Taking Opportunities as they Come

Deck Preservation Work During the
I-40 Rockslide Closure

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Deck Preservation Projects

- August 2009 – ARRA Project Selection began – We selected 4 bridge decks in poor condition
- Division & Central Bridge collaborated to develop the projects
- Contracts would included hydro-demolition and VES-LMC overlays
- Problems arose with Traffic Control plans due to bridge widths

Bridge Deck Condition

October 25, 2009

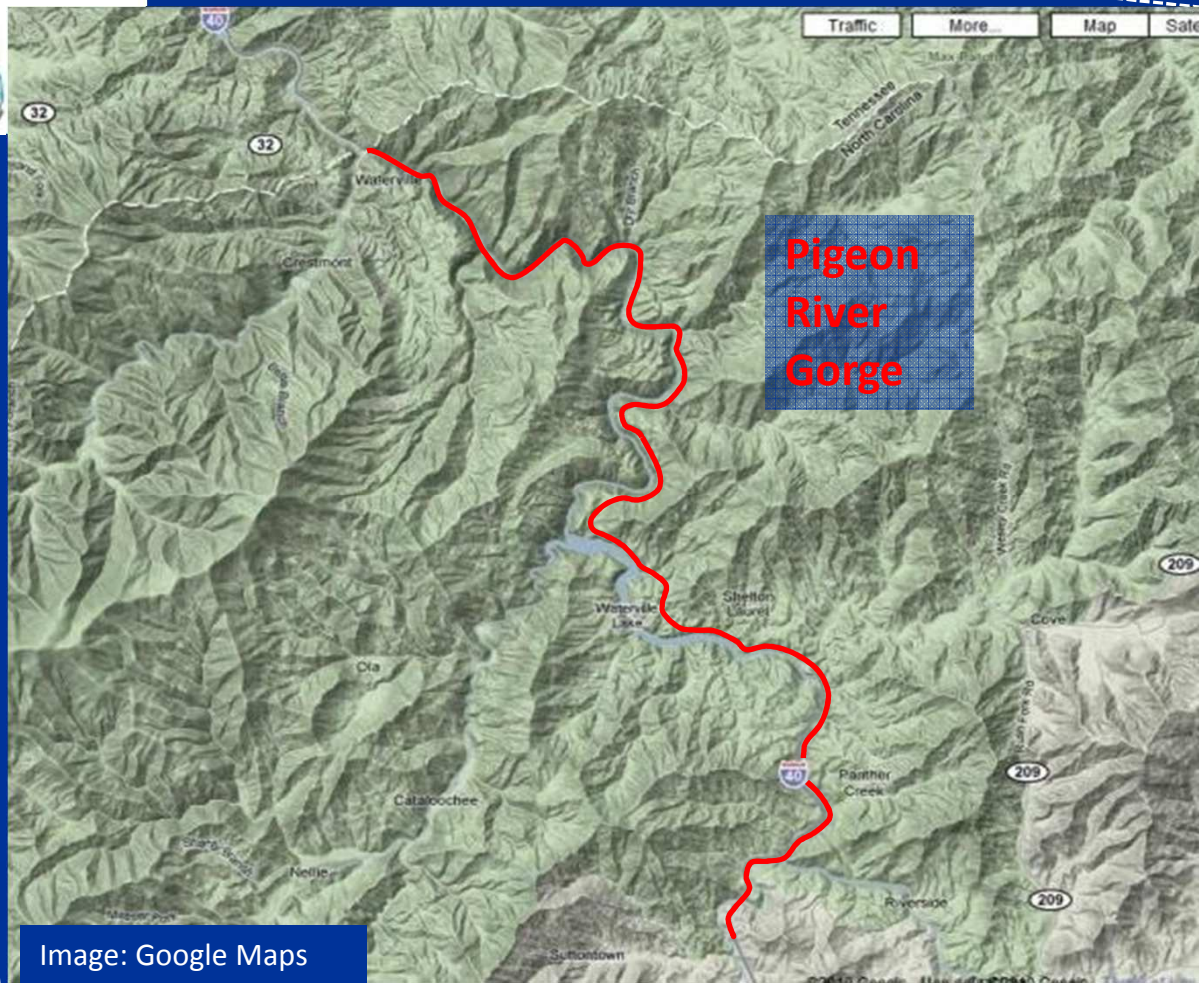

October 25, 2009


CATERPILLAR

I-40 IS A MAJOR EAST-WEST TRANSPORTATION CORRIDOR

Pigeon River Gorge:

