

# Michigan Transportation Asset Management Council PASER Training Part II



**Tim Colling, PhD, PE**  
**Andrew Manty, PE**  
**Pete Torola, PE**  
**Center for Technology & Training**



Michigan  
Transportation Asset  
Management Council



## Agenda

- 8:00 – Introduction
- Council Update (30 minutes)
- Business Rules (30 minutes)
- Rating Rules (30 minutes)
- 9:30 - Break
- Rating Exercises (2 hours)
- 12:00 - Closing
  
- Certification Exam for Registered Raters



Michigan Technological University • Department of Civil & Environmental Engineering

## Housekeeping

- Registration/Sign in
- Implementation Survey
- Evaluation



## E-mailed Certificates of Attendance



# Michigan Transportation Asset Management Council (TAMC) Update



## TAMC's Mission:

To develop and support excellence in managing Michigan's Transportation assets by:

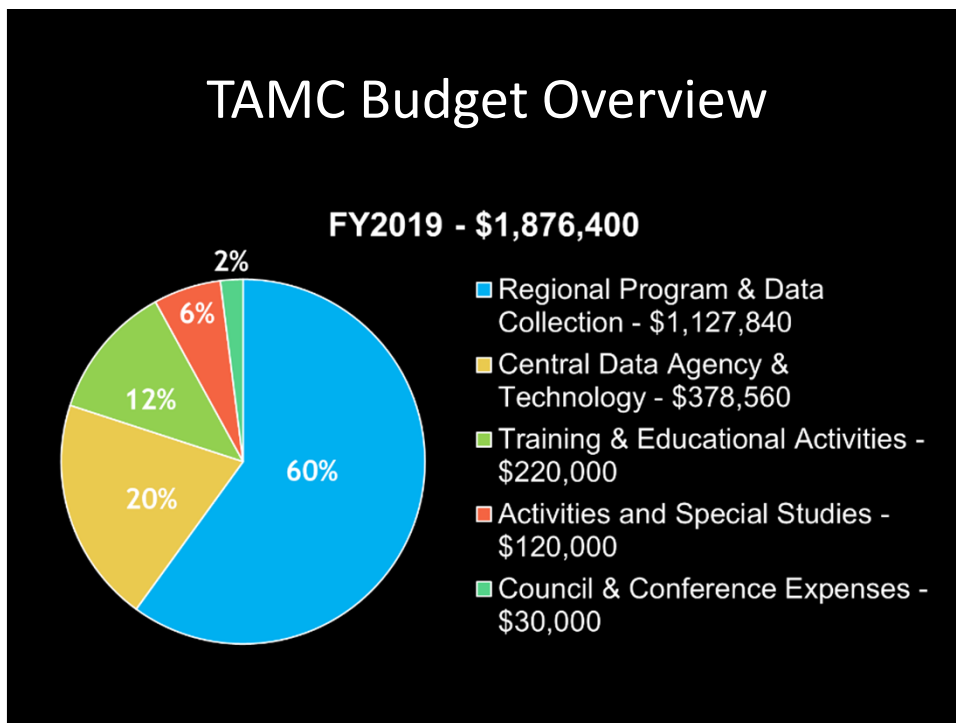
1. Advising the Legislature, State Transportation Commission (STC), Michigan Infrastructure Council (MIC), and Transportation Committees
2. Promoting Asset Management Principles
3. Providing tools and practices for road agencies
4. Collaborate and coordinate with Water Asset Management Council (WAMC) and other asset owners

 Michigan Transportation Asset Management Council

## Representing All Levels of Government



 Brad Weiferich MDOT	 Bill McEntee CRA	 Derek Bradshaw MAR	 Todd White MDOT	 Christopher Bolt MAC	 Rob Surber CSS
 Jon Start MTPA	 Joanna Johnson CRA	 Bob Slattery MML	 Gary Mekjian MML	 Jennifer Tubbs MTA	



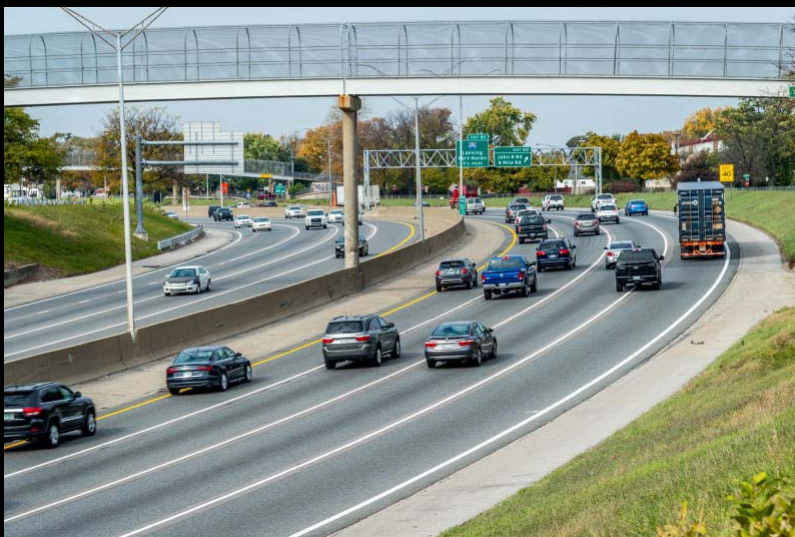


## Outcomes of TAMC's Program

- Collect data once, use multiple times
- Local agencies have ownership in data, most collect more than minimum
- State & regions get high quality data
- Local agencies have tools to extract information from data
  - Current condition mapping
  - Reporting & analysis
  - Deterioration models
  - Treatment benefit study tool
  - Network level model – determine condition for given budget
- Asset management adopted as business practice
- We talk the same language! Even beyond transportation agencies!



## 2018 PASER Federal Aid Results



## All Paved Federal Aid Roads ≈ 88,000 lane miles

Federal-Aid Roads Rated in 2018 = 58,187 lane miles  
66% of all Federal-Aid Roads by lane miles

Rated in 2017: 63%

Rated in 2016: 66%

Rated in 2015: 61%

Rated in 2014: 68%

Rated in 2013: 61%

Rated in 2012: 67%

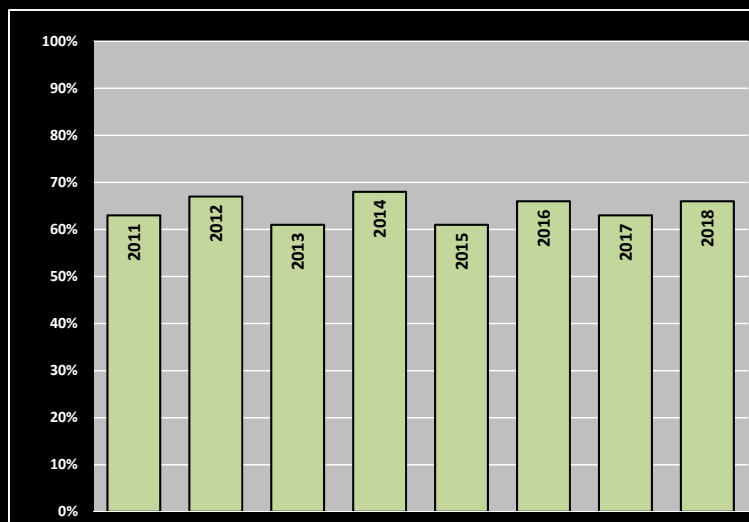
Rated in 2011: 63%

Rated in 2010: 71%

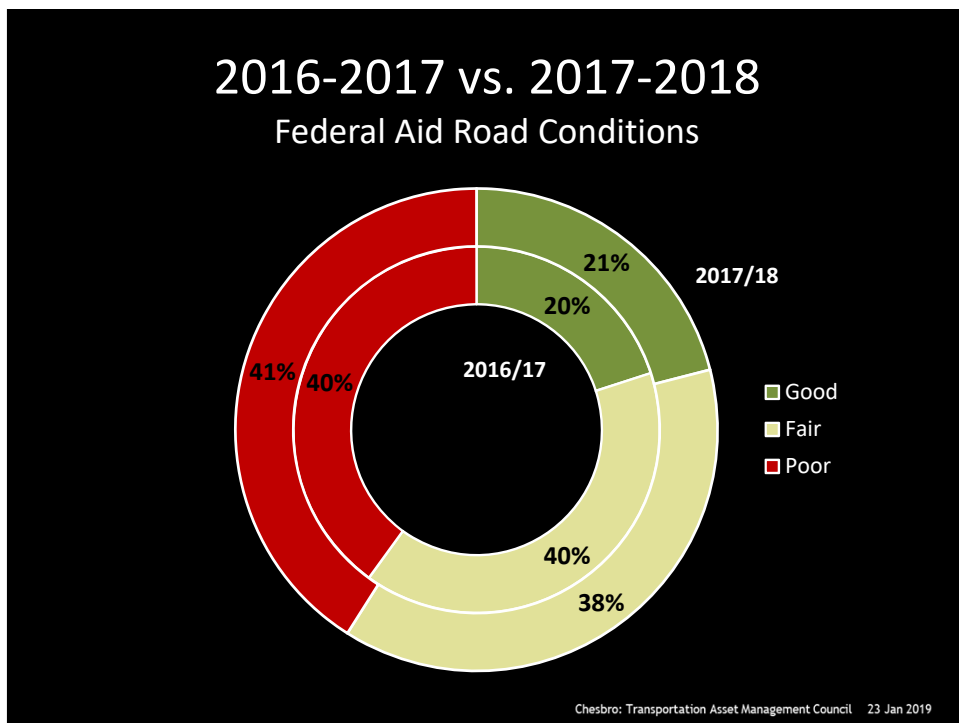
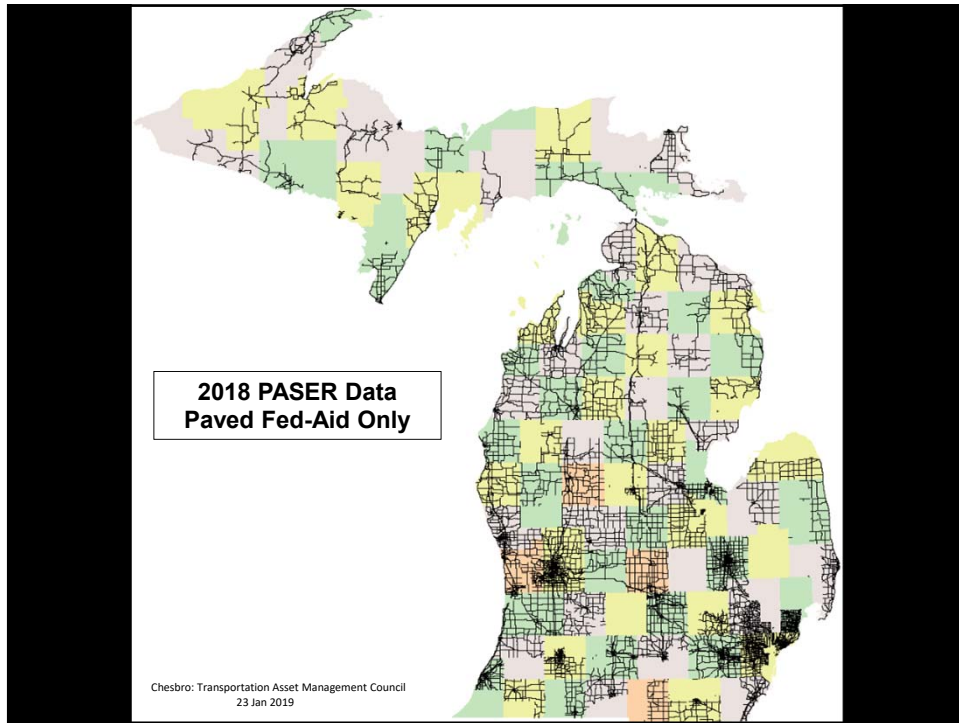
Rated in 2009: 67%

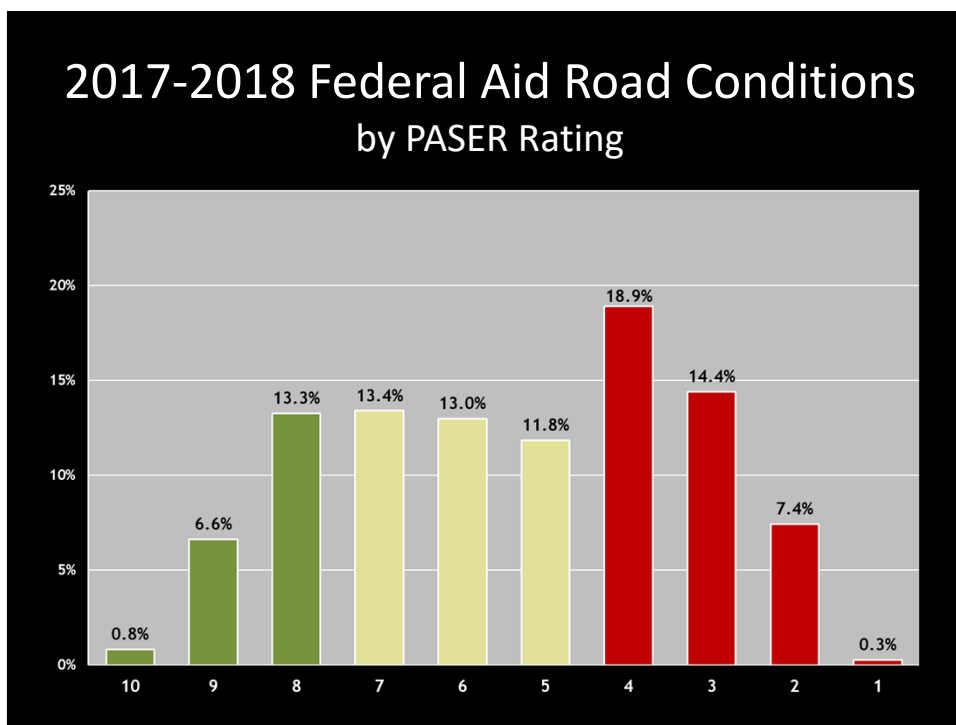
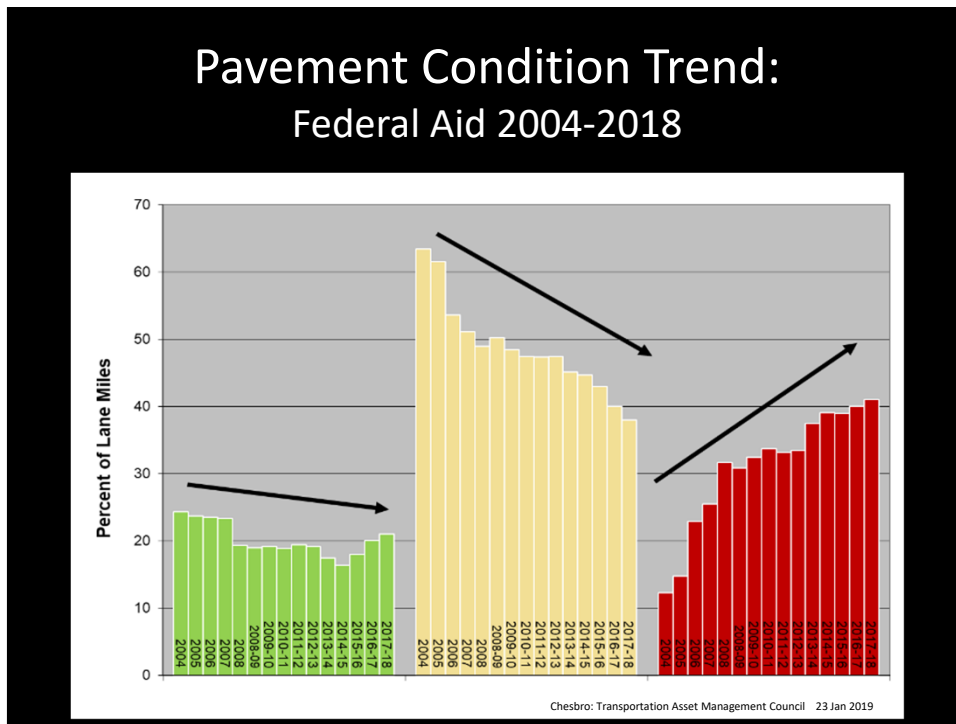
Chesbro: Transportation Asset Management Council 6 Feb 2019

## Percent of Paved Fed-Aid System Rated



Chesbro: Transportation Asset Management Council 6 Feb 2019





## What's New with TAMC?

1. Michigan's Roads & Bridges Annual Report – Next Report Due May 2, 2019
2. MIC/WAMC Coordination (Public Acts 323, 324 & 325 of 2018)
3. TAMC Strategic Planning – June 5, 2019
4. Policy Review & Developments
  - Asset Management Plans & Template
  - PASER Certification Policy
  - TAMC Investment Reporting Tool & Tracking Paving Warrantes

## 2018 – A Year of Pilots & Studies



- Culvert Mapping Pilot
- Analysis of TAMC Investment Reporting Data for Network Level Modeling on the Locally Owned Road System in Michigan
- 2018 Michigan Local Agency Pavement Treatment Life Study

## 2018 Culvert Mapping Pilot

- \$2 million Supplemental Appropriation (Non-MTF)
- 49 local agencies participated
  - 32 counties
  - 12 cities
  - 5 villages
  - Mix of large/small/urban/rural
- 49,664 culverts inventoried

### Pilot Work Program:

- ✓ Recommendation of Tools & Procedures
- ✓ Webinar Trainings
- ✓ Data Collection & Analysis

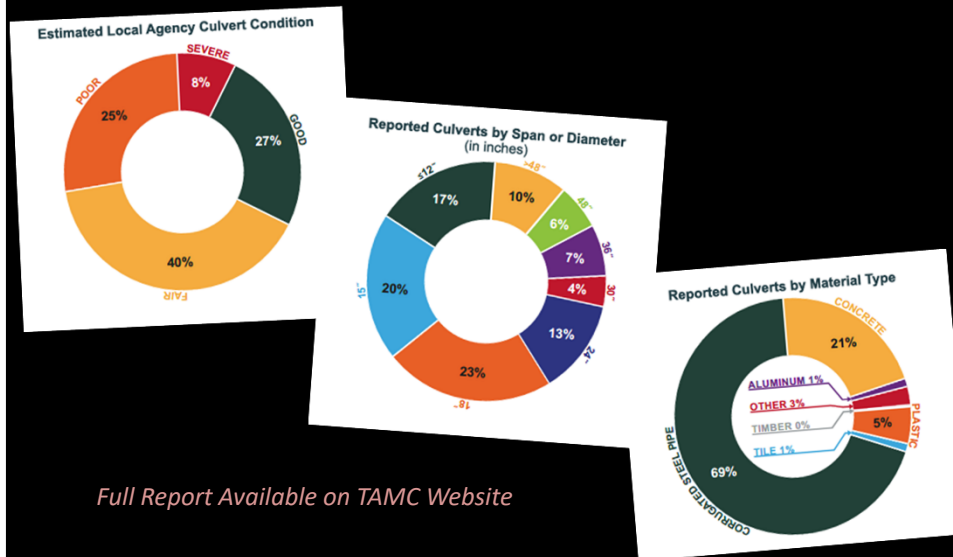


## 2018 Culvert Mapping Pilot

### Key Findings:

- Statewide estimate of local agency culverts: 196,000
  - 27% of culverts are in good condition
  - 69% of culverts are corrugated steel pipe
- Estimated time to inventory 1 culvert: 17 minutes
- Est. time to inventory & inspect: 25 minutes
- Est. replacement cost of locally-owned: \$1.48 billion
- TAMC-PASER business practice/relationships provide strong framework for data collection/training

## 2018 Culvert Mapping Pilot



## Analysis of IRT Data For Network Modeling

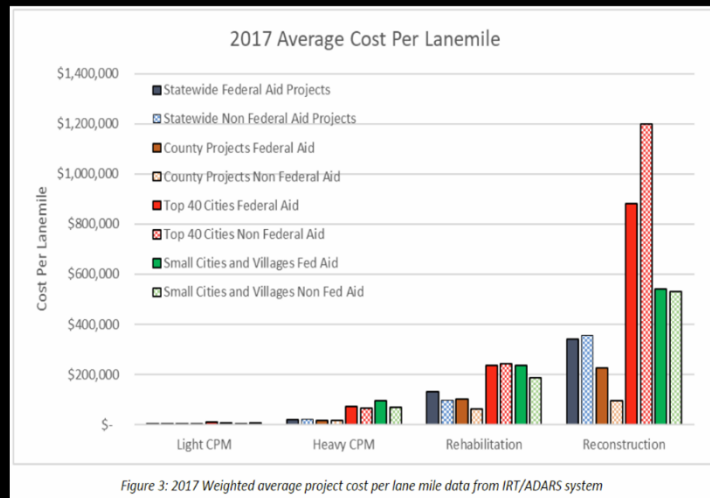
### Objectives:

- Determine inputs for Pavement Condition Forecast System
  - Average unit costs in 4 categories
  - Volume of projects done each year
- Provide local agencies with cost data on a variety of treatments
- Account for unreported or errors
- Recommendations





## Analysis of IRT Data For Network Modeling



## Analysis of IRT Data For Network Modeling

### Key Findings:

- TAMC's IRT is good source for data
- Costs for Common Treatments
  - Counties had lowest cost per lane mile
  - Large Cities had highest cost per lane mile
- Federal Aid projects typically cost more, except light CPM projects
- Repeat study every 2 years

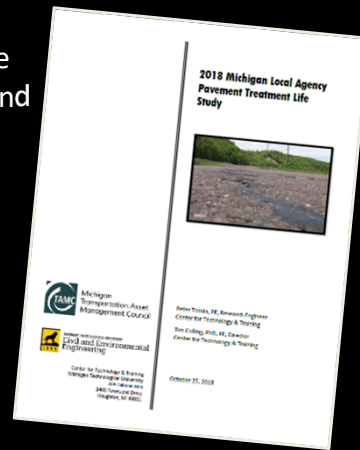
*Full Report Available on TAMC Website*



# Pavement Treatment Life Study

## Objectives:

- Determine average Extended Service Life (ESL) for modeling at the state and local level
- Show that local agencies have these tools to replicate the study
- Make minor improvements to the tools



# Pavement Treatment Life Study



## Key Findings:



Study looked at worst case analysis for ESL



Local agencies are collecting high quality data



Local agencies gain significant benefit with treatments



TAMC to consider repeating study in 4 to 6 years



Local agencies have data to do this

## Agencies Affected by Transportation Asset Management Plan (TAMP) Requirements

- Responsible for 100 or more certified miles of road
- All 83 county road agencies
- 39 of Michigan's largest cities

Ann Arbor Battle Creek Bay City Burton Dearborn Dearborn Heights Detroit Farmington Hills Flint Garden City Grand Rapids Holland Jackson	Kalamazoo Kentwood Lansing Lincoln Park Livonia Midland Muskegon Norton Shores Novi Pontiac Port Huron Portage Rochester Hills	Romulus Roseville Royal Oak Saginaw Southfield St Clair Shores Sterling Heights Taylor Troy Walker Warren Westland Wyoming
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## TAMP– 3 Year Schedule

- Updated TAMP Template
- Did seek Volunteer Agencies to “Go First”
- Provides Guidance on Culverts & Traffic Signals
- Other?





## Announcements

- Spring Asset Management Conference
  - ✓ May 21th-23rd – with APWA at Treetops, Gaylord
  - ✓ Fall Conference – Date to be announced soon
- Nominations for Individual & Organization Awards
- 2019 Training Schedules
  - ✓ Asset Management Plan Workshops
  - ✓ IRT/ADARS Training
  - ✓ Local Elected Officials
- Updated Policy for Collection of Roadway Surface Condition Data

## Announcements

- Reimbursement requests for PASER non-federal data collection: See your RPO/MPO
- Please submit your paved non-federal aid data with/without reimbursement





**Resources**



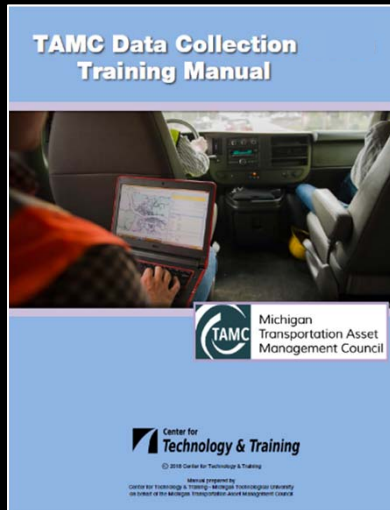
- Website: [www.Michigan.gov/TAMC](http://www.Michigan.gov/TAMC)
- TAMC Help Desk: (517) 373-7910
- Roger Belknap, MDOT, TAMC Coordinator  
(517) 335-4580  
[belknapr@michigan.gov](mailto:belknapr@michigan.gov)



**Questions?**

-  **CRA** County Road Association of Michigan
-  michigan municipal league
-  **MAC** MICHIGAN ASSOCIATION OF COUNTIES
-  **MTPA** Michigan Transportation Planning Association
-  Michigan Transportation Asset Management Council
-  **MAR** MICHIGAN ASSOCIATION OF REGIONS
-  **MTA** MICHIGAN TOWNSHIPS ASSOCIATION
-  **MDOT** Michigan Department of Transportation
-  **DTMB** Technology, Management & Budget

## TAMC Data Collection Business Rules



## Part 1: Webinar – Distress Identification

### #1 Webinar Session

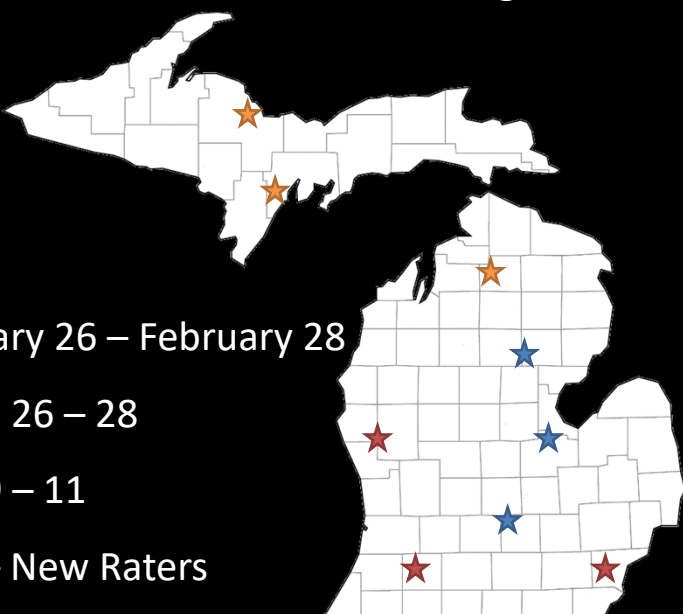
February 12 – 9:00 - 11:30 a.m.

February 21 – 1:00 - 3:30 p.m.

March 13 – 9:00 - 11:30 a.m.

April 2 – 1:00 - 3:30 p.m.

### Part 2: On-site – PASER Training



A map of Michigan is shown with a grid overlay. Colored stars are placed on the map to indicate training dates: blue stars for February 26-28, red stars for March 26-28, orange stars for April 9-11, and a white star for June - New Raters.

- ★ February 26 – February 28
- ★ March 26 – 28
- ★ April 9 – 11
- ★ June – New Raters

### Part 3: Webinar – Inventory Based Rating

## IBR System™ Training

#### #3 Webinar Session

February 13 – 1:00 - 3:00 p.m.  
March 14 – 9:00 - 11:00 a.m.

## 2019 TAMC-IRT Training Schedule

### \*\* 5 STATEWIDE ON-SITE SESSIONS \*\*

Please pre-register with the contact person below if you plan to attend a training session. Include your name and which session you would like to attend.

