Pavement Preservation and Improvements in Delaware

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Overview of Different Pavement Preservation Methods used in Delaware

1) Concrete and Hot Mix Patching
2) Crack sealing and Filling
3) Microsurfacing
4) Chip sealing
5) Joint Sealing
6) Thin Overlay

Experience From Recent Projects

1) Joint Sealing of SR1

2) Warm mix Thin Overlay Various Roads in Kent County

1) Joint Sealing Delaware State Route SR1 Project

Project General Information

- Delaware Rd # 150
- Length 96 Lane miles
- AADT 35084
- Truck % 14
- Built 1994
- Concrete Pavement with Hot Mix Shoulders
- Contractor: Pavement Contracting Services Inc.

Road Condition

1) Concrete in good Condition
2) Hot mix shoulders have many cracks
3) Have many failed joints

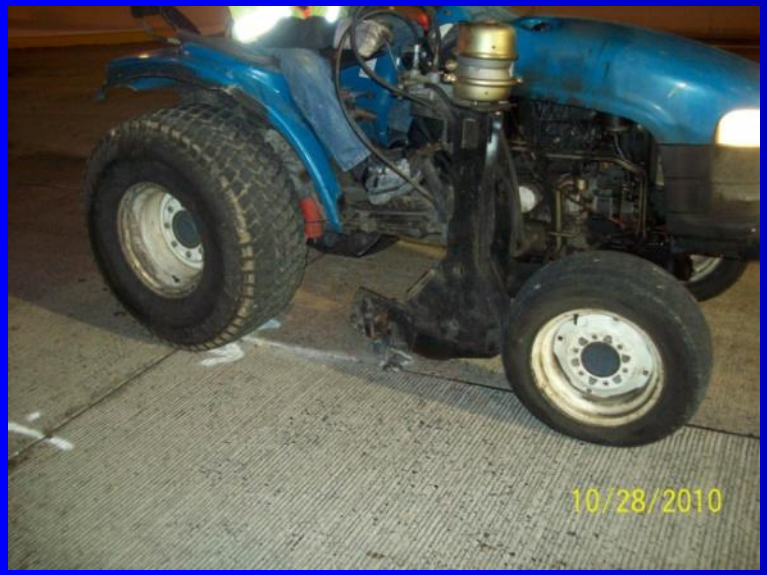
Joint sealing project for repair of different types of Joints

1) Longitudinal hot pour joints
2) Transverse neoprene joints
3) Interface joints between concrete pavement and hot mix shoulder

1) Longitudinal hot pour joints repair stages

If joint is missing or not working,

A: Remove the existing hot pour
B: Sand blast and clean the joint
C: Install backer rod
D: Fill the joint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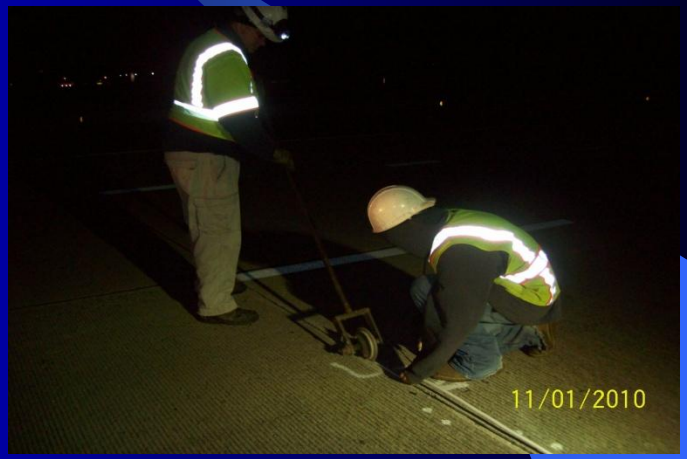
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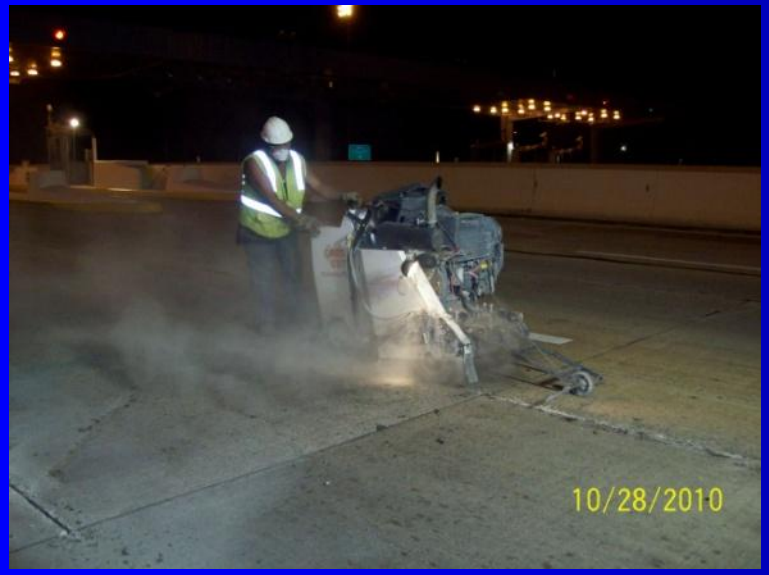
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2) Transverse neoprene joint problems and fixes