- ADT of approx 19,000
- 32% Trucks
- Several major slides over last 25 years



Seize the Opportunity

- I-40 shut down to traffic
- Corridor Maintenance Work

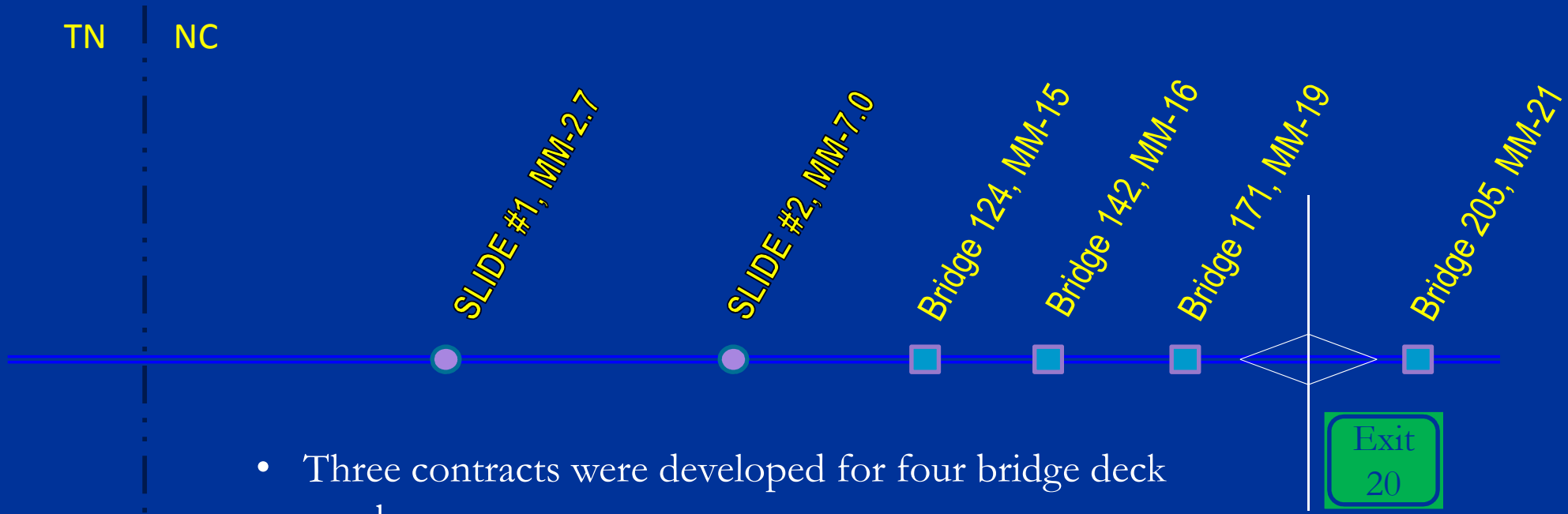
Maintenance Activities

- Clear Right-of-Way
- Repair to median barrier walls
- Tunnel cleaning, maintenance, and paving
- Bridge deck preservation

