



# *MnROAD Benefits Summary*

**Safer, Smarter, Sustainable Pavements through Innovative Research**



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May 2015

We all have a stake in **A  B**



# MnROAD Benefit Documentation

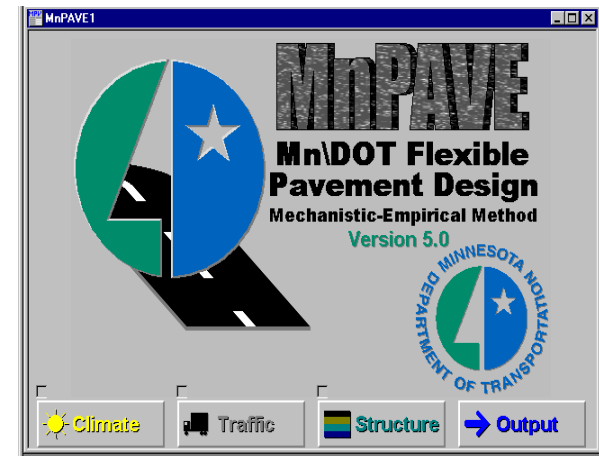
- **Two Reports have been written on the overall benefits of MnROAD research efforts**
  - **Phase I (1994-2006)**
    - Economic Benefits Resulting from Road Research Performed at MnROAD
    - <http://www.mrr.dot.state.mn.us/research/pdf/2008MRRDOC033.pdf>
  - **Phase-II (2007-2016)**
    - Benefits of MnROAD Phase-II Research
    - [Will be online in June 2015](#)
- **The following is a summary of these two reports**
  - Contains only estimates for Minnesota savings but the same rational could be applied to other agencies



# MnROAD Phase-I (1994-2006) Benefits

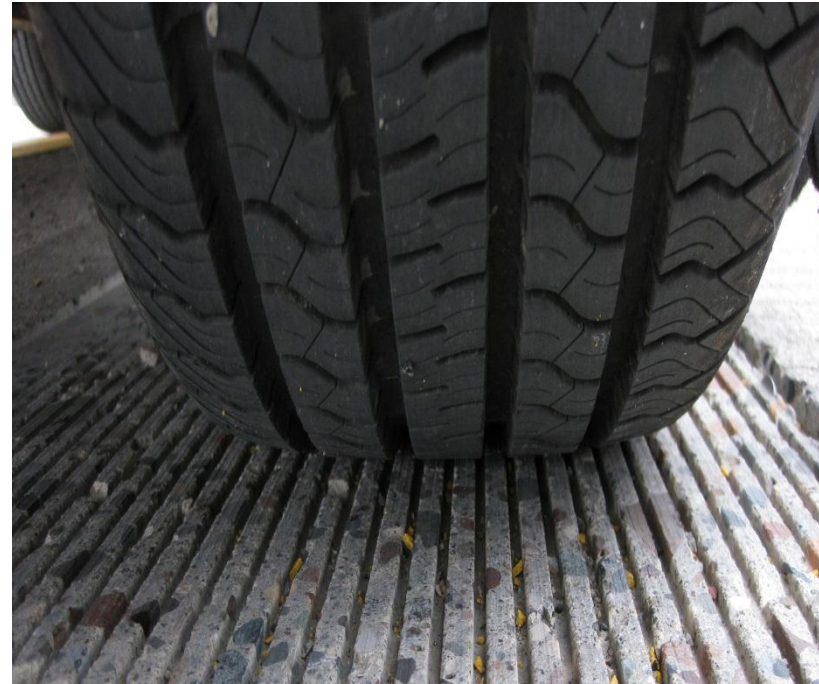
**Saves \$33 million Annually**  
(Savings from 2006-2018)

- **Seasonal Load Limits**
  - Spring Restrictions / Winter Overloads
- **Improved Design Methods**
  - Flexible & Rigid Updated Designs
    - Environment Drives Pavement Performance
    - Current Designs are too Conservative
- **Sealing Pavement / Shoulder Joints**



# Phase-II Categories of MnROAD Benefits

- **Direct**
  - Savings of materials
- **Indirect**
  - Time savings and quality
- **Avoidance**
  - Don't do that on the system
- **Demonstration**
  - Confidence to try something new



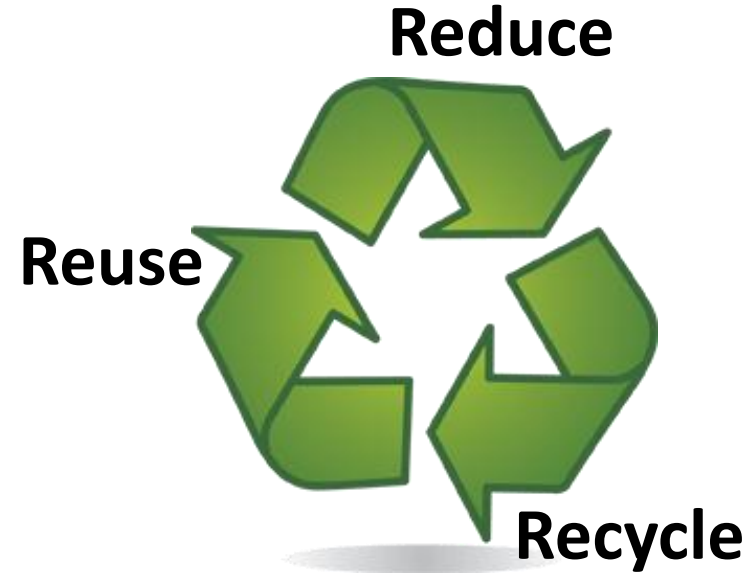
MnROAD can only quantify the direct savings for actual dollar estimated savings even though each provides benefits for our roadway systems



