

# Rubber Modified Asphalt (RMA) Historical Performance in Michigan

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# Objectives

This study aims to summarize the RMA's historical performance in Michigan. It evaluates pavement performance, cost per ton, traffic volumes, aggregate types, construction types, and different RMA technologies for about 40 test sections constructed between 2012 and 2019.

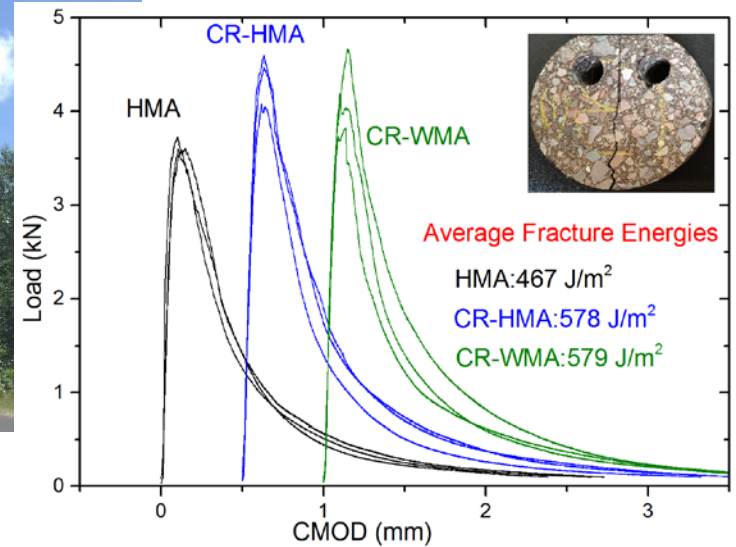
Specific objectives are to:

- Develop RMA performance evaluation criteria and approach
- Provide technical assistance in classifying the portfolio of RMA projects
- Support the analysis of lessons learned, success factors, and executive summary for EGLE

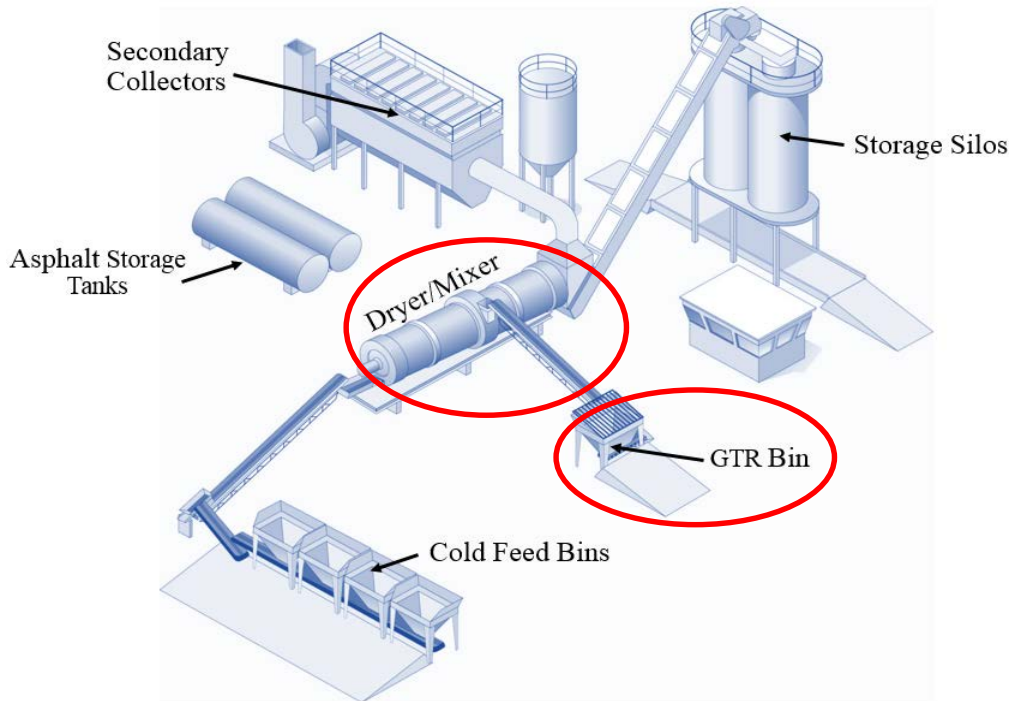




# Field Demonstration in Keweenaw County- Terminal Blend



# Dry Processed Rubber Demonstration Project in Kalamazoo



Revised from (Mamlouk, 2017)