[ewaldn@michigan.gov](mailto:ewaldn@michigan.gov) or Nan Ewald (517)373-0684

~~Thursday, February 28 – Okemos \*~~  
1:30 pm to 4 pm  
Okemos Conference Center  
2187 University Park Dr. Okemos, MI 48864

~~Wednesday, March 27 – Kalamazoo \*~~  
1:30pm to 4:00pm  
Road Commission of Kalamazoo County  
3801 Kilgore Rd, Kalamazoo, MI 49001

**Tuesday, April 9 – Gaylord \***  
1:30pm to 4:00pm  
University Center  
80 Livingston Blvd, Gaylord, MI 49735

**Wednesday, April 10 – Escanaba \***  
1:30pm to 4:00pm  
Delta County Road Commission  
3000 32<sup>nd</sup> Ave N, Escanaba, MI 49829

**Tuesday, June 11 – SEMCOG (Detroit)**  
9:00am to 12:00pm  
1001 Woodward Avenue, Suite 1400  
Detroit, MI 48226

**\*These training sessions are provided in conjunction with MTU's RoadSoft morning trainings at the same locations.**

## 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



## TAMC Collection – What to Rate

### Federal Aid Network

- Rate at least 50% of your Fed Aid eligible roads every year, both paved and unpaved
- Anything not rated in 2018
- Rating System
  - Paved = PASER
  - Unpaved = IBR



## TAMC Collection – Timeline

First Monday in APRIL  
Begin Collection



Last Friday in NOVEMBER  
Complete Collection



First Friday in DECEMBER  
Submit data to CSS





## TAMC Collection - Funding

- Agencies report time and expenses to Regional RPO/MPO
- Regional Coordinator reports to TAMC
  - Use TAMC Expense Log

**TRANSPORTATION ASSET MANAGEMENT COUNCIL**  
**2019 DATA COLLECTION - ROAD INVENTORY LOG**

CREW: Include members name and 2019 PASER Training Date or Certification Exam Date

MDOT Rep -	Name:	Date:
Region/MPO Rep -	Name:	Date:
County Rep -	Name:	Date:
City/Village Rep -	Name:	Date:

Please check the following:

OFFICE WORK:	FIELD WORK:
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GEOGRAPHIC AREA: Please insert region, county, township, city, etc.

## Rated Road Requirements

Crew member names

Surface type

Number of lanes

PASER/IBR number

## Rating Team

### Federal Aid

- MDOT
- RPO/MPO
- Jurisdiction

### Non-Federal Aid \*

- Jurisdiction

- All members of the rating teams must be trained.
- Members log into LDC with first and last name.

\* NFA agencies approved for TAMC reimbursement shall consist of a minimum of two.

Collection Policy is located in Appendix F of Collection Manual

## Non-federal aid collection

- TAMC wants your data
- Properly tagged data
- TAMC may reimburse collection
- Follow Manual →

### TAMC Data Collection Training Manual



Center for  
**Technology & Training**

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Manual prepared by  
Center for Technology & Training - Michigan Technological University  
on behalf of the Michigan Transportation Asset Management Council

## What Tools Are Used?



Roadsoft 2019.3\*

Roadsoft GPS Laptop Data Collector 2019.3\*

Framework Version 17

\*or latest version

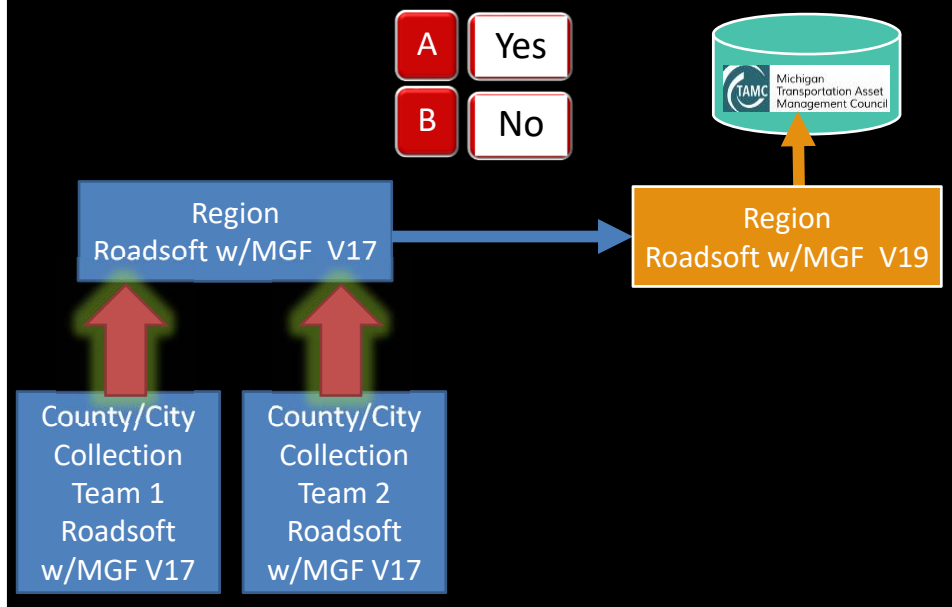
## MGF V19 Framework Base Map

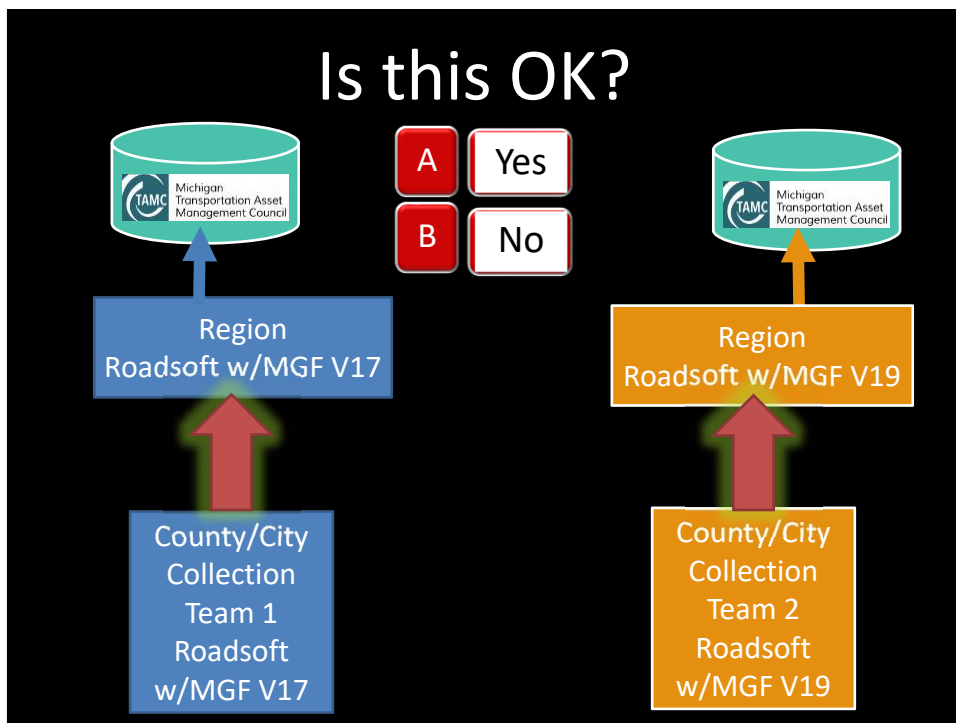
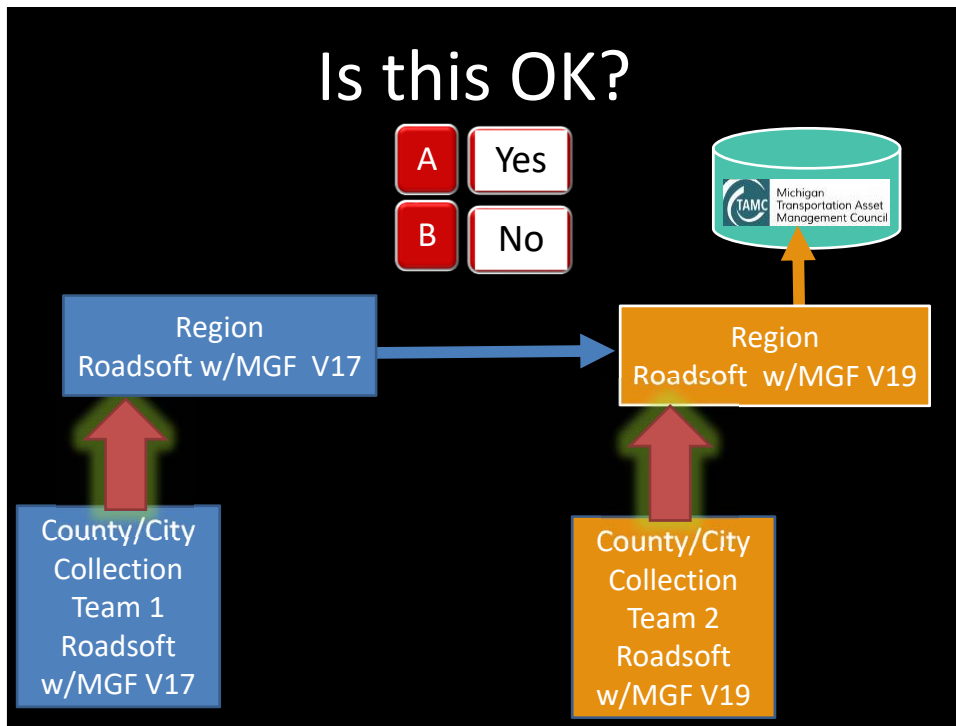
- State upgrading Michigan Geographical Framework (MGF) base map process
- New MGF map usually received in February
- New MGF map in Roadsoft usually released April 1
- Roadsoft version with new map planned for Summer, 2019

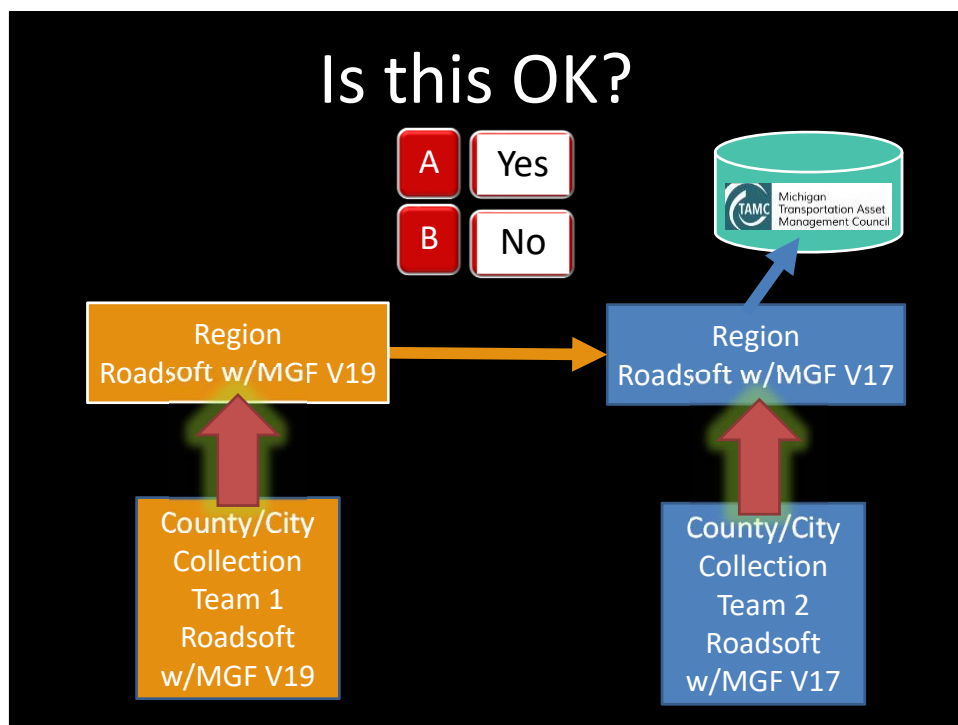
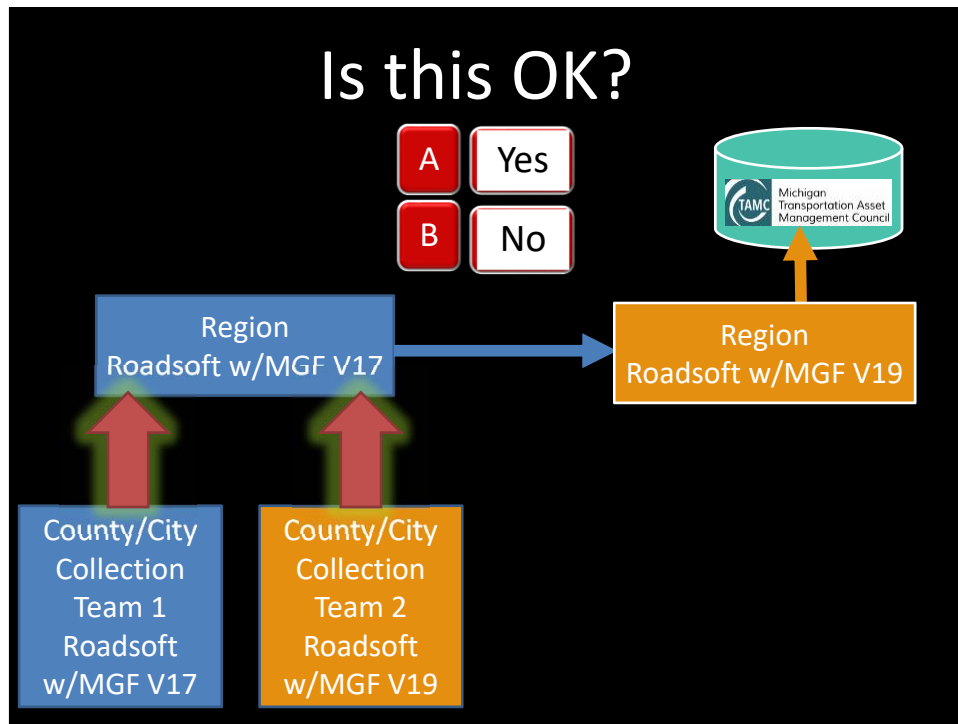
## “Rules” For Dealing with Collection and Base Map Update In Roadsoft

- Roadsoft and LDC Versions Need to Match
- Always Complete the Roadsoft Data Cycle
- Do Not Update Roadsoft or the LDC During Active Data Collection
- Can Collect Data in MGF V17 or MGF V19
- Regions Can Receive Data in Either MGF V17 or MGF V19
- Regions Should Submit to TAMC in MGF V19

### Is this OK?

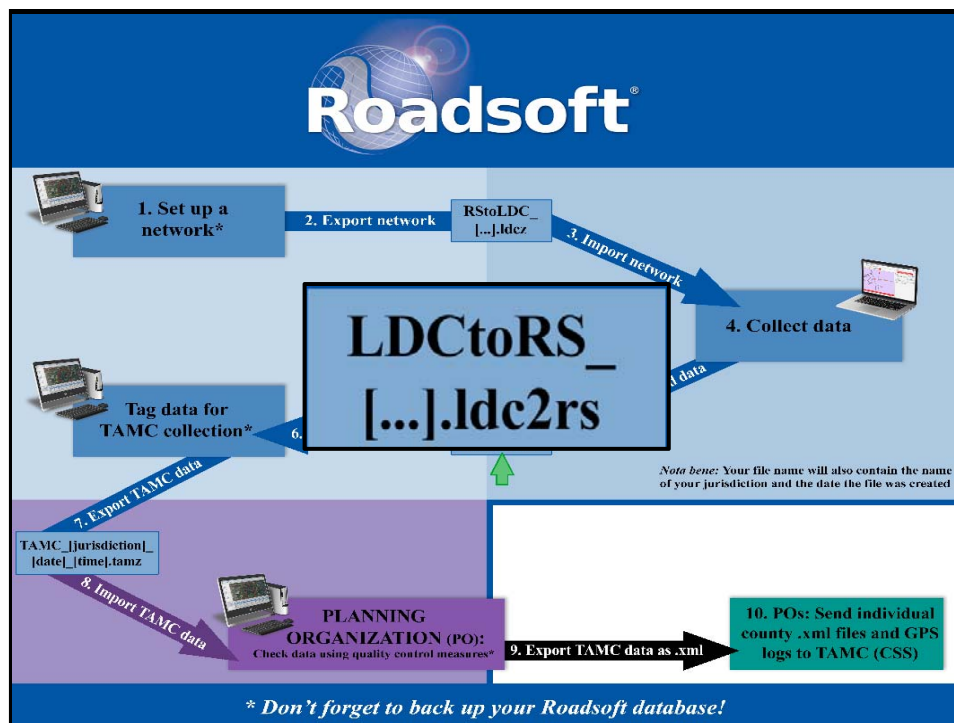




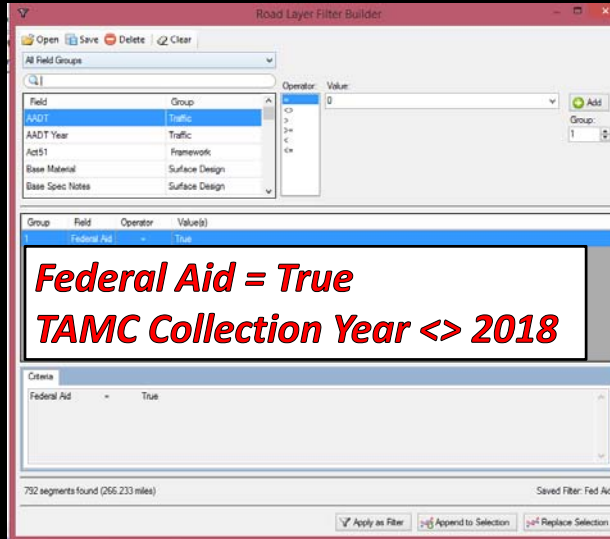


# Updating Roadsoft

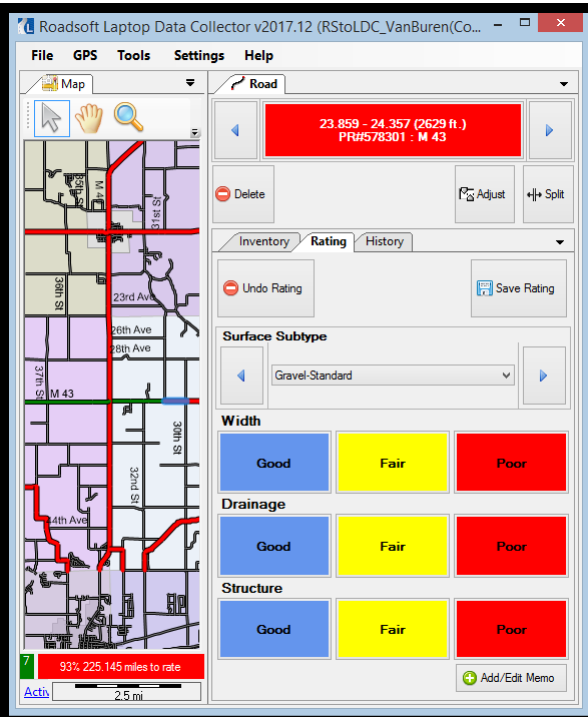
1. Complete Data Collection Cycle - upload LDC and Mobile data into Roadsoft
2. Backup Roadsoft database
3. Update Roadsoft and the LDC
4. Update framework data
5. Begin the Data Collection Cycle again from step 1



## 50% Network

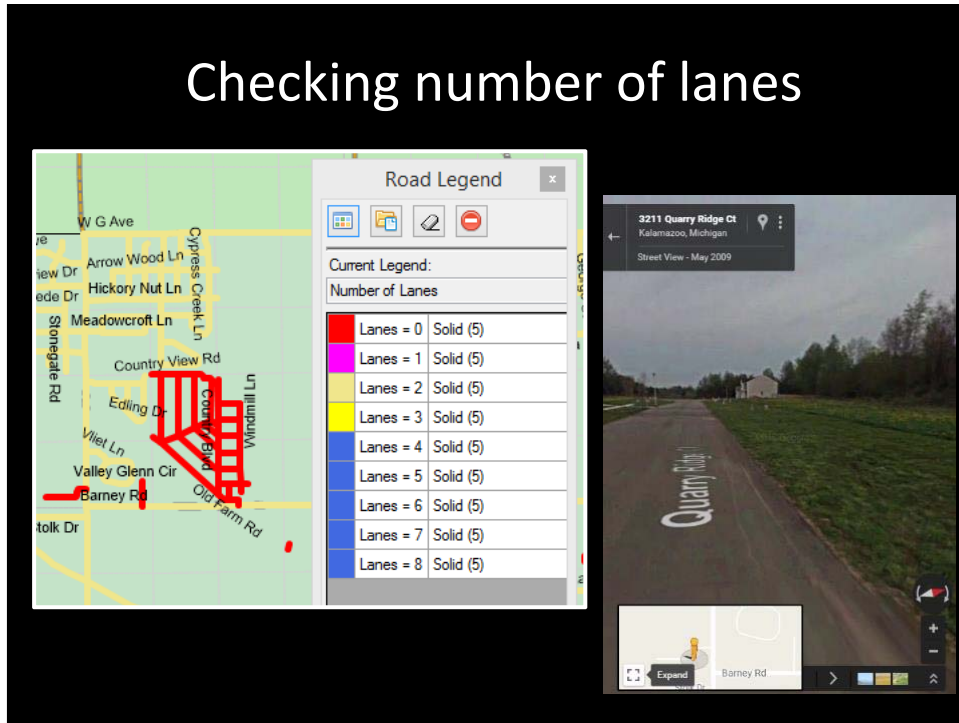


## Surface Type in the LDC

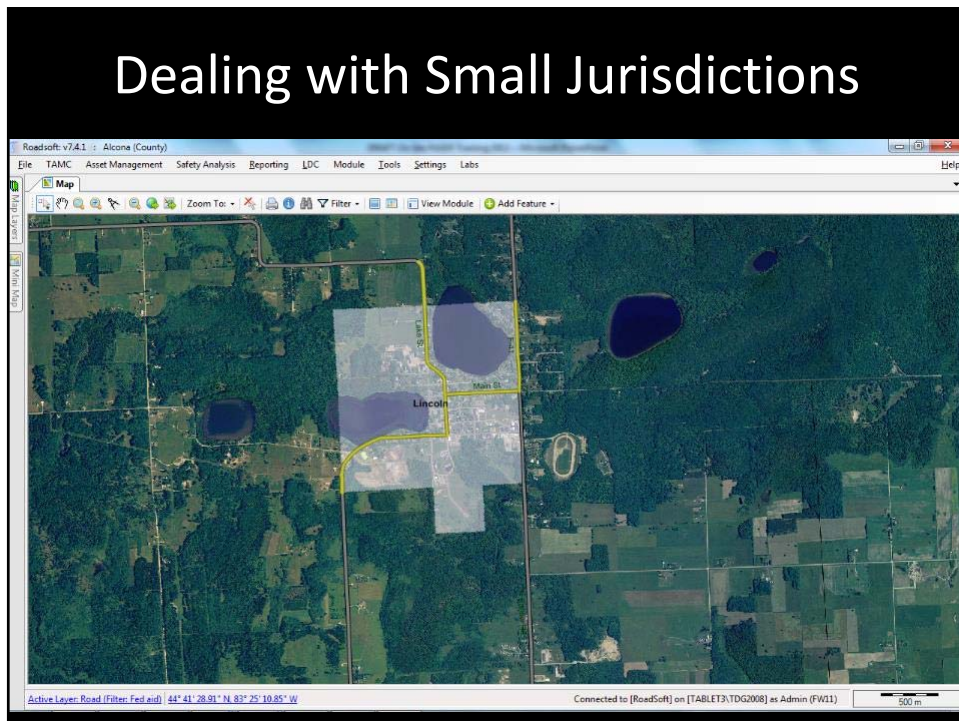




## Checking number of lanes

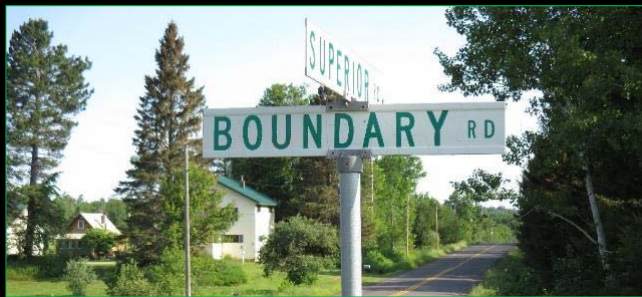


## Dealing with Small Jurisdictions



## Collection Reminders

- Boundary Roads
- Begins at the local agency, **not** at RPO/MPO
- Collection must be done in LDC, **not** Roadsoft
- ~~50% networks sent to CSS before collection~~



## PASER Manual Descriptors



- 10 & 9 – Excellent
- 8 – Very good
- 7 & 6 – Good
- 5 & 4 – Fair
- 3 – Poor
- 2 – Very Poor
- 1 – Failed

**Not based on any definitions**

## TAMC Groupings Definitions



Michigan  
Transportation Asset  
Management Council

**10, 9 & 8 – Good**

**Routine Maintenance**

**7, 6 & 5 – Fair**

**Capital Preventative Maintenance**

**4, 3, 2 & 1 – Poor**

**Structural Improvement**

## TAMC Groupings Definitions

In TAMC nomenclature, roads that are considered “Good” have a PASER of 8, 9, or 10. This category includes roads that only require routine maintenance, that have been recently sealed, or that are newly constructed. Routine maintenance is the day-to-day, regularly-scheduled, least activities to prevent water from seeping into the surface. These activities include street sweeping, drainage clearing, gravel shoulder grading, and crack sealing. “Good” roads require little maintenance beyond routine maintenance.

Roads that are considered “Fair” have a PASER of 5, 6, or 7. Roads in this category still show good structural support but their surface is starting to deteriorate. Capital preventive maintenance (CPM) addresses pavement problems of “Fair” roads before the structural integrity of the pavement has been severely impacted. CPM is a planned set of effective treatments applied to an existing roadway that slows further deterioration and that maintains or improves the functional condition of the system without significantly increasing the structural capacity. The purpose of CPM fixes is to protect the pavement structure, slow the rate of deterioration, and/or correct pavement surface deficiencies.

According to TAMC, roads that are considered “Poor” have a PASER of 1, 2, 3, or 4. These roads exhibit alligator cracking, rutting, and potholes. Road rutting is evidence that the underlying structure is beginning to fail and it must be rehabilitated with a fix like a crush and shape or totally reconstructed. “Poor” roads require structural improvement (SI) such as resurfacing or major reconstruction.

