PASER Training Part 1: Distress Identification

Agenda

Why Rate Roads?

Distress Identification for Rating:
- Asphalt
- Concrete
- Sealcoat
Stop distractions!

Not Registered?

Call (906) 487-2102 after training
Why is TAMC Rating Roads?

Public Act 499 (2002) Summary

All public roads in Michigan will be managed using the principles of asset management.
Public Act 199 (Dec. 2007)

TAMC shall develop a pavement management system.

MDOT and local agency reporting to the council is mandatory.

- Road and bridge condition
- 3 year project plan
- Expenditures

To support excellence in managing Michigan’s transportation assets by:

- Advising the Legislature and State Transportation Commission
- Promoting asset management principles
- Providing tools and practices for road agencies
TAMC Annual Report To Legislature

2007-2016 Pavement Condition of Federal Aid Eligible Roads

Chesbro: Transportation Asset Management Council  25 Jan 2017
Why Should You Rate Roads?

• See how road condition is changing
• Estimate future road condition
• Measure effectiveness of past improvements
• What, Where and When improvements are needed

Estimating Deterioration
Cost Effectiveness of Treatments

Cost per Year of Treatment Life

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Expected Treatment Life (Years)</th>
<th>Cost per Year of Treatment</th>
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<tbody>
<tr>
<td>Crack Seal</td>
<td>2</td>
<td>$5k</td>
</tr>
<tr>
<td>Chip Seal</td>
<td>4</td>
<td>$10k</td>
</tr>
<tr>
<td>Mill &amp; Fill</td>
<td>6</td>
<td>$15k</td>
</tr>
<tr>
<td>Crush &amp; Shape</td>
<td>8</td>
<td>$20k</td>
</tr>
<tr>
<td>Reconstruct</td>
<td>10</td>
<td>$25k</td>
</tr>
<tr>
<td>Reconstruct</td>
<td>12</td>
<td>$30k</td>
</tr>
<tr>
<td>Reconstruct</td>
<td>14</td>
<td>$35k</td>
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</table>
Training & Data Collection Effort Is Funded

Rating Team: MDOT, County, City or Village

TAMC Coordinator

MPO or RPO

Data Collection Policy

All rating team members must attend:
1. PASER webinar - new raters and raters that did not do item 2
2. Onsite PASER training - in the same year of collection
3. IBR training - every 3 years

See the TAMC Policy for more details:
TAMC Coordinator Assists With:

<table>
<thead>
<tr>
<th>Reimbursement</th>
<th>Roger A. Belnap, TAMC Coordinator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Certification</td>
<td>Ph: (517) 373-2249 <a href="mailto:BelknapR@michigan.gov">BelknapR@michigan.gov</a></td>
</tr>
<tr>
<td>Data collection policy</td>
<td>Dave Jennett, TAMC Transportation Planner</td>
</tr>
<tr>
<td>Reporting requirements</td>
<td>Ph: (517) 241-5164 <a href="mailto:JennettD@michigan.gov">JennettD@michigan.gov</a></td>
</tr>
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Preparation for Rating
A Tale of Two Data Collections....

- TAMC federal aid data collection
- Non-federal aid data collection
  - Agency decides what to collect
  - Agency must get approval first to be eligible for reimbursement
  - Agency rater does their own roads

Who? What? How?

Raters
- County or City
- MDOT
- RPO or MPO
What Tools Are Used?

Roadsoft 2018.1*
Roadsoft GPS Laptop Data Collector 2018.1*
Framework Version 17

*or latest as of April 1 2018

Start Date / End Date

• First Monday of April
  Start collecting (weather permitting)

• Last Friday of November
  Last day to collect

• First Friday of December
  Last day RPO/MPO to submit to CSS
4 Major Pavement Types & 3 Manuals

- **Hot Mix Asphalt (HMA)**
  - Asphalt
  - Gravel Base
  - Sand Sub-Base
  - Native Soil (sub grade)

- **Composite**
  - Asphalt
  - Old Concrete Pavement
  - Gravel Base
  - Native Soil (sub grade)

- **Concrete**
  - Concrete Pavement
  - Gravel Base
  - Native Soil (sub grade)

- **Sealcoat**
  - Gravel Base
  - Sand Sub-Base
  - Native Soil (sub grade)

2 Other Pavement Types

- **Brick**
  - Brick
  - Gravel Base
  - Sand Sub-Base
  - Native Soil (sub grade)

- **Gravel**
  - Gravel
  - Sand Sub-Base
  - Native Soil (sub grade)
Asphalt Pavement

First Signs of Block Cracking
Rutting Less Than ½ Inch
Longitudinal Joint Cracks Present
Transverse Cracks at 40 foot Spacing
Asphalt Distress Types

- Structural
- Age-related
- Surface defects
- Limited extent (generally)
- Others (potholes and patches)

Load Distribution

Asphalt
Gravel Base
Sand Sub-Base
Native Soil (sub grade)

Rigidity
Cost
Traffic

Traffic
Structural Distresses

- Rutting
- Cracking in Wheel Path
- Alligator Cracking

Structural Distress: Rutting
Deep Rutting

Surface (mix) Rutting
Signs of Rutting

Range of depths

- ½” to 1”
- 1” to 2”
- > 2”
Structural Distress
Longitudinal Cracking in Wheel Path