Deck Preservation Contract Challenges

- Completion Time
- Traffic Control
- Purchasing Constraints

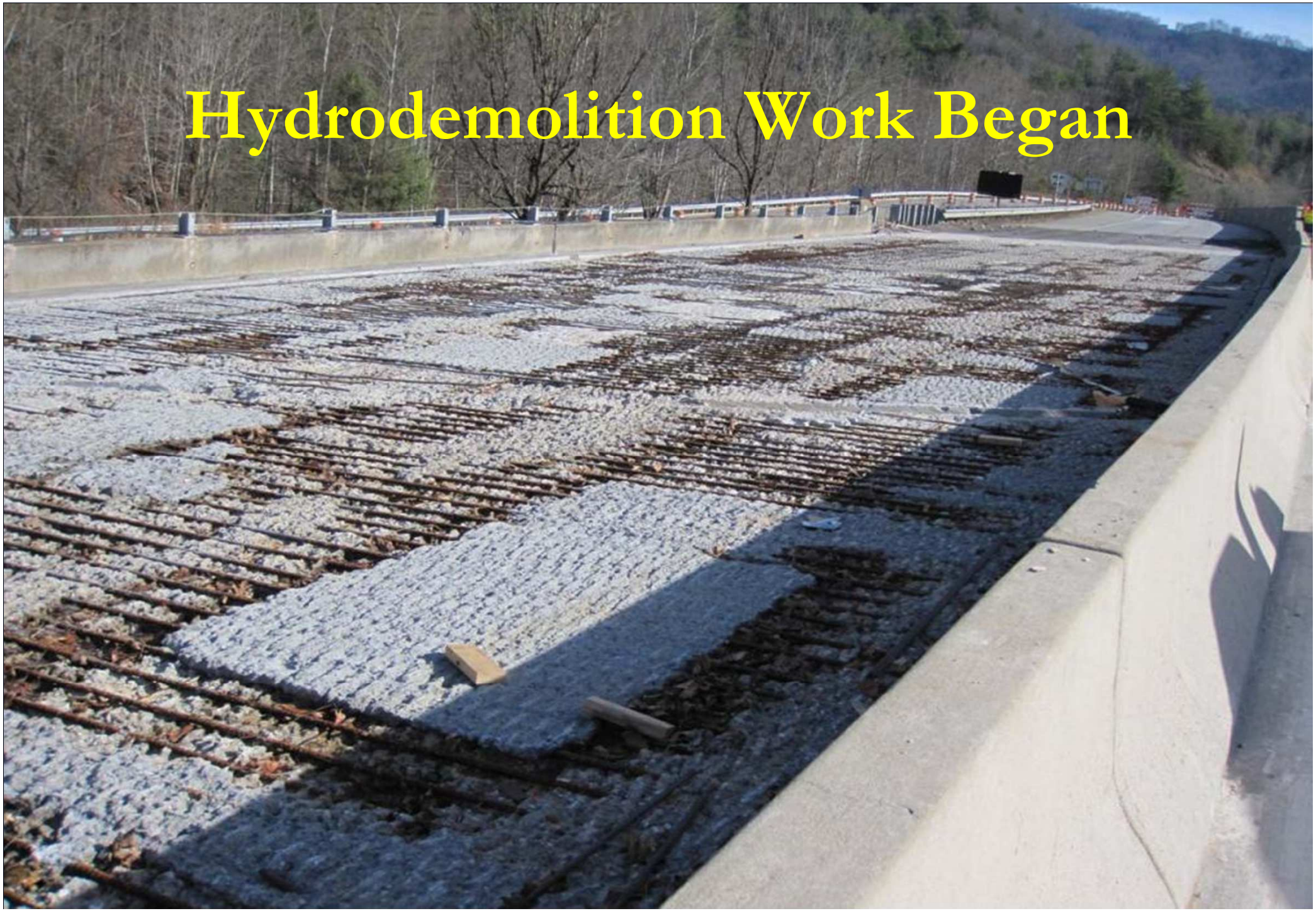
Bridge Locations on I-40



- Three contracts were developed for four bridge deck overlays
- Two outside bridges were grouped into one contract and would control the traffic pattern
- The two interior bridges had their own contracts
- Intermediate Completion times to restore east bound lanes first (January 1, 2010) in all contracts

Contract Award and Construction

- Contract awarded in 5 weeks after slide occurred
- One contractor was awarded all 3 contracts
- Work began on Nov. 21, 2009 with a contract completion date of Jan. 31, 2009