## New Report on Extended Service Life

<http://ctt.mtu.edu/asset-management-resources>

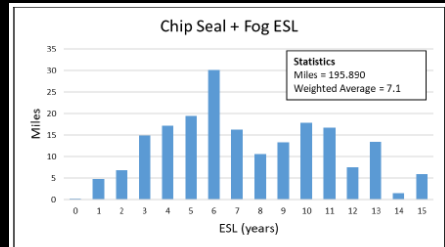


Figure 11: Chip seal plus fog seal qualifying miles distribution by ESL

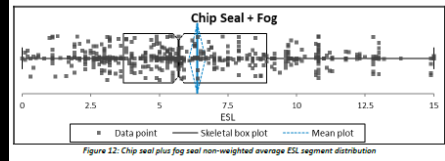


Figure 12: Chip seal plus fog seal non-weighted average ESL segment distribution

### 2018 Michigan Local Agency Pavement Treatment Life Study



**TAMC** Michigan Transportation Asset Management Council  
 Peter Toralá, PE, Research Engineer  
 Center for Technology & Training  
 Tim Culling, PhD, PE, Director  
 Center for Technology & Training

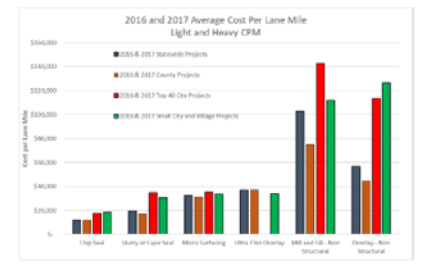
Peter Toralá, PE, Research Engineer  
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October 25, 2018

## New Report on Treatment Cost

<http://ctt.mtu.edu/asset-management-resources>

TAMC Class	Project Subcategory	# of Projects	Lane Miles	Total Project Dollars	\$/LM
Heavy CPM	Chip Seal	2938	7997.2	\$ 97,225,143	\$ 12,229
Heavy CPM	Slurry or Cape Seal	112	510.1	\$ 9,961,373	\$ 19,528
Heavy CPM	Micro Surfacing	233	220.7	\$ 8,739,353	\$ 32,281
Heavy CPM	Ultra Thin Overlay	115	288.1	\$ 10,196,521	\$ 36,780
Heavy CPM	Mill and Fill - Non Structural	412	437.0	\$ 44,946,306	\$ 102,855
Heavy CPM	Overlay - Non Structural	652	1133.0	\$ 63,980,522	\$ 56,468
Rehabilitation	Mill and Fill - Structural	180	284.8	\$ 38,887,034	\$ 136,538
Rehabilitation	Overlay - Structural	566	1044.3	\$ 101,343,033	\$ 97,046
Rehabilitation	Cross and Shape	474	940.6	\$ 143,728,966	\$ 152,804
Rehabilitation	Minor Rehab	142	306.2	\$ 20,760,477	\$ 67,803
Rehabilitation	Major Rehab	101	379.0	\$ 42,881,715	\$ 113,151
Rehabilitation	Resurfacing	810	1762.1	\$ 242,866,181	\$ 137,825
Reconstruction	Reconstruction	746	1126.9	\$ 435,635,749	\$ 386,938



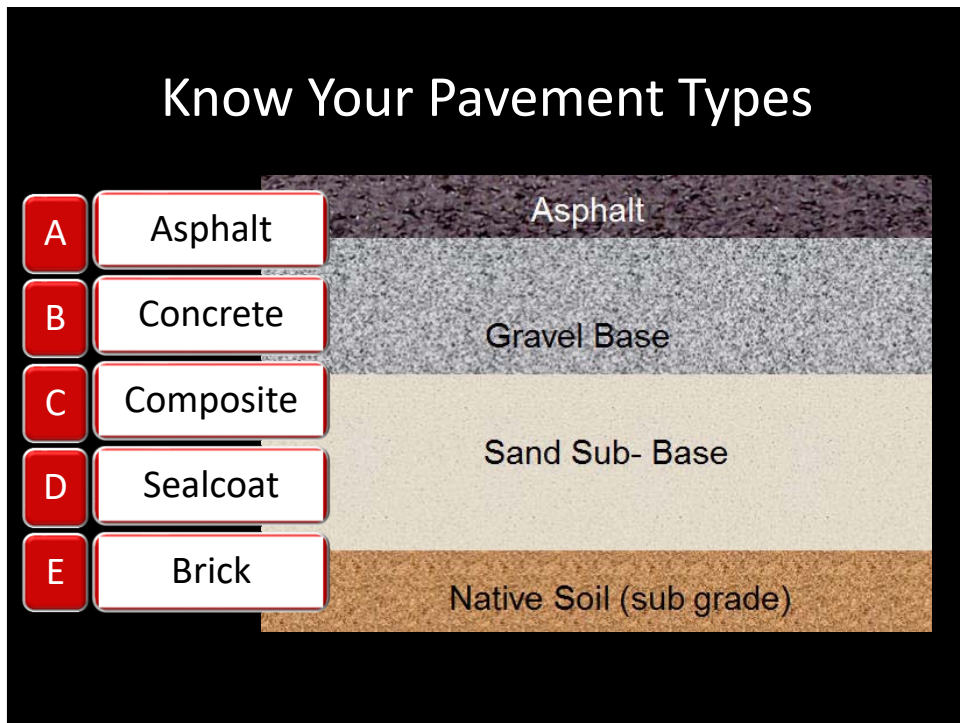
### Analysis of TAMC Investment Reporting Data for Network Level Modeling on the Locally Owned Road System in Michigan



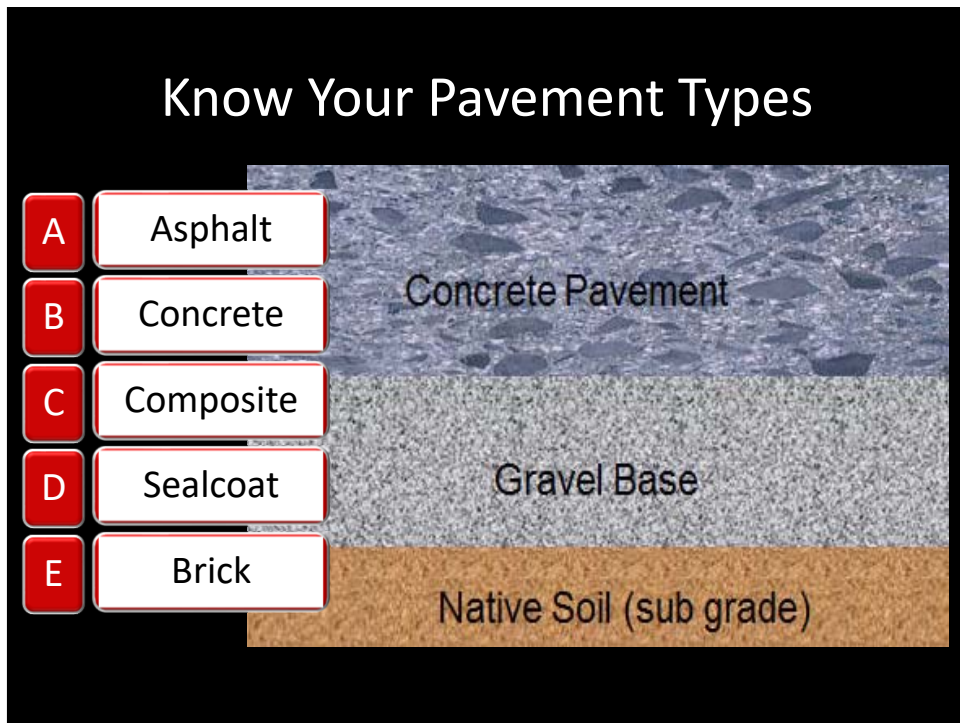
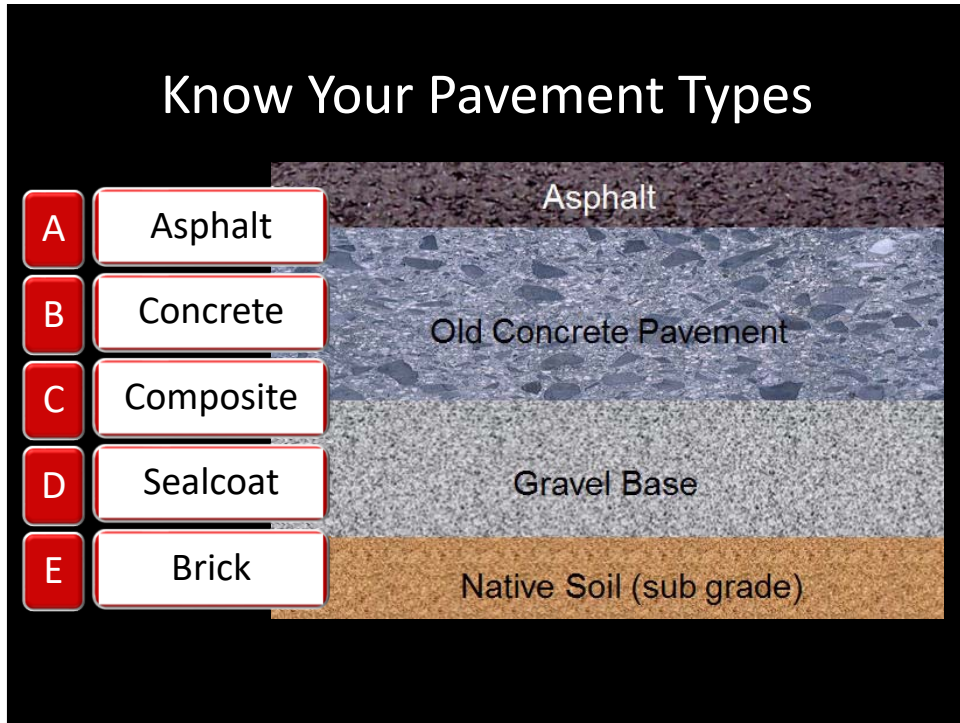
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 Center for Technology & Training

October 25, 2018







## Know Your Pavement Types

The diagram shows a cross-section of pavement layers. On the left, a legend lists five options: A Asphalt, B Concrete, C Composite, D Sealcoat, and E Brick. The pavement structure consists of three main layers: a top layer of Gravel Base, a middle layer of Sand Sub-Base, and a bottom layer of Native Soil (sub grade). A thin layer of asphalt is visible at the very top surface.

## Brick and Gravel

Two manual covers are displayed side-by-side. The left cover is titled 'PASER Manual Brick & Block' and features images of brick and block pavement. The right cover is titled 'Inventory-based Rating System for Gravel Roads Training Manual' and features images of gravel roads and a tractor. Both manuals are published by the Transportation Information Center at the University of Wisconsin-Madison.

## Rate Distress Not Ride



## Which Lane To Rate?





## Which Pavement Type To Rate?



## Which Pavement Type To Rate?



## Rate Distress Not Importance



## Construction

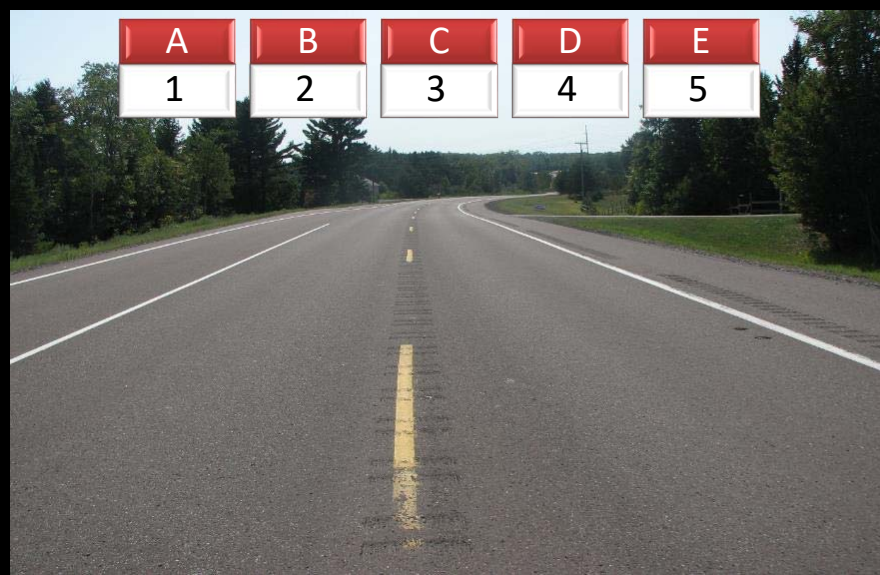


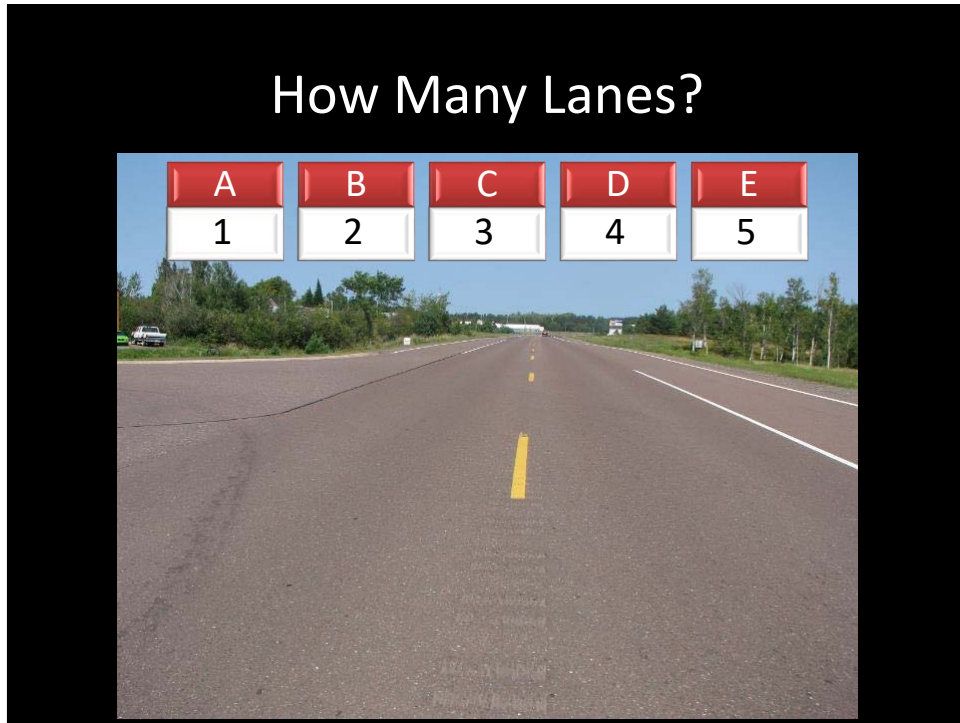


## How Many Lanes?



## How Many Lanes?







How do you rate after a new seal coat?



Should this ghost crack influence rating?

- A Yes
- B No



Photo Credits: Larry Brown, Allegan CRC

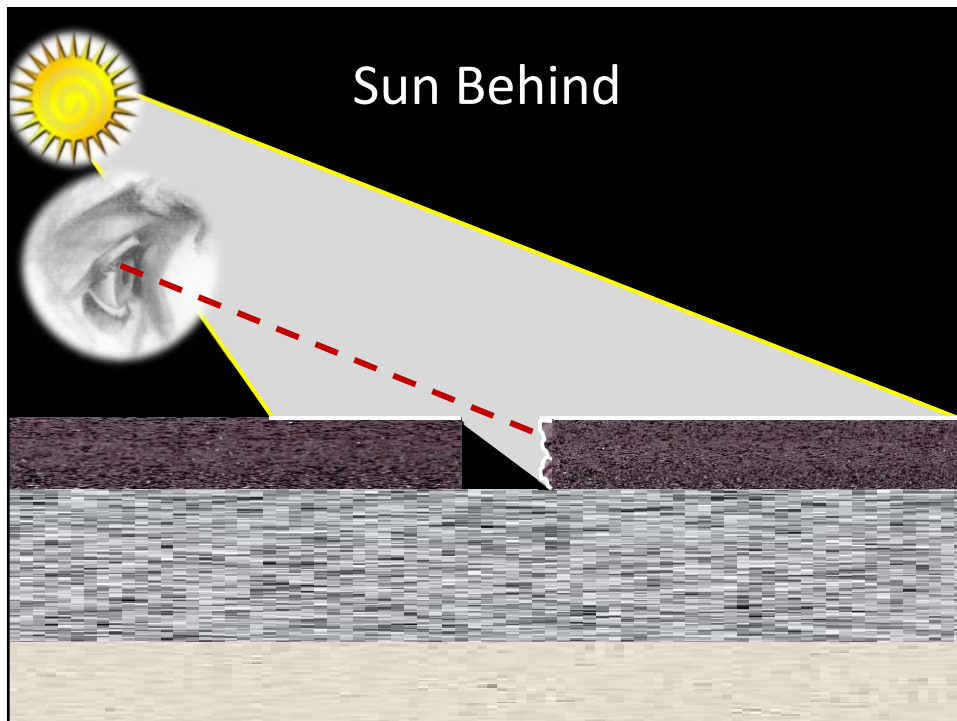
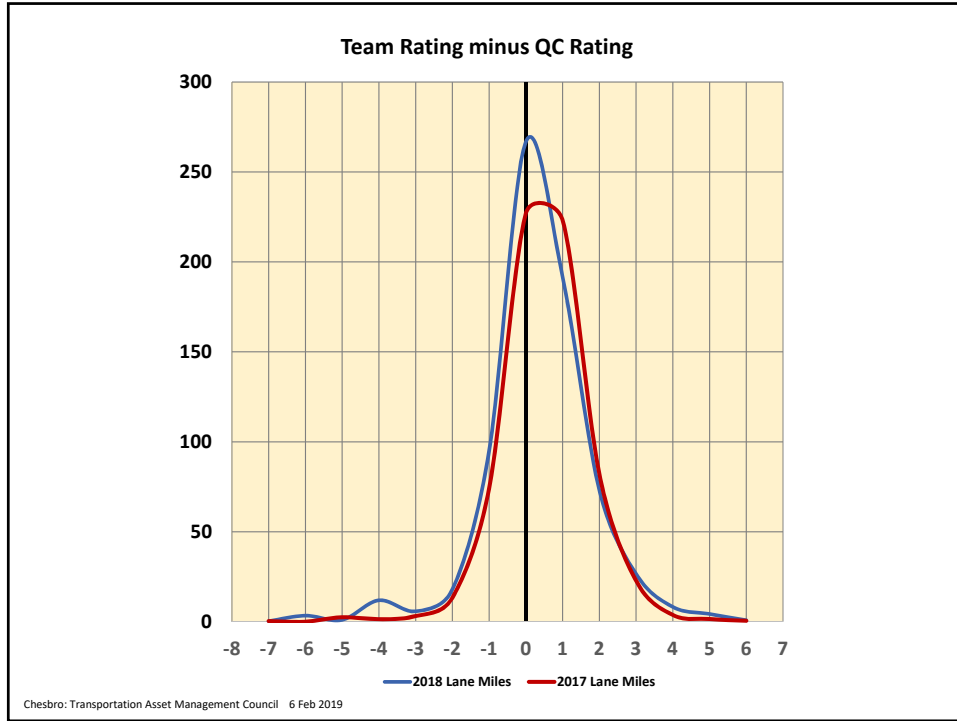
## Rating Tips

## Driving

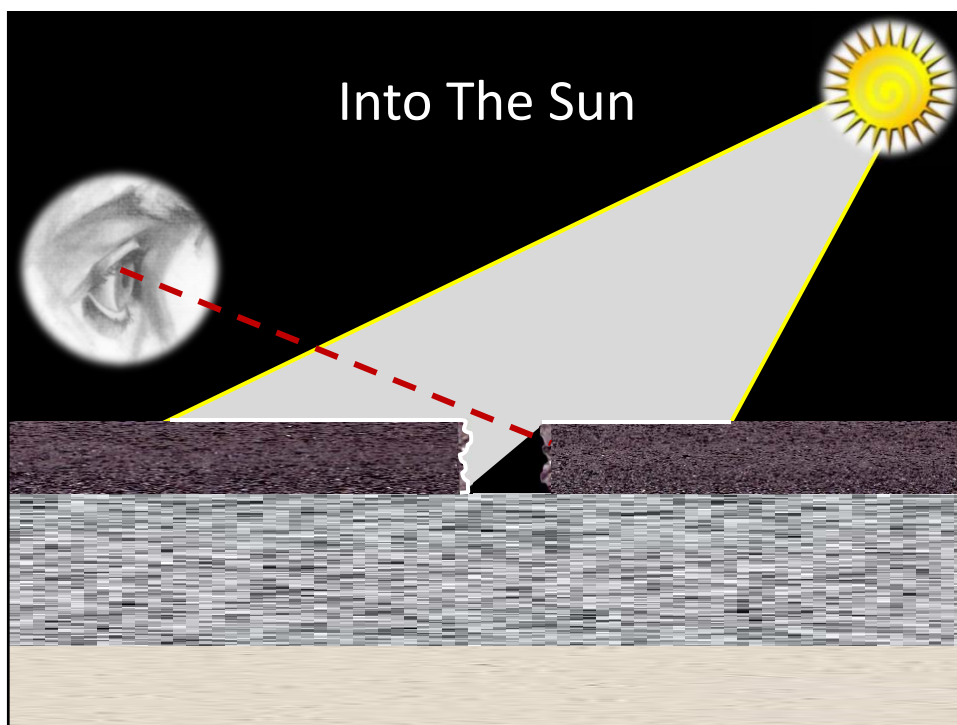
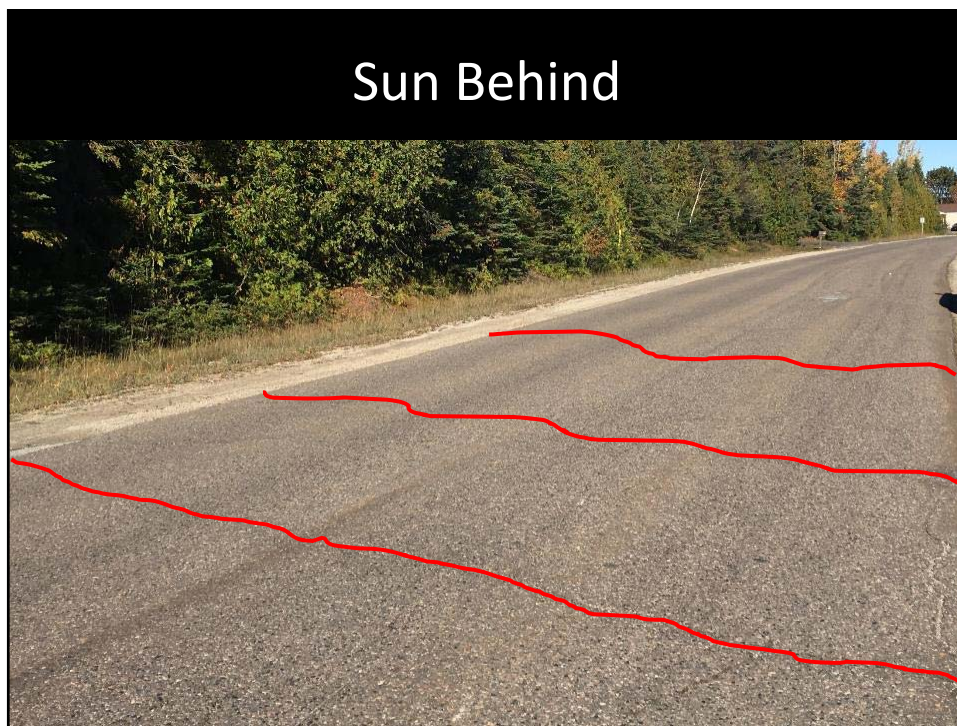
Slow down

Drive the segment again if needed

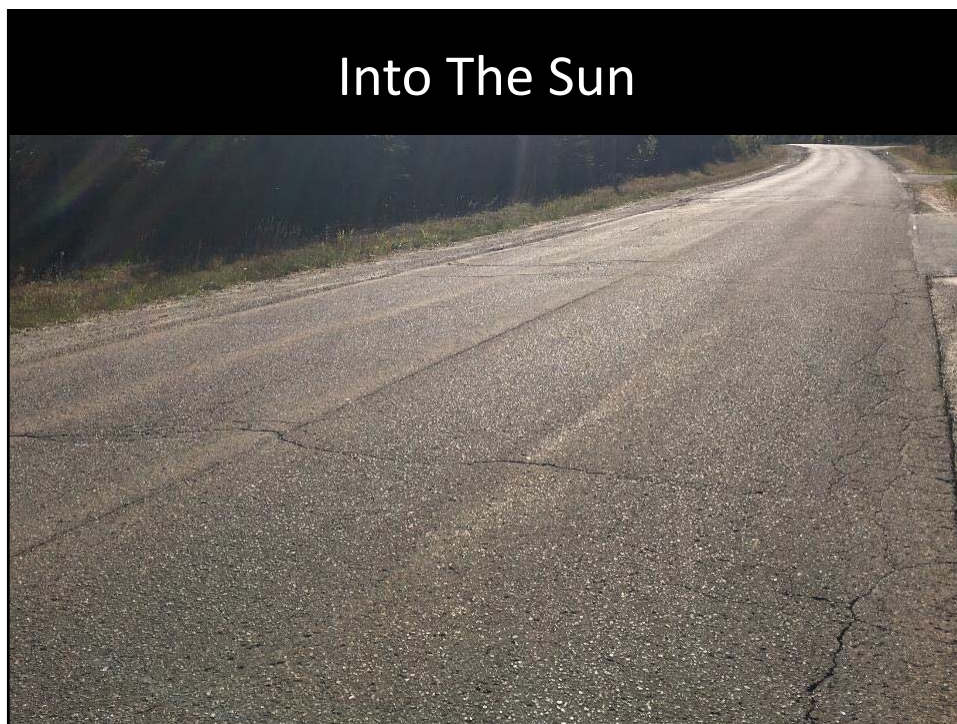












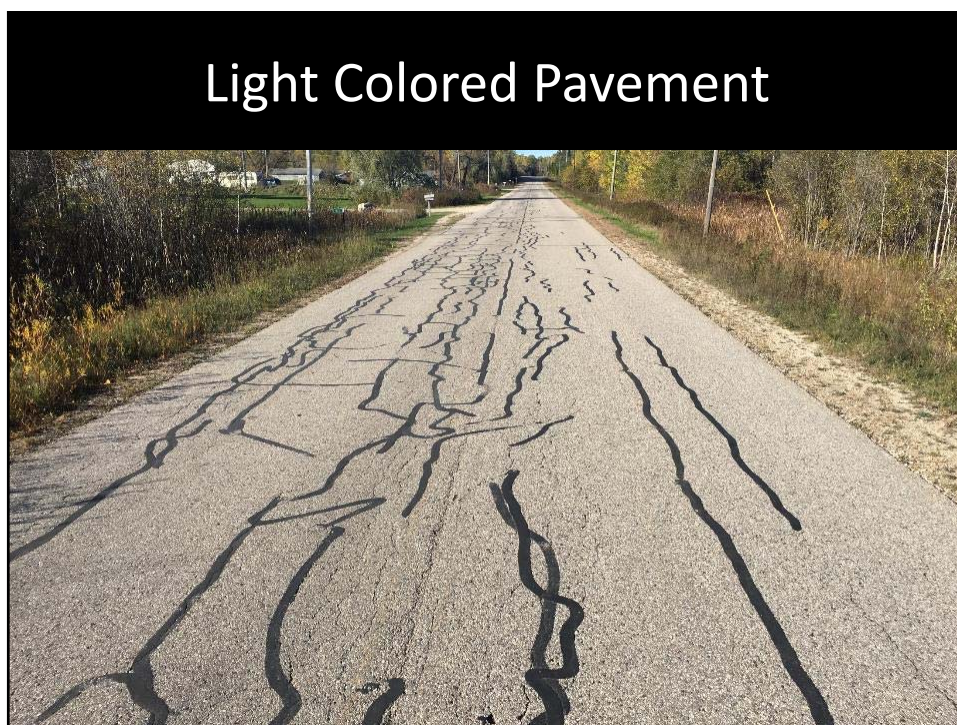


## What About These?

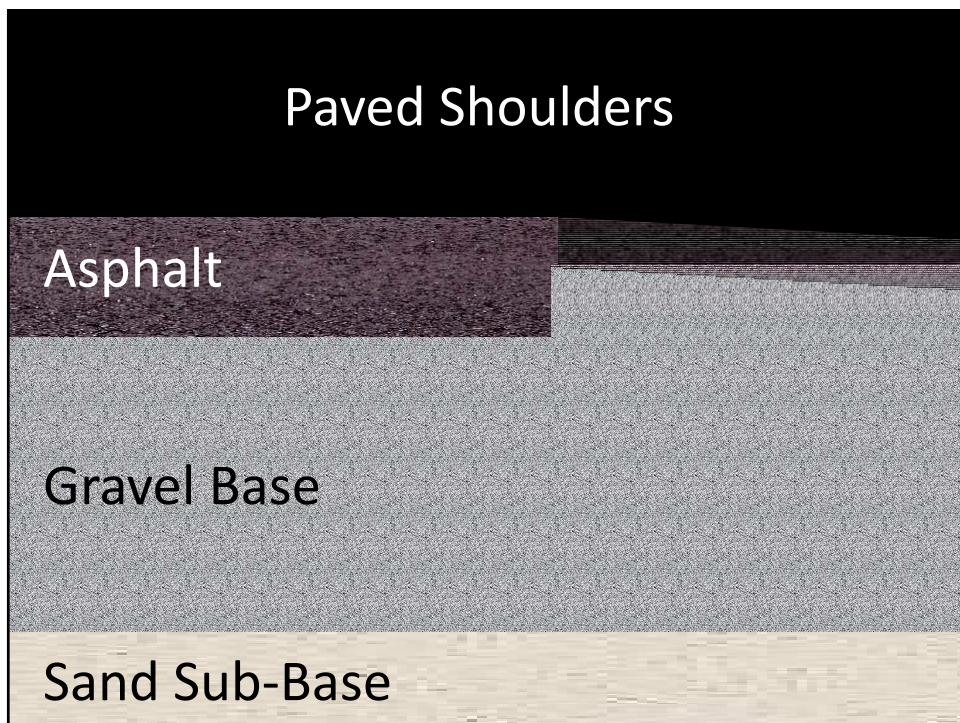
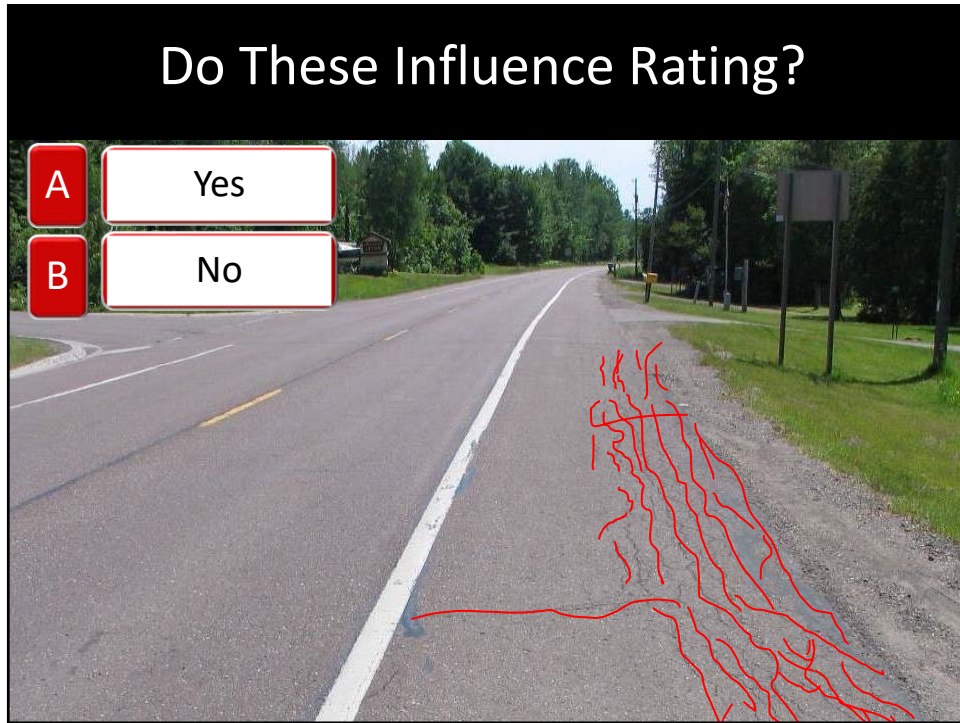


