



Michigan Technological University • Department of Civil & Environmental Engineering

PASER Training

Part 1: Distress Identification



Michigan
Transportation Asset
Management Council

TAMC Data Collection Training Program

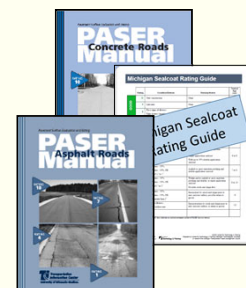
PASER for Paved Roads

Part 1: Distress Identification

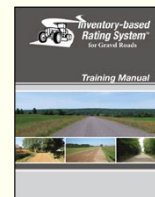
Part 2: Pavement Rating Intro & Council Update

Part 3: Rating and Data Collection Rules

Part 4: Rating Exercises

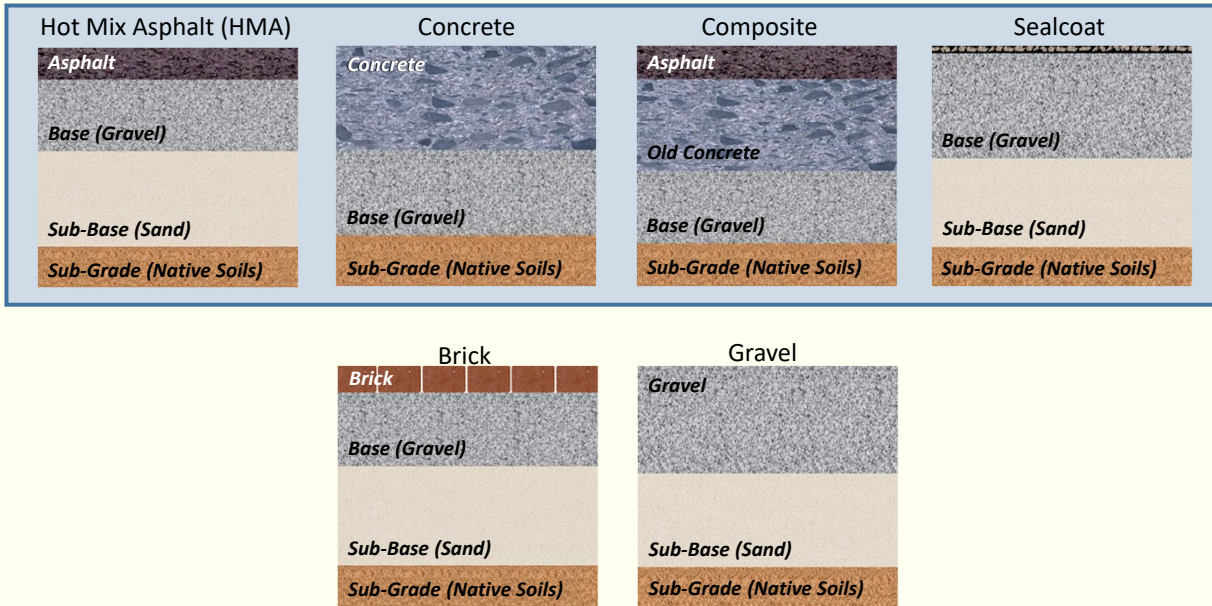


Inventory-Based Rating for Gravel Roads

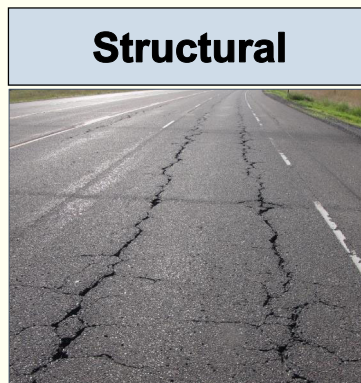