Hydrodemolition Work Began


Deck Pour

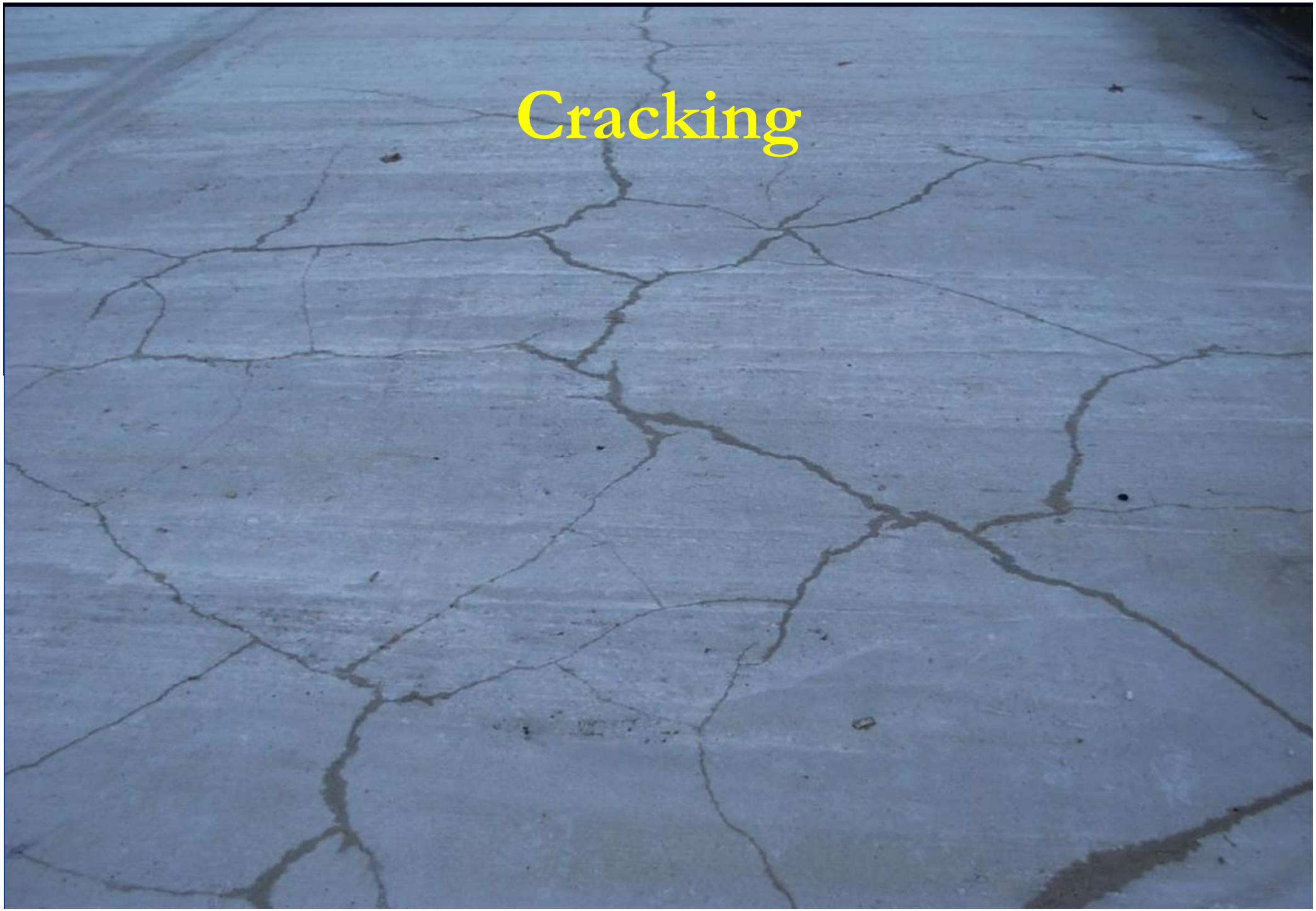
Deck Curing

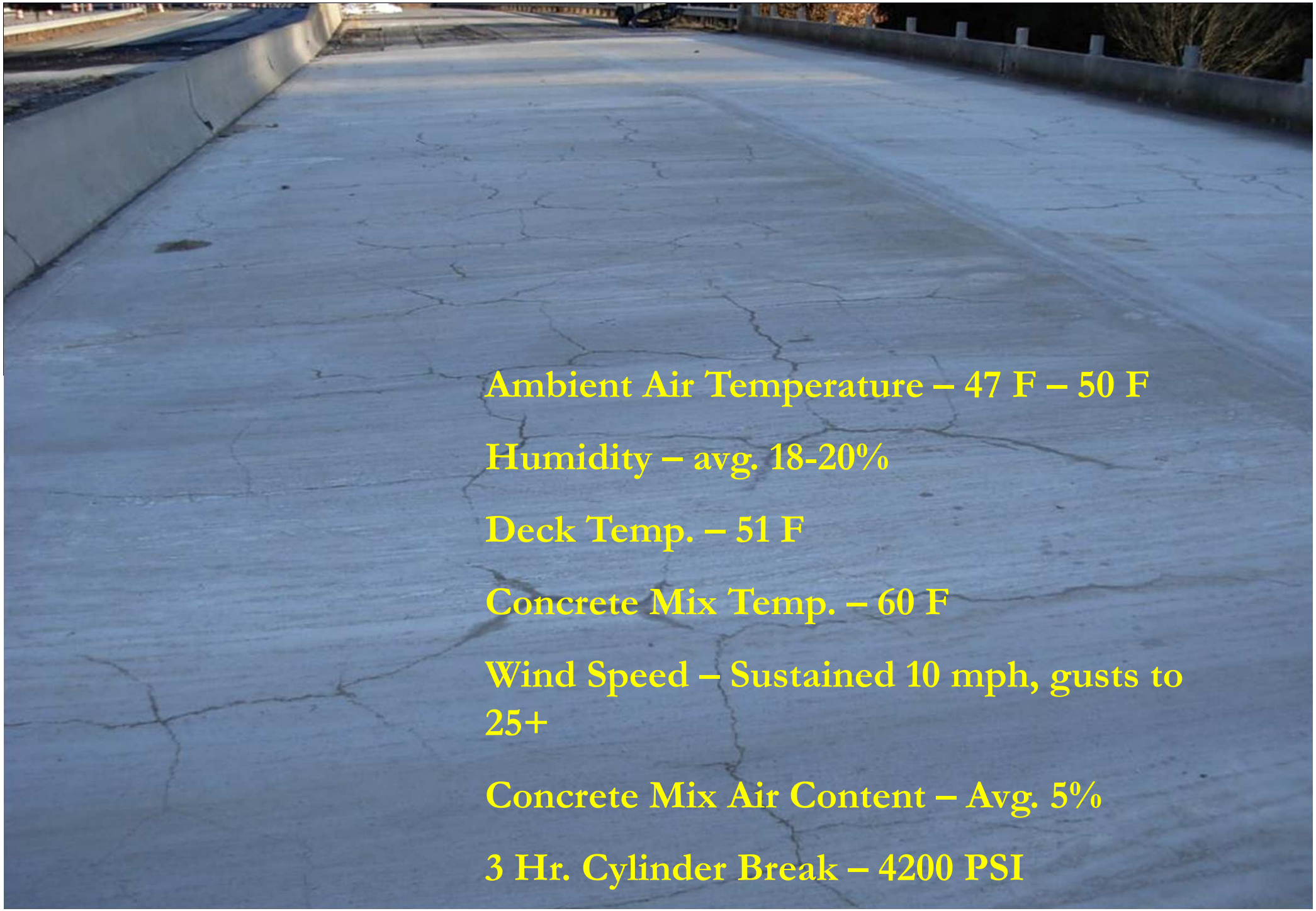
Rare Good Weather Day!

Typical Weather Day

VES-LMC Mix Design

Cement – CTS Rapid Set	658 lbs/CY
Sand – Type 2S	1528 lbs/CY
Stone – 78M	1230 lbs/CY
Water	17.2 Gal
Latex	24.5 Gal/CY


Cracking


Ambient Air Temperature – 47 F – 50 F
Humidity – avg. 18-20%
Deck Temp. – 51 F
Concrete Mix Temp. – 60 F
Wind Speed – Sustained 10 mph, gusts to 25+
Concrete Mix Air Content – Avg. 5%
3 Hr. Cylinder Break – 4200 PSI

Underside

Core Samples

Full Depth Cracking is apparent

Avg. Cracking – 0.006 – 0.010 in.

Some as large as 0.014 in.