A. If joint has dropped less than 1:1, leave alone, unless other problems exist

B. If joint has dropped 1:1, seal on top of neoprene only

C . If joint is loose, push down to get 1:1 and seal.

D. If joint dropped greater than 1:1, remove existing material, clean, install backer rod, and seal


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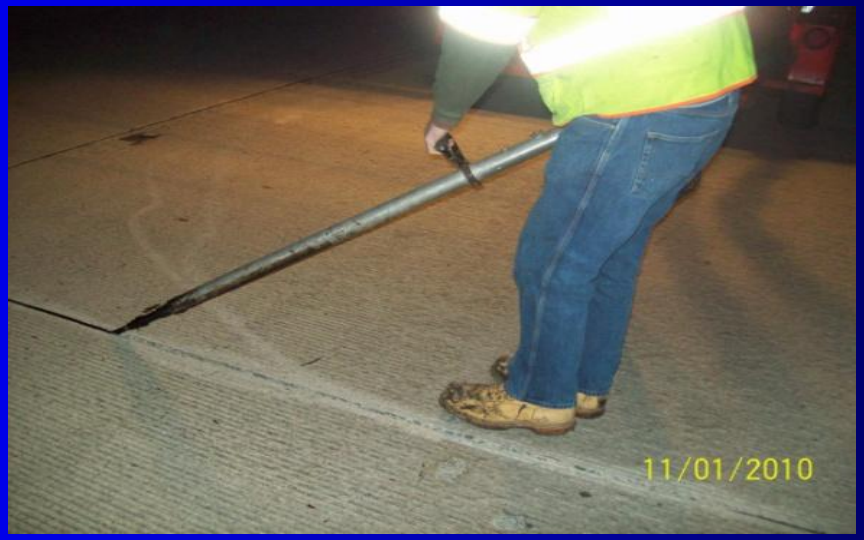
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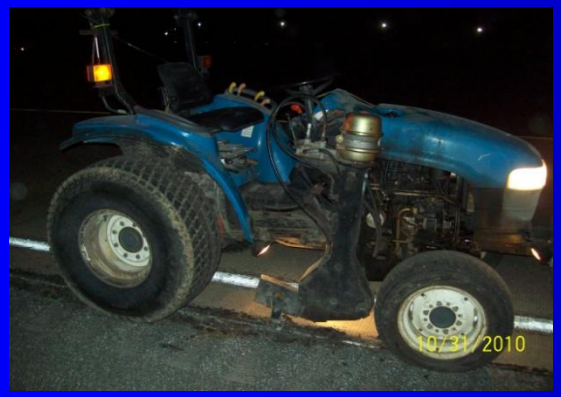
3) Interface Joint

