

Overnight Reconstruction of Concrete Pavements

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Why Overnight ?



GEORGIA CASE STUDIES

- I-75 LANE REPLACEMENT
- SR 316 LANE REPLACEMENT

Interstate Reconstruction

I-75 Lane Replacement (2003)



Scope of Project

- Removal and Replacement of outside lane with Concrete Pavement.
- Full Depth and Partial Depth Patching on the middle lane
- Diamond Grinding of all 3 lanes
- Reconstruction of outside shoulder

Existing Slabs

- No Dowels
- 10 inch thick
- Joint spacing 30 feet
- Base: Soil Aggregate (Sand-Clay) with top three inches bituminous stabilized.

New Slabs

- Thickness 10 ½- 11 inches (Payment by CY as measured in place)
- Maximum Joint Spacing 15 feet
- Dowel Bars
- Structural Welded Wire Reinforcing Grade 80 equivalent to #5 Rebar @ 12" centers
- Strength of concrete 2500 psi in 24 hours
 - 3500 psi in three days.

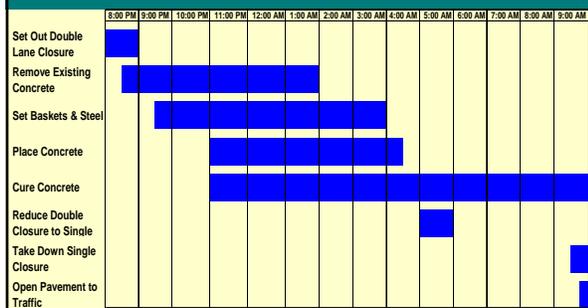
Traffic

- I - 75
 - From SR-49 to Hartley Bridge Road
 - ADT is 73,000 and 19% trucks (7000 trucks one way)
 - From SR-96 To SR-49
 - ADT is 53,800 and 24% Trucks (6500 trucks one way)
 - ESAL's ----- 5.0 million/year +/-

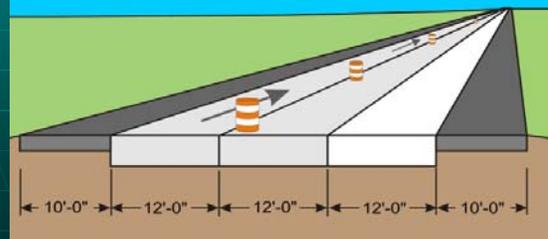
I-75, Bibb, Crawford, Peach County

	Monday-Thursday	Friday	Saturday	Sunday
6:00 AM				
7:00 AM	Single Lane Closure	Single Lane Closure	Double Lane Closure	Double Lane Closure
8:00 AM				
9:00 AM				
10:00 AM				
11:00 AM				
12:00 PM				
1:00 PM				
2:00 PM	No Lane Closures	No Lane Closures	No Lane Closures	No Lane Closures
3:00 PM				
4:00 PM				
5:00 PM				
6:00 PM				
7:00 PM				
8:00 PM		Single Lane	Single Lane	
9:00 PM				
10:00 PM				
11:00 PM				
12:00 AM	Double Lane Closure	Double Lane Closure	Double Lane Closure	Double Lane Closure
1:00 AM				
2:00 AM				
3:00 AM				
4:00 AM				
5:00 AM				

Nightly Schedule



I-75 Outside Lane Replacement



8:30 pm Remove Existing Slabs



Remove Existing Slabs



Dowel Bars & Chairs for Steel Mat



Steel Mat in Place



Slip-Forming Concrete



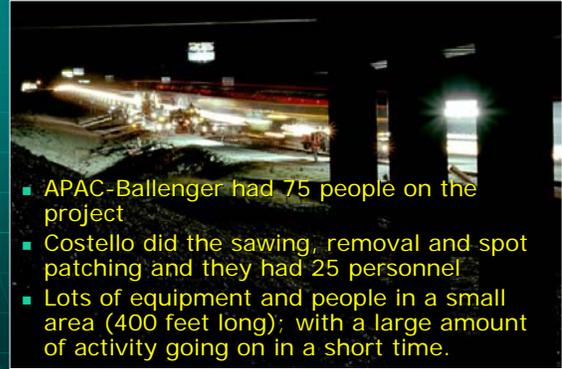
Finishing Concrete



10 am Next Day Open to Traffic



Large Construction Force



- APAC-Ballenger had 75 people on the project
- Costello did the sawing, removal and spot patching and they had 25 personnel
- Lots of equipment and people in a small area (400 feet long); with a large amount of activity going on in a short time.

