What do I have to share from this project to help improve asphalt construction and quality today?

• No data
• No product recommendations
• Nothing
Strategic implementation through cooperative pavement research.

Joining forces to improve the future of our nation’s roads:

• Government agencies
• Associations
• Academia
• Private industry
Our goal is to achieve consistent benefits from real world research.
Our five teams study the breadth of pavement topics:

- Flexible
- Rigid
- Geotechnical
- Intelligent Construction Technologies
- Preventive Maintenance

Since 2015

671 funded projects
Since 2015

71 funded research
43 government agencies

associations

48 academic institutions

68 private companies
Asphalt Mix Rejuvenators - Background

• Rejuvenators/Recycling Agents are an emerging technology in HMA
• Increase recycled (RAP or RAS) content in mix
• Many producers, sources, and sales-representatives
• NCHRP research on lab testing and dosing
• Limited field performance available
Objective

NRRA Flexible Team wanted to answer:

1. Can mix rejuvenator be incorporated into the HMA plant and construction process?

2. How well do these products perform in real world conditions?

3. What are rejuvenators doing to our asphalt and how long does it last?

Project Details

TH6 from south of Emily to Outing, MN

- 5 inch existing asphalt
- 2 inch mill and fill
- 1.5 inch wearing course overlay (SPWEA340B)
  - Rejuvenators in this lift only
- All Research Sections placed in southbound direction
Coordination

• Rejuvenator producers paid Anderson Brothers directly for construction delays and plant upgrade ($63,000/7 participants = $9,000 each)

• NRRA agencies to do mix testing

• Flexible Team $100,000 for performance analysis and binder testing (RFP currently open)

Field Sections

• Section 6001 – Cargill - Anova 1815 Rejuvenator

• Section 6002 – Poet - JIVE

• Section 6003 – US Soybean Board - Epoxidized Soybean Oil – SESO

• Section 6004 – Ingevity (WMA) - Evoflex CA-17

• Section 6005 – Kraton Polymers US LLC - SYLVAROAD/tm/ RP1000 Performance Additive

• Section 6006 – Asphalt and Wax Innovations – PAVSAV

• Section 6007 – Georgia Pacific - TUFFTREK 4002 Renewable Oil Technology (terminally blended with different binder source)

• Section 6010 – 30% RAP control

• Section 6011 – 40% RAP control (day 1)

• Section 6012 – 40% RAP control (day 2)

Not a direct comparison or ranking of product performance but a comparison to control
Dosage Targets

- Project used PG 58S-28
  - LTTP Bind -34 and -40
- RAP grade ≈ 75-23
- Target xx-34
  - Based on plant mix extracted binder + PAV
- Reported higher than typical “dosages”

Construction and Mix Sampling

- Construction on mornings of August 28-29, 2019
- No major issues during construction. All suppliers were happy with their sections
  - Anderson Brothers plant & paving crew were invaluable
- 300+ buckets collected
  - 30 buckets of HMA collected per section
  - Also collected: RAP, aggregates, virgin binder, and rejuvenator
- NRRA state agency testing
  - MnDOT- DCT & Hamburg
  - Illinois – I-FIT
  - Missouri – TSR
  - Wisconsin – IDEAL CT
  - Potentially others
Since Construction

- Initial testing has occurred (Gmm)
- Cored sections 6 weeks after construction for future binder testing
- RFP for binder testing and long-term evaluation closed 2/3/2020
  - A lot of interest in this project nationally
- Ride has been measured twice (fall 2019)
  - IRI < 40 in /mile
- 500’ test sections have been established for long-term performance monitoring
- MnDOT OMRR Research staff will continue to monitor ride and take cores

Early Reflective Cracking

- Transverse reflective cracks noticed in January 2020
- Ride is still very good
- 3-4 cracks per 500’
- All sections
THANK YOU AGAIN!!!

- NRRA TAP and Flex Team Members
- MnDOT Bituminous Office
- MnDOT District 3
- Contractor – Anderson Brothers
- MnDOT Research Staff
  - Ben Worel and Dr. Raul Velasquez
- Rejuvenator Suppliers/Producers

Only possible with team effort facilitated by NRRA!!!