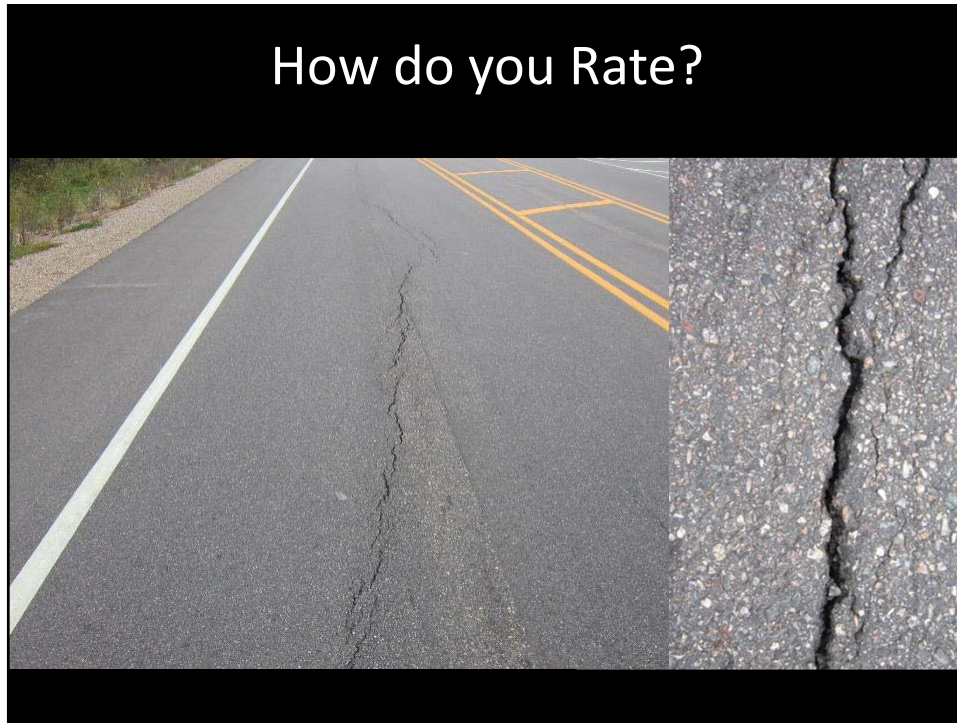
## Tree Shade












## Asphalt Cheat Sheet


Asphalt PASER		
	<p><b>Asphalt 10</b></p> <ul style="list-style-type: none"> <li>New construction</li> <li>No defects</li> <li>Less than 1 year old</li> <li>Only a "10" for 1 year</li> <li>Recent base improvement</li> <li>No action required</li> </ul>	<p><b>Asphalt 9</b></p> <ul style="list-style-type: none"> <li>Like new condition</li> <li>No defects</li> <li>More than 1 year old</li> <li>Recent overlay with or without a patch and close</li> <li>No action required</li> </ul>
<b>Good</b>	<p><b>Asphalt 7</b></p> <ul style="list-style-type: none"> <li>Transverse cracks 10"-40" apart</li> <li>Cracks open &lt; 1/4"</li> <li>Little or no crack erosion</li> <li>Little or no raveling</li> <li>Few if any patches in good condition</li> </ul> <p><b>Asphalt 6</b></p> <ul style="list-style-type: none"> <li>Transverse cracks less than 10" apart</li> <li>Initial block cracking (0-10' blocks)</li> <li>Cracks open 1/4" - 3/8"</li> <li>Blocks are large and stable</li> <li>Slight to moderate polishing or flushing</li> <li>No patches or few in good condition</li> <li>Slight raveling</li> </ul> <p><b>Asphalt 5</b></p> <ul style="list-style-type: none"> <li>Secondary cracks (crack raveling)</li> <li>Moderate block cracking (1 - 3' blocks)</li> <li>First sign of longitudinal cracks at edge</li> <li>Cracks open 1/8"</li> <li>Flushing/raveling in good condition</li> <li>Moderate raveling</li> <li>Extensive to severe flushing &amp; polishing</li> </ul>	<p><b>Asphalt 8</b></p> <ul style="list-style-type: none"> <li>Occasional transverse crack &gt;40' apart</li> <li>Crack width tight (flushed) or sealed</li> <li>Few if any longitudinal cracks on joints</li> <li>Recent seal coat or slurry seal (rate below) little or no maintenance required</li> </ul>
<b>Fair</b>	<p><b>Asphalt 4</b></p> <ul style="list-style-type: none"> <li>Longitudinal cracking in the wheel paths</li> <li>Rutting 1/2" - 1" deep</li> <li>Severe block cracking &lt;1' blocks</li> <li>Severe surface raveling</li> <li>Multiple longitudinal &amp; transverse cracks with slight crack erosion</li> <li>Patching in fair condition</li> </ul> <p><b>Asphalt 3</b></p> <ul style="list-style-type: none"> <li>&gt; 25% alligator cracking (first signs)</li> <li>Moderate rutting 1" - 2" deep</li> <li>Severe block cracking (alligator)</li> <li>Longitudinal &amp; transverse cracks showing extensive crack erosion</li> <li>Occasional potholes</li> <li>Patches in fair/poor condition</li> </ul> <p><b>Asphalt 2</b></p> <ul style="list-style-type: none"> <li>&gt; 25% alligator cracking</li> <li>Severe rutting or distortion &gt;2"</li> <li>Closely spaced cracks with erosion</li> <li>Frequent potholes</li> <li>Extensive patches in poor condition</li> </ul>	<p><b>Asphalt 1</b></p> <ul style="list-style-type: none"> <li>Loss of surface integrity</li> <li>Extensive surface distress</li> </ul>
<b>Poor</b>	<p><b>Asphalt 1</b></p> <ul style="list-style-type: none"> <li>Loss of surface integrity</li> <li>Extensive surface distress</li> </ul>	

## Asphalt Repair Techniques

- New construction
- Reconstruction
- Crush and shape



- Micro Surface / Slurry seal
- Seal coat
- Wedging
- Crack seal



## New Construction





## Reconstruction



## Crush and Shape



## Micro Surface / Slurry Seal



## Seal Coat





## Wedging



## Crack Seal



## Asphalt - Good




10	9	8
No defects  Less than one year old	No defects  More than one year old	Transverse cracks >40' apart  All cracks tight or sealed

**Crush & Shape** - A treatment is considered a reconstruct only if the base material is replaced or rehabilitated.

## Proactive Sealcoat Treatments

Asphalt 8
◆ Occasional transverse crack >40' apart ◆ Crack width tight (hairline) or sealed Few if any longitudinal cracks on joints
<u>Recent seal coat or slurry seal (*see below)</u>
<i>Little or no maintenance required</i>


### Asphalt - Fair

 <b>7</b>	 <b>6</b>	 <b>5</b>
Transverse cracks 10' to 40' apart  Cracks open <math>< \frac{1}{4}</math> inch	Transverse cracks <math>< 10'</math> apart  Blocks 6' to 10'  Cracks open $\frac{1}{4}$ to $\frac{1}{2}$ inch	Secondary cracks  Blocks 1' to 5'  First signs of edge cracking

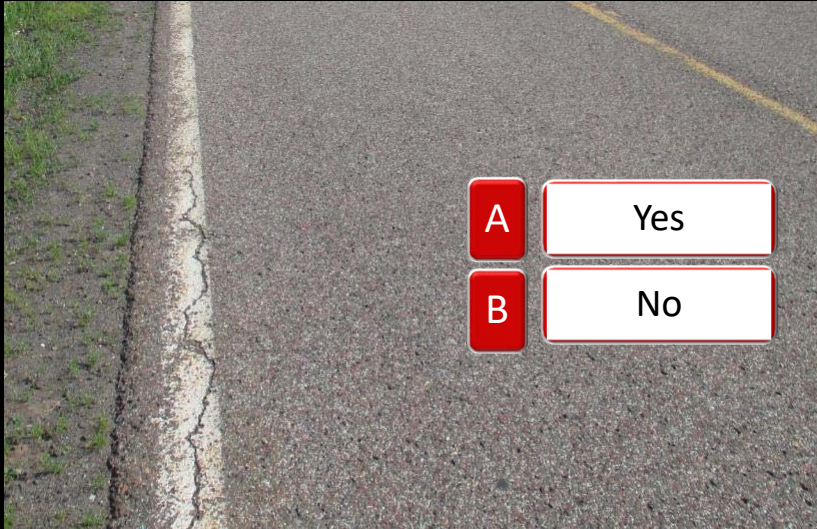
### Is This Edge Cracking?

**A** Yes

**B** No



### Is This Edge Cracking?



A


Yes

B

No

This image shows a close-up view of a road's edge. A white painted line separates the asphalt road from a grassy shoulder. A distinct longitudinal crack runs along the edge of the asphalt, following the line. The crack is approximately 1/4 inch wide and extends several feet into the road.

### Is This Edge Cracking?



A

Yes





B

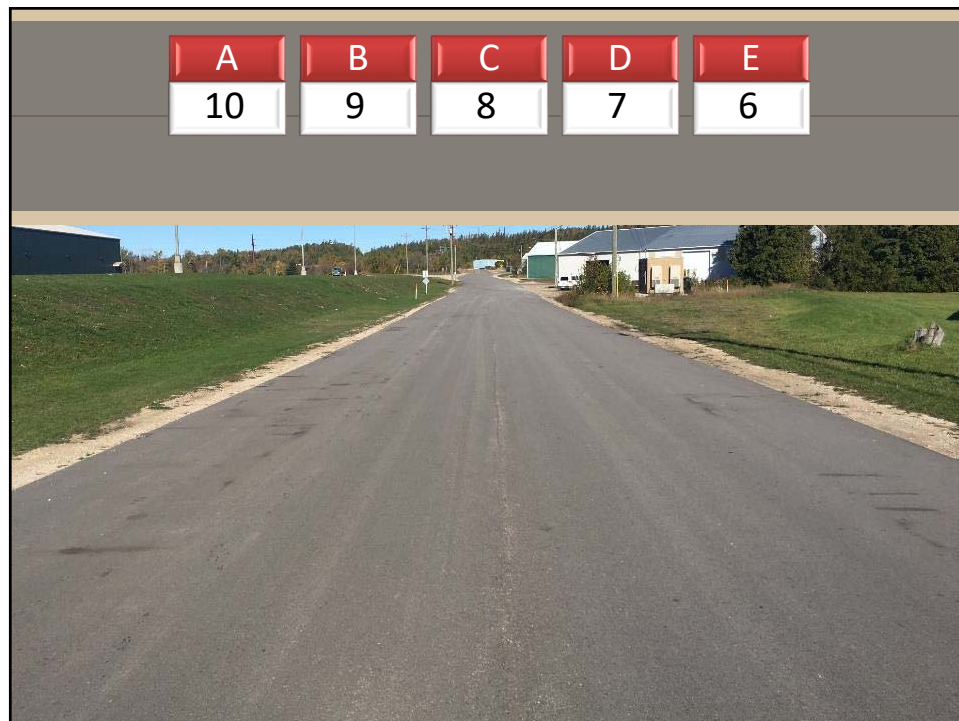
No

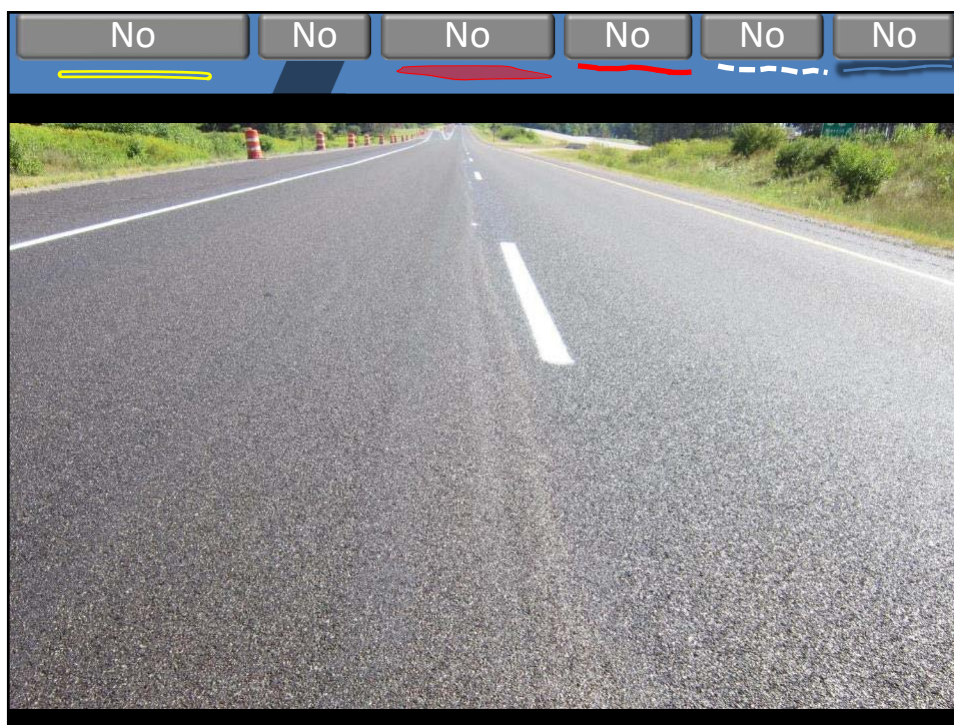
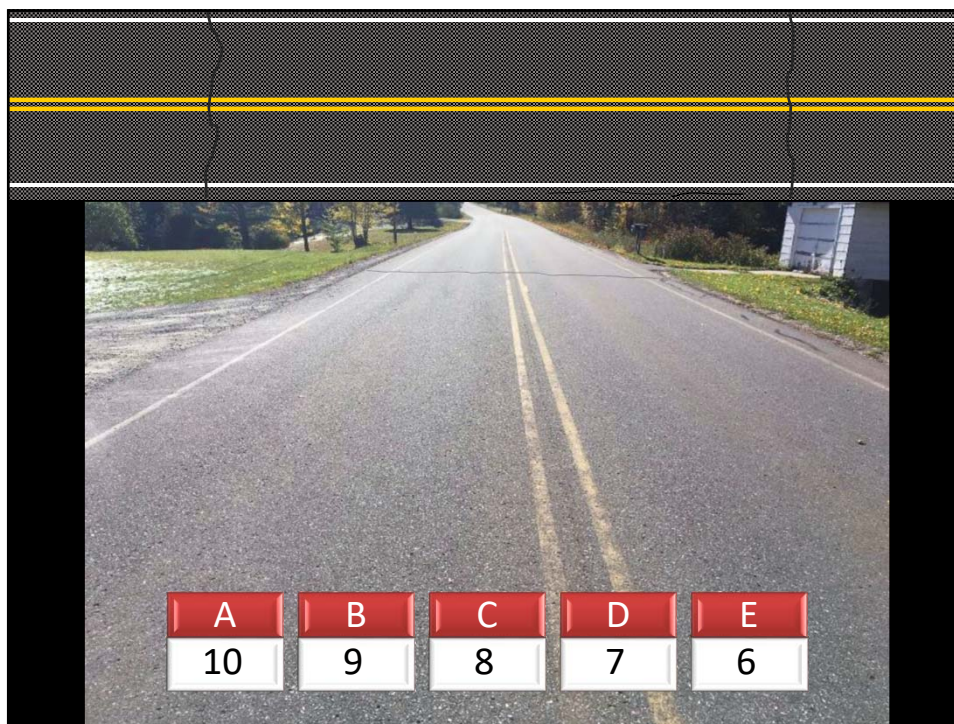
This image shows a wider view of a road's edge. The asphalt road is on the right, and a grassy shoulder is on the left. A jagged, irregular crack pattern runs along the edge of the asphalt, extending several feet into the road. The crack is approximately 1/4 inch wide and has a jagged, irregular pattern.



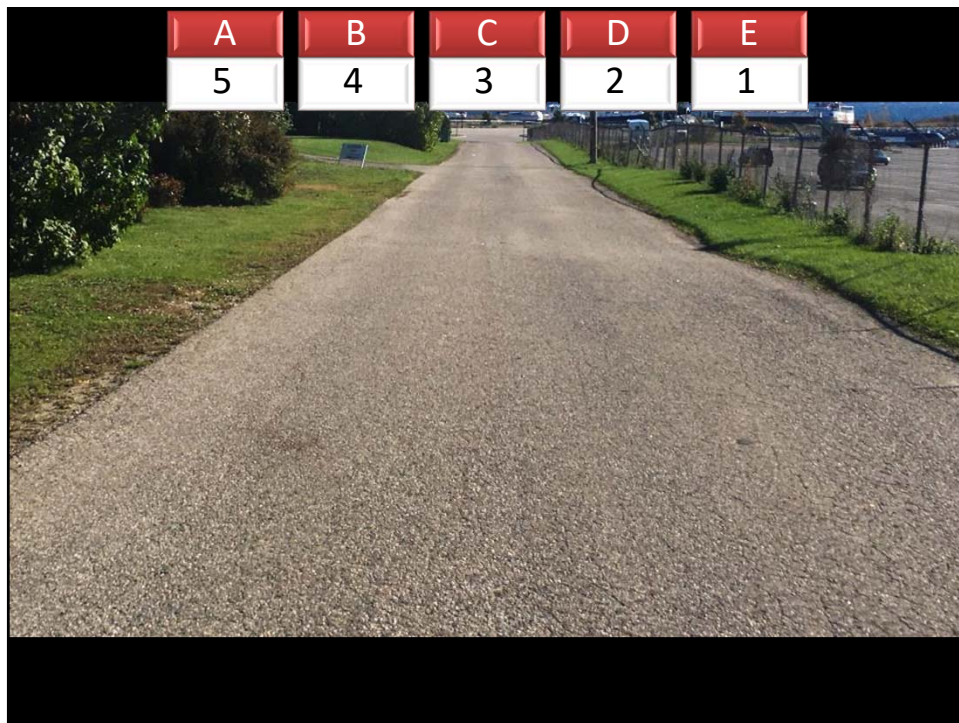
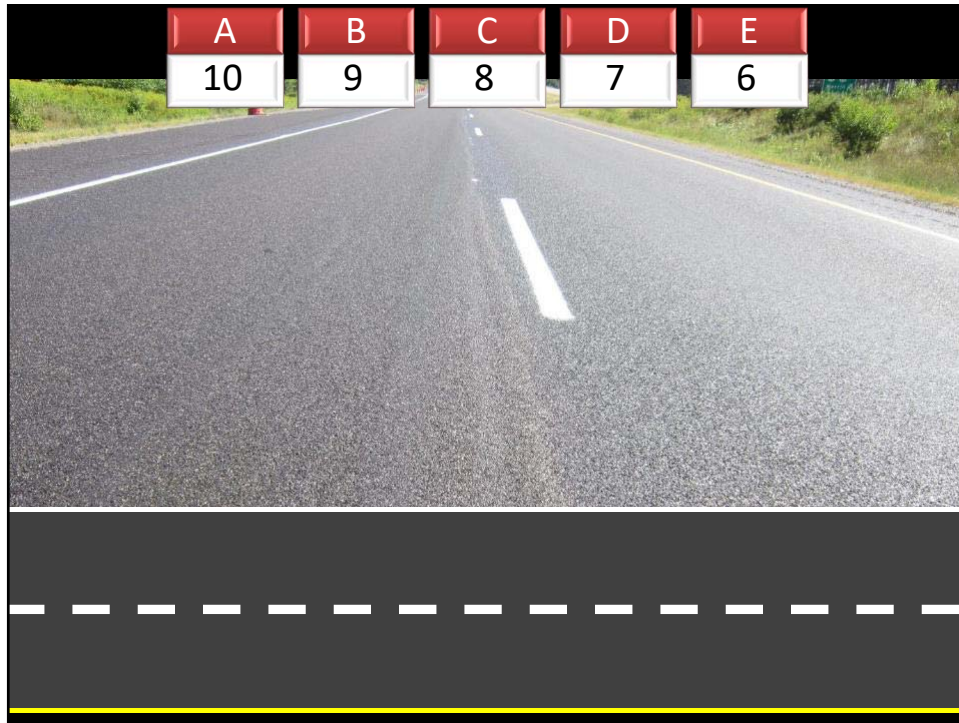
### Asphalt - Poor

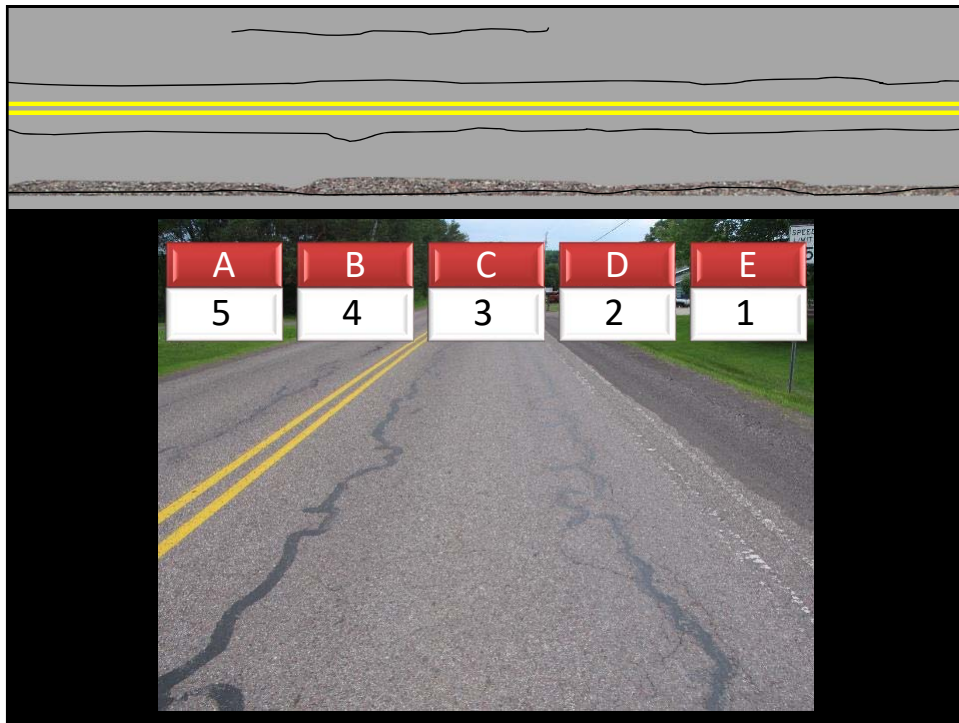
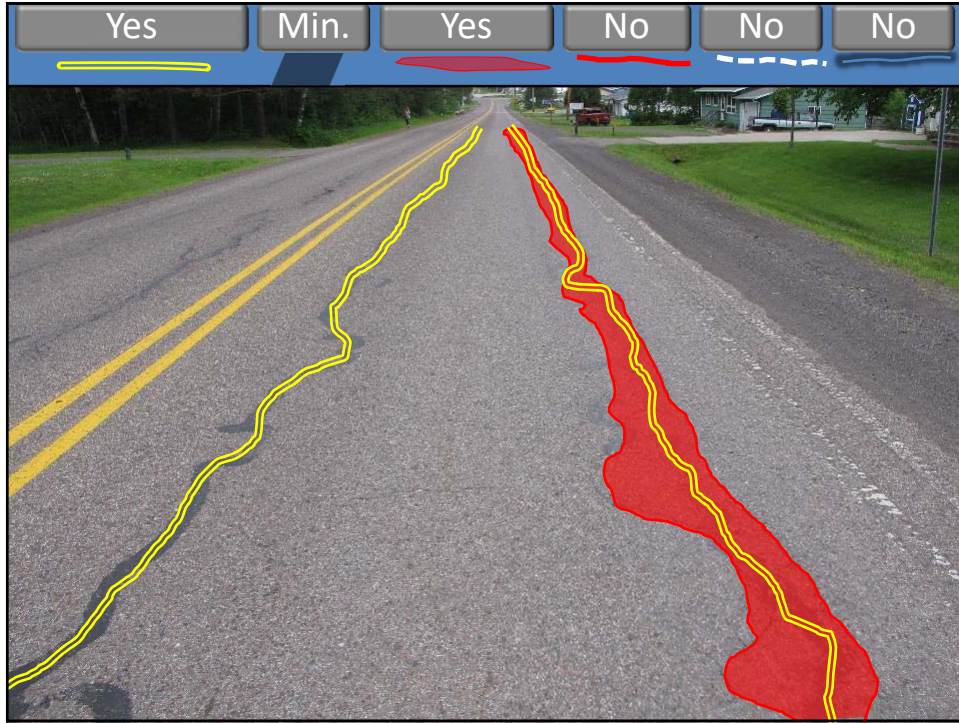
 <b>4</b>	 <b>3</b>	 <b>2</b>
Wheel path cracks  ½" to 1" ruts  Blocks <1'	<25% Alligator  1" to 2" ruts  Alligator like Block cracking	>25% Alligator  >2" ruts
		 <b>1</b>
		Visible base



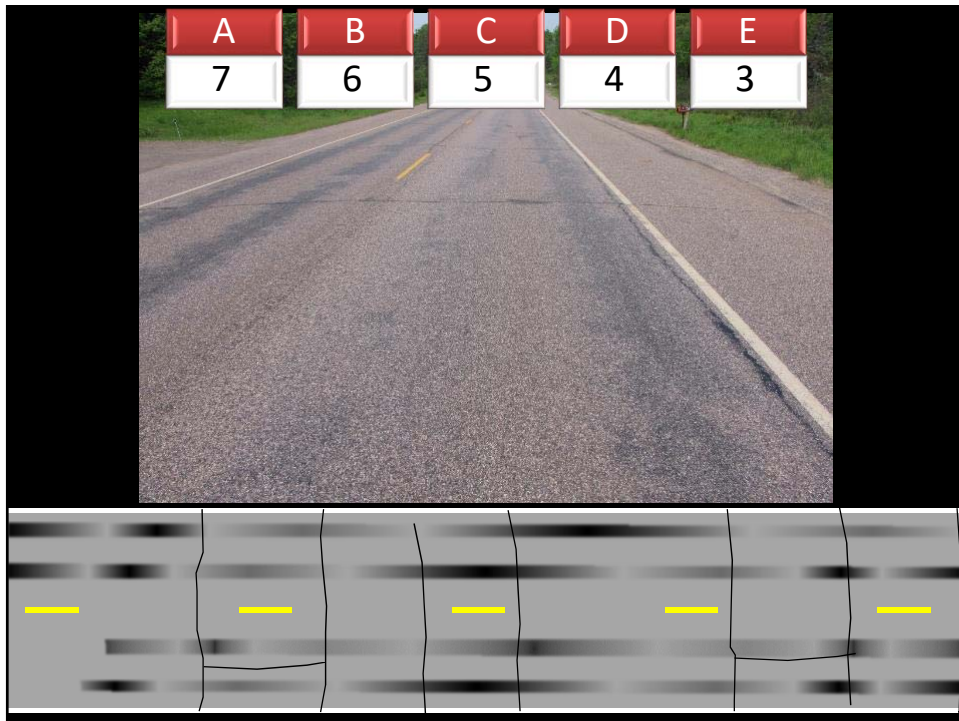
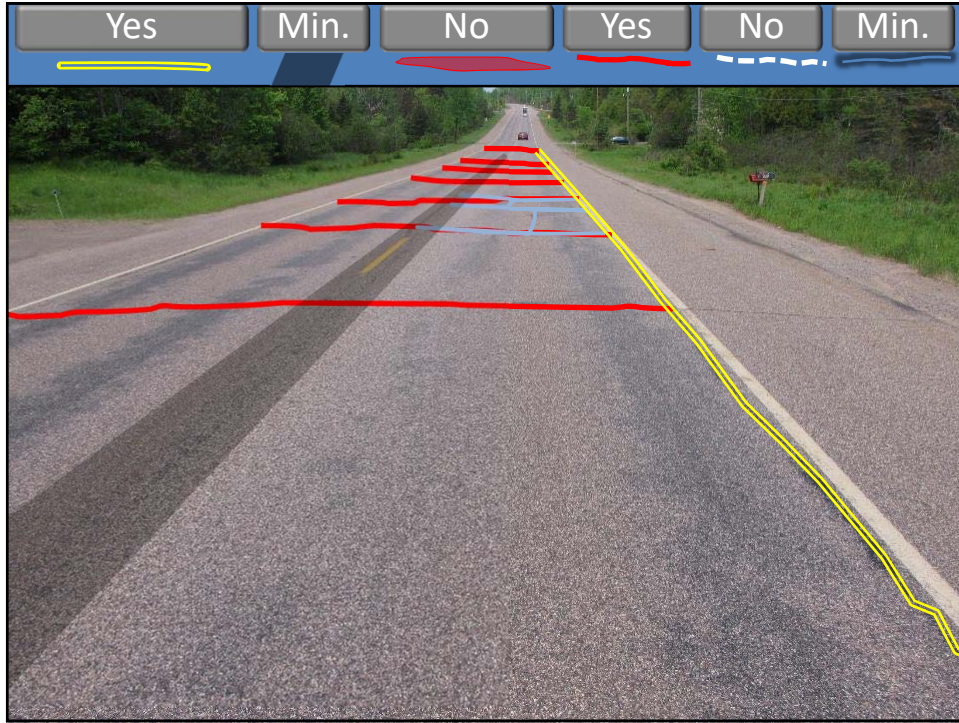


