Buried Treasures, Resuscitating Old Concrete Pavements
New Jersey Route 21

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What is Buried Treasure?

- A pavement rehabilitation strategy that uncovers and renews aged PCCP that has been overlaid with asphalt due to functional, not structural issues (noise, ride, friction)
- PCCP must be structurally sound and in relatively good condition
- Asphalt is removed; RAP is recovered and sold to offset project cost
- Pavement is repaired where needed
- Final surface is diamond ground
New Jersey Hwy 21

- Project validates that an asphalt overlay can be removed.
- And replaced cost effectively with a diamond ground surface.
NJDOT’s 2nd precast slab project

- Route 21 Essex & Passaic Counties
- MP 5.0 to 6.5 constructed in 1931
- MP 6.5 to 10 constructed in 1958
- AADT 70,000
- First micro-surfacing applied in 1993
- Second micro-surfacing applied in 2001
- Both were done to address low skid numbers
The IRI Ride on micro surfacing in 2007 was 160.94 inches/mile
The IRI ride after the asphalt mill removed the micro treatments was 222.80 inches/mile
The final IRI ride after Diamond Grinding was 112.00 inches/mile
All Work done at night 8:00 pm – 6:00 am only
New Jersey Route 21

- Slab Stabilization
- Catch Basin Repair
- Pre-Cast Panel for Full Depth Repairs
- Partial Depth Repairs
- Diamond Grinding
- Joint Resealing
NJDOT’s Route 21 Scope

- Bid Price $4.32 /pound for 150,000 pounds or $648,000 for grout stabilization
- Pre-Cast Panel bid was $472.89 /square yard for 4,900 sy at a total cost of $2,317,161
- Synthetic resin partial depth repairs
- Bid Price of $1,113.95 for 490 SY or $545,835.50
- Diamond Grinding final surface bid price of $7.63 SY for 266,750 sy or $1,963,280
Slab Stabilization
Slab Stabilization

BASF Polyurethane Foam
Slab Stabilization
Failed Catch Basins
Failed Catch Basins
NJDOT’s Experience with Precast PCCP

- **Route I-295 Burlington County**
  - $8.7 million total, *$2.4 M for slab repairs*
  - Award 9/1/06 Precast Qty 62,000 SF

- **Route 21 Essex & Passaic Co.**
  - $9 million total, $2.3 M for precast slabs
  - Letting 1/31/08 Precast Qty 44,000 SF

- **Route I-280 Essex County**
  - $21.6 million total, $2.6 M for precast slabs
  - Award 6/5/08 Precast Qty 35,000 SF
Why Precast PCCP?

- NJ fast track mix requires 6.5 hr cure, temperature sensitive
- Fast Track long term durability issues
- Cast in place requires flexural beam tests that require staff and equipment at night
- Many concrete plants don’t want to open at night for a few loads of concrete
- Some towns prohibit concrete plants from operating at night
Why Precast PCCP

- More expensive than cast in place fast track
- Cost competitive with Rapid Set w/latex
- Better quality control and durability
- Lane can be opened to traffic immediately after slab placement
- Slabs can be removed and reset if not set properly
- Better for correcting localized subsidence
- Lower risk for opening lane on time
- Can work in cooler weather
New Jersey Route 21

- Repairs are measured and marked in the field
- Then Fort Miller Co. Inc. of Schuylerville NY built the panels
- Bid Cost was $472.89 /square yard
- Total of 4,900 sy
Removals
Dowel Bar Drilling Rig

- Dowels were 1 ½” in Diameter
- Only 4 Dowels per wheel path were used
- Centerline bars replaced as needed
Full Depth Preparation
Initial Checking of Subbase
Screeding of Subbase Material
Fine grading stone sand
Subbase preparation
Base compaction
Grout Holes to lock Dowels in the Pre-Cast Panel
Final Full Depth Ready for Diamond Grinding
Partial Depth Repair

Patch Area Primed for TechCrete
Crafco Product
TechCrete

Repair area after removal and sandblasting
Partial Depth Synthetic Resin Patch
Partial Depth Repair
Diamond Grinding

- Diamond Grinding Contractor Interstate Improvement Co.
- Asked that asphalt milling not dig too deep into old concrete
- Some Asphalt left in low spots
Conventional Diamond Grinding

- Cuts a 10’ – 14’ Flat Surface
- From wheels behind the grinding head
- To the front wheels
New Jersey Route 21

- Slab Stabilization
- Catch Basin Repair
- Pre-Cast Panel for Full Depth Repairs
- Partial Depth Repairs
- Diamond Grinding
- Joint Resealing
Value of Old Asphalt

- Every inch of asphalt generates 0.05 tons per square yard of pavement.
- At $20 per ton value for asphalt millings.
- Each inch per square yard generates $1.00 of revenue.
- A typical asphalt overlay of 3 inches would generate $3.00.
- Most Diamond Grinding bids are between $3.00 and $5.00.
Final Surface
Washington SR 522

- In 2002, WASHDOT decides to rehabilitate pavement
- Old overlays and asphalt patches removed
- Full depth PCC patches used to repair damaged concrete
- Widened asphalt lanes replaced with full depth concrete lanes
- Entire surface diamond ground as final surface texture
- Pavement still performing well today
Washington SR 522
Washington SR 522
Summary

- This is a challenging time for the transportation industry
- Innovative cost effective solutions are needed to survive the storm
- Many old PCCPs were overlaid in the past due to functional, not structural reasons (noise, friction, ride)
- The RAP removed from overlaid PCCP has value and can help reduce project costs
Questions ?

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