My Approach

- Goals:
  - Benchmark MDOT practices against national best practices
  - Offer suggestions to the questions posed for focus topics
  - Offer suggestions for changes aimed at improving pavement performance

- Surveys conducted among 38 State Asphalt Pavement Associations
- NAPA's Pavement Performance task group
- Useful resources from national organizations including NAPA, NCAT, TRB NCHRP, AASHTO and FHWA
General Observations & Priorities

- Separate RAP & RAS Specifications and Increase RAP Allowed
- Consider reducing number of binder grades
- Implement mix verification best practices & encourage local agencies
- Local agencies follow fundamental and best practices for quality and in a timely manner
  - Local agencies should consider RAP use for cost savings
- Continue use of incentives & performance expectations along with contractors’ options to use technologies
Michigan RAS Usage & Recommendations

• MDOT’s limit of 17% binder replacement for RAS is appropriate

• Permissive specification that allows limited RAS use

• RAS should be treated differently than RAP

• Consider specifying RAS binder availability between 0.7 & 0.85 – follow AASHTO PP78 guidelines & FHWA Asphalt ETG recommendations
Where to find the latest survey report:

www.asphaltpavement.org/recycling
New Publications

High RAP Asphalt Pavements
Japan Practice - Lessons Learned

Best Practices for RAP and RAS Management
## Pavement Performance & Quality

<table>
<thead>
<tr>
<th>The Issues</th>
<th>The Strategy</th>
<th>The Focus</th>
</tr>
</thead>
<tbody>
<tr>
<td>Long-term funding and lack of proper funding for preservation and maintenance</td>
<td>Pavement Performance Task Group Issues and Industry Strategies Partnerships Recommendations for Ensuring Durability</td>
<td>Refocused Engineering Committee Focus on Durability in Partnership with FHWA &amp; SAPAs Rethinking Asphalt Mixture Design &amp; Simplifying Specifications TRB Workshop NAPA Workshop FHWA Task Group</td>
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<td>Possible dry mixtures with low asphalt content</td>
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<tr>
<td>Construction practices, lack of inspection, and need for training.</td>
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Where is MDOT/APAM leading?

- Minimum thickness of asphalt layer corresponds to NMAS – MDOT follows 4x for all mixes

- Consider fine-graded (smaller NMAS) mixture for reduced permeability and easier compaction to achieve density

- SMA and Thin Overlays (4.75 mm mixtures)

- Increasing effective asphalt content
  - $VMA = \text{Air Voids} + \text{Effective Volume of Asphalt}$; consider changing target air voids which will result in asphalt content changes (essentially what MDOT is doing during regression)

- High RAP, greater than 25% RAP binder ratio, use softer binder
Considerations for the Future

- Rethinking mix design to be balanced, performance-based
- Aggregate Bulk Specific Gravity
  - Run and check frequently, mix designs should report values
  - RAP $G_{sb}$
- Simplify number of gyration levels to 3 or less while lowering $N_{design}$ - consider VMA and gradation
- According to a SAPA survey, the following states use in place density determined by correlated nuclear gauge: MN, CO, OH, KS, NY, & VA.
- The NAPA Pavement Performance task group has made the following recommendations:
  - Greater frequency of in-place density testing and cores for in-place density testing
  - For acceptance testing, recommend vacuum sealing method for cores with greater than 2% water absorption and consider tightening the 2% water absorption requirement to less than 2%.