# Sustainable Technologies

(should also be noted but sometimes do not product direct benefits )

- **Warm Mix Asphalt**
- **Recycled Pavements**
  - Asphalt, Shingles, Concrete
  - New Pavements, Base Materials
- **In Place Recycling**
  - FDR, Stabilized FDR
- **Surface Treatments**
  - Chip Seal, Microsurfacing, Fog Seal
- **Thin Pavements**
  - Whitetopping, Unbonded Overlays, Novachip
- **Lower Construction Costs, Shorter Construction Time, Improved Pavement Performance**



# MnROAD Phase-II Concrete Benefits

- **Direct Benefits**

- Whitetopping

- Thinner designs utilized
- \$1.9 Million / year

- **Non-Direct Benefits**

- Improved Concrete Overlay Design
- Use of Recycled Materials in PCC
- Use of Fibers
- Concrete Repairs





# MnROAD Phase-II Asphalt Benefits

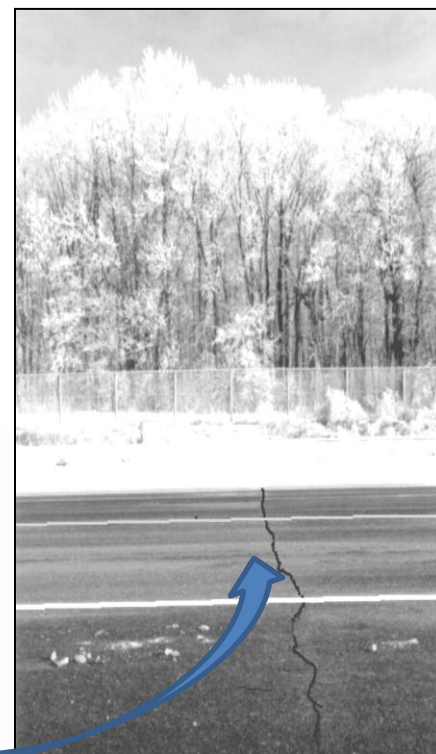
- **Direct Benefits**

- Low Temperature Cracking

- Reduced cracking/less maintenance /better performance
    - 2.3 million / year

- **Non-Direct Benefits**

- Use of Warm Mix
  - Better understanding on modification
  - Developing a performance test for LTC
  - Use of Recycled materials



# MnROAD Phase-II

## Unbound Materials Benefits

- **Direct Benefits**

- Stable and Drainable Base Materials

- Reduced deterioration of HMA cracks & PCC joints – maintenance
- \$ 4.7 million / year

- Recycled Unbound Materials

- More sustainable material selection vs virgin materials
- \$ 0.8 million / year

- Full Depth Reclamation

- Proven design and life extending benefits
- \$ 0.5 million / year

- Stabilization using High Carbon Fly Ash

- Insurance for construction delays
- \$ 0.1 Million / year

- **Non-Direct Benefits**

- Importance of drainage / Performance





# MnROAD Phase-II Pavement Preservation Benefits



- **Direct Savings**

- Innovative Diamond Grind

- Economic analysis shows savings of ~\$800,000 per year for amount of future noise walls and height based on OBSI (for a period of 10 years)
    - Note: lowering of minimum noise level reduction requirements is needed to realize this additional benefit

- **Non-Direct Benefits**

- High Volume Chip seals
  - Flexible Microsurfacing
  - Better understanding of the asphalt aging



# MnROAD Phase-II (2007-2016) Summary

- **MnROAD Costs (9 yr avg)**
  - Benefits Report
  - \$2.75 million / year

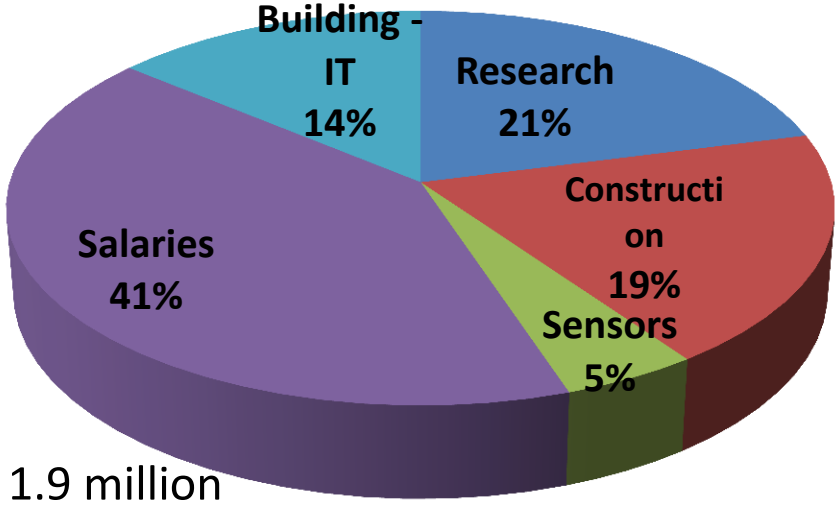
- **Savings ~ \$10.3 million/yr**

- Whitetopping
- Low Temperature Cracking
- Stable and Drainable
- Recycled Unbound Materials
- Full Depth Reclamation
- Stabilization High Carbon Fly Ash

- \$ 1.9 million
- \$ 2.3 million
- \$ 4.7 million
- \$ 0.8 million
- \$ 0.5 million
- \$ 0.1 million

also could include:

- Noise wall reduction → \$ 8.0 million  
(provided minimum noise level requirements could be lowered)



- **Estimated Savings greater than Costs (~ 3.8 B/C Ratio)**  
(without noise walls)






# Thank You

*(MnROAD is looking forward to Phase-III and working with its research partners)*



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