- Interface joint problems
  - If joint is missing or not working, remove existing material to create a 1:1 reservoir, remove necessary seal and vegetation, clean, seal, and band (using squeegee)
- Cracks in concrete and hot mix
  - Clean, seal, and band (using squeegee)
- Holes
  - Remove loose debris, clean, and seal
- Failure areas
  - Remove loose debris and existing cold patch, clean, and seal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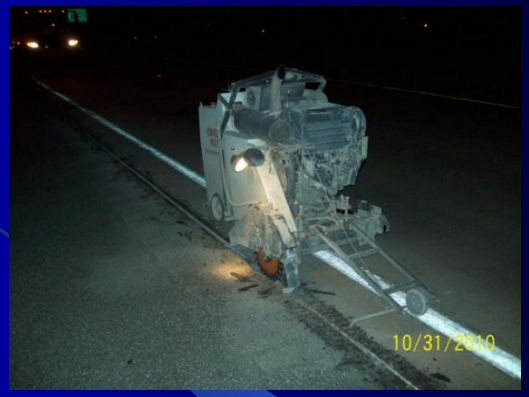
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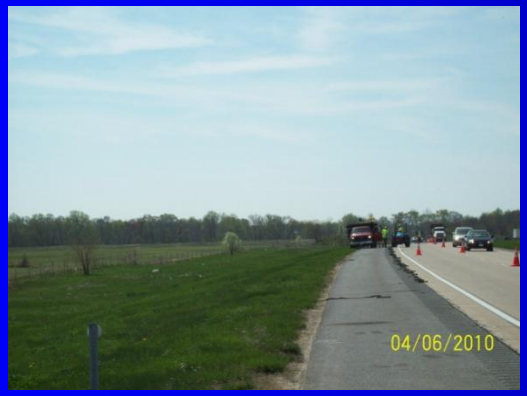
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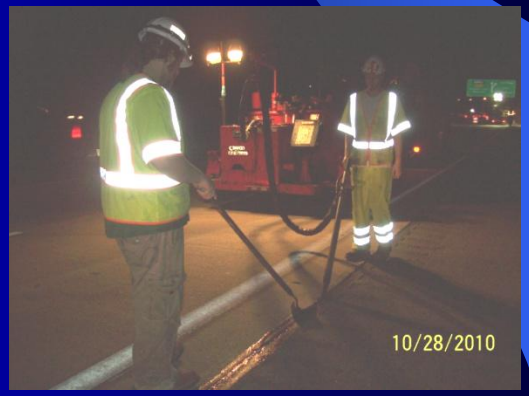
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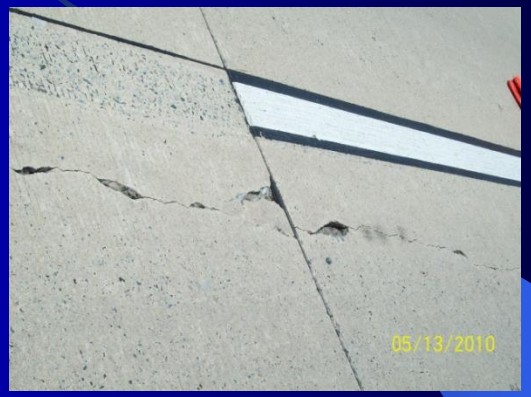
Finished products

interface joints

Other Problems that was fixed

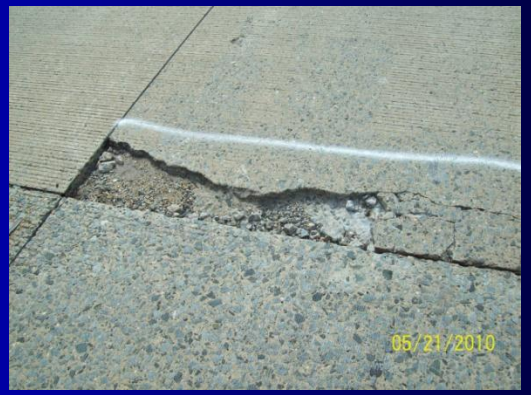
Spalls

Cracks



Holes with larger voids under concrete surface

Failures



Project summary

Lane miles, including exits

- Highway lane miles: 74
- Exit lane miles: 22
- Total lane miles: 96

Total project cost

- Project completed in two phases
- Total cost: $1,757,778

Material used for crack sealing conforms to ASTM D6690 hot-applied, single component polymer /rubber modified asphalt

Total average cost per lane mile

$18,310

Conclusions

1) After approximately 16 years of service most of neoprene joints were in good shape and need little repair. Most of the damage was due to diamond grinding. Or loss of neoprene due to tightness of the joints at curves. And in areas close to toll plaza due to braking force.
2) Almost all of the longitudinal and interface joints needed to be replaced.