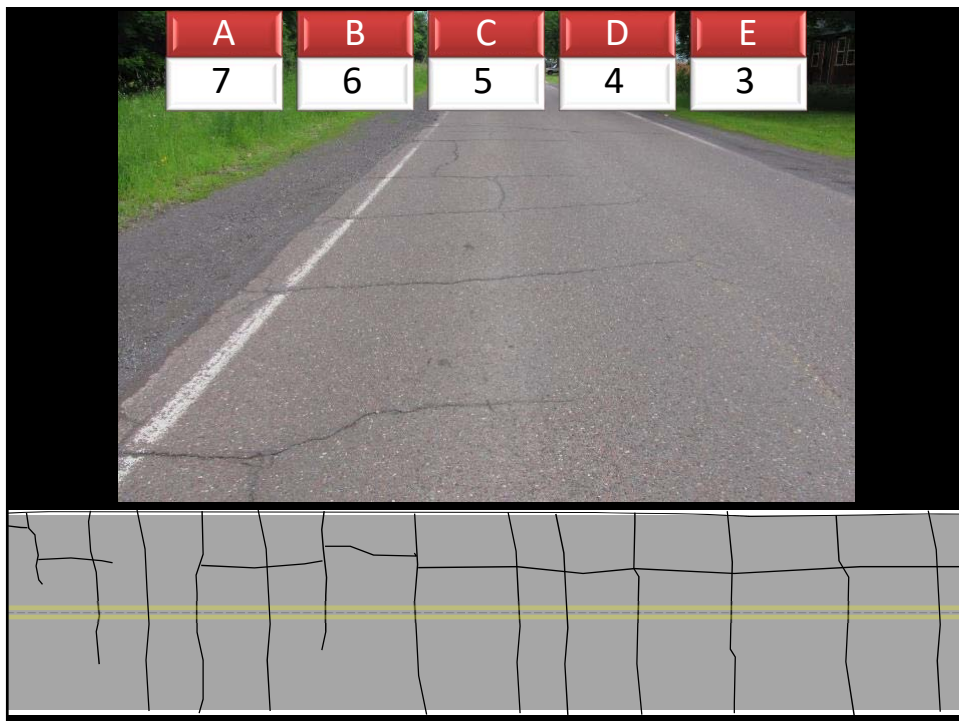
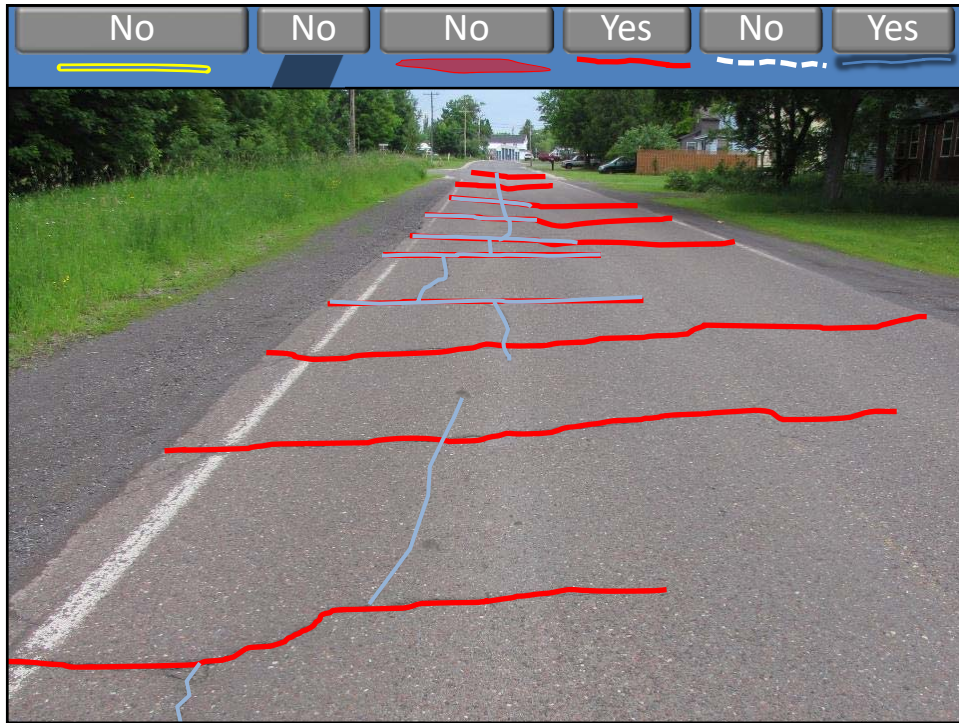




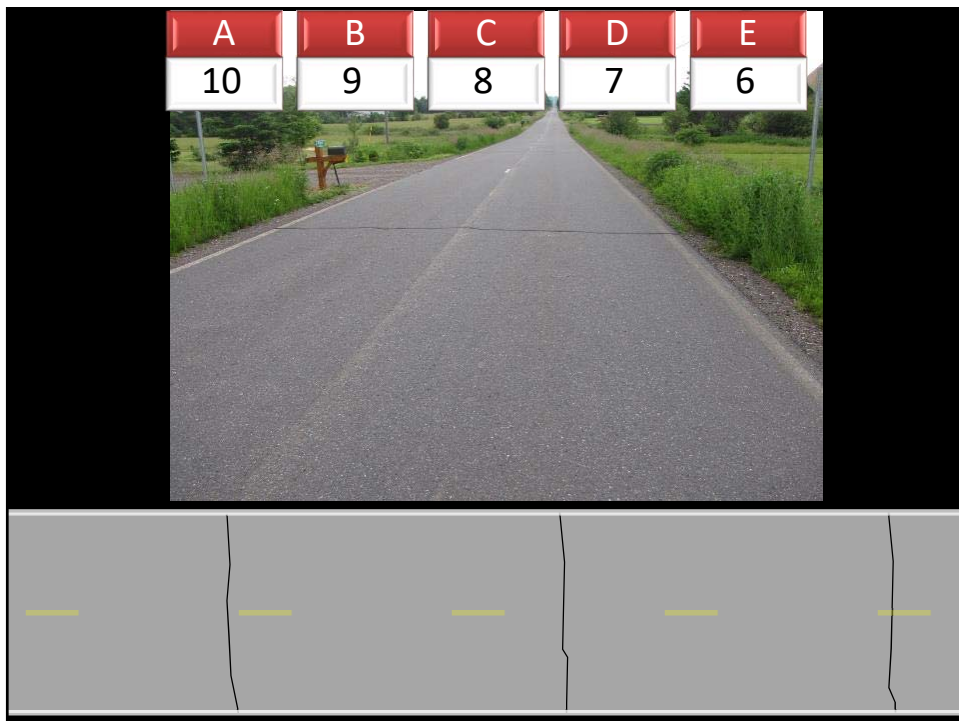
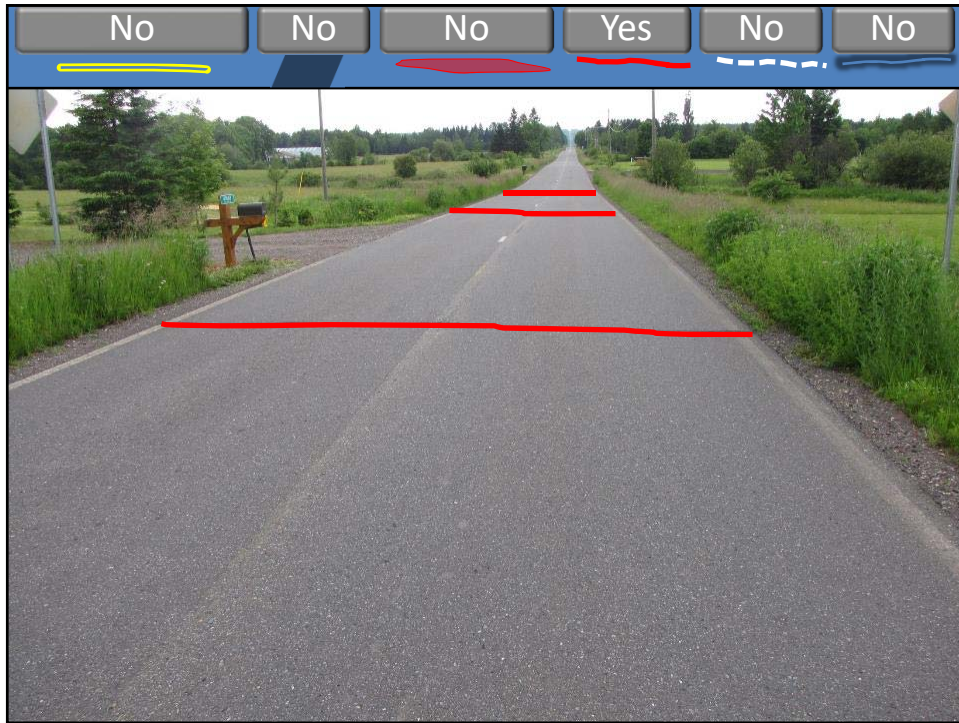


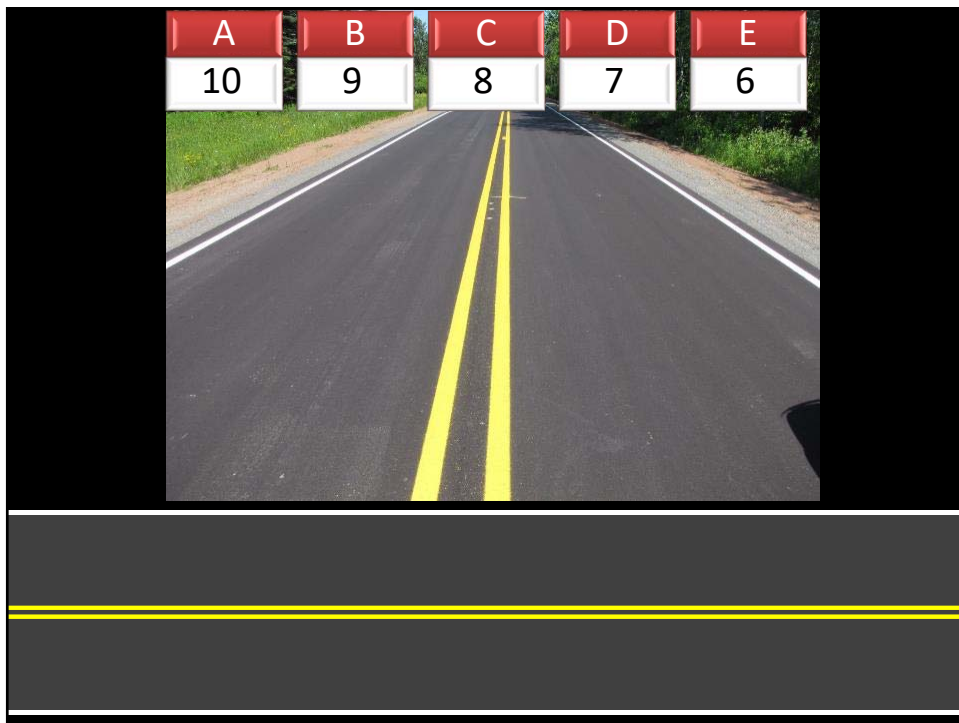
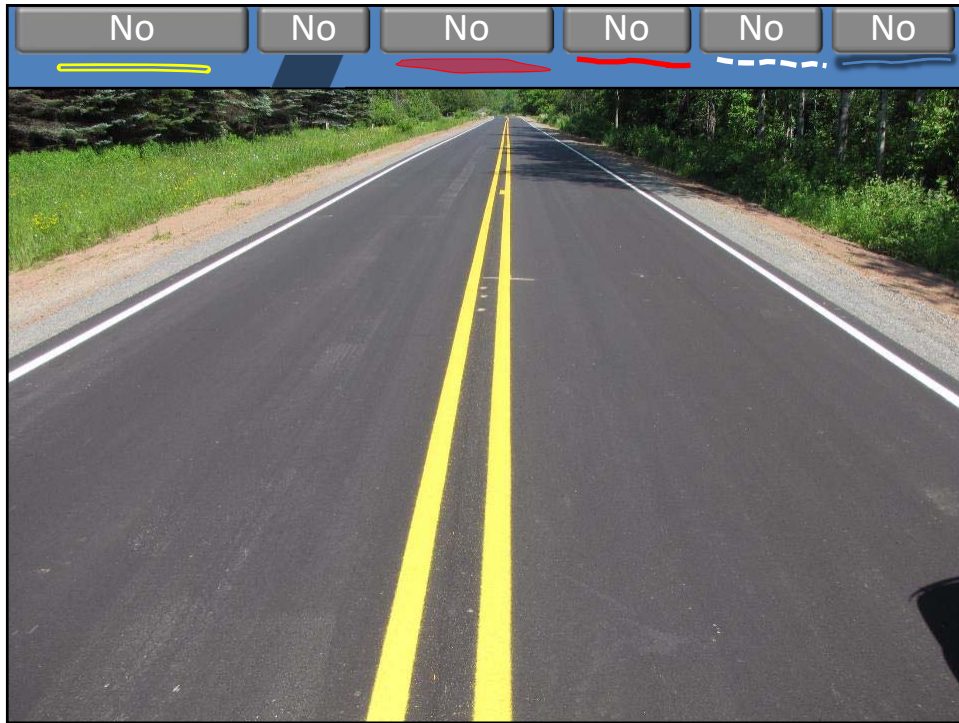


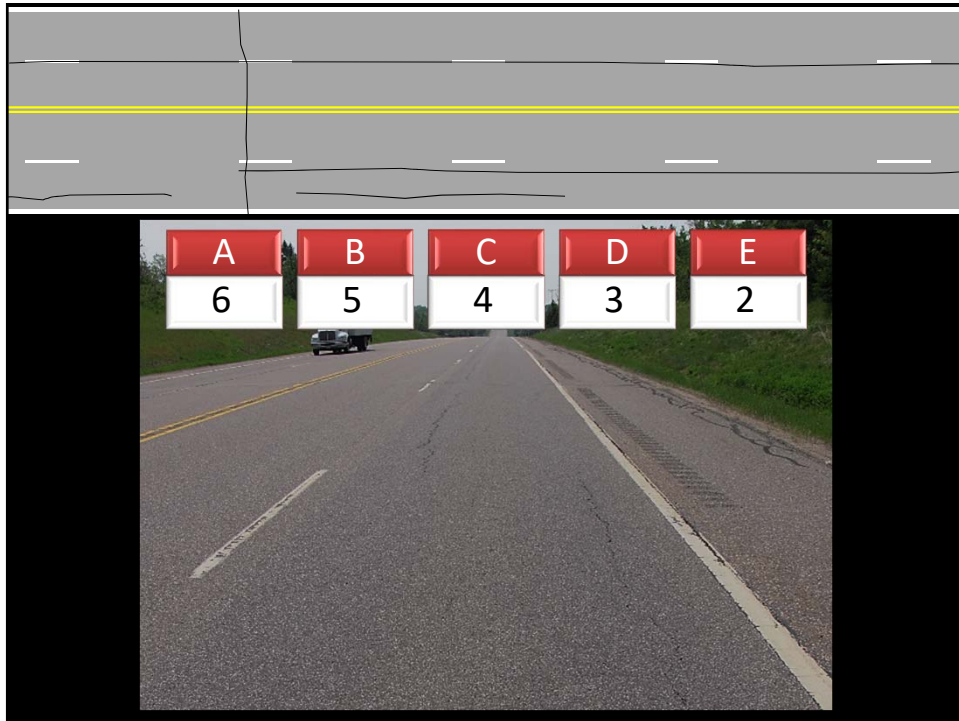
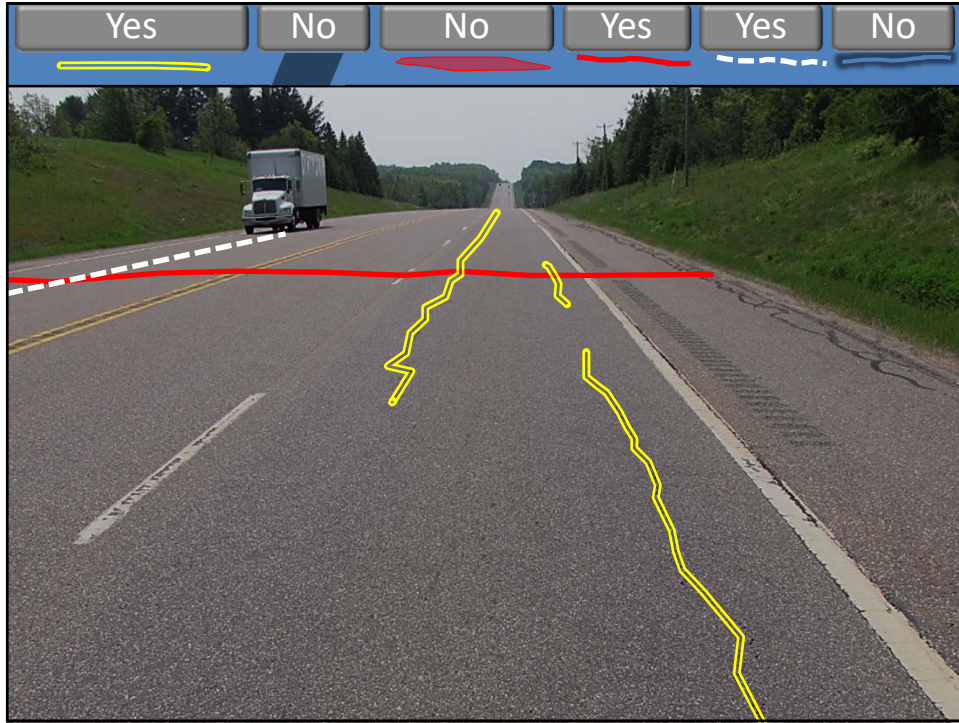




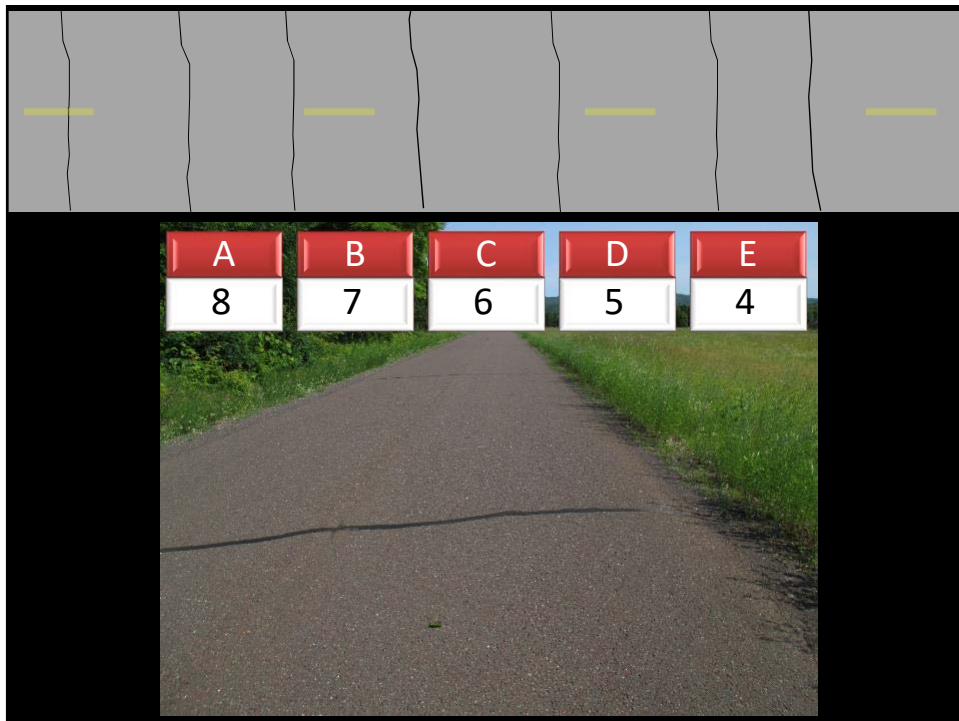
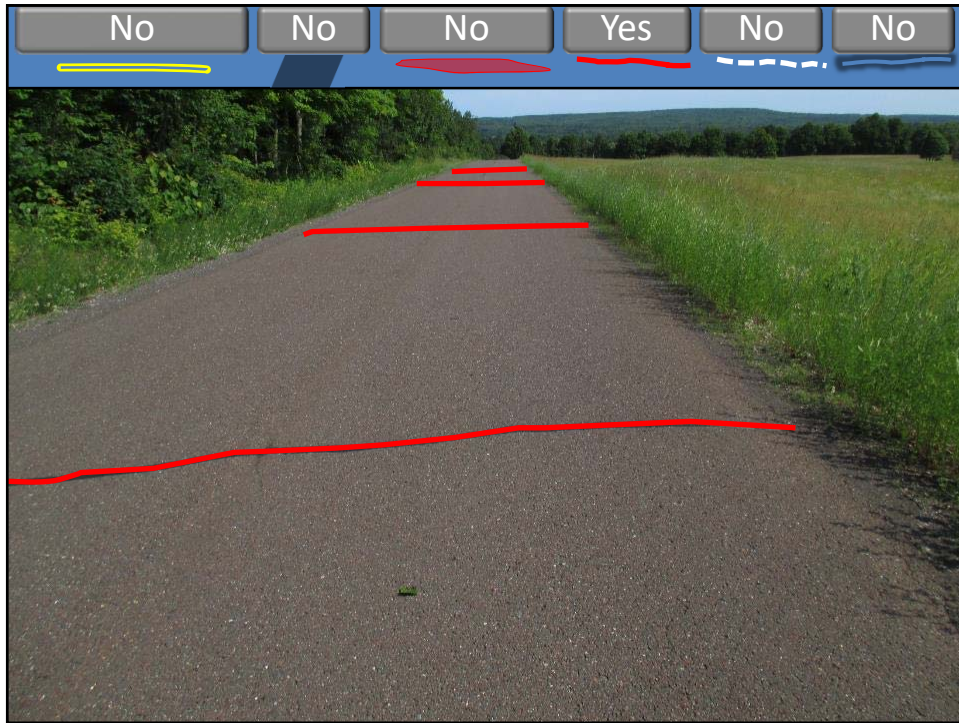


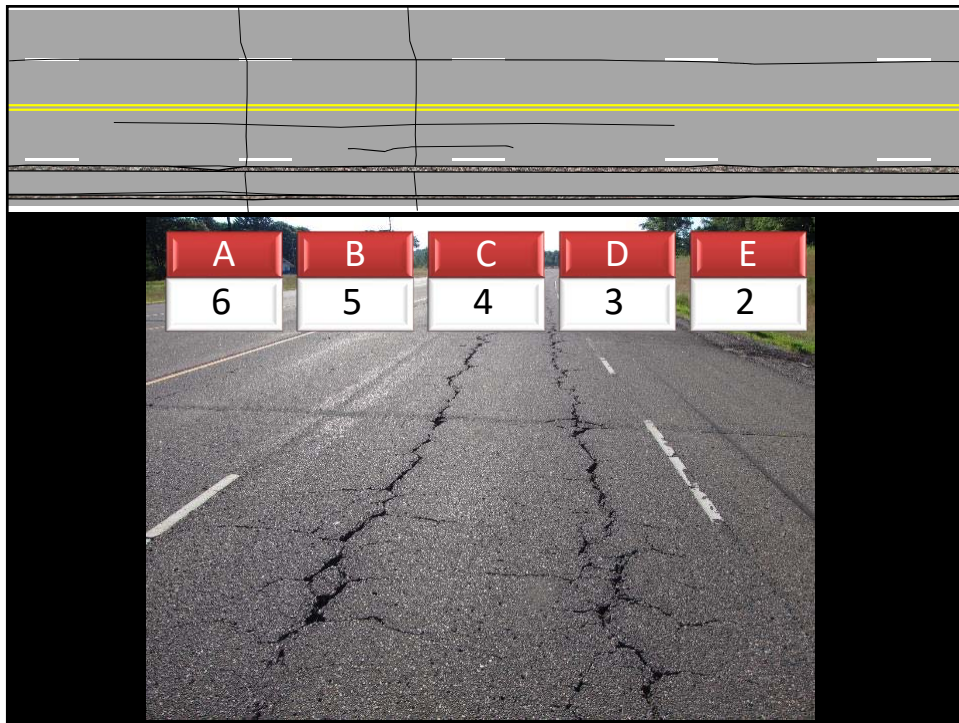
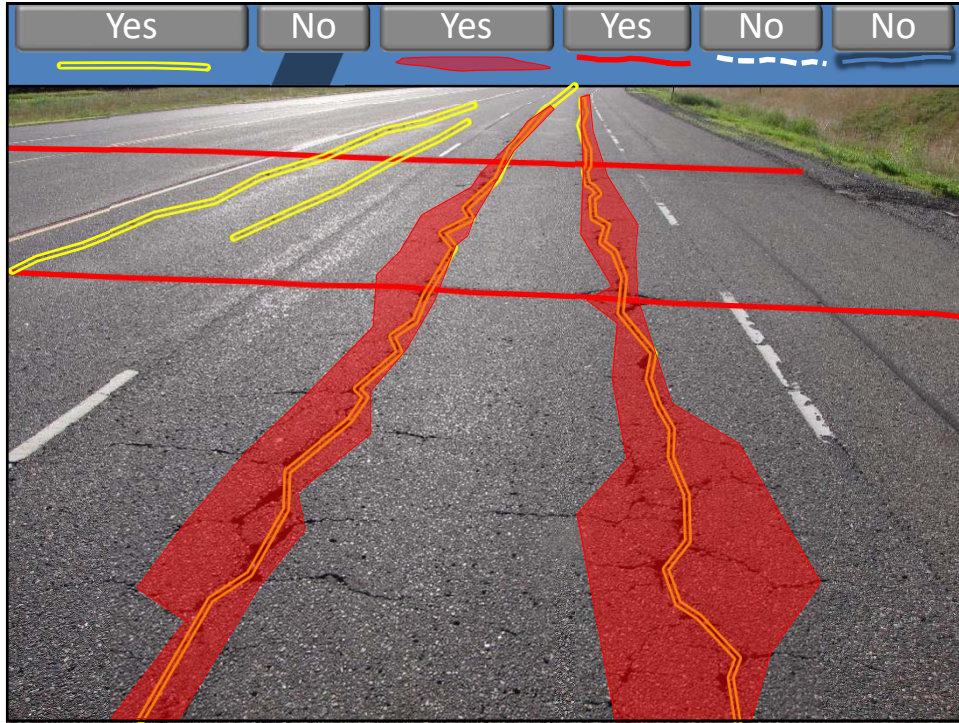




