I-285 Asphalt Shoulder Replacement with Roller Compacted Concrete
Atlanta, GA

Virginia Concrete Conference
March 10, 2006
Project Location
Definition

“Roller-Compacted Concrete (RCC) is a no-slump concrete that is compacted by vibratory rollers.”

- Zero slump (consistency of damp gravel)
- No forms
- No reinforcing steel
- No finishing
- Consolidated with vibratory rollers

Concrete pavement placed in a different way!
Why Use RCC on I-285?

Ease of Placement

Durability

Successful Projects Elsewhere

Cost Effective

$$$$$
HEAVY TRUCK CORRIDOR
The Project

NHS – M001-00(534)01

17.3 miles of shoulder reconstruction with RCC, PCC slab replacement, various bridge joint replacements, and safety upgrades including guardrail, recovery zone improvements, rumble strips and wet reflective striping.
The Project

Let: July 2004

- RCC Subcontractor: A. G. Peltz – Birmingham, AL
- Total Contract Price: $20,168,734
  - RCC cost: $4.3 million
- Start Date: September, 2004
  - Completion Date: November, 2005
- RCC Paving: October thru November, 2004
  - March thru early August, 2005
  - 22 week-ends
**Comparisons**

- **Total cost associated with RCC:** Approx. $8 million
  - Associated costs include grading, saw-cutting, joint sealing, etc.
  - RCC Contract Price: $115 per cubic yard
- **Cost if asphalt had been used:** Approx. $7.35 million
  - Based on estimated cost of $42 per ton

**Differences:**
- RCC goes down in one lift and asphalt requires two or three lifts for the same depth creating the need for more traffic control and additional time
  - Less impact to traveling public
  - Safer for workers and motorists
- It is anticipated that RCC will have a useful life about two times that of asphalt resulting in lower long-term maintenance costs
Contract Specifics

- New shoulder width of 10 to 14 feet
- South of I-20, RCC six inches deep
- North of I-20, RCC 8 inches deep with 8 inches of GAB
- Contract calls for approx. 38,500 cubic yards of concrete (203,000 sq. yds)
- Work hours restricted primarily to weekends
  - 9:00 p.m. Friday until 5:00 a.m. Monday
  - Holiday restrictions
- Traffic counts at approx. 140,000 ADT
- Truck Traffic: 15% (7000 trucks in OSL per day)
Typical Construction Schedule

- Removal of shoulders began Fri. Night at 9:00 PM.
- Typically removed between 1.5 and 2 miles.
- RCC placement began Sat. at 5:00 AM and continued until 6:00 PM. Began again Sun. at 5:00 AM and continued until completion.
- All lanes must be reopened by 5:00 AM Monday.
Design and Acceptance

RCC: Required 28-day Mix
Design Strength of 4,000 psi

Acceptance based on
density- 98% AASHTO T-180 or 28-day core strength of 3500 psi

Core strength averaged 3980 psi

Cylinder strength averaged 3964 psi
## Table 1

<table>
<thead>
<tr>
<th>RCC Thickness Required</th>
<th>Allowable Interior Load Repetitions Over Lifetime of RCC Pavement</th>
<th>Design Life in Years</th>
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Old Material Removed
Base Prepared for Compaction
Base Ready for Compaction
Base Compacted
Concrete Plant
New Concrete Placed
New Concrete Placed
Material Placement
Short Cure Rate
Initial Roller Compaction
Initial Roller Compaction
Roller Compaction
(rubber-coated drum)
Curing
Quality Control
Quality Control
Saw Cut Joints
Completed Shoulder
Joint Intersection

Sealed Joints

Existing PCC

New RCC
Rumble Strips
Finished Product
Finished Product
QUESTIONS OR COMMENTS