2) Warm mix Thin Overlay Project Various Roads in Kent County

Project General Information

Various Roads in Kent County
Length 52.11 Lane miles
AADT 2442- 145278
Truck % 8-14
Contractor: George &Lynch
Cost per Lane: 31,254.00

Objective of the Project

1) Protect and preserve the roads that have been recently patched and crack sealed.
2) Improve the rideability of the roads that could not be achieved with microsurfacing.

Material

1) Warm mix asphalt with PG 70-22 no rap
2) Tack coat 64-22

3) Aggregate 80-100 percent passing #4 (4.75 mm)

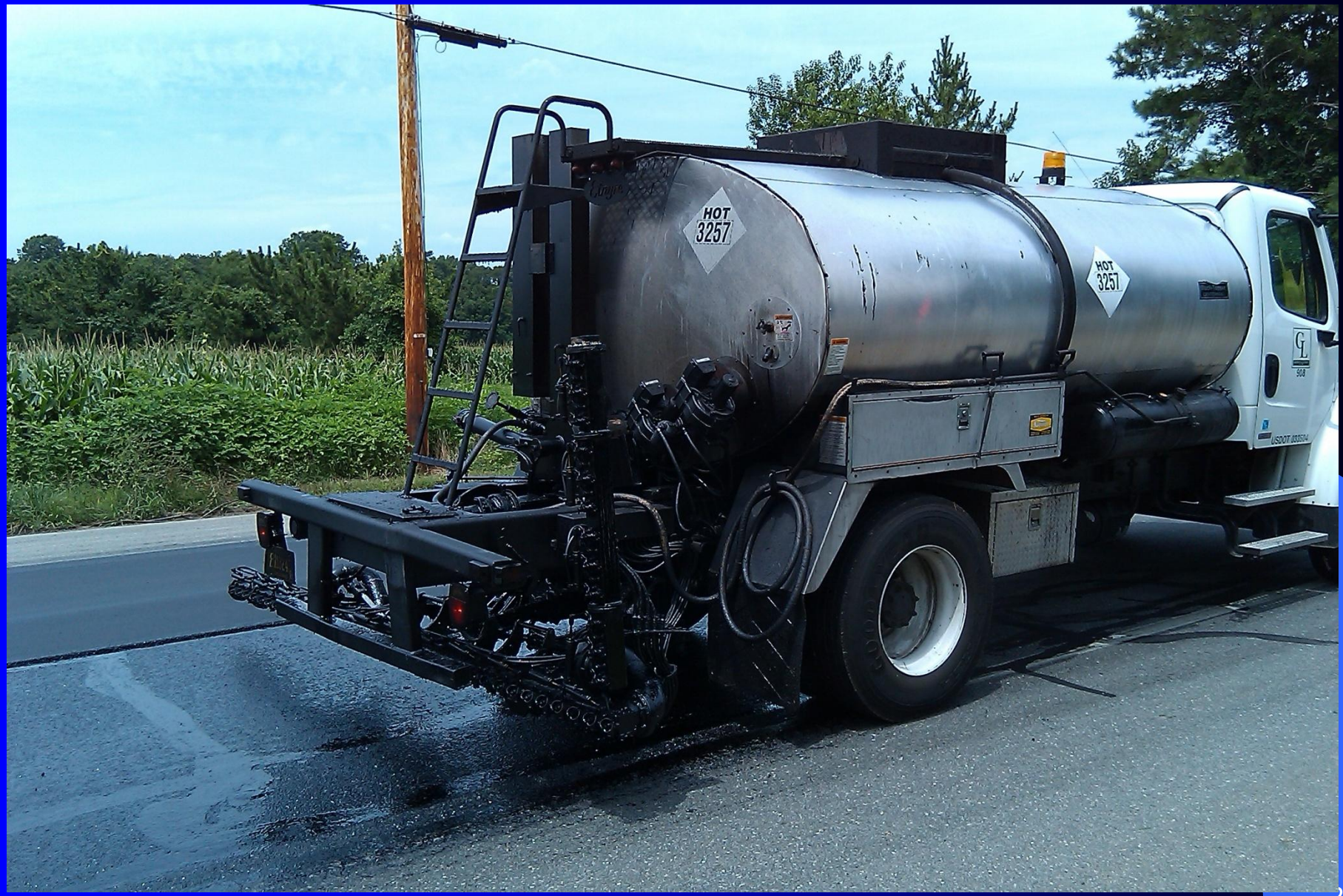
Tack Coat Application Rate and Temperature

After testing various application rates on a test strip it was decided to use application rate of 0.1 gal/ Yard^2 at the application temperature 340-300 Fahrenheit

Warm mix temperature 270-290
Average thickness 0.7 in.