See ctt.mtu.edu for upcoming trainings

4 Major Pavement Types



Asphalt Distress Types



Asphalt Distress Types

Age



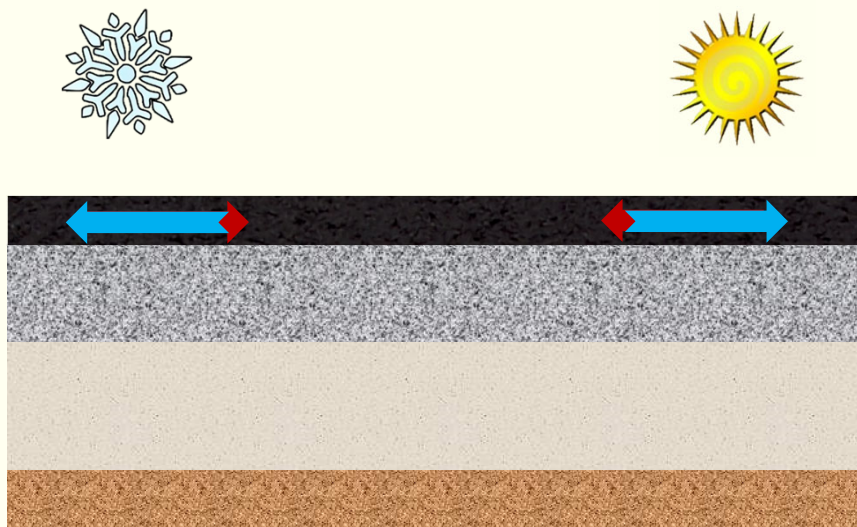
Structural



Limited

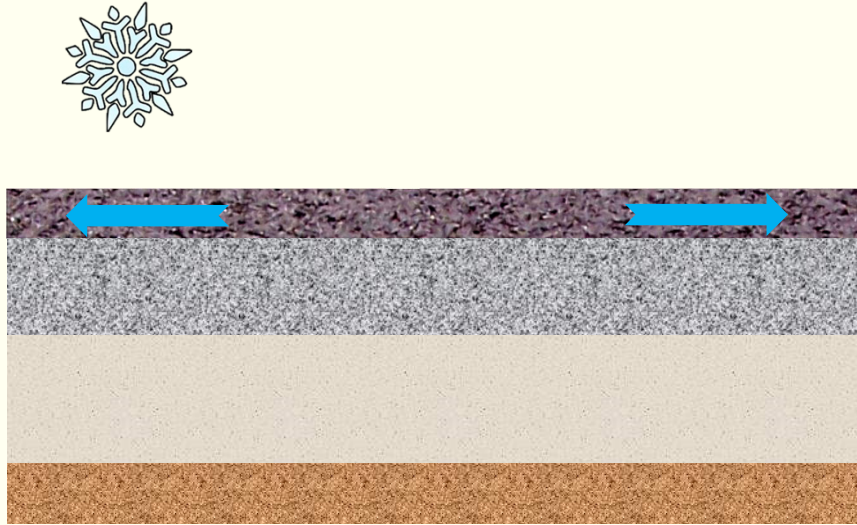


Environment



Age Related Asphalt Distress

Environment



Age Related Asphalt Distress

First Distress



Age Related Asphalt Distress

Primary Age-related Distresses: Cracking



Transverse



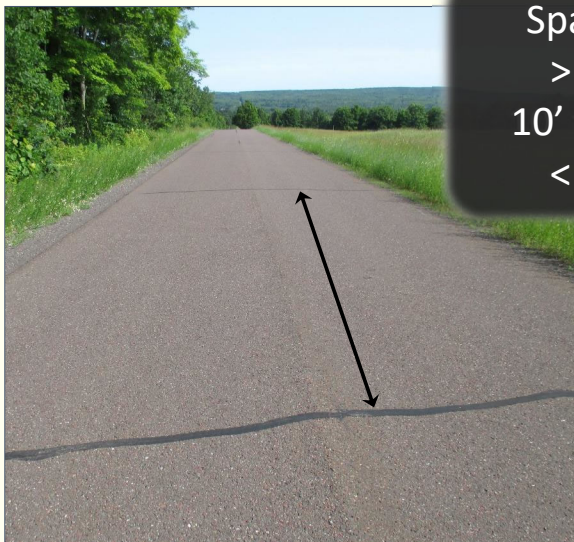
Longitudinal Joint



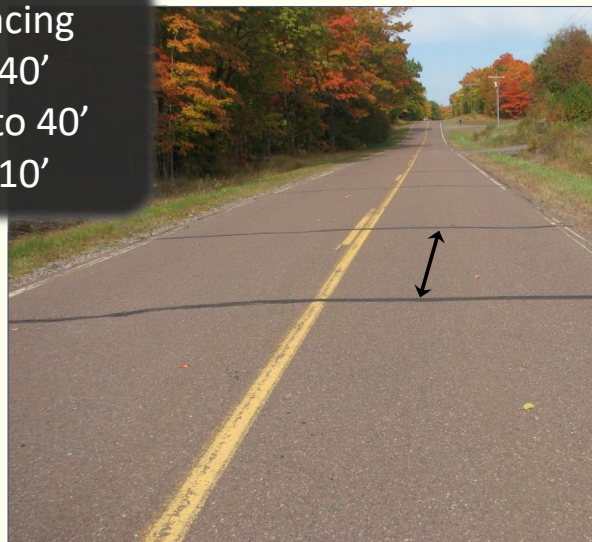
Block

Age Related Asphalt Distress

Transverse Cracking



Spacing
> 40'
10' to 40'
< 10'