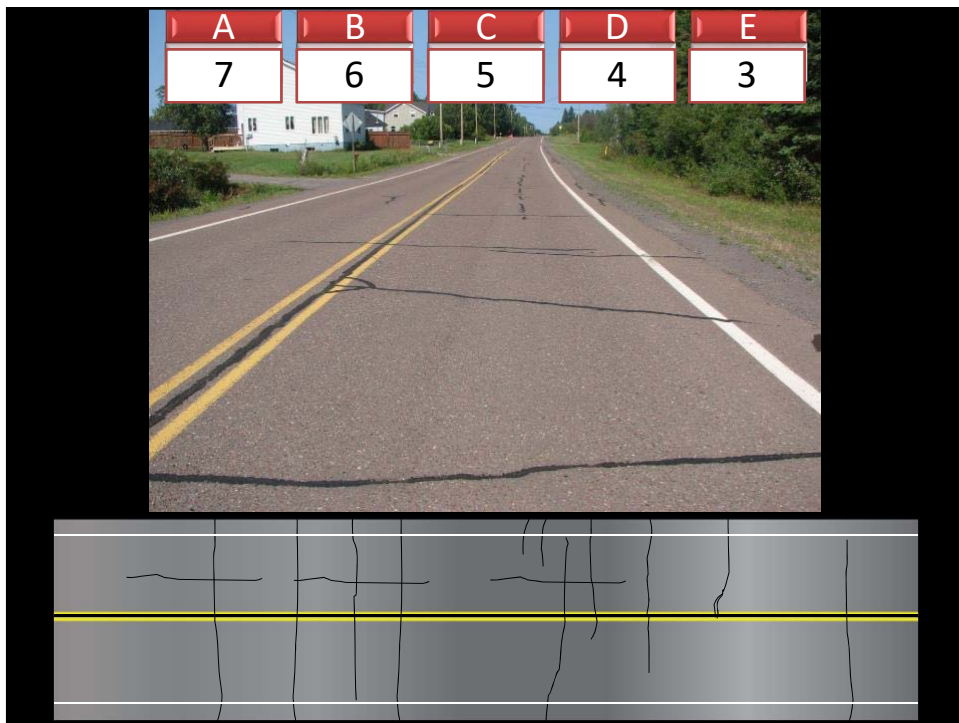
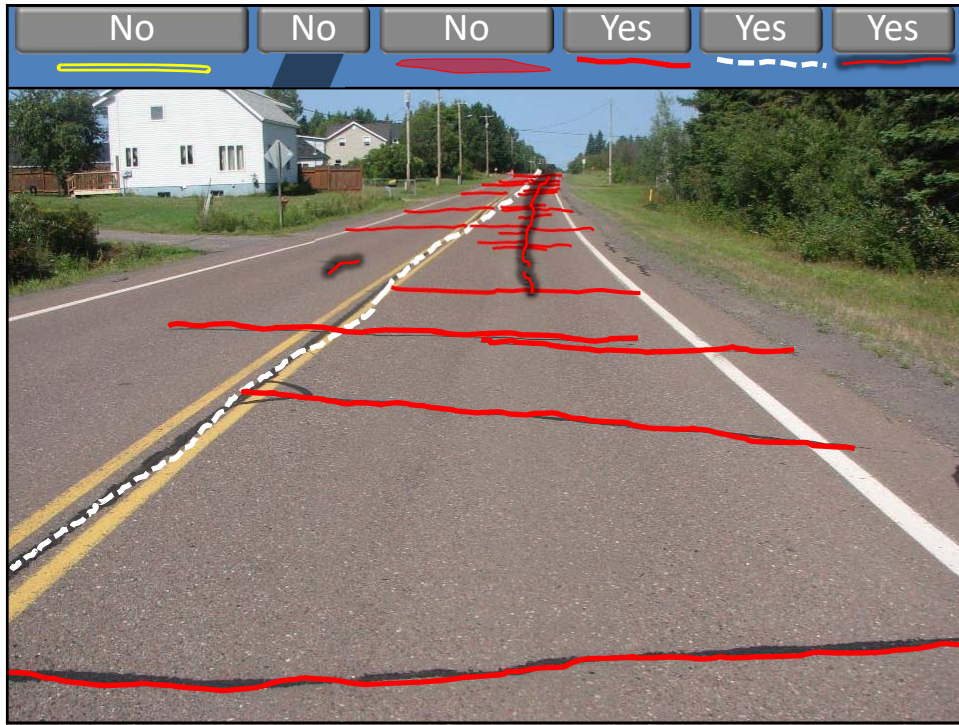


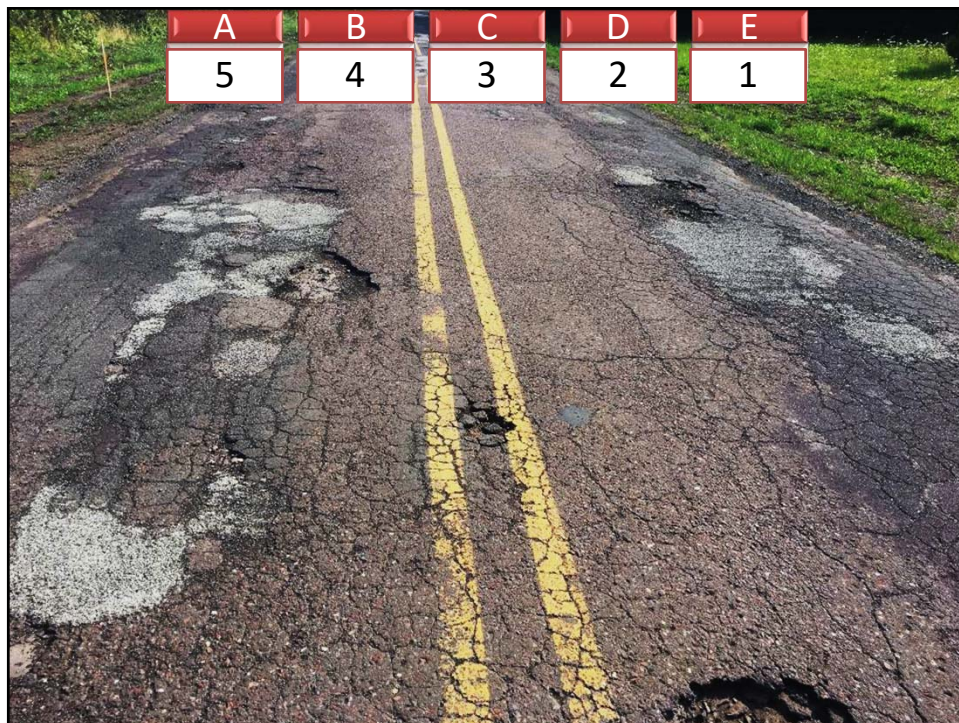




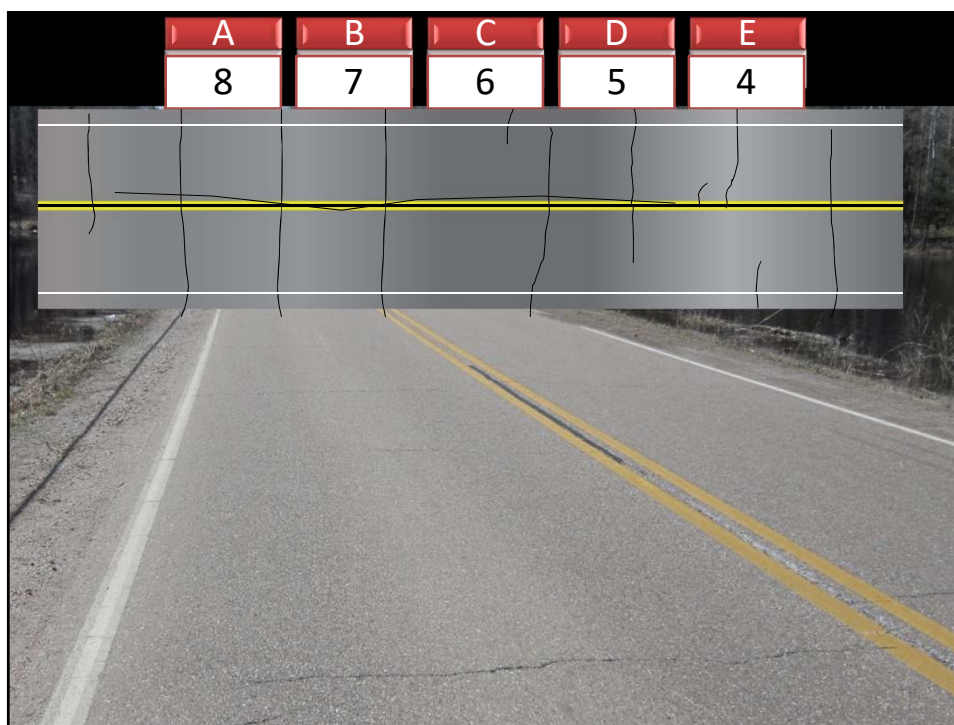
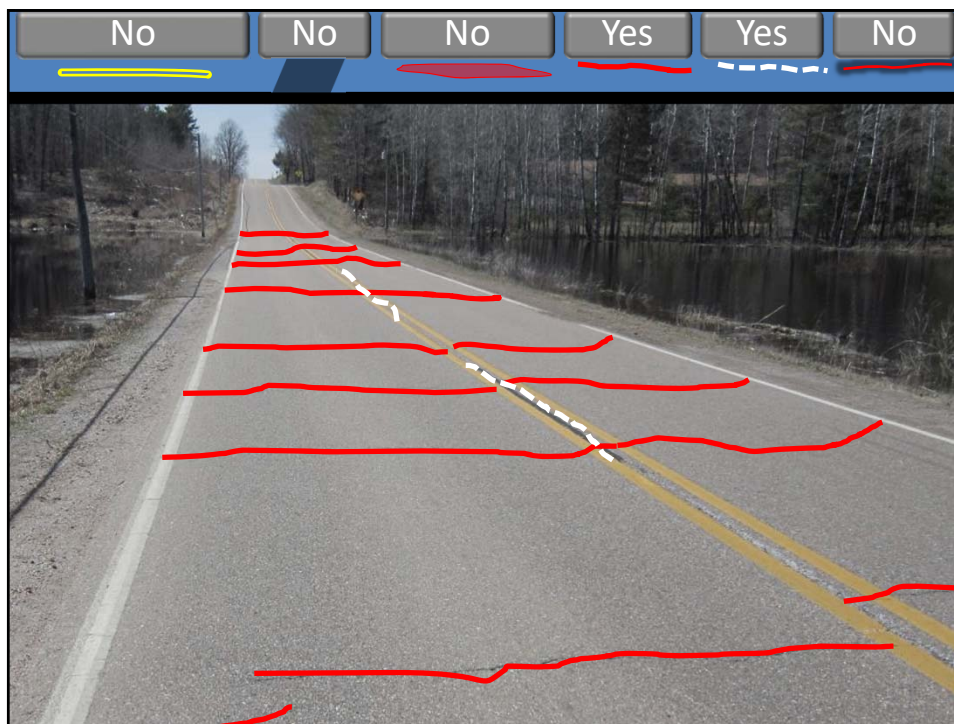


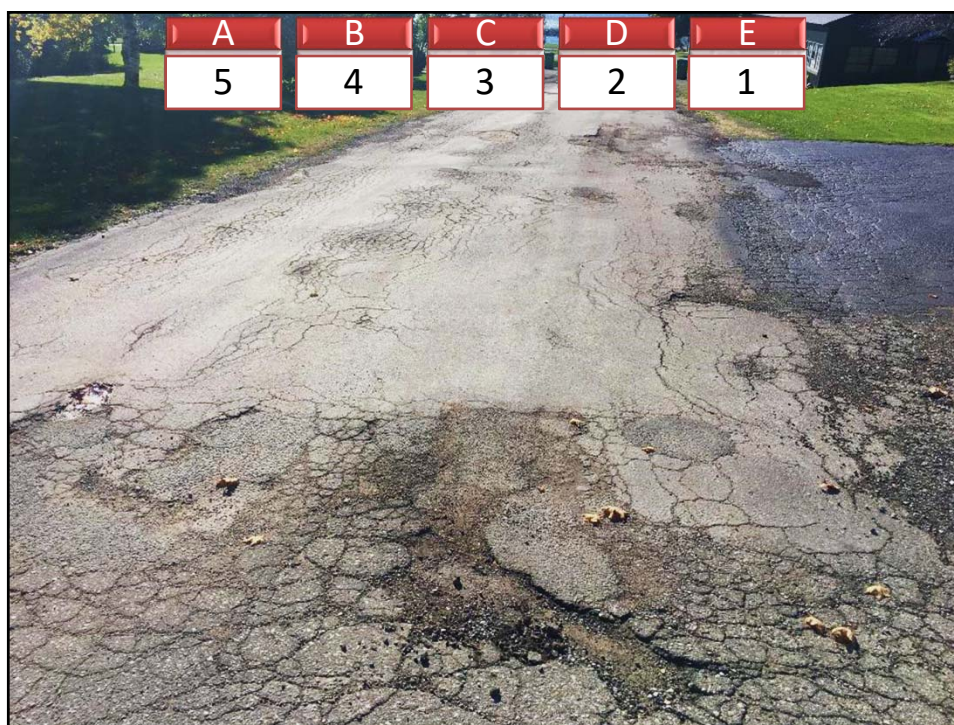
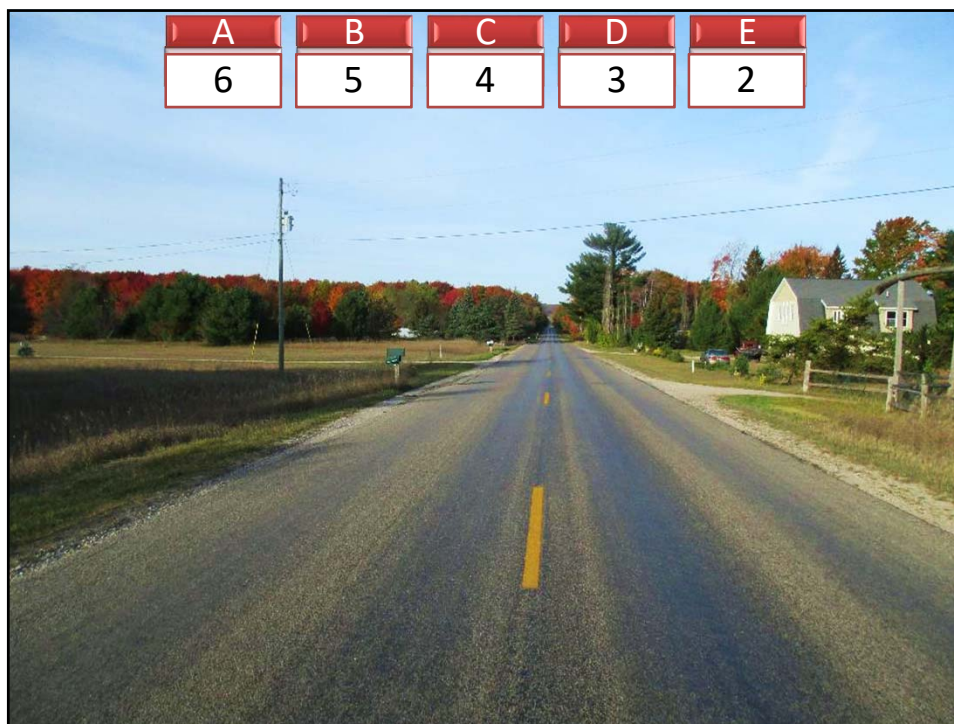












# Concrete Cheat Sheet

Concrete PASER		Modified for Michigan TAMC Data Collection	
		• Denotes Priority Distress	
Good	<b>Concrete 10</b>	<b>Concrete 9</b>	<b>Concrete 8</b>
	<ul style="list-style-type: none"> <li>New construction</li> <li>No defects</li> <li>Less than 1 year old</li> <li>Only a "10" for 1 year</li> <li>Recent reconstruction</li> <li>No action required</li> </ul>	<ul style="list-style-type: none"> <li>Joint rehabilitation, only if no other defects are present</li> <li>Like NEW</li> <li>Slight traffic wear in wheel path</li> <li>Slight map cracking</li> <li>Few pop outs</li> <li>Recent concrete overlay</li> <li>No maintenance required</li> </ul>	<ul style="list-style-type: none"> <li>Joints all in good condition</li> <li>Partial loss of joint sealant</li> <li>No transverse cracks</li> <li>Minor surface defects: pop outs, map cracking or slight scaling</li> <li>Isolated meander cracks (cracks are well sealed or tight)</li> <li>Light surface wear</li> <li>Isolated cracks at manholes (cracks are well sealed or tight)</li> <li>Little or no maintenance required</li> </ul>
	<b>Concrete 7</b>	<b>Concrete 6</b>	<b>Concrete 5</b>
Fair	<ul style="list-style-type: none"> <li>Isolated transverse cracks</li> <li>Full depth repairs all in excellent condition</li> <li>Minor surface scaling</li> <li>Some open joints</li> <li>Some manhole cracks</li> <li>Isolated settlement or heave areas</li> <li>Pop outs could be extensive but sound</li> <li>Suggested Action: Seal open joints</li> <li>Seal repair surface defects</li> </ul>	<ul style="list-style-type: none"> <li>Meander and transverse cracks 1/2" open</li> <li>Transverse joints open 1/2"</li> <li>Longitudinal joints open 1/2"</li> <li>Moderate surface scaling &lt;25% of surface</li> <li>Several corner cracks tight or well-sealed</li> <li>First signs of shallow reinforcement cracks</li> <li>Suggested Action: Seal open joints and cracks</li> <li>Overlay surface leveling areas</li> </ul>	<ul style="list-style-type: none"> <li>First signs of crack/joint faulting up to 1/2"</li> <li>First signs of joint or crack spalling</li> <li>Moderate to severe scaling or polishing between 25% to 50% of surface</li> <li>Scaling from shallow reinforcement</li> <li>Multiple corner cracks</li> <li>Suggested Action: Grind and repair surface defects</li> <li>Some partial depth joint repairs or patching may be needed</li> </ul>
	<b>Concrete 4</b>	<b>Concrete 3</b>	<b>Concrete 2</b>
Poor	<ul style="list-style-type: none"> <li>Crack or joint faulting up to 1"</li> <li>Severe spalling on joints and cracks</li> <li>Multiple transverse or meander cracks</li> <li>Severe scaling, polishing, map cracking or spalling &gt;50% of surface</li> <li>Corner cracks missing pieces or patches</li> <li>Pavement blowups</li> <li>Suggested Action: Some full depth repairs</li> <li>Asphalt overlay or extensive surface texturing</li> </ul>	<ul style="list-style-type: none"> <li>Severe crack or joint faulting up to 1"</li> <li>D-Cracking evident</li> <li>Many joints, transverse and meander cracks open and severely spalled</li> <li>Extensive patching in fair to poor condition</li> <li>Suggested Action: Extensive full depth repairs</li> <li>Some full slab replacements</li> </ul>	<ul style="list-style-type: none"> <li>Extensive and severely spalled slab cracks</li> <li>Extensive failed patches</li> <li>Joints failed</li> <li>Severe and extensive settlement &amp; heaves</li> <li>Suggested Action: Replace or rebuild pavement</li> </ul>
			<b>Concrete 1</b>
			<ul style="list-style-type: none"> <li>Restricted Loads</li> <li>Extensive potholes</li> <li>Total loss of pavement integrity</li> <li>Suggested Action: Total reconstruction</li> </ul>

**Contact Information**

Roadsoft & LDC Technical Support: 906-487-2102  
 TAMC Coordinator: Roger Behrens: 517-879-2449  
 e-mail: behrens@mtu.edu  
 TAMC Website: tamc.mtu.edu

Center for Shared Solutions (CSS) Framework Issues: 517-879-7920, ask for Ashli Hoss  
 PASER Data Submission via the CSS IRT web site  
<https://mlgslp.mtu.edu>



No

No

No

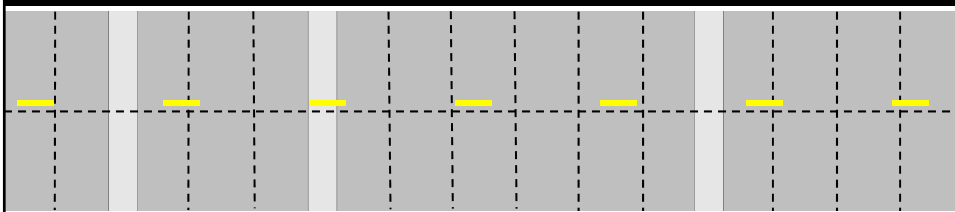
No

10

No defects  
Less than one year old




No No No No



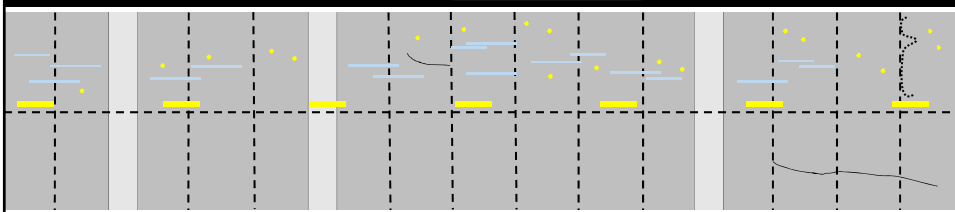
9

Joint rehab completed and no other defects

Like New



No No No No




8

Joints are good

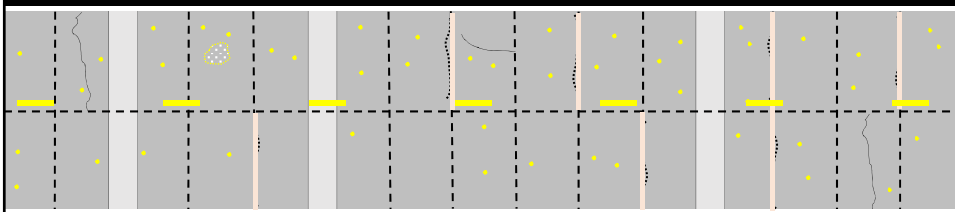
Partial loss of sealant

No transverse

Isolated meander



Yes No No No

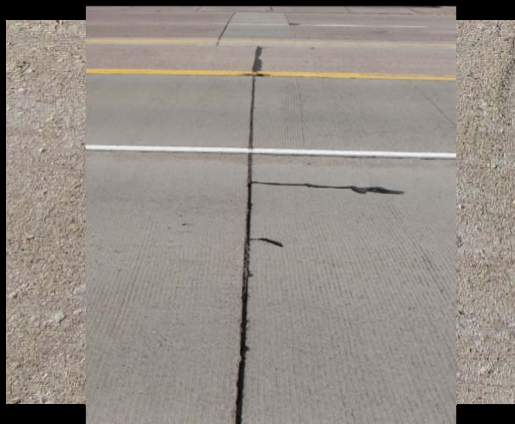


**7**

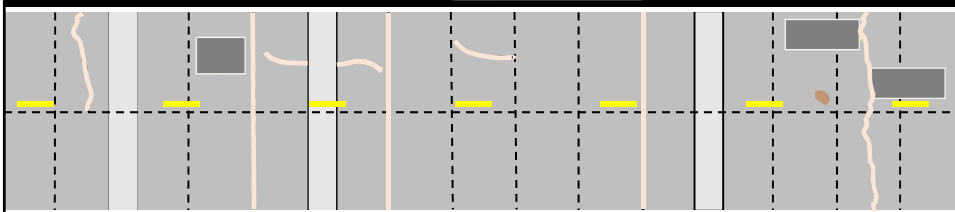
Isolated transverse

Full depth repairs are excellent

Minor scaling




Yes No No Yes



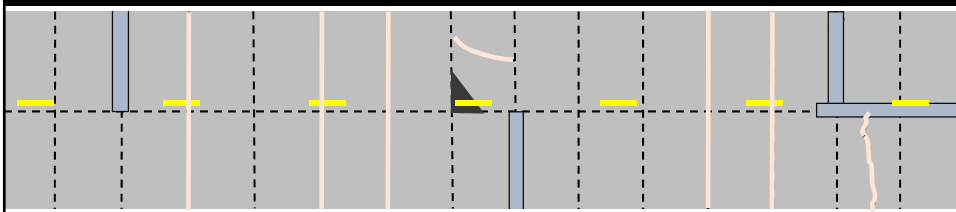
**6**

Joints and cracks open 1/4"

Scaling < 25% of surface



Yes Yes No




**5**

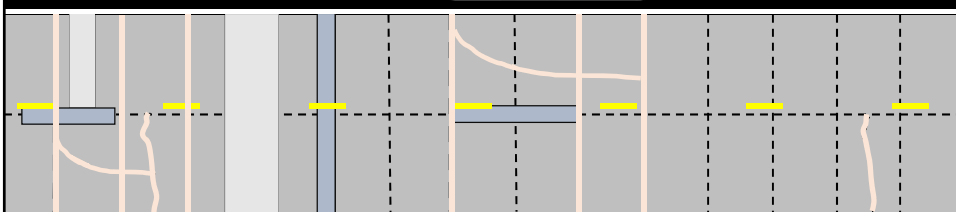
Faulting <math>< \frac{1}{4}</math>"

First signs of spalling

Scaling 25% to 50% of surface



Yes Yes




**4**

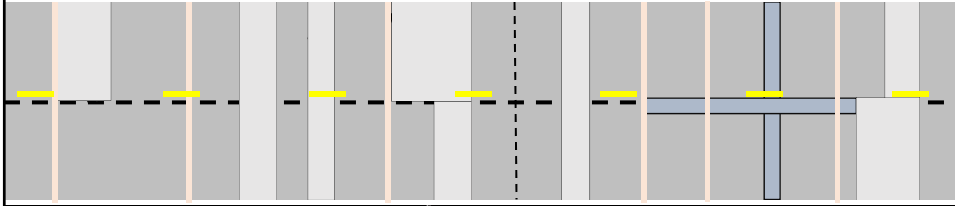
Faulting <math>< \frac{1}{2}</math>"

Severe joint/crack spalling

Multiple cracks




Yes Yes



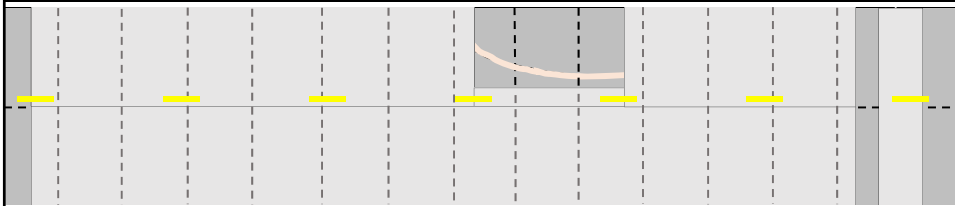
3

Faulting < 1"  
D-Cracking  
Many open joints/cracks




The diagram shows three cross-sections of pavement. The first shows a vertical crack. The second shows a vertical crack with a dashed line indicating a faulting measurement. The third shows a vertical crack with a blue horizontal bar across it. The photograph shows a road with a faulting defect where the pavement surface is uneven.

No Yes



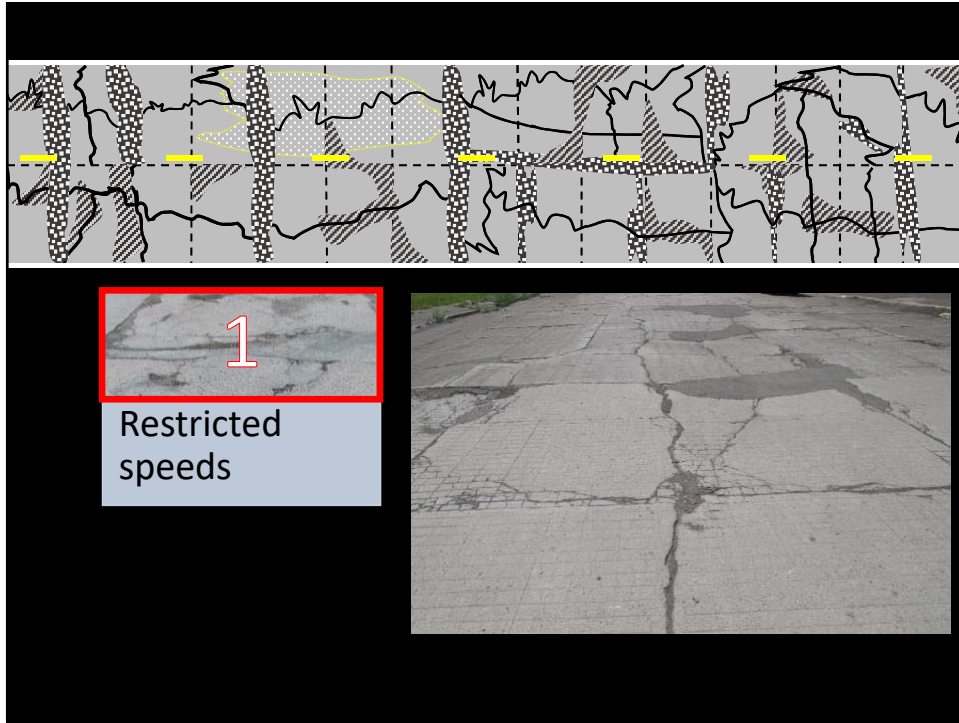
2

Rebuild pavement



The diagram shows three cross-sections of pavement. The first shows a vertical crack. The second shows a vertical crack with a dashed line indicating a faulting measurement. The third shows a vertical crack with a blue horizontal bar across it. The photograph shows a road with a faulting defect where the pavement surface is uneven.