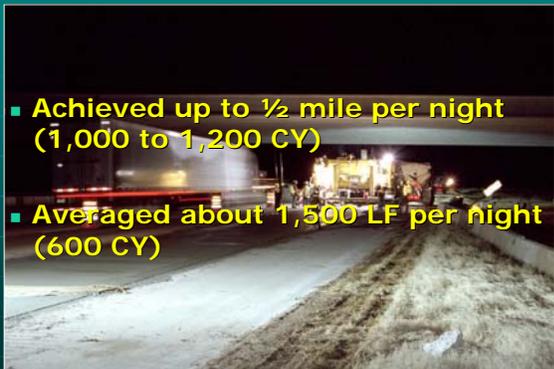
Recycled Slabs



Crushed & to be Reused in Shoulder Base



Production Rates



- Achieved up to ½ mile per night (1,000 to 1,200 CY)
- Averaged about 1,500 LF per night (600 CY)

Unit Prices

- New PCC Pvmnt----\$188.00/CY* (\$55 SY)
- Removal of Conc. Pvmnt-----\$13.22/SY
- Diamond Grinding-----\$1.95/SY

* Field Measured Reduces risk and therefore gets lower price to state.

Summary Replacing PCCP with PCCP

- I-75 Peach, Crawford, & Bibb Co.'s, GA
 - **Replacement of 20.1 Lane Miles in 11 Paving Weeks**
 - Limited Nighttime Work Hours, Open to Traffic Each Day
 - Six Hours Cure Time on Last Concrete Placed each Night

Urban Concrete Pavement Rehabilitation

SR 316 Gwinnett Co, GA (2006)



PROJECT DETAILS

- PROJECT LENGTH:
 - 5.7 miles
- PAVEMENT:
 - 9 INCH PCC+6 INCH LCB
- TRAFFIC:
 - ADT 68,000 30% TRUCKS
- PCC LANE REMOVAL AND REPLACEMENT:
 - 33,000 SY. (PROJECT TOTAL 56,000 SY)
 - 3.55 MILES ONE LANE , ONE DIRECTION

PROJECT DETAILS

- LANE CLOSURE TIME:
 - SU-THU 9:00PM TO 5:00AM
 - PENALTY \$1000/HR
- CONSTRUCTION TIME:
 - 22 NIGHTS OVER A 6 WEEK PERIOD
 - AVG. 1000FT/NIGHT. HIGH 1400FT
- COST :
 - REMOVE \$35 SQ.YD
 - REPLACE \$68 SQ.YD (9 INCH)

PROJECT DETAILS

CONSTRUCTION SEQUENCE

- PLACE LANE CLOSURE STARTING AT 9:00PM
- REMOVE OLD PCC
- PLACE DOWEL BASKETS
- PLACE AND FINISH NEW PCC
- GREEN SAW JOINTS
- FINISH PLACING CONCRETE BY 1:00AM
- PRE-SAW AHEAD IN OLD PCC FOR REMOVAL
- OPEN TO TRAFFIC BY 5:00AM





Concrete Mix

- Cement content: 752 lbs per CY
- No. 57 stone CA/FA 64%/36%
- Non-Chloride Accelerator
- Compressive Strength: 2500 psi in 24 hours
- Air: Target of 5%
- Slump: Target of 1.5 inches
- Max. W/C ratio: 0.45

Opening to Traffic Specification Language

- Schedule slab replacements so that the concrete will have a curing time of at least four hours.
- The Engineer may require a longer curing period, mix design adjustments, or other corrective action to ensure sufficient concrete strength development before opening to traffic.

Opening to Traffic Specification Language

- Until final acceptance of this work, replace damaged or broken slabs ---
 - Improper or Unsatisfactory methods, equipment, or materials
 - Construction or Public Traffic
- Replace slabs at NO additional cost to the Department

Strength at Opening to Traffic

- About 1200 to 1500 psi based on limited maturity testing

Evaluation of Early Strength Requirement of Concrete for Slab Replacement Using APT

FDOT Study

Final Report March 2005



■ Summary of Findings from FL Study

- Based on the limited test results from this study , it appears that for a 9 inch slab placed on a strong foundation (asphalt base used in this study) and a maximum temperature differential of +10F in the concrete slab, a **minimum required compressive strength of 1100psi to 1600 psi** for the concrete at the time of applications of traffic loads may be adequate

Summary of Benefits for Fast-Track

- Concrete pavement is feasible for all types of projects
- Expedite construction operations
- Reduce work zone congestion
- Allow residents and business people access to pavement quicker than normal
- Useful for all traffic conditions