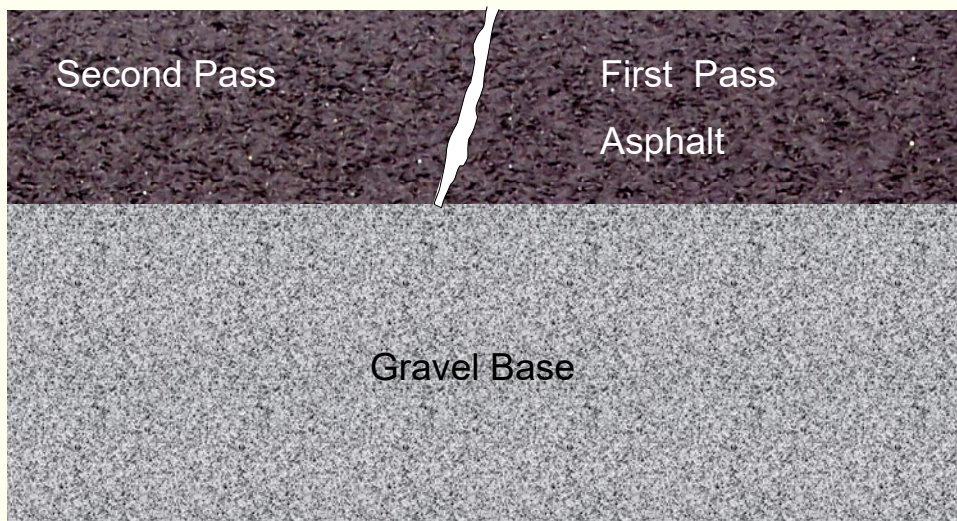
Age Related Asphalt Distress

Longitudinal Joint Cracking



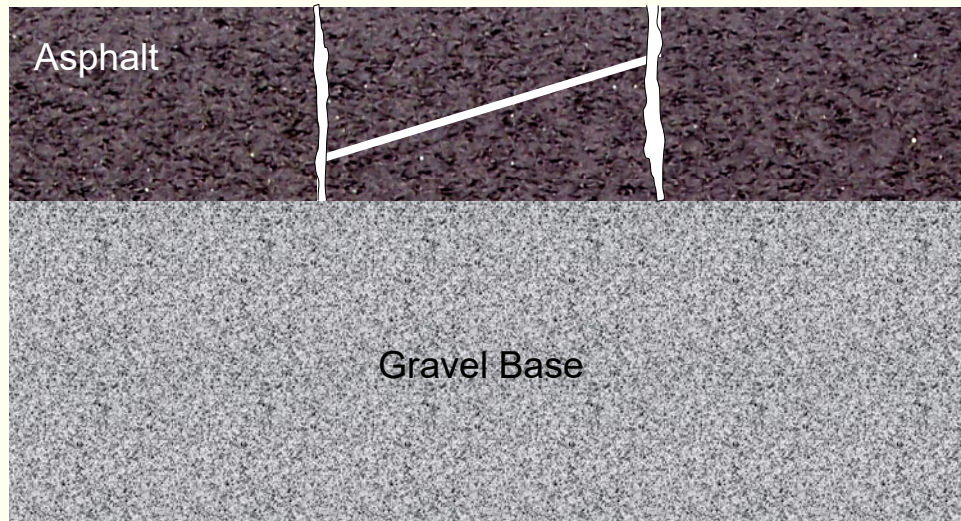
Age Related Asphalt Distress

Common Construction Joint



Age Related Asphalt Distress

Longitudinal Construction Joint (Tapered)



