effect July 1, 2022.
SCDOT Ten Year Investment Plan

Source: State of the SCDOT, February 2019
SCDOT Interstate condition trend

Source: SCDOT Initial Transportation Asset Management Plan, April 2018
SC Gas Tax increase: Is it working?

Increase in second of six-year process

By Wright Gazaway | November 12, 2018 at 6:23 PM EST - Updated November 12 at 7:05 PM

BEAUFORT, SC (WTOC) - In just its second year, the gas tax hike in South Carolina appears to be
NEWS IN BRIEF

Jogger Clearly On First Run Of Plan To Turn Life Around

2/09/16 1:33pm • SEE MORE: HEALTH •

CHICAGO—Taking note of the man’s beat-up tennis shoes, sweat-drenched shirt, and ill-fitting pair of sweatpants as he made his way down the sidewalk, witnesses reported Tuesday that area jogger Dan Andreychuk was clearly out on his very first run of a plan to turn his life around. “He just started jogging like a madman today, but he already

8
MEMORANDUM OF AGREEMENT
FOR
FEDERAL-AID PREVENTIVE MAINTENANCE PROJECTS

May 2015

Introduction
Preventive maintenance is a planned strategy of cost-effective treatments to extend the service life of pavements, bridges, and essential highway appurtenances without significantly increasing structural capacity. Preventive maintenance activities are eligible for federal assistance so long as the activities are shown to be a cost-effective means to extend the useful life of the highway and are located within a defined corridor with logical termini. The following guidance shall apply for preventive maintenance on all Federal-aid highway funded projects.
**Eligible Preventive Maintenance Activities**

**PCC Pavement**

1. Concrete joint/crack sealing
2. Diamond grinding

4. Isolated, partial, and/or full depth patch concrete repairs to restore the functionality of the slab
5. Slab replacement, not exceeding 50% of the total area
Interstate 20, MP 0 to 6, Aiken County, SC

- Opened to traffic in 1967.
- Estimate design lane has carried approximately 6 million trucks to date.
- 9” JPCP, 25’ joint spacing, no dowels over 5” cement-stabilized sand clay.
- Has had at least two CPR projects in the last 25 years.
- In 2016, was in poor condition with substantial faulting.
I-20, Near MP 2, April 2017
I-20, MP 0 to 6, PavementME forensic analysis, Year 0 = 1967
I-20, MP 0 to 6, PavementME forensic analysis, Year 0 = 1967

Initial IRI: 63
### SCDOT recent concrete preservation projects

<table>
<thead>
<tr>
<th>Project</th>
<th>Letting</th>
<th>Substantial Completion</th>
<th>Final Installed Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>I-20, Aiken Co.</td>
<td>4/12/2016</td>
<td>8/14/2017</td>
<td>$4,061,387</td>
</tr>
<tr>
<td>I-95, Jasper Co.</td>
<td>4/12/2016</td>
<td>10/25/2017</td>
<td>$6,124,176</td>
</tr>
<tr>
<td>I-95 &amp; I-26, Dorchester Co.</td>
<td>7/12/2016</td>
<td>9/25/2018</td>
<td>$16,590,730</td>
</tr>
<tr>
<td>I-95, Dillon, Clarendon, Florence Cos.</td>
<td>7/23/2016</td>
<td>6/30/2018</td>
<td>$22,901,354</td>
</tr>
<tr>
<td>I-85, Anderson Co.</td>
<td>8/9/2016</td>
<td>6/9/2018</td>
<td>$2,066,633</td>
</tr>
<tr>
<td>I-77, Fairfield and Richland Cos., I-20 Richland Co.</td>
<td>7/11/2017</td>
<td>Ongoing</td>
<td>$10,357,035 (contract)</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td></td>
<td></td>
<td><strong>$62,101,315</strong></td>
</tr>
</tbody>
</table>
## SCDOT recent concrete preservation projects