Shear Cracking
Longitudinal Cracking in Wheel Path

First Sign

Structural Distress
Edge Cracking
Edge Cracking

First Sign
Edge Cracking

Moderate

Structural Distress
Edge Cracking

Progressed
Structural Distress
Alligator (Fatigue) Cracking

First Sign

Alligator (Fatigue) Cracking
Structural Distress
Alligator (Fatigue) Cracking

Severe

Percentage of Worst Lane

10'
6'
Primary Age-related Distresses

Transverse cracking  Longitudinal joint cracking  Block cracking

Environment

[Images of cracks, snowflake, sun, and layers of pavement]

[Center for Technology & Training logo]

Michigan Technological University • Department of Civil & Environmental Engineering
Environment

First Distress
Water Intrusion

Base Weakening & Loss of Support
Distress Propagation

Primary Aging Distress
Transverse Cracking

Spacing
> 40’
10’ to 40’
< 10’
Poll Question

Primary Aging Distress
Longitudinal Joint Cracking
Common Construction Joint

Second Pass

First Pass
Asphalt

Gravel Base

Longitudinal Construction Joint (Tapered)

Asphalt

Gravel Base
Longitudinal Tapered Joint Cracking

Primary Aging Distress Block Cracking

Length

Width
Primary Aging Distress
Block Cracking Progression

First Signs
(6’ to 10’ blocks)
Primary Aging Distress
Block Cracking

Moderate
(1’ to 5’ blocks)

Primary Aging Distress
Block Cracking

Severe
(<1’ blocks)
Widths of Cracks

Open

Tight
Width of Cracks

More Than Just a Crack.....

Secondary

Structural
### Surface Defects

<table>
<thead>
<tr>
<th>Surface Defect</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Raveling</td>
<td></td>
</tr>
<tr>
<td>Flushing/bleeding</td>
<td></td>
</tr>
<tr>
<td>Polishing</td>
<td></td>
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</tbody>
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**Raveling**

**Slight**
Surface Defect
Flushing/Bleeding

Slight to Moderate

Flushing / Bleeding

Extensive to Severe
### Surface Defect Polishing

<table>
<thead>
<tr>
<th>Degree</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Slight</td>
<td>Polishing</td>
</tr>
<tr>
<td>Moderate</td>
<td>Polishing</td>
</tr>
<tr>
<td>Extensive</td>
<td>Polishing</td>
</tr>
<tr>
<td>Severe</td>
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![Slight to Moderate Polishing](image1.png)

### Polishing

<table>
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![Extensive to Severe Polishing](image2.png)
Asphalt Limited Extent Distresses

- Slippage cracks
- Shoving & rippling
- Heave & settling

Limited Extent Distress Slippage Crack
Slippage Cracking

Limited Extent Distress
Heave & Settling
Differential Settlement

Concrete Pavement
Ask the Audience

Concrete Distress Types

• Deformations
• Joint Distress
• Cracking
• Surface Distress
Concrete Deformations

- Blowups
- D-cracking
- Faulting

Deformations
Blowups

Non-compressible Material
Deformations
Blowups

Deformations
Blowups or Tenting
Deformations Blowups

Cracking – Durability Crack
Cracking
Durability Crack

Deformations – Faulting
Faulting

Concrete Cracking

- Transverse cracking
- Meander cracking
- Corner cracking
Cracking
Transverse Crack

Isolated

Cracking
Transverse Crack

Multiple
Cracking
Meander Crack

Settlement – Utility Trench
Settlement – Utility Trench

New Construction Meander Crack
Cracking
Corner Break and Crack

Slab Curling

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Spalling Happens On:

- Transverse joints
- Longitudinal joints
- Transverse cracks
- Meander cracks
- Corner cracks
- Shallow reinforcing steel

Joint Distress - Spalling
Dowel Bars (load transfer)

Incompressible Material Causes Joint Spalling
Partial Depth Joint Repair

Partial Depth Joint Repair
Full Depth Needed

Full Depth Joint Repair
Full Depth Joint Repairs

Joint and Crack - Spalling
Joint and Crack - Spalling

First Sign

Joint and Crack - Spalling

Severe
Concrete Surface Distresses

- Due to shallow reinforcement
- Scaling
- Pop outs
- Map cracking
- Polishing
Surface Distress
Shallow Reinforcement

Surface Distress
Shallow Reinforcement
Surface Distress - Scaling

Surface Scaling
Surface Distress
Scaling

Surface Distress
Pop Outs
Surface Distress
Pop Outs

Surface Distress
Map Cracking
<table>
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Sealcoat Pavements

Gravel Base

Sand Sub- Base

Native Soil (sub grade)
Sealcoat Pavement Close Up

Gravel Base

Chip Seal or Sealcoat On HMA

Asphalt
Gravel Base
Sand Sub- Base
Native Soil (sub grade)
Asphalt vs. Sealcoat

Sealcoat

Hot Mix Asphalt

Sealcoat Distress Types

Raveling

Edge Cracks

Lane Cracks/Ruts
Edge Distress

- Sealcoat
- Gravel Base
- Sand Sub-Base

Edge Distress Progression
**Edge Distress**

**Lane Cracking**

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**Percent of Worst Lane**

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**Webinar 2018**
Part Two of PASER Training: On-site

- February 27 - March 1
- March 27-29
- April 10-12
- TBD

Rater Certification Test

- Not required
- Relief from webinar & on-site training next year
- 3 or 6 years (prior to 2018) rating experience and training required
- Pre-registration required
## Final Thoughts

- Register for:
  - On-Site training
  - IBR training
  - Certification Testing (if invited)
- Safety when Rating
- Review PASER Manuals prior to On-Site training

We will see you in the classroom!