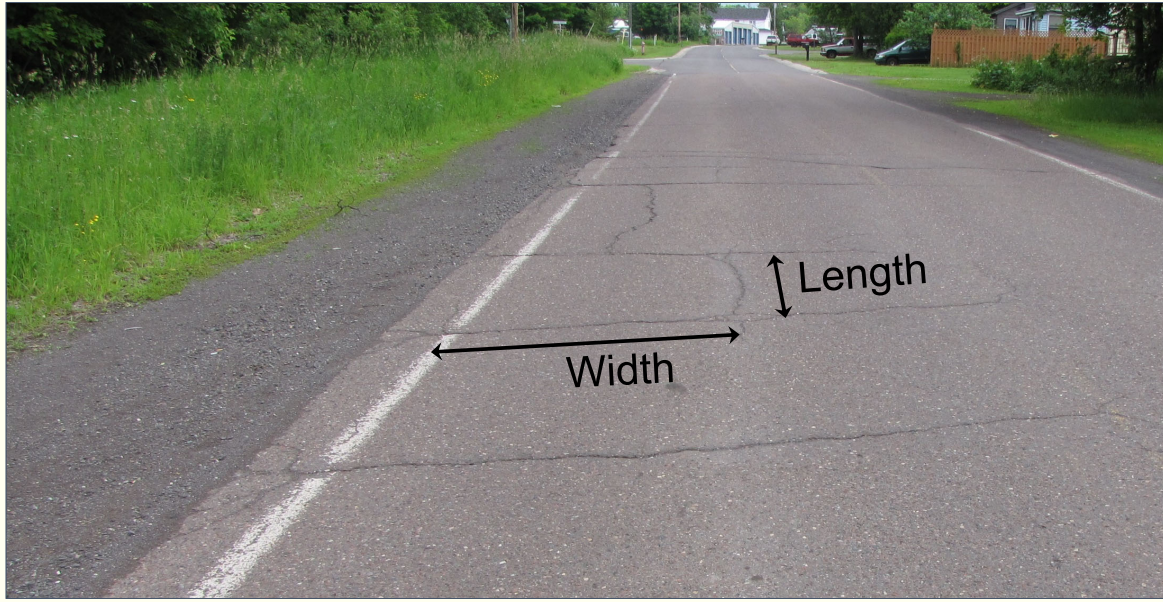
Age Related Asphalt Distress

Longitudinal Tapered Joint Cracking



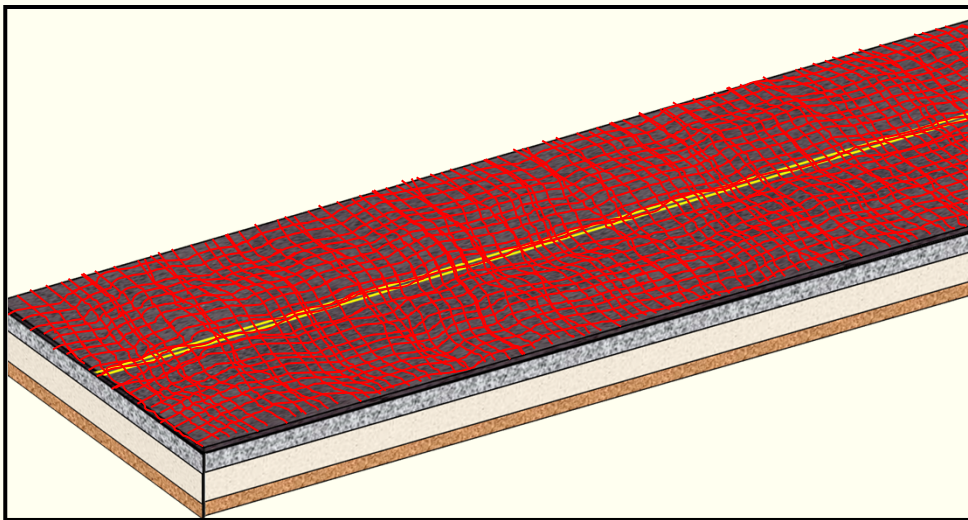
Age Related Asphalt Distress

Block Cracking



Age Related Asphalt Distress

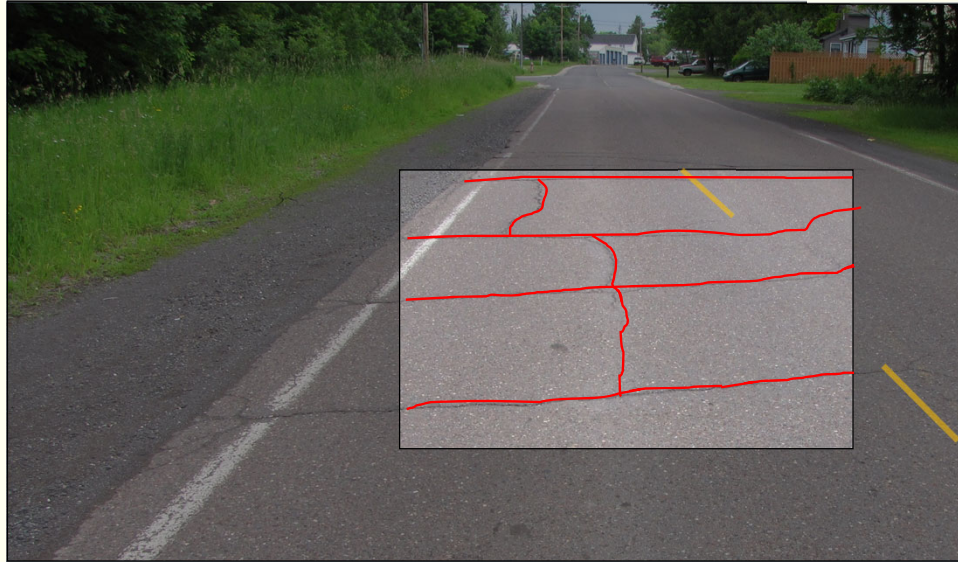
Block Cracking Progression



Age Related Asphalt Distress

Block Cracking – First Signs

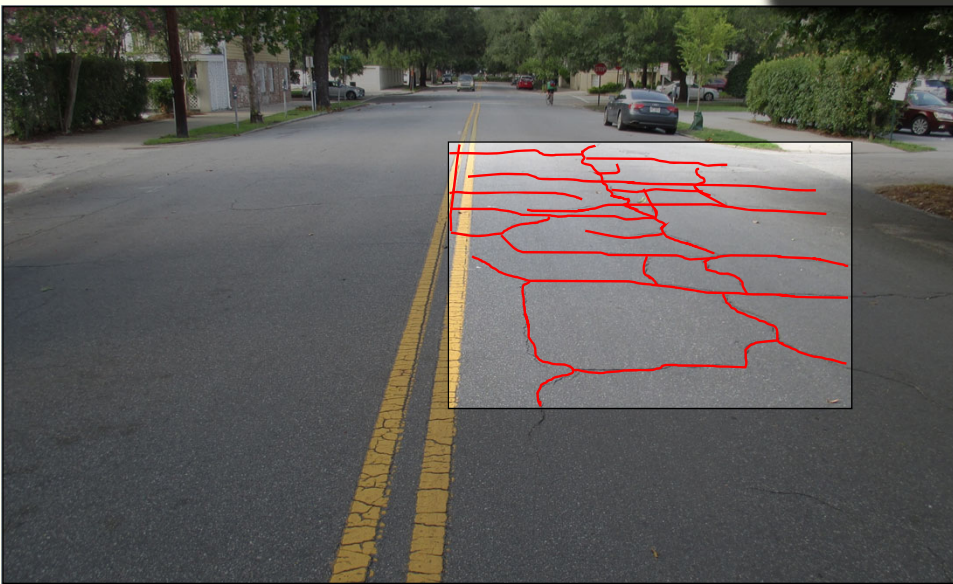
First Signs
(6' to 10' blocks)



Age Related Asphalt Distress

