SUSTAINABILITY

- Historical performance
- Future
- During construction
- Safety
- Environmentally
Pavement sections: I-40

From SR 1319 to U.S. 70
- Constructed in 1982
  - 9.5-inch JPCP
  - Cement-treated ABC or ABC
- Constructed in 1983
  - 10-inch JPCP
  - 4-inch Cement-treated ABC

From U.S. 70 to Exit 301
- Constructed 1982
  - 9.5-inch JPCP
  - Cement-treated ABC/ABC
- Constructed 1983
  - 10-inch JPCP
  - 4-inch Cement-treated ABC

Rehabilitated in 2007:
- Replaced 11 slabs, sealed 6,600 feet of wide (>1 inch) cracks and placed 420 patches
- Ultrathin placed over the entire surface

11-inch JPCP median lane added in 2000
- I-40 (Exit 301) to Poole Road
- Poole Road to U.S. 64

11-inch JPCP median lane added in 1997
- Constructed in 1981
  - 10-inch JPCP
  - 4-inch Cement-treated ABC
- Constructed in 1976
  - 8-inch CRCP
  - ABC Base
• Originally constructed in 1981 – 10-inch JPCP
• Top 3-inch milled and 4-inch bonded overlay placed in 2000
• Bonded overlay milled off and overlaid with asphalt in 2009
• Ultrathin was placed over the entire surface in 2009

ASR Mechanism: 2-step process

**Step 1**: Alkali hydroxides from the cement react with unstable silica (SiO₂) in the aggregate to form alkali-silica gel

**Step 2**: The gel absorbs water from the surrounding paste and expands, eventually causing cracking
Extensive map-cracking caused by ASR

Dennis Jernigan, P.E. - NCDOT's Project Fortify
SUSTAINABILITY

- Historical performance
- **Future**
- During construction
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Why Fortify?

• 30-year-old pavement is cracking & crumbling because of a chemical reaction happening underneath the road, triggered by a reaction between paving materials used in paving several decades ago.

• Crews must rebuild an 11.5-mile stretch of I-40 and I-440.

Previous Maintenance Costs

• 1988-2012: Spent more than $11.1 million on maintenance repairs and preservation on I-5338.

• 2009-2010: Spent more than $3.9 million to preserve the pavement on I-5311 until a rehabilitation TIP could be developed.
Pavement Options

- Rubblization of existing concrete
  - Cracking may provide space for gel expansion
  - Cracking may cause more moisture exposure driving ASR reaction
- Removal of existing pavement and reconstruction

Risk of Using Existing Pavement

<table>
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Pavement Design

- 3.0” S9.5D
- 3.0” I19.0D
- 9.0” B25.0C
- 12.0” Class IV Select Material (Crushed Concrete)
- Soil Stabilization Geotextile
Pavement – Dedicated Asphalt Plant

- Dedicated state-of-the-art asphalt plant
- Natural gas reduces emissions
- $5 million cost savings

Value Added...

- An economical 22' median barrier section
- A sustainable reuse of existing pavement
- A state-of-the-art asphalt plant - natural gas
- An efficient material delivery system
- A travel demand management committee

Bridge Rehabilitation – Concrete Overlays
Pavement – Subgrade Stabilization

- Sustainability
- ATC #1 - Class IV
- Expedited construction
- Significant cost savings
- Over 80,000 haul loads eliminated

Construction Approach
SUSTAINABILITY

- Historical performance
- Future
- During construction
- Safety
- Environmentally

Stakeholder Involvement

- Met with 50+ groups of stakeholders to inform them about the project, answer questions and promote/discuss travel alternatives
- Will meet again with all stakeholders to discuss in detail construction schedule for construction
- The design-build team is a part of our Fortify communication campaign
**Stakeholder Involvement**

- First responders
- Hospitals
- N.C. Truckers Association
- Cities and counties
- Businesses
- Media
- Schools
- Professional societies

**Traffic Management Plan**

- Travel demand manager
- 30+ portable ITS devices
- Incident management plan
- Full-time communication specialist
- New STOC engineer
- 20-minute contract towing requirement
- Re-timing signals on alternate routes
- Monthly traffic operations meetings
- Speed limit reduction
- HAWKS program
Dennis Jernigan, P.E. - NCDOT's Project Fortify
NCDOT Helps Ease Congestion

- Keeping 3 lanes open in both directions during the entire I-40 rebuild

- Investing an additional $12 million in public transportation to add more buses and routes, and identify new park & ride options

We Need Your Help

To help reduce congestion, our goal is to get 30,000 cars off the road during heavy commute times

- Morning: 6 a.m. – 8:30 a.m.
- Evening: 4 p.m. – 6:30 p.m.

Major Fortification

- Replace pavement along 11.5-mile stretch of southern stretch of I-40 / I-440
- Extend the lanes between ramps in each direction at:
  - U.S. 1/I-64 (Exit 293) / Gorman St (Exit 295)
  - Gorman Street (Exit 295) / Lake Wheeler Rd (Exit 297)
- Extend deceleration lane – off ramp for Rock Quarry Road (Exit 300B)
- Rehabilitate 14 bridges within project zone
What Can You Do?

- ALTERNATIVE ROUTE
- CAR OR VANPOOL
- PUBLIC TRANSIT
- SHIFT WORK SCHEDULE

Know Before You Go

www.fortifyNC.com
- Live traffic cams
- Maps & drive times
- Updated information
- Transit options
- Commuter apps

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