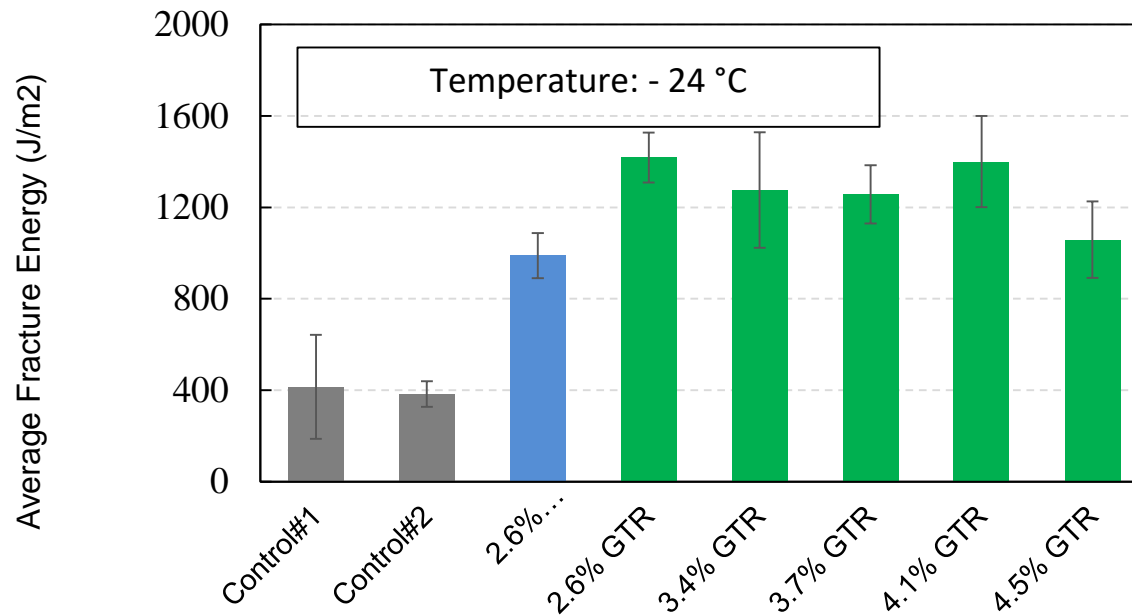
## Asphalt Plant and Production





# Experimental Program in Kalamazoo: Dry Processed Rubber

## Disk-Shaped Compact Tension (DCT) Test results



2 to 3 times higher fracture energy than the control mix

# Field construction in Dickinson County: Dry Processed Rubber



Emulsion application  
before surface placement



Surface layer placement



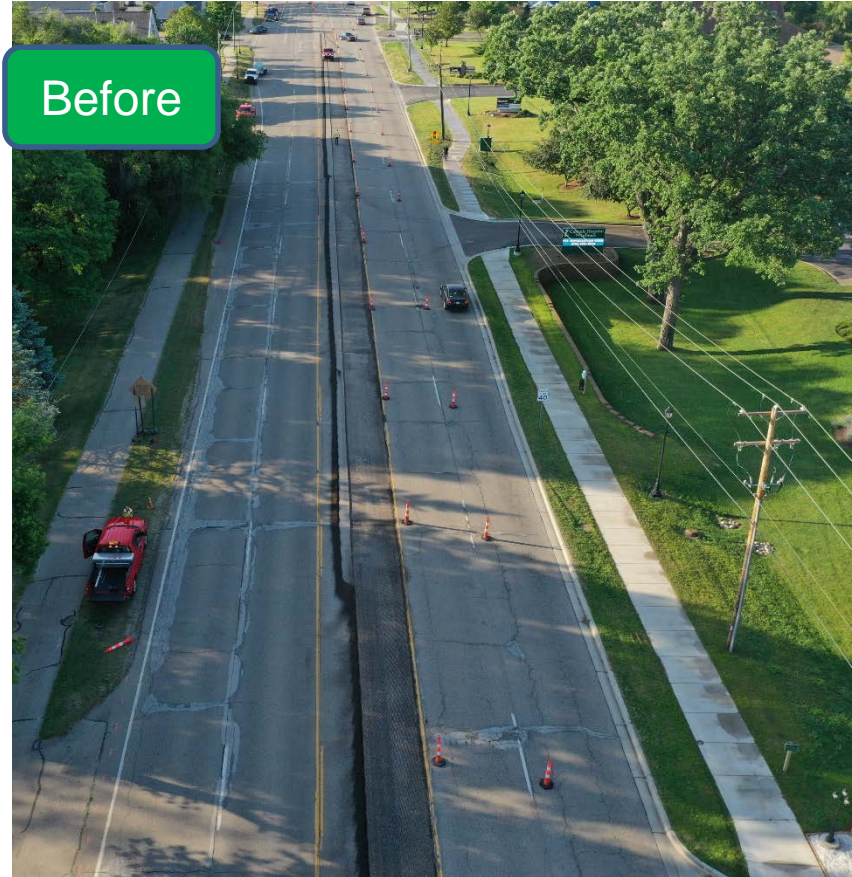


# Field Visit in Dickinson County

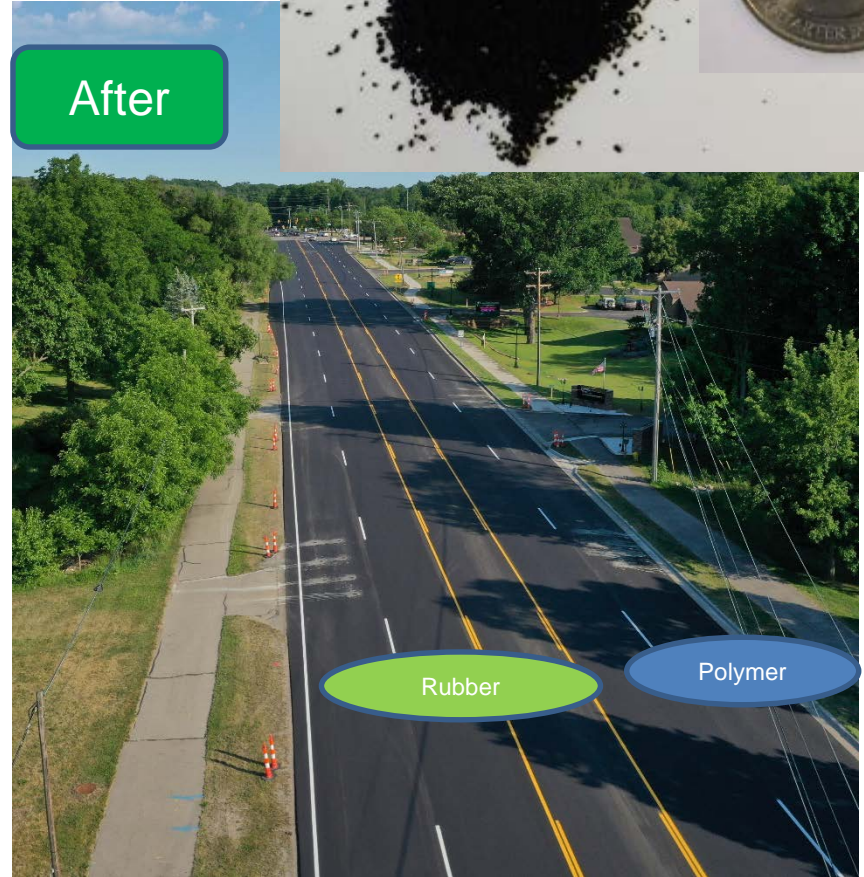




# Implementation in Kent County: Dry Processed Rubber



Before



After

Rubber

Polymer



# Hot Rubber Chip Seal



# Performance Evaluation

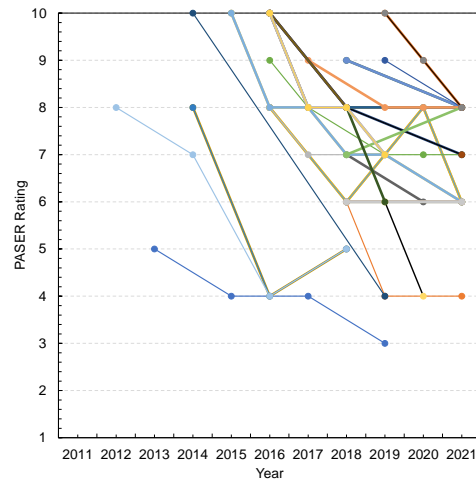
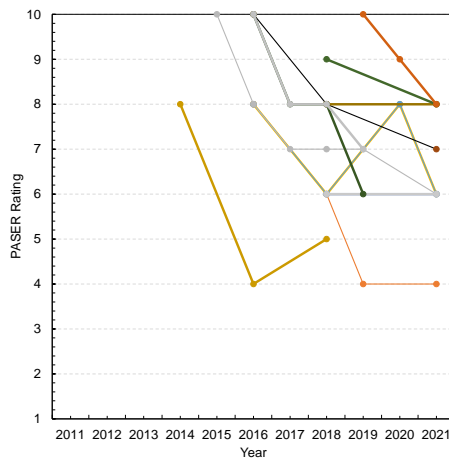
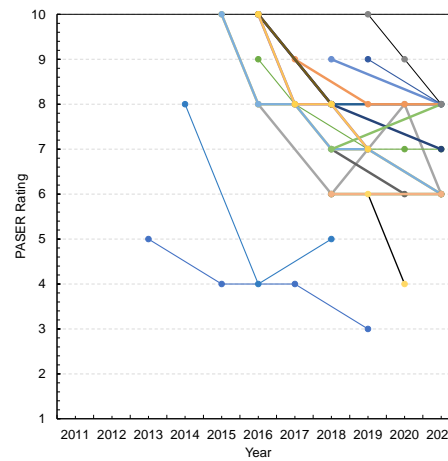


Figure 2 Performance of all sections (PASER Rating)



(a) Control sections



(b) RMA sections

Figure 3 Performance of the selected sections (PASER Rating)



# Results — Performance Evaluation

- The pavement sections with terminal blend (TB) and wet RMA technologies indicated comparable performance to the control section,
- There is no significant difference in performing the sections in different regions,
- The rehabilitation and reconstructed pavement showed the best performance,
- On average, pavements with RMA performed slightly better than control sections; however, the results are not statistically significant,





# Results — Satisfaction Survey

- The majority (67%) of respondents did not identify any construction-related issue and did not make extra efforts to achieve densities for the RMA test sections.
- The majority (84%) think RMA performance is better or like HMA materials.
- Also, most stakeholders (84%) think RMA needs less or similar maintenance to HMA layers.
- The majority (95%) of agency staff showed a willingness to use RMA technology.



# *Thank You*

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