The top portion of the slide features a schematic diagram of a pavement cross-section with various distress patterns, including vertical and horizontal cracks, and areas with different textures. Below this, a photograph shows a real-world view of a cracked concrete pavement surface. A red-bordered inset in the bottom-left corner of the photograph shows a close-up of a crack with a red number '1' overlaid. A light blue box below the inset contains the text "Restricted speeds".

### What Repair is Needed?



A close-up photograph of a vertical crack in a concrete pavement surface. The crack is filled with a dark material. Two vertical pink lines are drawn on the pavement surface, one on each side of the crack, extending downwards. To the right of the photograph are two red buttons labeled 'A' and 'B', each next to a white box containing a repair option.

- A Partial Depth
- B Full Depth

## Partial Depth Repair



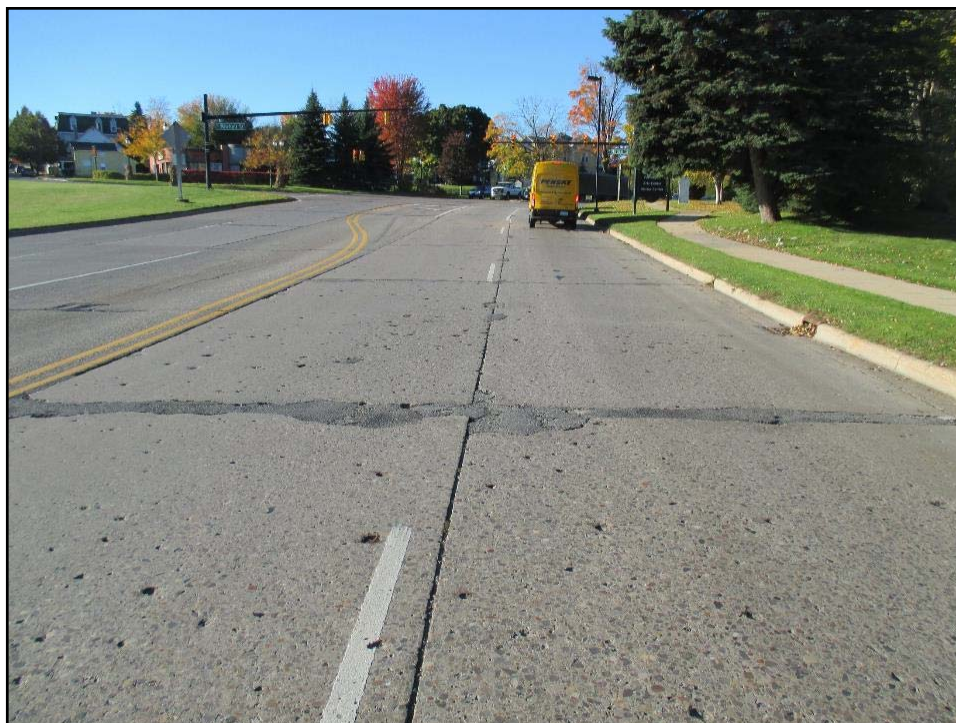
## What Repair is Needed?

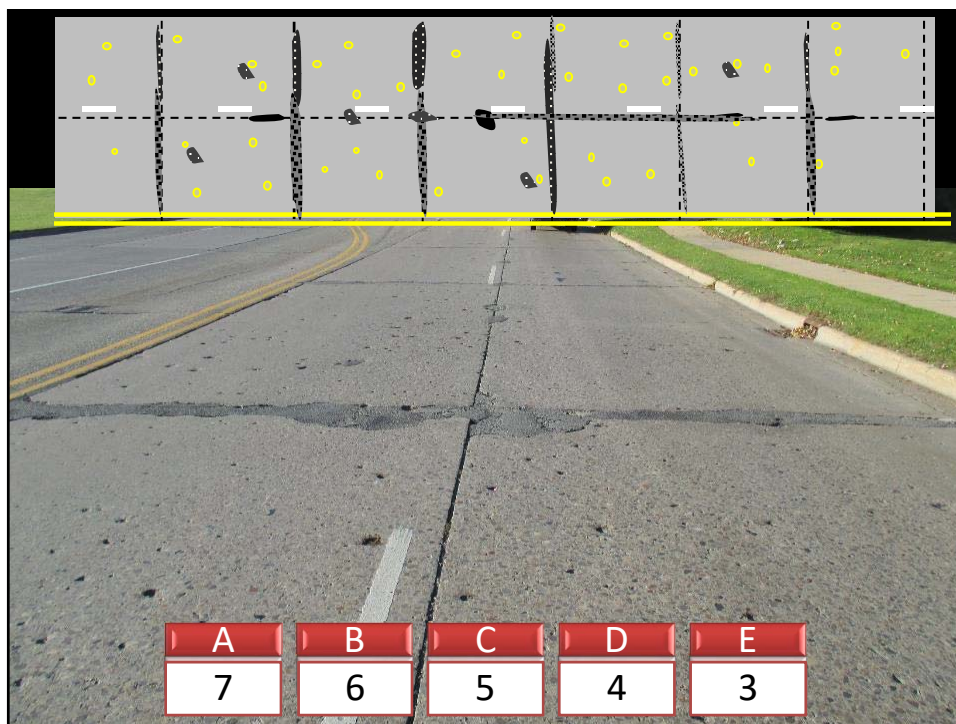


- A** Partial Depth
- B** Full Depth

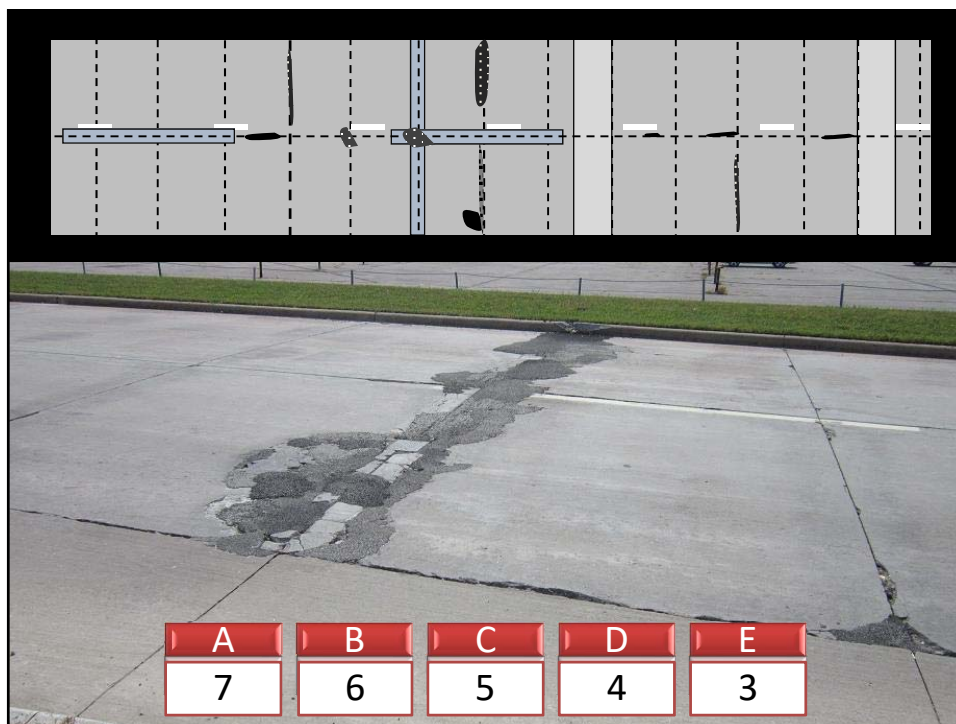


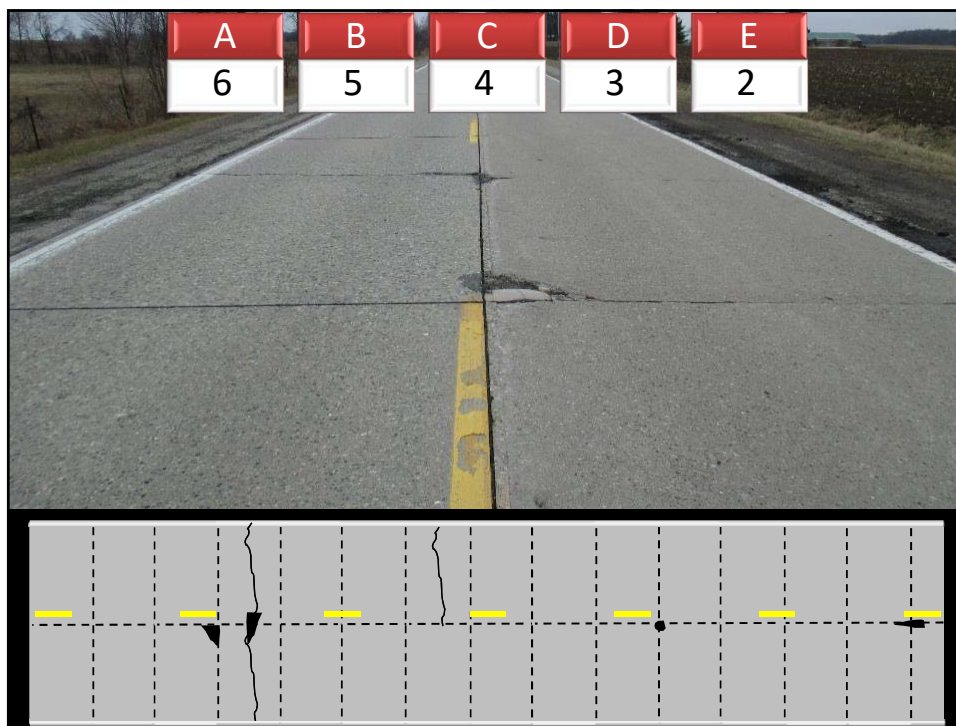
## Full Depth Repair



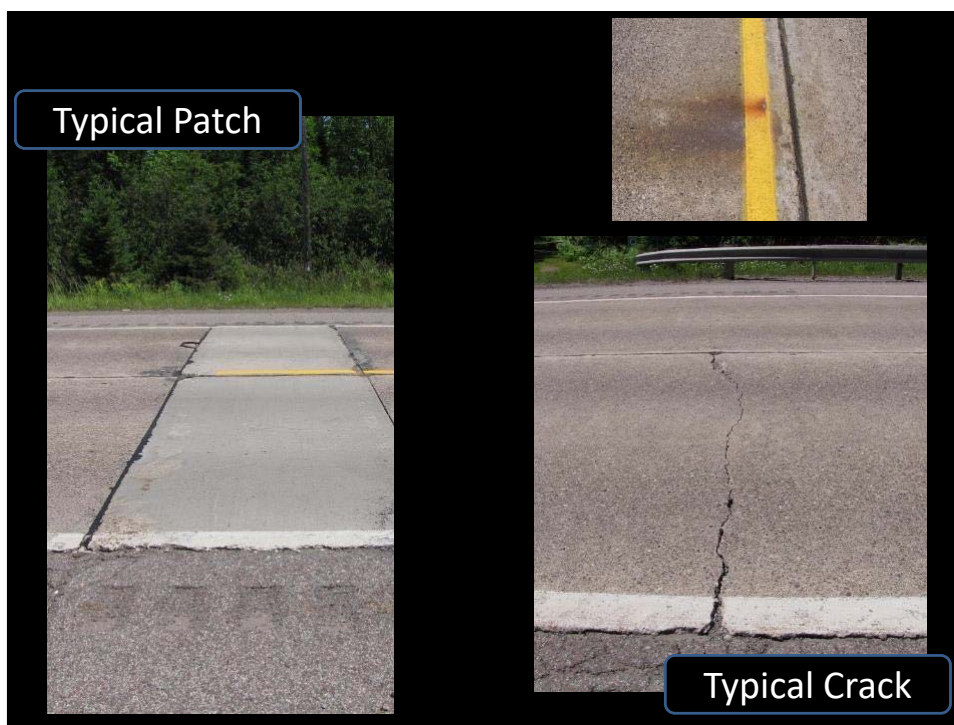
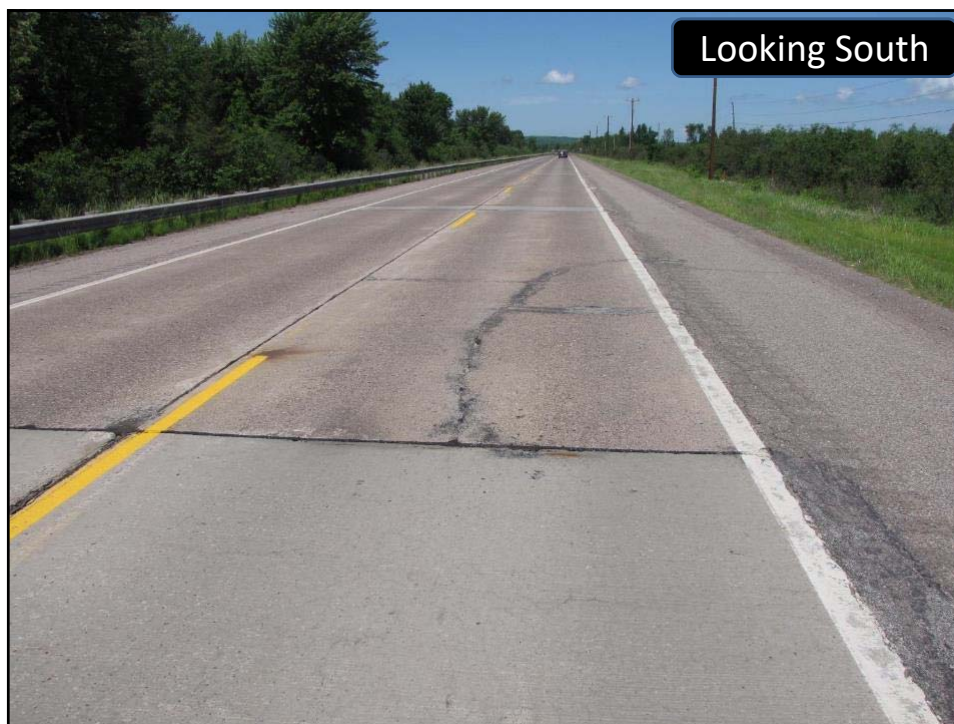


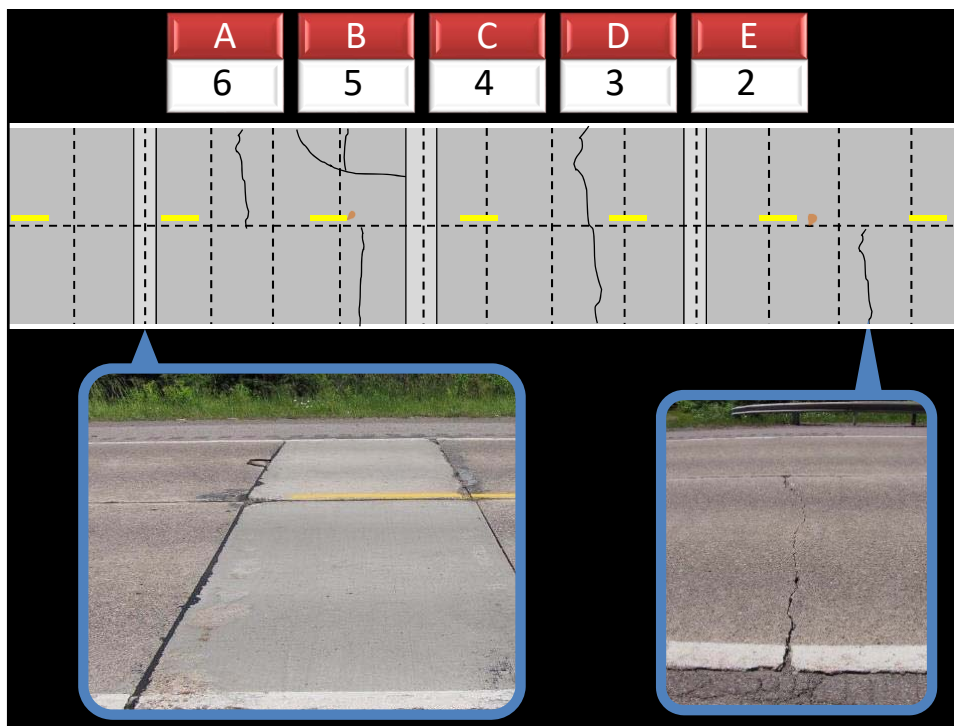




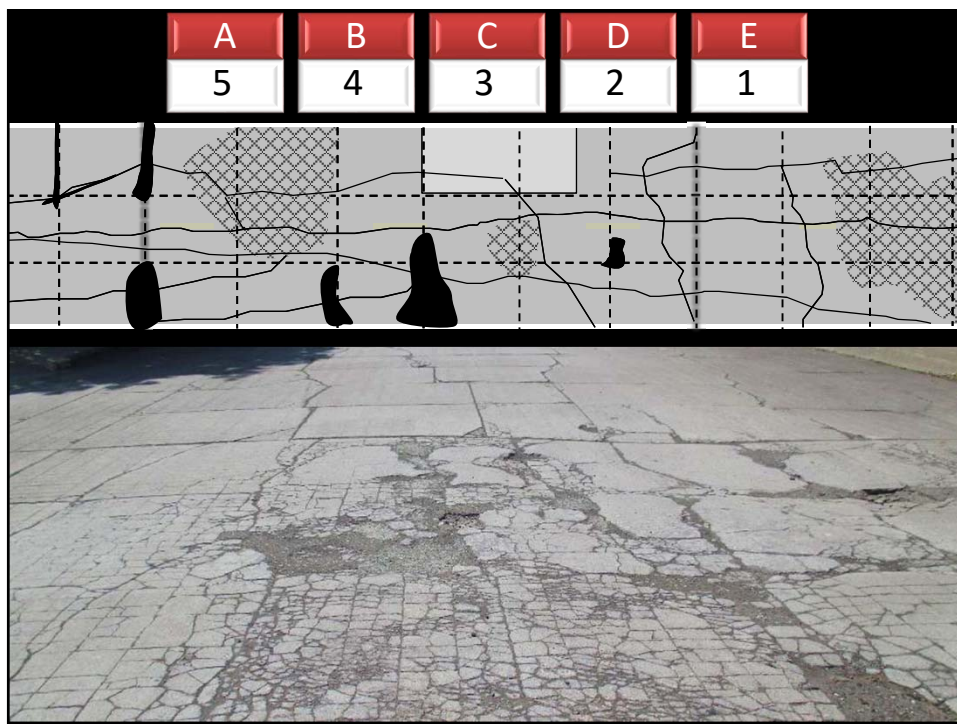


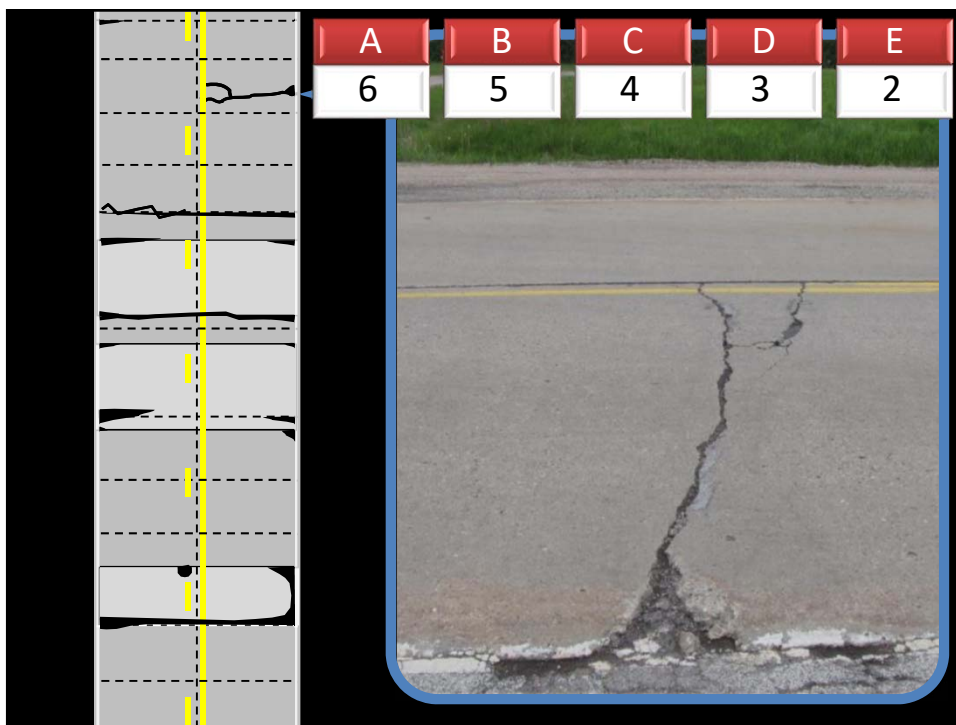




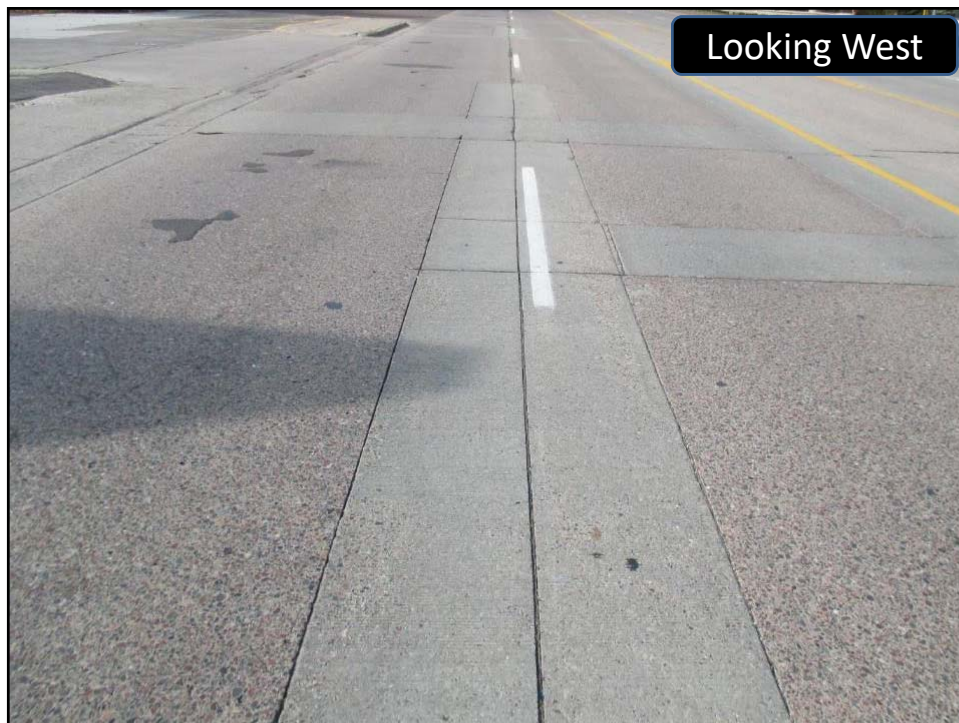
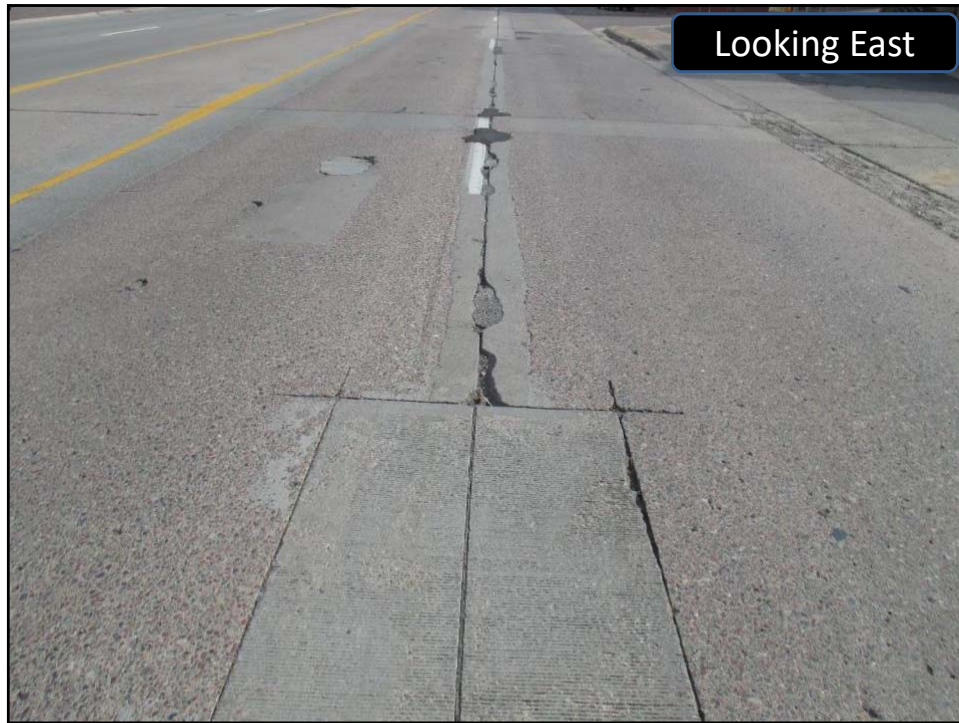


