Wayne Harrall, P.E
Deputy Managing Director of Engineering
Fiber Reinforced Asphalt

- Much higher resistance to rutting and cracking
- Longer life expectancy
- Higher strength
- Reduced thickness
Project Details

- 2016
- Cascade Rd between Hall St and Spaulding Ave
- 2 inch mill and fill
- Rieth-Riley
- CSI Geoturf
- ADT exceeding 25,000
# Rieth-Riley Bid

<table>
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<tr>
<th>Items of Work</th>
<th>Amount</th>
<th>Unit Price</th>
<th>Amount</th>
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<tr>
<td>Cold Milling</td>
<td>5,600.00 Syd</td>
<td>$1.90 per Syd</td>
<td>$10,640.00</td>
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<td>HMA, 5E3</td>
<td>550.00 Ton</td>
<td>$98.88 per ton</td>
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<td>Traffic Control</td>
<td>1.00 Lsum</td>
<td>$6,000.00</td>
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**Bid Total** $71,024.00

**Plus fiber Cost** $10,000

**Grand Total** $81,024.00

Second Bid = $110,000
RCKC Crumb Rubber Trials
Chip Seal and HMA Overlay
February 5, 2020

www.kalamazooountyroads.com
Your Local Road Professionals since 1909
Schoolcraft Township

From: 14th Street (Schoolcraft Village limits) To: Portage Road

3.0 Mile Study Area

1.5 Miles HMA Overlay
West half of study area
• 0.75 Miles trial (west end)
• 0.75 Miles control

1.5 Miles Chip Seal
East half of study area
• 0.75 Miles trial (east end)
• 0.75 Miles control
<table>
<thead>
<tr>
<th>Sieve</th>
<th>CS1</th>
<th>Min</th>
<th>Max</th>
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<tr>
<td>¾”</td>
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<td>100.0</td>
<td>100.0</td>
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<tr>
<td>½”</td>
<td>82.0</td>
<td>85.0</td>
<td>90.0</td>
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<td>0.0</td>
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<td>¼”</td>
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<td>3.0</td>
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Asphalt Coated Chips

Target 1.0% (by weight of dry chips)
Rubber Modified Binder

Target 28% (by weight)
Application Rate

Target 0.6 Gallon/Yard²
Lessons Learned

- Local partners and team communication are key to success

Chip Seal:
- Rubber Modified Binder needs to come directly from a supplier
  - Avoids complications with mixing
  - Could use local equipment

HMA:
- Rubber was found to reduce noise from high speed vehicles (about 2.5 dBA)
- Steel rollers need to immediately compact the mixture after paving
  - Soapy water should be applied to prevent sticking
Costs

- Grant Estimate: $273,928 ($136,964 ELGE Grant + $136,964 local match)

Chip Seal Trial Estimate: $124,000
Chip Seal Control Estimate: $35,000
  - Total Estimate: $159,000
  - Final Total: $245,300

HMA Trial Estimate: $165,000
HMA Control Estimate: $109,000
  - Total Estimate: $274,000
  - Final Total: $234,300

Project Total: $479,600
Thanks to all of our partners!
EGLE, Michigan Tech
Lakeland Asphalt, Bit-Mat Products, SME,
FNF Construction, RAR X
DICKINSON COUNTY’S USE OF FIBER & RUBBER IN ASPHALT PAVING

Dickinson County Road Commission
Engineering Department
BREITUNG CUT-OFF
MILL & FILL
USING ARAMID FIBERS

Dickinson County Road Commission
Iron Mountain, Michigan
Breitung Avenue (aka- Breitung Cut-off Road) is a minor arterial road connecting Kingsford to US-141.

It is 2.8 miles long between Kingsford City limit and the newer approach at US-141

It has the 2nd highest ADT of all County Roads (ADT=6500, 6% commercial)

The pavement is failing rapidly. (PASER in 2015= 6 & 5, 2018 = 2 & 3)

Board made this a priority to get this road fixed
WHAT FUNDING?

- $1.3 million project for the 2.8 miles
- ($800,000 to Powder Lake Road, 1.51 miles)
- Not eligible for RTF dollars as in the Iron Mountain - Kingsford small urban area
- DCRC won’t get the small urban funds until 2022, and then only $375,000
- We have a definite situation
NO SIMPLE SOLUTION?