Why Warm Mix Thin Overlay and PG 64-22 Tack Coat?

Because the roads were heavily crack sealed it was decided to use only warm mix and PG grade asphalt to avoid swelling of the crack sealed material.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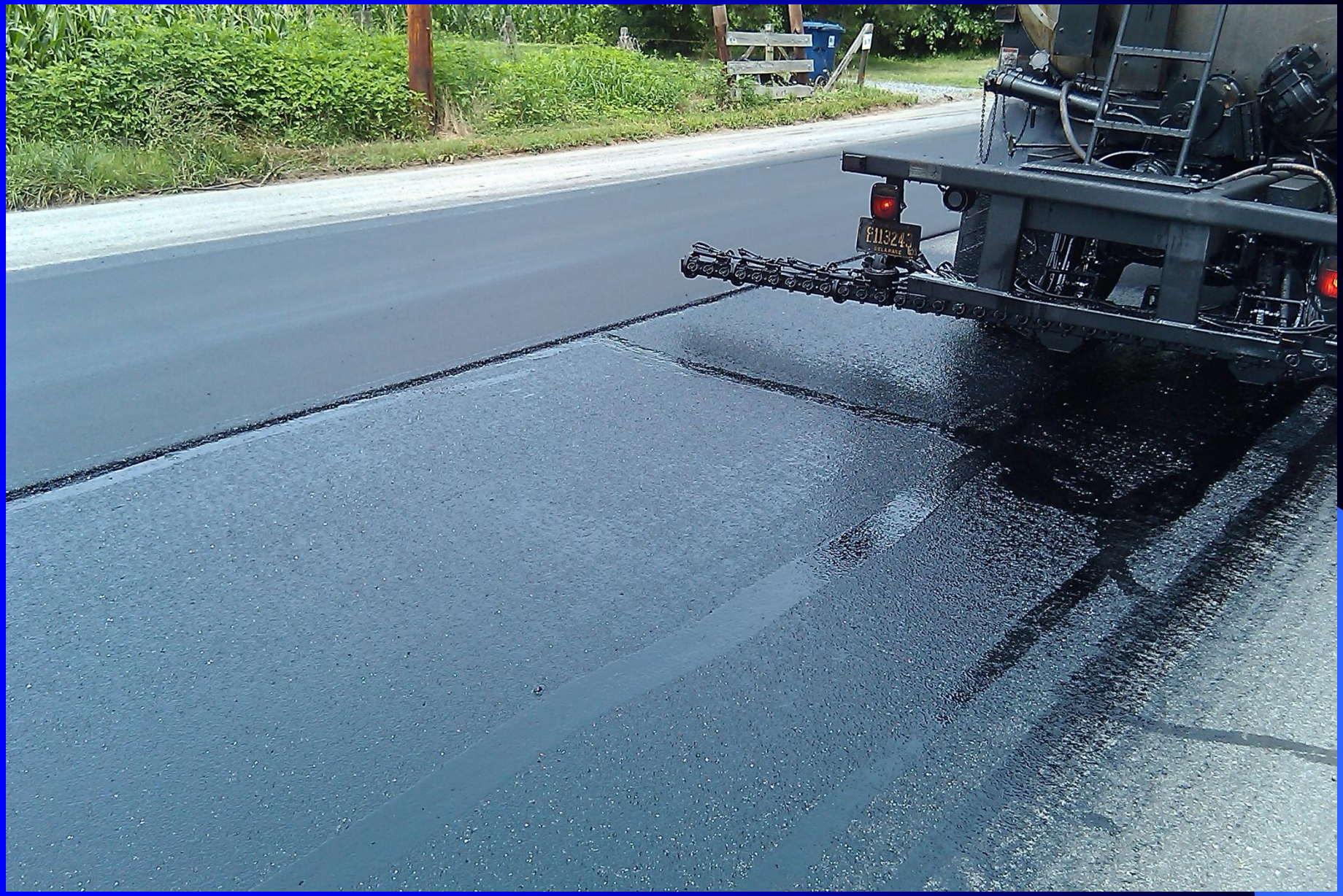