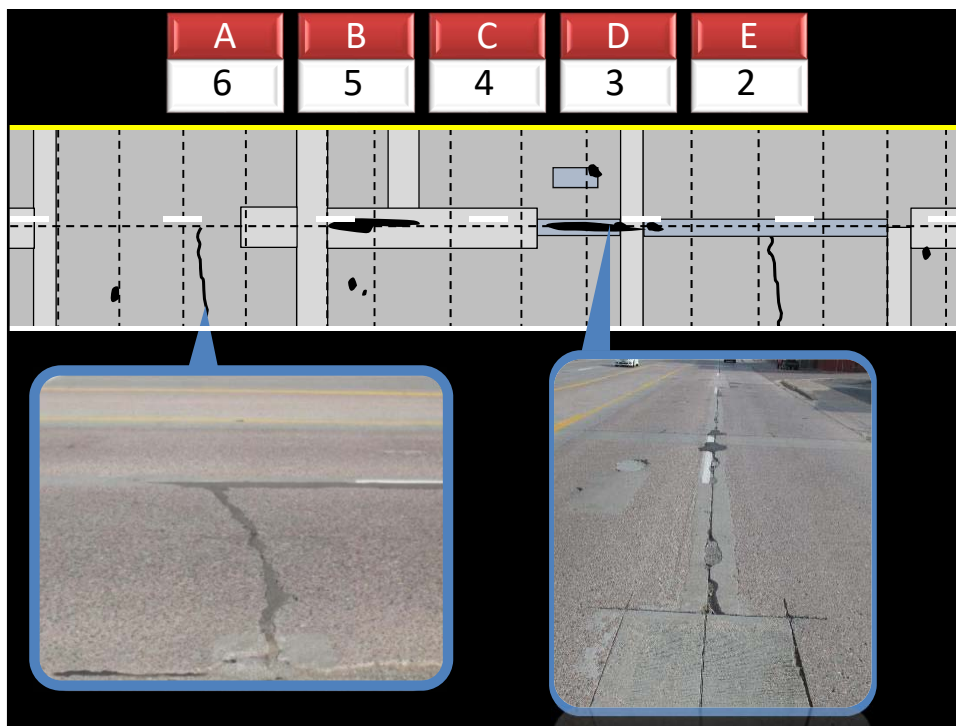




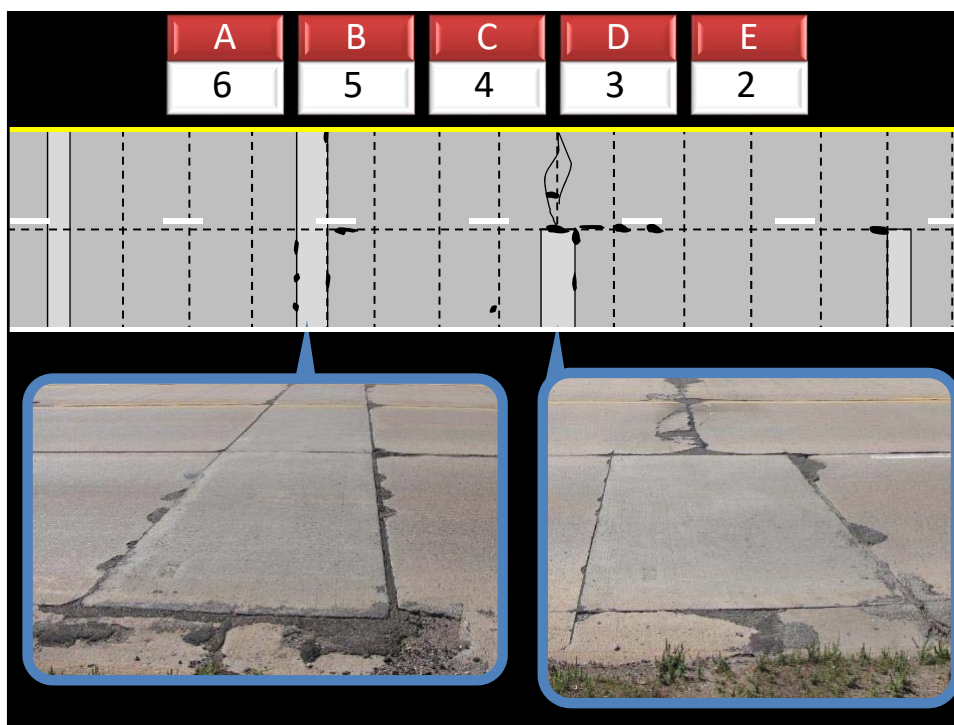
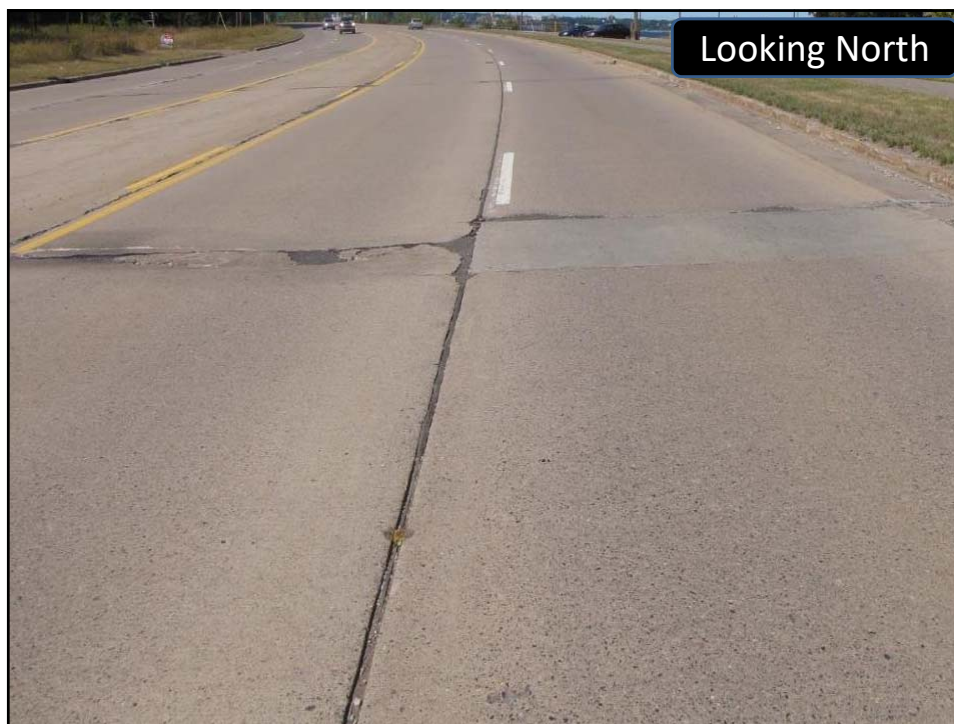






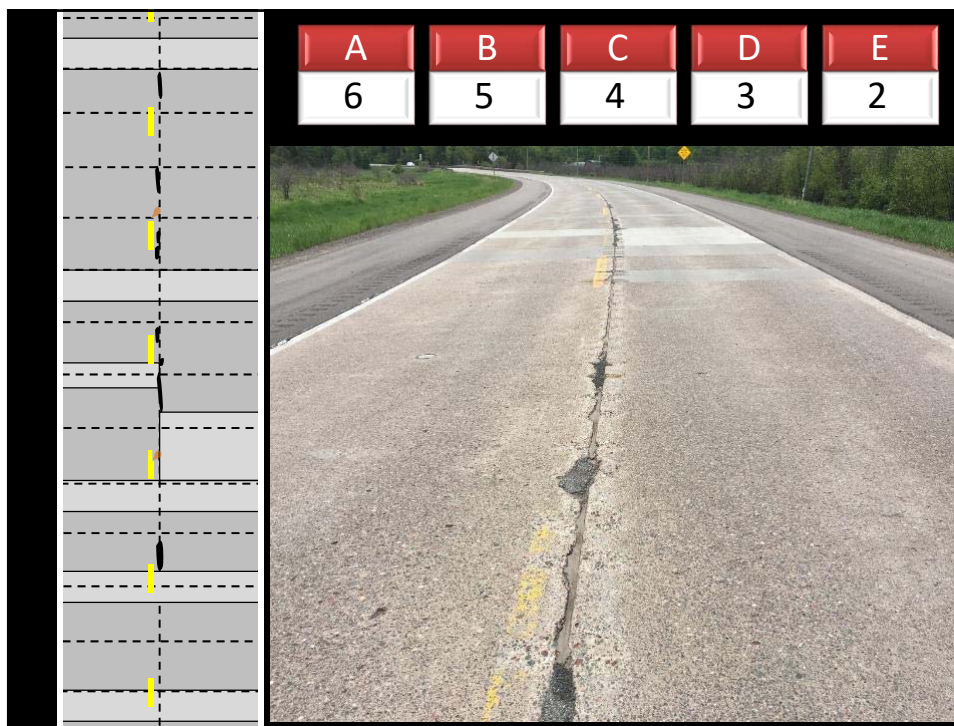
















A	B	C	D	E
10	9	8	7	6

  
  
A diagram showing a road layout with a yellow center line and white dashed lines, with small white circles representing markers.

## Sealcoat Cheat Sheet

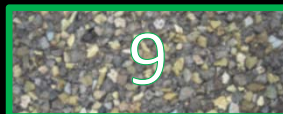
Rating	Description	Condition / defects	Remedy / action	Typical age (years)
10	Good	New construction	None	< 1 year
9	Good	Like new	None	1 to 3
8	Good	First signs of distress Limited edge distress	Routine maintenance Minor edge seal	3 to 5
7	Fair	Minor distress Edge distress with limited lane, distress < 5%, OR Raveling < 5%	Minor asphalt or spray-injection patching Possible single application sealcoat	4 to 6
6	Fair	Moderate distress Edge distress up to 10%, Lane distress up to 10%, OR Raveling up to 10%	Moderate asphalt or spray-injection patching Single application sealcoat	5 to 7
5	Fair	Distressed Edge distress up to 20%, Lane distress up to 20%, OR Raveling up to 20%	Moderate asphalt or spray-injection patching Single application sealcoat With up to 50% double application sealcoat	6 to 8
4	Poor	Edge distress up to 30%, Lane distress up to 30%, OR Rutting of 1/4" to 1"	Asphalt or spray-injection patching and double application sealcoat	7 to 9
3	Poor	Edge distress up to 50%, Lane distress up to 50%, OR Rutting of 1" to 2"	Wedge and/or asphalt or spray-injection patching and double or triple application sealcoat May be necessary to crush and reshape prior to new sealcoat surface	8 to 10
2	Poor	Edge distress > 50%, Lane distress > 50%, OR Rutting greater than 2"	Reconstruct by crush and shape prior to new sealcoat surface, possible return to gravel	> 9
1	Poor	Extensive distress > 50% of surface area	Reconstruct by crush and shape prior to new sealcoat surface, or return to gravel	> 10
0	Not rated			

## Seal Coat - Good



New construction

Less than one year old



Like new

More than one year old






First signs of distress

Limited edge distress

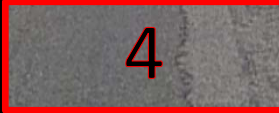



### Seal Coat - Fair

Edge distress, or Lane Distress, or Raveling

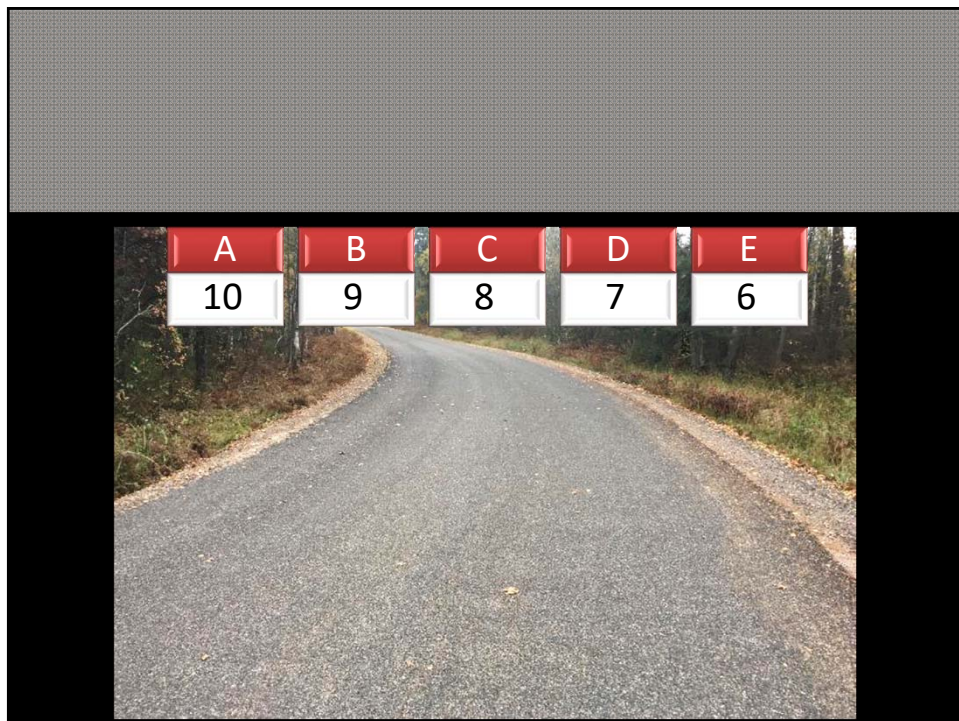
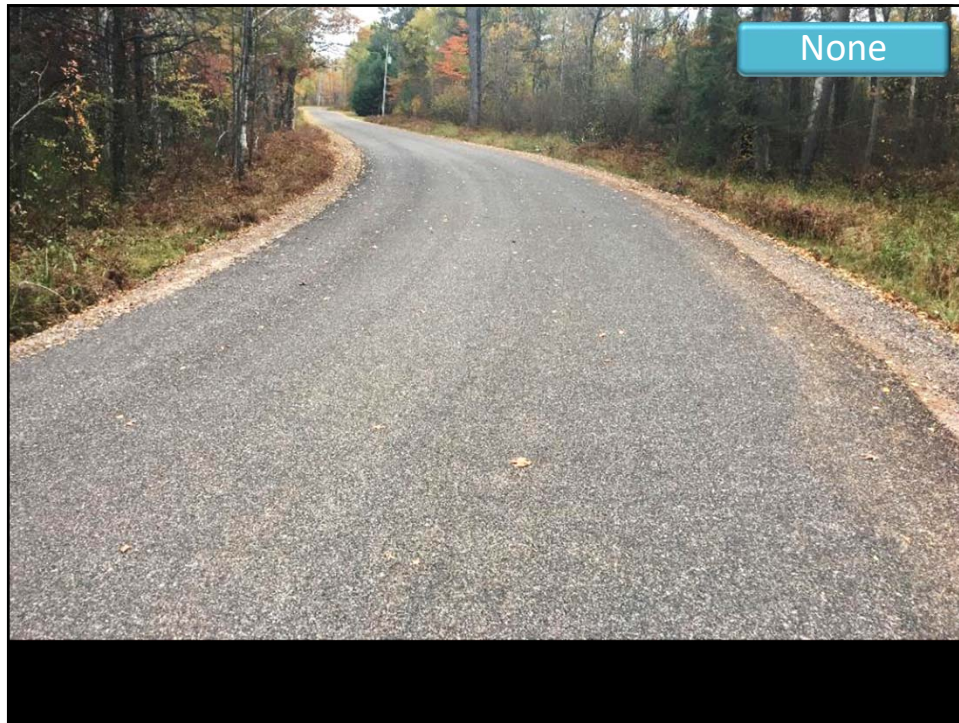
 7	 6	 5
Less than 5%	Up to 10%	Up to 20%

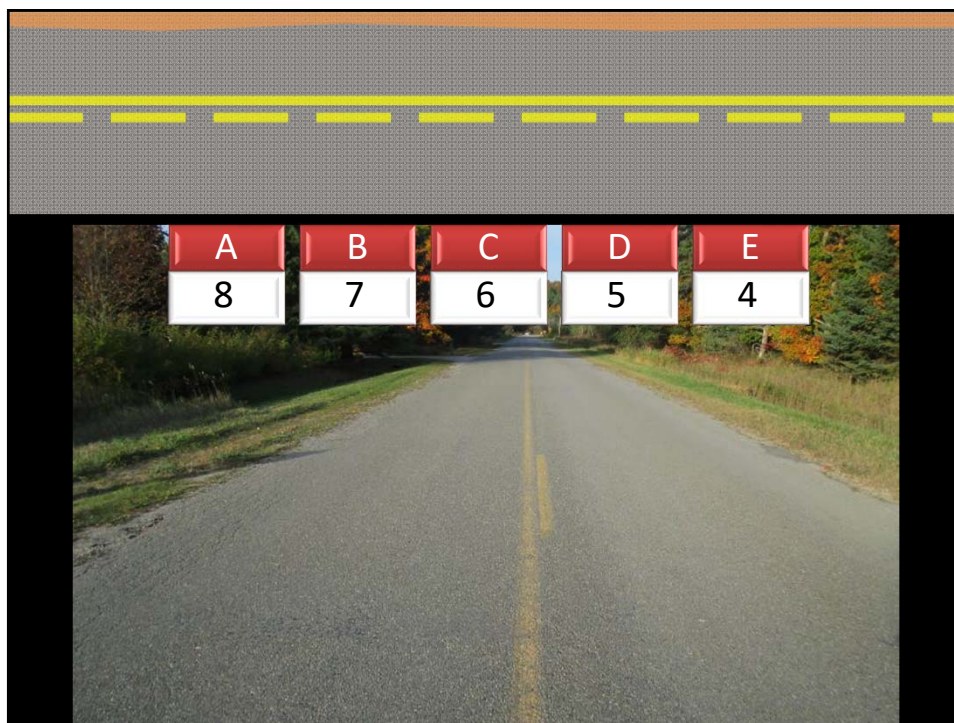
### Seal Coat - Poor

Edge distress, or Lane Distress, or Rutting

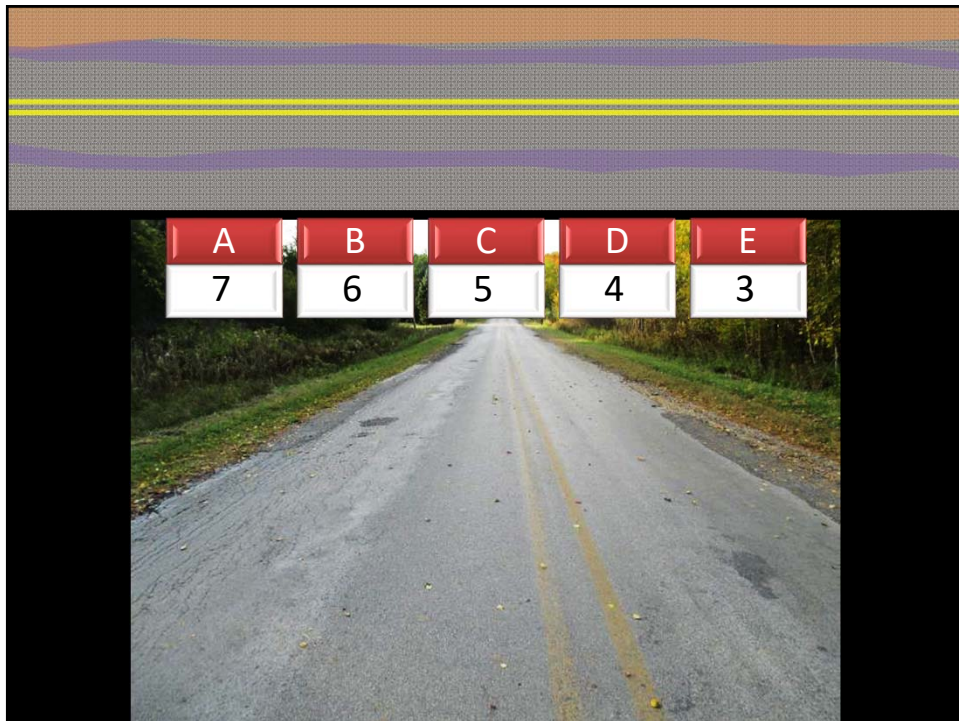
 4	 3	 2
Up to 30% Ruts ½" to 1"	Up to 50% Ruts 1" to 2"	Over 50% Ruts over 2"
		 1
		Same as 2 with visible base



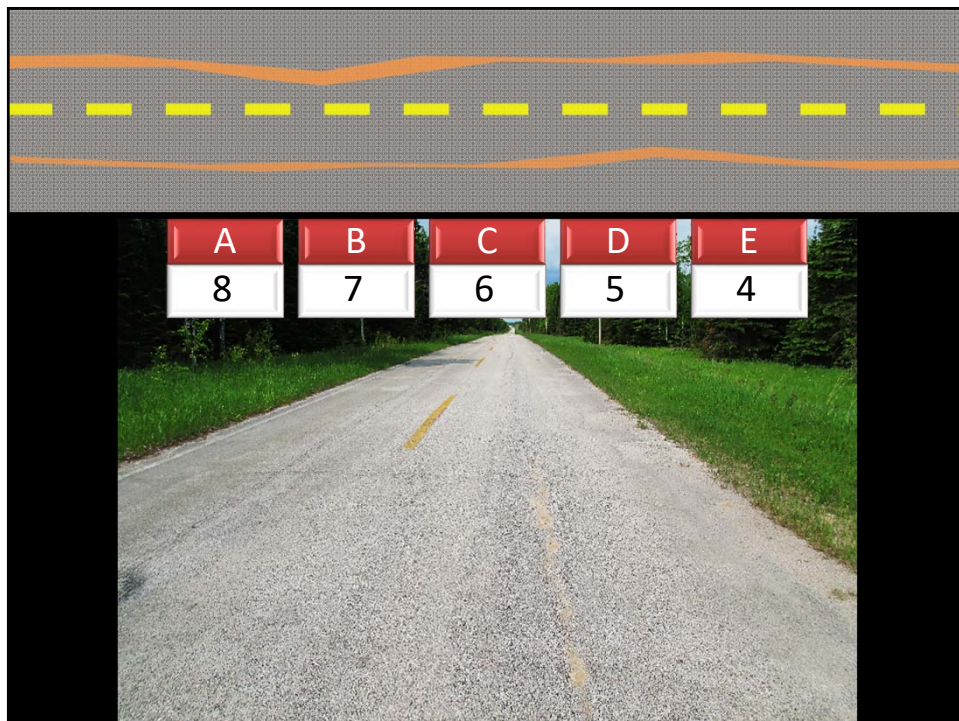
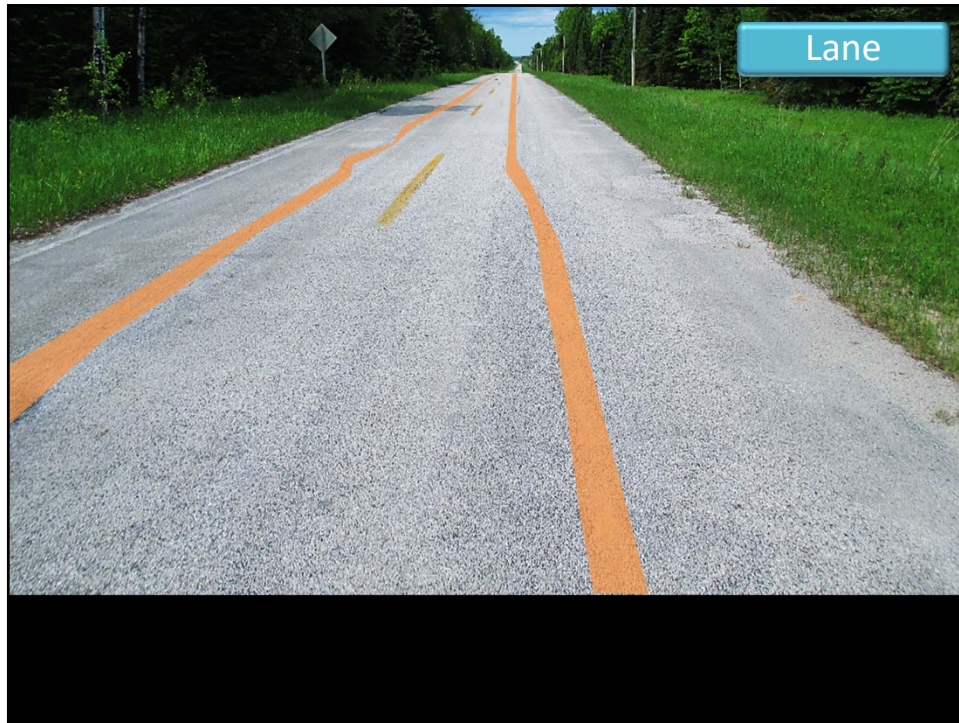


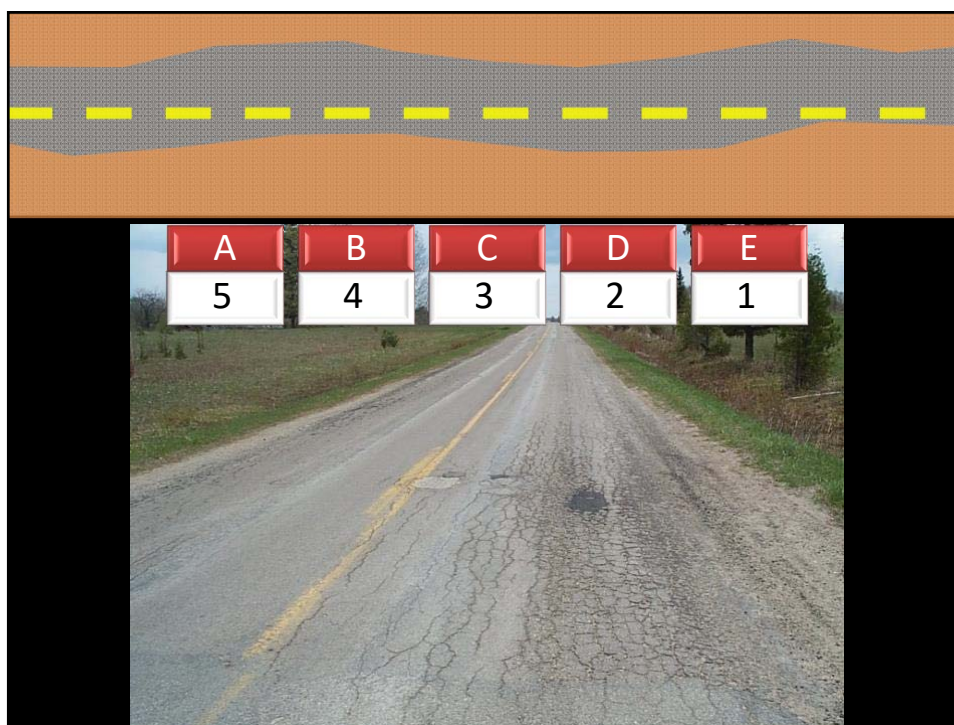
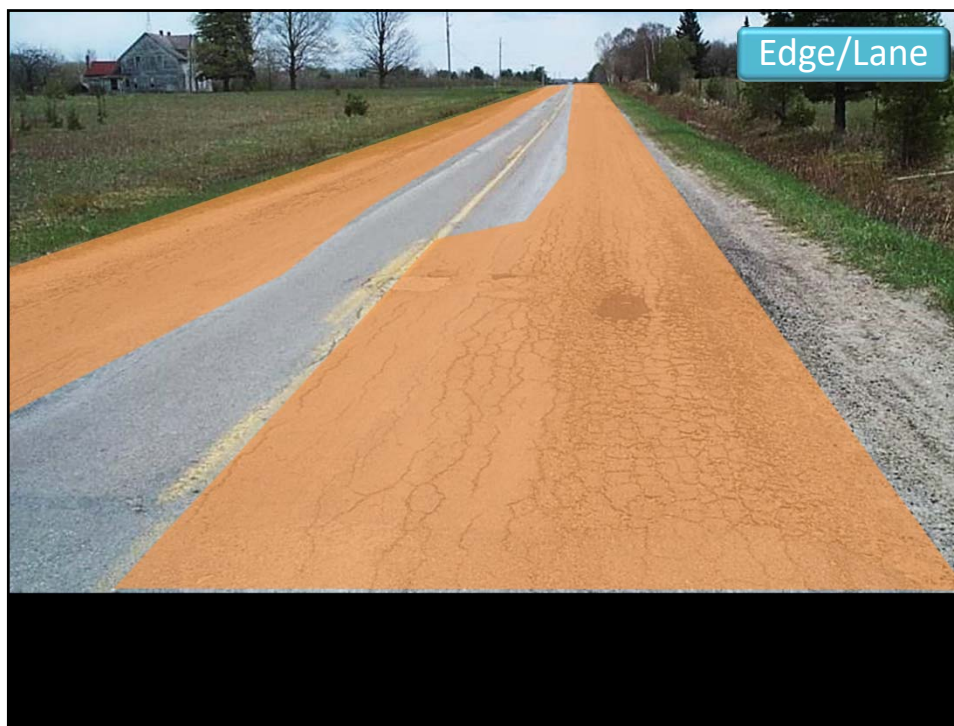




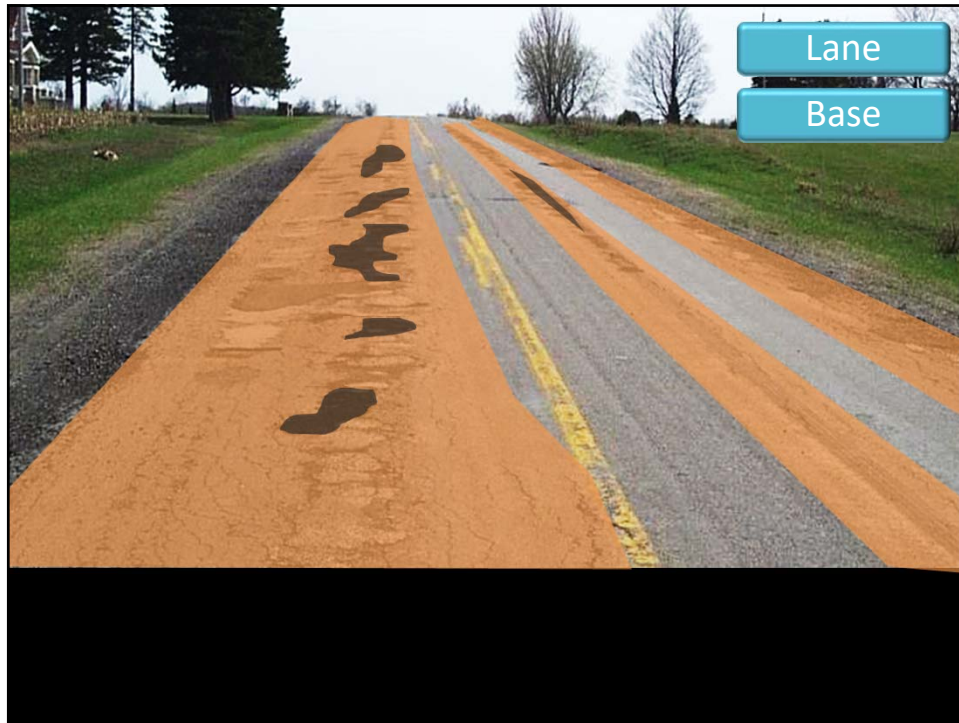














## Contact Information



Michigan  
Transportation Asset  
Management Council

[www.michigan.gov/tamc](http://www.michigan.gov/tamc)



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