Block Cracking – Moderate

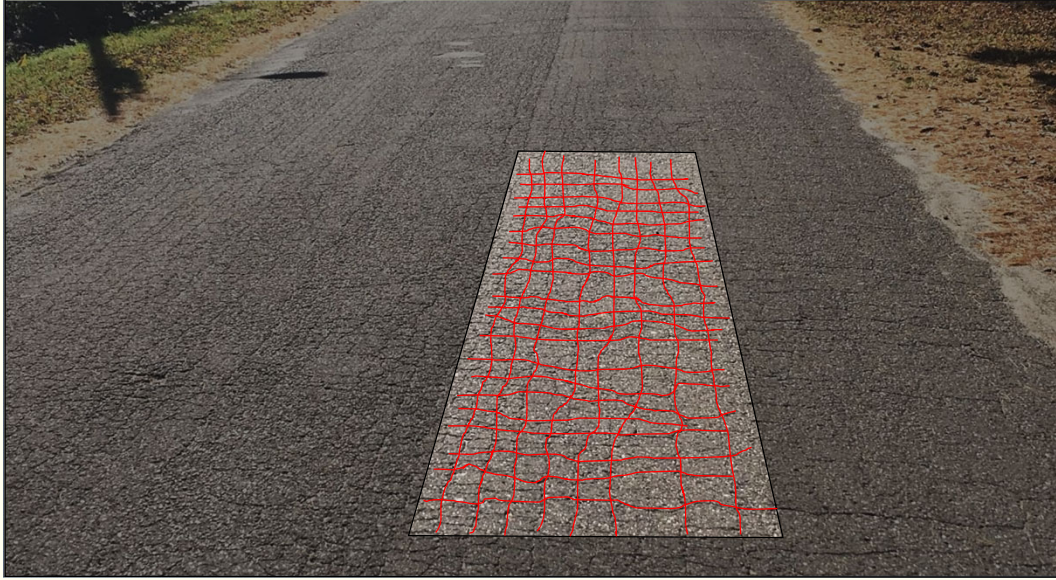
Moderate
(1' to 5' blocks)



Age Related Asphalt Distress

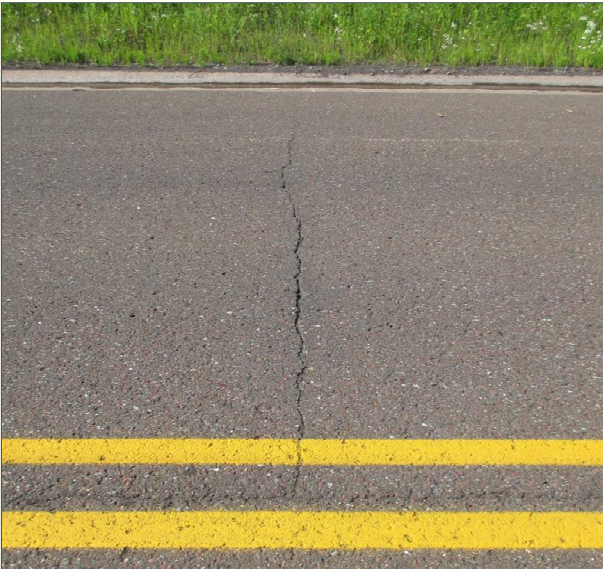
Block Cracking – Severe

Severe
(<1' blocks)



Age Related Asphalt Distress

Crack Width - Tight



Tight

Age Related Asphalt Distress

Crack Width – Open



Open

Age Related Asphalt Distress

Secondary Cracking



Secondary

Age Related Asphalt Distress

More Than Just a Crack.....



