Madison Heights Bypass

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Lynchburg District
Background Information
Lynchburg
Located in Central Virginia
Rte 29 through Madison Heights in Amherst Co was stressed due to traffic.
Design

- ESAL Loading in excess of 50 million.
- Resilient Modulus – 3500psi
- PCC Modulus of Rupture – 650 psi.
- Elastic Modulus of Slab – 3.7 million.
- k values ranging from 100 to 130 psi/in.
- Reliability of 90-95%
1. 1/2" of continuously reinforced hydraulic cement concrete pavement.
2. 3' asphalt concrete type BM-25
3. Stabilize top 8" of subgrade with 12% hydraulic cement by volume. Cover with 0.3 gal/sq yd CRS-2L and 20 lbs/sq yd No. 8 aggregate.
4. Asphalt concrete surface course type SM-12.5D @ 220 lbs. per sq. yd.
5. 4' asphalt concrete base course type BM-25
6. 6' cement stab. aggregate base material type I, No. 21A (4% hydraulic cement by weight)
1. 300mm OF CONTINUOUSLY REINFORCED CONCRETE PAVEMENT.

2. 75mm ASPHALT CONCRETE BASE COURSE TYPE BM-25 (@ 181 kg/m²)

3. STABILIZE TOP 200mm OF SUBGRADE WITH 12% HYDRAULIC CEMENT BY VOLUME. COVER WITH 1.3 LITRE/m² CRS-2L AND 11 kg/m² NO. 8P AGGREGATE.

4. ASPHALT CONCRETE SURFACE COURSE TYPE SM-125D @ 125 kg/m²

5. 100mm ASPHALT CONCRETE BASE COURSE TYPE BM-25

6. 150mm AGGREGATE BASE MATERIAL TYPE 1 No. 21A STABILIZE WITH 4% HYDRAULIC CEMENT BY WEIGHT.
• The Madison Heights Bypass was constructed in phases with nine separate contracts.
• The connectors and interchanges were built with a hot mix asphalt design.
• The mainline was constructed with a Continuously Reinforced Concrete Pavement.
The Pleasant Valley Interchange
Monacan Bridge over the James River
Route 210 Connector
Route 130 Connector and 29 interchange
Sweet Briar Interchange
South Section – Opened 2004
North Section – Opened 2005
Construction!
A good riding concrete surface starts with the sub grade.
The soil cement was maintained within a half inch from plan elevation.
Laying Asphalt to grade proved to be challenging. The Asphalt contractors on both projects used Top Con systems so grade could be placed from a string line. The learning curve resulted in substantial areas in which the grade was not appropriate to construct on.
For the steel design we used #7 English or #22 metric longitudinal bars, spaced at 6 3/4±3/8 inches.

For the transverse bar we used a #5 English or a #16 metric, spaced at 48±2 inches.
The southern project utilized the Hardy Chair-Lok system to set the steel at mid-depth.
The Northern Project utilized SMI’s combination transverse bar/chair assembly (TBA).
The paver was followed with some light hand work to strike off the surface. This was intended to knock off any mortar and also smooth imperfections the paver may have left.
The longitudinal joint was then sawed. This was completed normally within 12 hours.
Keys to Success

• Subgrade, subgrade, subgrade
• Parallel Planes
• Great Contractors
• No large stone OGDL
• others
We placed a test pad exactly as the pavement would be built. This helped all parties work out the “bugs” before the paving operation began.
The finished product resulted in an average IRI of 50 to 60.
IRI Northbound AVE. 75-76

IRI Southbound AVE. 68-72
TSD (Traffic Speed Deflectometer)
How is it holding up?
Southbound Patch at Rte. 210 Ramp
Southbound Patch at Rte. 210 Ramp
This is a project that all the groups involved are proud of…
Prime Contractor for South Project
6029-005-F22,C501
Glade East, Inc.
Concrete Pavement
Glade East, Inc
Asphalt Sub-Contractor
Marvin V Templeton and Sons, Inc.
Soil Cement Sub-Contractor
Site Prep, Inc
Prime Contractor for North project
6029-005-F22,C502
English Construction Co., Inc.
Haymes Brothers, Inc.
Concrete Pavement
APAC, Inc.
Asphalt Sub-Contractor
Lawhorne Bros., Inc.
Soil Cement Sub-Contractor
Site Prep, Inc.
<table>
<thead>
<tr>
<th>Specification</th>
<th>Requirement</th>
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<tr>
<td>Air Content</td>
<td>4.0% - 8.0%</td>
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<tr>
<td>Concrete Temp.</td>
<td>Min. 40°F</td>
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<tr>
<td></td>
<td>Max. 90°F</td>
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<tr>
<td>Slump</td>
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<tr>
<td>Compressive Strength</td>
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<td>Flexural Strength</td>
<td>Min 650 psi</td>
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<tr>
<td>Cementitious Material Content</td>
<td>Min. 565 lb/yd²</td>
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All good things must come to an end.
The End