<table>
<thead>
<tr>
<th>Project</th>
<th>Patching</th>
<th>Grinding</th>
</tr>
</thead>
<tbody>
<tr>
<td>I-20, Aiken</td>
<td>$150.00/6035 sy</td>
<td>$3.10/143,921 sy</td>
</tr>
<tr>
<td>I-95, Jasper</td>
<td>$135.00/5039 sy</td>
<td>$2.45/482,610 sy</td>
</tr>
<tr>
<td>I-95 &amp; I-26, Dorchester</td>
<td>$198.85/30,620 sy</td>
<td>$2.97/1,166,770 sy</td>
</tr>
<tr>
<td>I-95, Dillon, Clarendon, Florence</td>
<td>$178.60/51,760 sy</td>
<td>$2.46/775,900 sy</td>
</tr>
<tr>
<td>I-85, Anderson</td>
<td>$433.66/60 sy</td>
<td>$2.47/747,600 sy</td>
</tr>
<tr>
<td>I-77, Fairfield &amp; Richland/I-20 Richland Co.</td>
<td>$175.80/23,425 sy</td>
<td>$2.46/925,500 sy</td>
</tr>
<tr>
<td><strong>Weighted Unit Price/Total Quantity</strong></td>
<td><strong>$180.12/116,989 sy</strong></td>
<td><strong>$2.66/3,775,451 sy</strong></td>
</tr>
</tbody>
</table>
Patching influence on load transfer efficiency

• Load transfer efficiency (LTE) at joints and cracks is defined as:

\[
\text{Efficiency (\%)} = \frac{\Delta_a}{\Delta_l} \times 100
\]

where: \( \Delta_a \) = approach slab deflection
\( \Delta_l \) = leave slab deflection

• Low LTE is associated with faulting, pumping, and corner breaks.
• If planning an asphalt overlay, joints with LTE less than 60% to 70% should be improved prior to overlay to mitigate reflective cracking.
Load transfer efficiency observations

- SCDOT evaluated I-95 in Dillon County to observe the effect of patching on LTE.
- 10” JPCP, 5” cement-stabilized sand-clay base, 25’ joint spacing, no dowels.
- Approximate pavement age is 50 to 55 years.
# Patching influence on load transfer efficiency

<table>
<thead>
<tr>
<th>Scenario</th>
<th>Approach Slab</th>
<th>Leave Slab</th>
<th>Approximate Percentage of Slabs</th>
<th>Load Transfer Efficiency</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Patched</td>
<td>Patched</td>
<td>20%</td>
<td>85-89%</td>
</tr>
<tr>
<td>2</td>
<td>Cracked</td>
<td>Cracked</td>
<td>10%</td>
<td>40%</td>
</tr>
<tr>
<td>3 (Low Severity Fault)</td>
<td>Good</td>
<td>Good</td>
<td>25%</td>
<td>87%</td>
</tr>
<tr>
<td>4 (Moderate to High Severity Fault)</td>
<td>Good</td>
<td>Good</td>
<td>25%</td>
<td>69-75%</td>
</tr>
<tr>
<td>5</td>
<td>Good</td>
<td>Cracked</td>
<td>10%</td>
<td>70%</td>
</tr>
<tr>
<td>6</td>
<td>Cracked</td>
<td>Good</td>
<td>10%</td>
<td>Mixed Results*</td>
</tr>
</tbody>
</table>
Around 2012, an area of I-95 near Florence was noted to have a high rate of run off the road wet weather accidents.

Research in California and elsewhere beginning in the early-1970s indicated longitudinal grooving was effective in these circumstances. Georgia DOT also reported excellent results from grooving.

Initial project was constructed in 2013, along with speed limit reduction from 70 mph to 60 mph in affected area.

Wet weather accident rate was dramatically reduced.
Grooving for improved wet weather friction
Grooving for improved wet weather friction

- Included grooving in moderate quantities (17,430 sy and 72,372 sy) in a couple of the first preservation contracts. Prices were $2.70/sy and $2.15/sy, respectively.
- Areas for grooving were selected by SCDOT Safety Office based on wet weather run-off-the-road crash rates at various locations.
- In August 2016, let a large (720,122 sy) standalone grooving contract. Price was $1.75/sy.
- Crashes of this type are reported to have dropped to near zero in grooved areas.
Thank you!

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