Structural

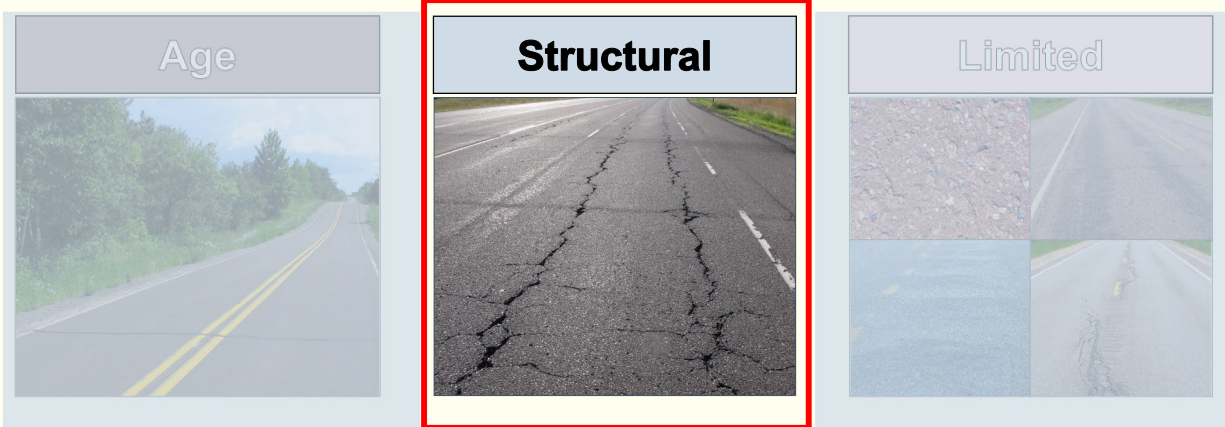
Age Related Asphalt Distress

Some notes about cracks...

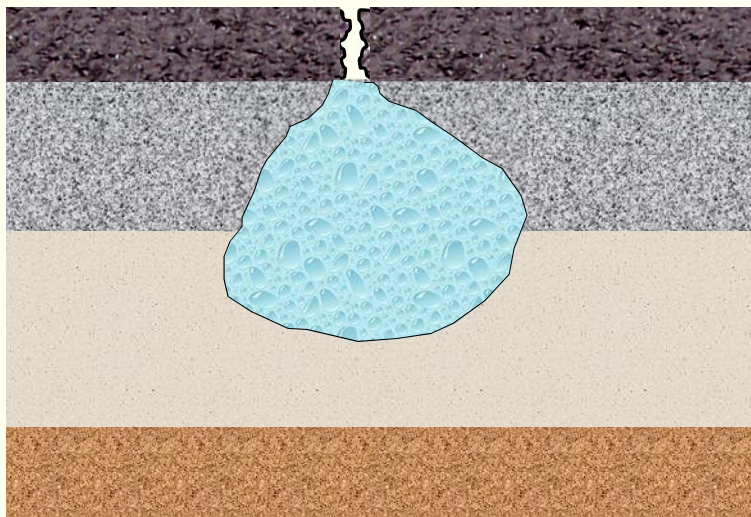
- A sealed crack is still a crack
- Crack opening width is the *only* thing changed by sealing
- Width varies due to thermal expansion and contraction