- Not enough money for Crush-Shape-Pave.
- Not a candidate for chipseal.
  - Road to far gone.
- Not comfortable with an overlay.
  - Top lift is delaminating and crumbling so not a good bond for an overlay.
  - Plus lots of cracks would reflect up through the surface.
- NEED TO FIND A DIFFERENT FIX
The only fix which seemed to be close to the money was mill & fill.

- Would be quick with minimal traffic disruption to a major road.
- But a mill & fill only has a 3-5 year life expectancy.
- Susceptible to reflective cracking, especially at the widening joint in wheel path
- Still can’t get to Powder Lake Rd with the money.
A mill & fill only has a 5 year life expectancy.
  - Fix - Strengthen the asphalt and control the cracking.

Susceptible to reflective cracking especially the widening joint in wheel path
  - Fix - Control the cracking.
USE FIBERS

- Mostly natural fibers (mostly jute) used in Michigan.
  - This for oil retention in open graded asphalts only.
  - No strength or crack control recognized by MDOT.
- Aramid and other fibers have been tested in other states and shown to improve pavement strength and crack resistance.
  - Not used in Michigan
  - Learned FHWA calls these a non-proven technology
WHAT IS THIS STUFF??

Available through Elsey Construction Products

Available through CSI Geoturf

Per the manufacture's aramid fibers literature and salesmen
- made of ARomatic polyAMId e (ARAMID), same chemical composition as Kevlar
  - increase material strength (load capacity)
  - better resists rutting, shoving, and cracking
BEFORE & MAY 28, 2019
FIBERS ARE WORKING
FIBERS ARE WORKING
THE SUMMARY

- 1.51 miles
  - 28,129 Syd cold milled 1.5 inch deep
  - 2,377 tons fiber reinforced 5E1 laid
- Contractor cost $331,587
- Performing better than traditional mill & fill
Using Engineered Crumb Rubber from Recycled Tires on CR 607, Dickinson County

Dickinson County Road Commission Engineering Department
THE SITUATION

◊ County Road 607 (aka- Bass Lake Road) is a Primary and a Major Collector road connecting Iron Mountain to Randville.

◊ It is about 13 miles long

◊ It is a beautiful scenic route along the Menominee River. Many locals and tourist alike travel this for the natural beauty.

◊ The pavement was failed. (PASER in 2011= 2, 2018 = still a 2)

◊ Truck drivers often use this as a bypass of M-95, failing it more

◊ Board gave direction to get this road fixed
Existing Conditions
3 Sections, a Control and 2 Test Sections

**Proposed Control Section**
Not to Scale
164+00 (P.O.B.) to 193+25

**Proposed Test Section #1**
Not to Scale
193+25 to 226+50

**Proposed Test Section #2**
Not to Scale
226+50 to 256+00 (P.D.E.)

Note: All curves shall have a super elevation rate of 6%

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<th>Code</th>
<th>Item</th>
<th>Yield B</th>
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<td>SEL</td>
<td>165 lb/ft³</td>
<td>PG 50-34</td>
<td>200</td>
<td>Surface</td>
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<tr>
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<td>LVSP</td>
<td>220 lb/ft³</td>
<td>PG 50-34</td>
<td>NA</td>
<td>LEVELING</td>
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<td>3</td>
<td>ECR Modified SEL</td>
<td>165 lb/ft³</td>
<td>PG 50-34</td>
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<td>Surface</td>
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<td>4</td>
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<td>PG 50-34</td>
<td>NA</td>
<td>LEVELING</td>
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<tr>
<td>5</td>
<td>Bend COAT</td>
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<tr>
<td>6</td>
<td>8&quot; Recycled HMA &amp; Gravel Mix</td>
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<td>7</td>
<td>3H 1/4&quot; Sand &amp; Gravel Subbase</td>
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Testing
Rubber
Rubber Blower & Operator
Summary

- 10,000 Feet (1.9 miles)
  - 3,300 Ft traditional HMA leveling & surface control section
  - 3,300 Ft Traditional HMA leveling & ECR modified HMA surface
  - 3,300 Ft ECR modified HMA leveling & ECR modified Surface
- Project construction cost $531,830
- All together 2,661 tons of ECR modified asphalt was used.
  - Used 29,271 lbs rubber, or the equivalent of about 3,659 scrap tires
- Performing well, will know more in the spring.
- Multi year test section for MTU
QUESTIONS?

Dickinson County Road Commission
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Engineering: (906) 774-1162

FOR MORE INFORMATION
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