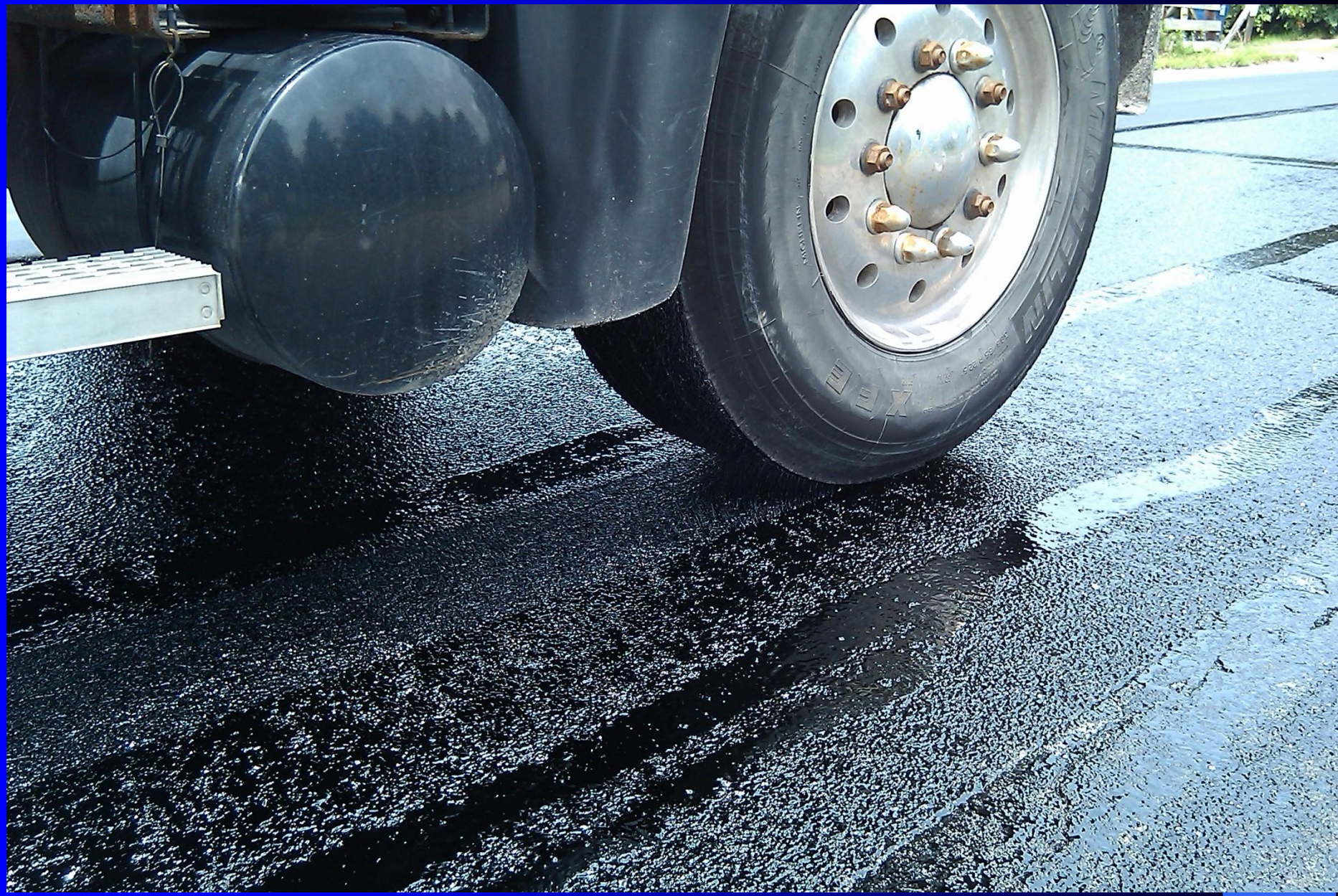

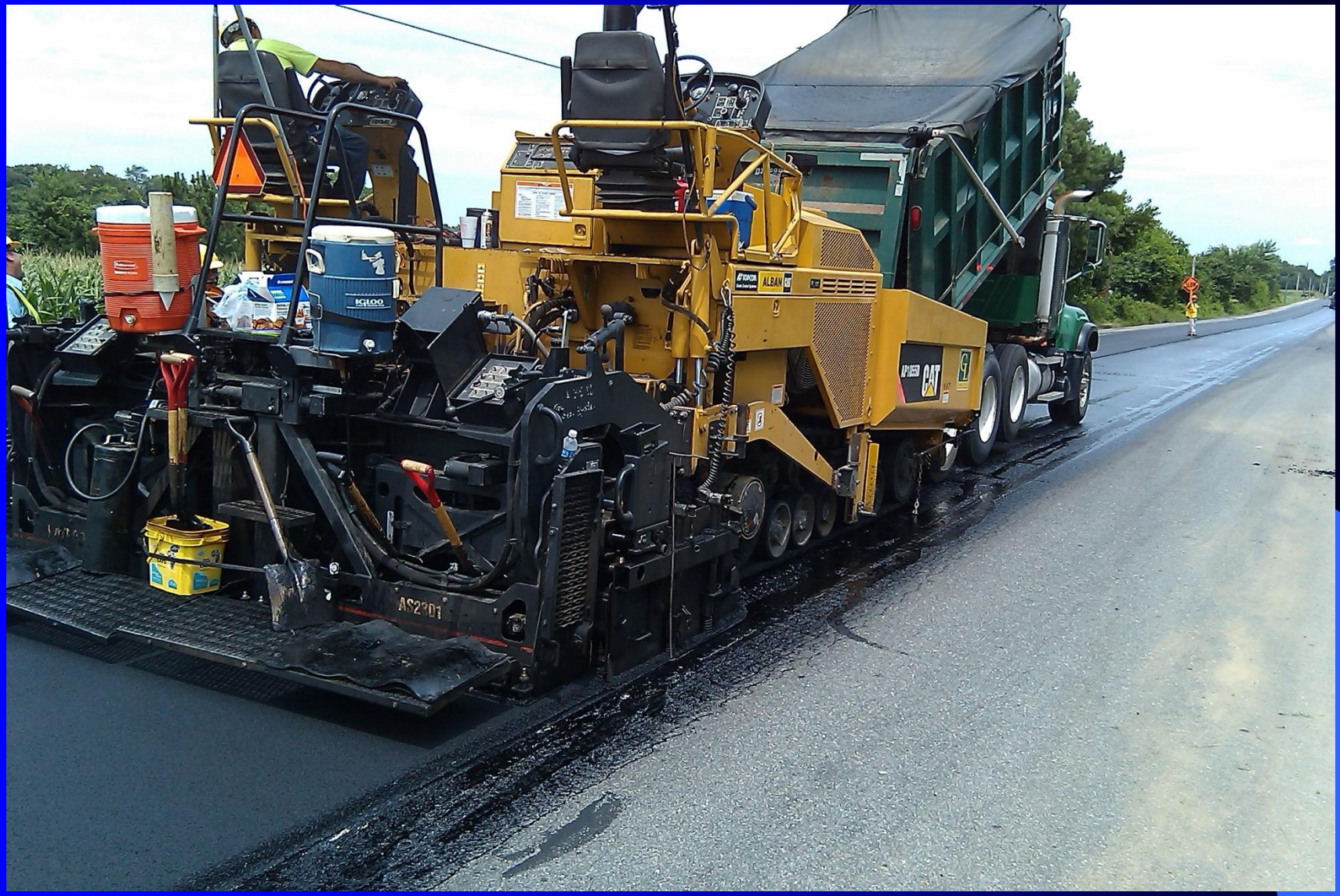
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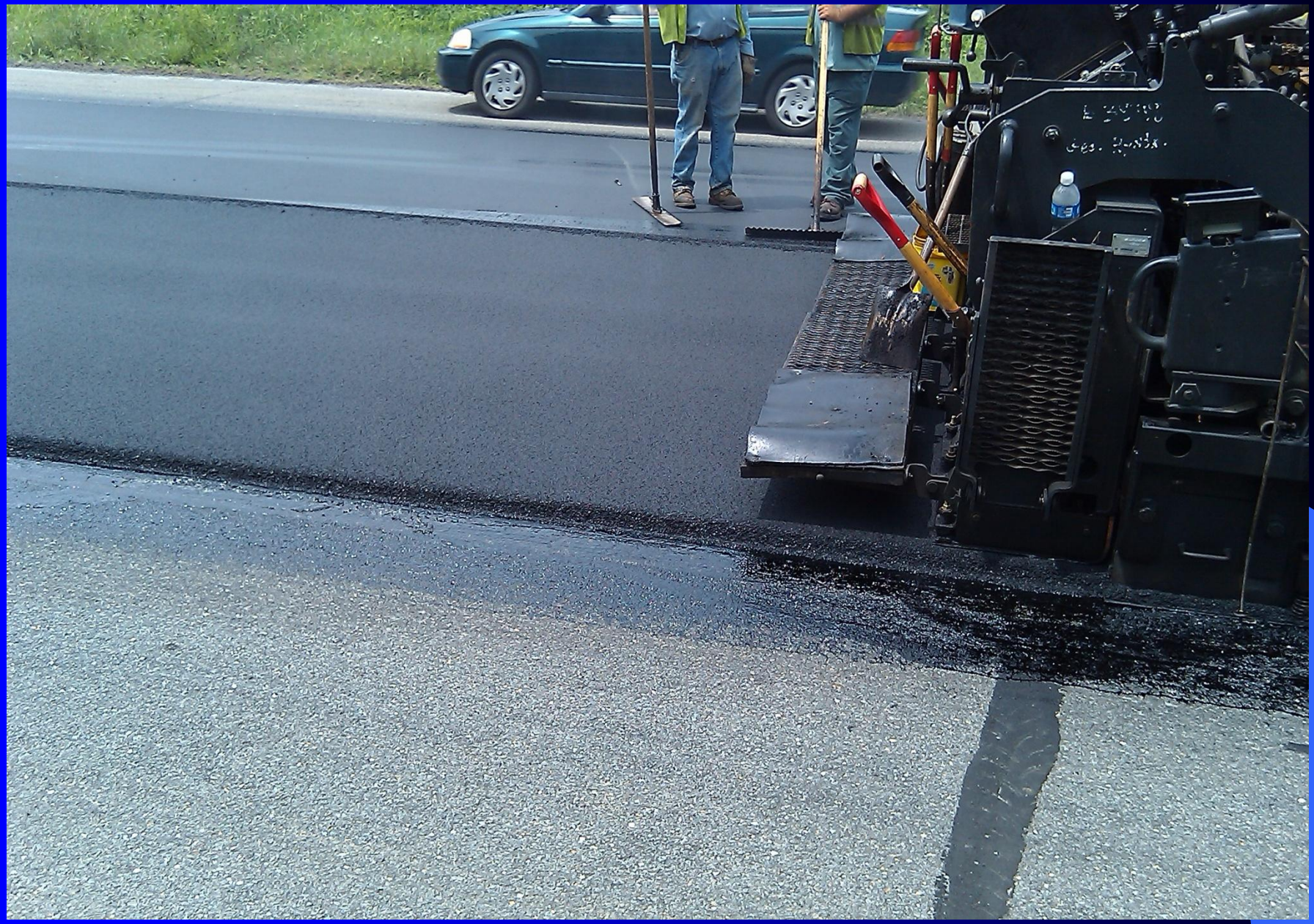

Finished Road with microsurface shoulders

Cost Comparison Per Lane Mile with other Methods

1) Thin Overlay $31,254.00
2) Microsurfacing $15000.00
3) Two inch Overlay $81,500.00

Conclusions

1) Warm mix thin overlay is a cost effective pavement preservation method that can be used to improve rideability, add some extra structure and preserve the roads.
2) This method although more expensive, can be used in lieu of microsurfacing where improvement in rideability and adding structure is desired.

Conclusions Continued

3) Thin overlay can in many cases be a cost effective alternate to conventional 2 in. overlay. This is because there is very little need for milling. As a result some structural strength is always being added to the road.

Questions?