Asphalt Distress Types

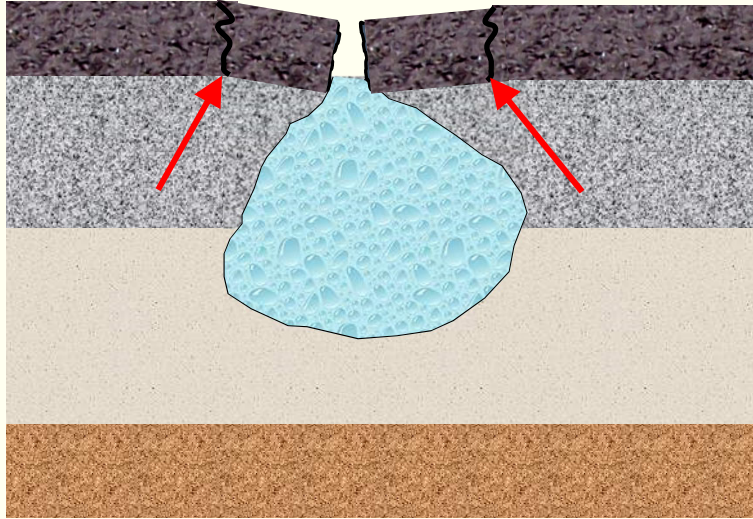


Water Intrusion



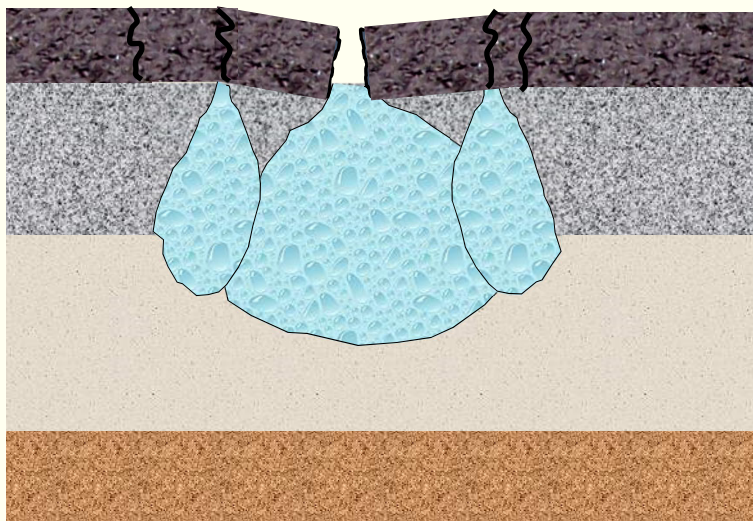
Structural Related Asphalt Distress

Base Weakening & Loss of Support



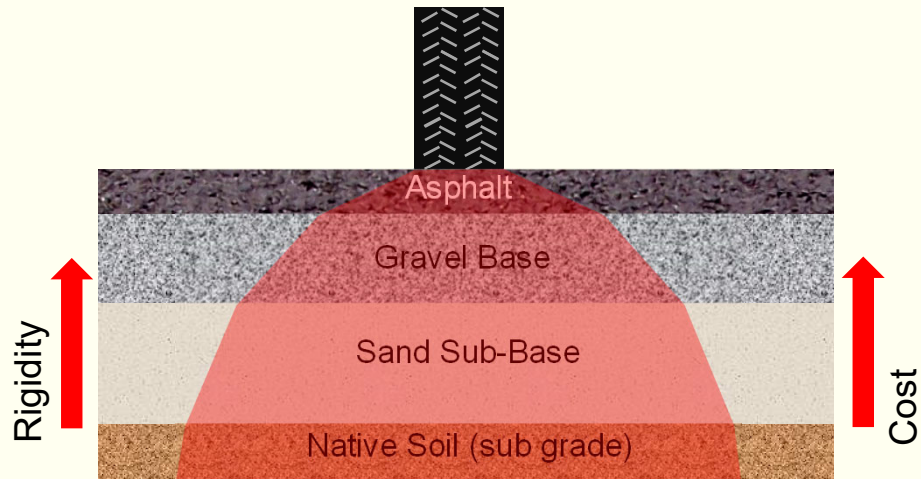
Structural Related Asphalt Distress

Distress Propagation



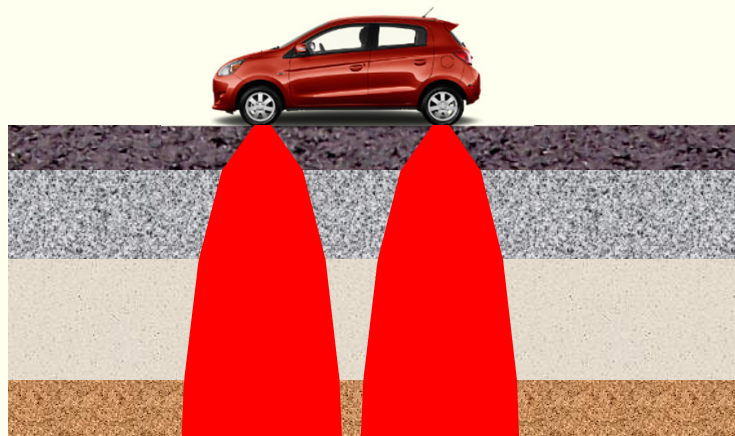
Structural Related Asphalt Distress

Load Distribution



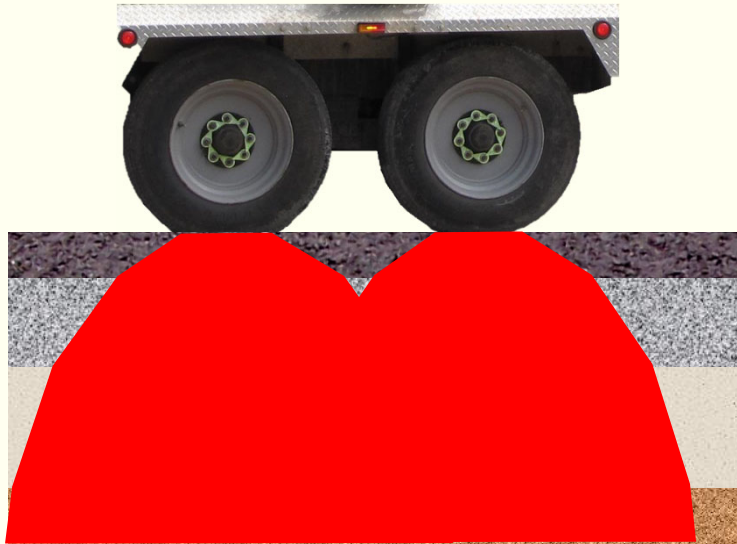
Structural Related Asphalt Distress

Load Distribution – Small Vehicle



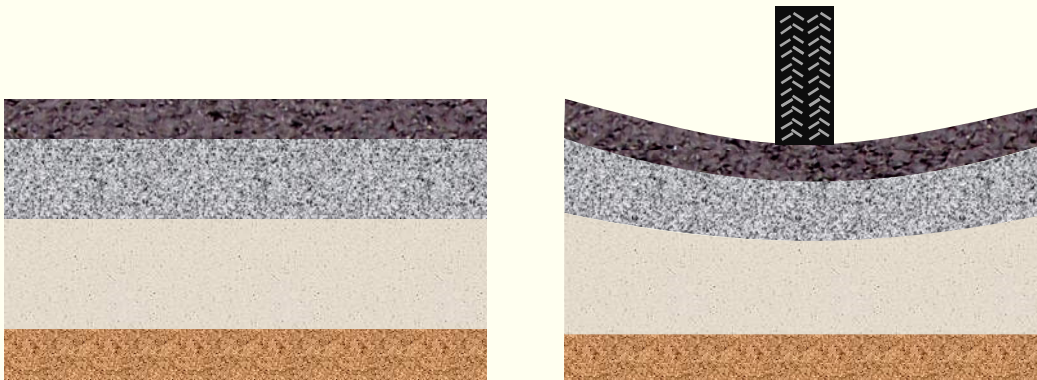
Structural Related Asphalt Distress

Load Distribution – Large Vehicle



Structural Related Asphalt Distress

Repeated Loading