Within 2- 3 SF areas

Bond Strength Testing

- Performed an onsite pull test to check bond strength.
- Test results were acceptable
- Avg. 552 psi at 28 days

Addressing Cracking

- Consultation with FHWA, VDOT, Contractor, and NCDOT staff
- Remove and replace?
- Deck sealing

Deck Sealing

- BASF Methacrylate Sealant
- Light sand over top for skid resistance
- Sealants were place in February 2010 (approx. 2 months after construction began)


One Year Later (2/11)


One Year Later (2/11)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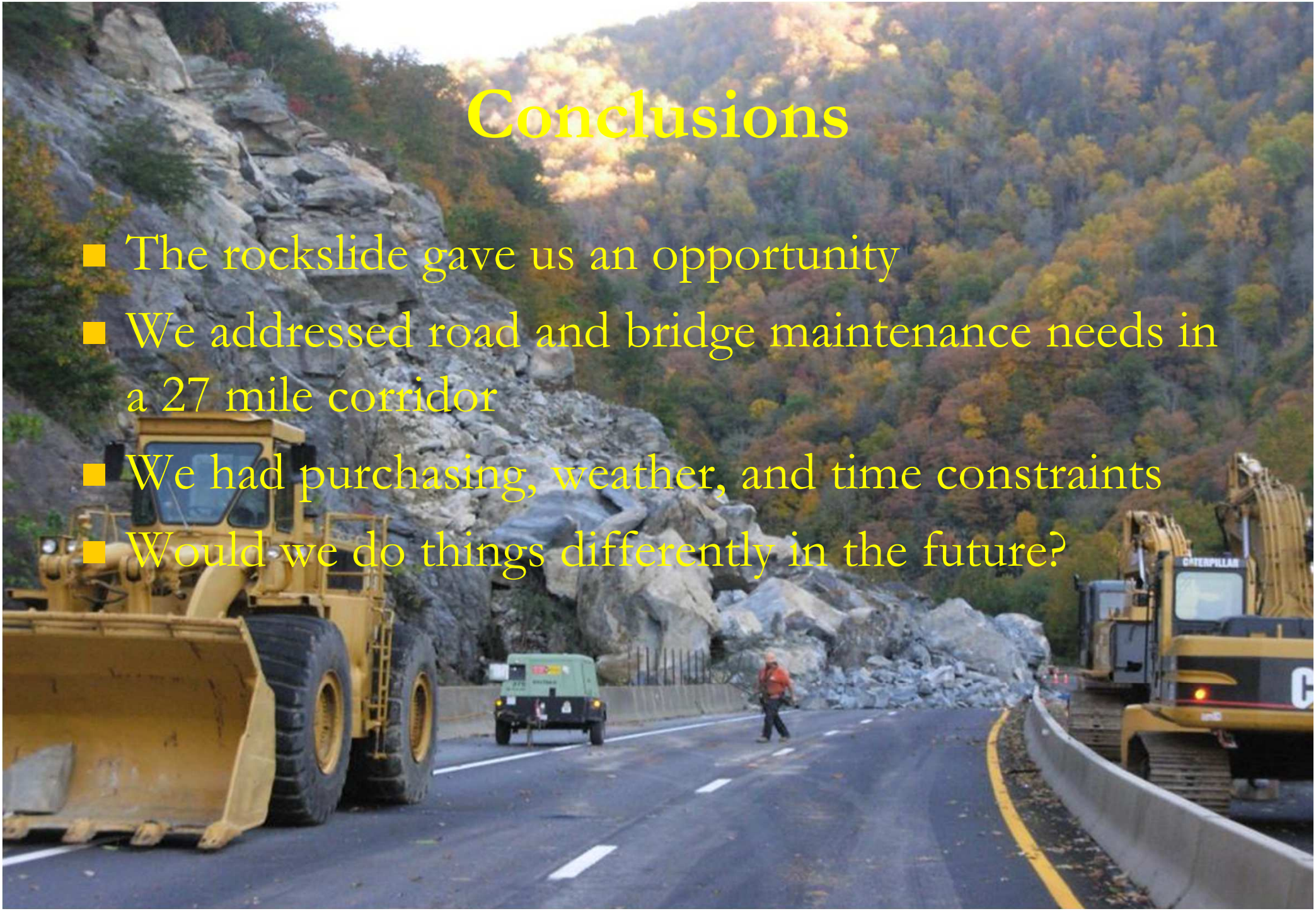

Conclusions

- The rockslide gave us an opportunity
- We addressed road and bridge maintenance needs in a 27 mile corridor
- We had purchasing, weather, and time constraints
- Would we do things differently in the future?

Questions?