Structural Related Asphalt Distress

Structural Distresses



Rutting



Shear Cracking



Alligator Cracking

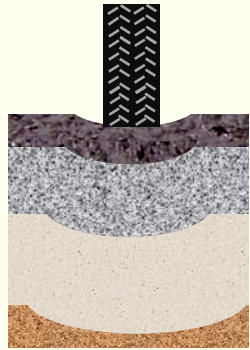
Structural Related Asphalt Distress

Structural Distress – Rutting



Structural Related Asphalt Distress

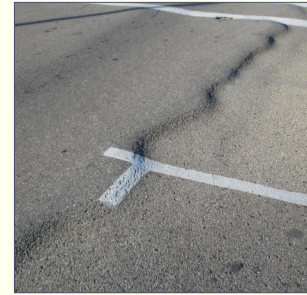
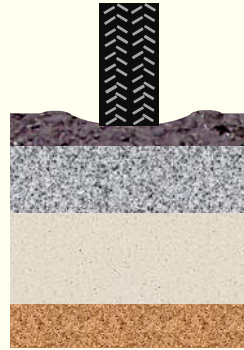
Structural Distress – Rutting



Deep Rutting

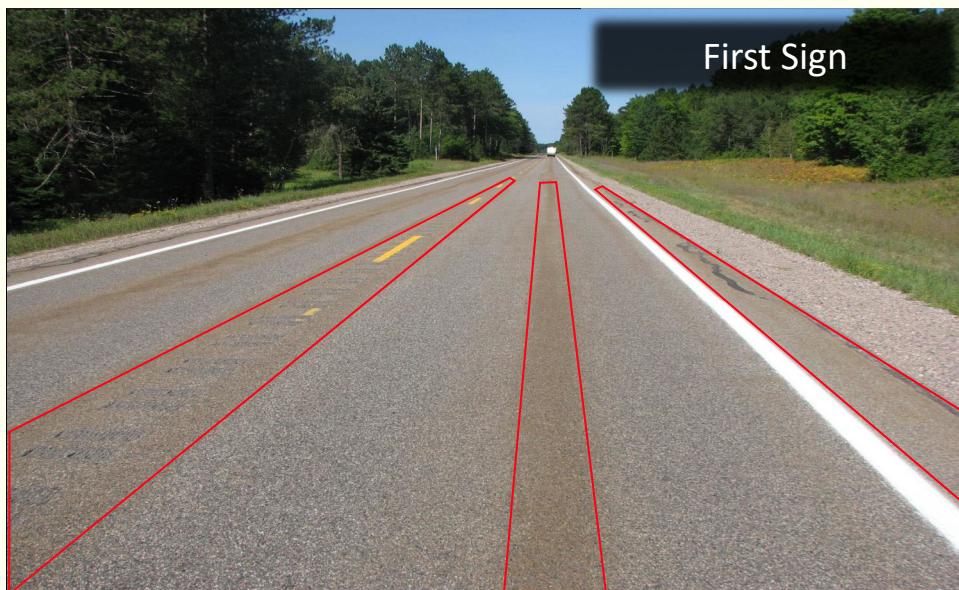


Surface Rutting



Structural Related Asphalt Distress

Rutting Progression



Structural Related Asphalt Distress

Rutting Progression



Moderate

Structural Related Asphalt Distress

Rutting Progression



Severe

Structural Related Asphalt Distress

Measuring Rutting



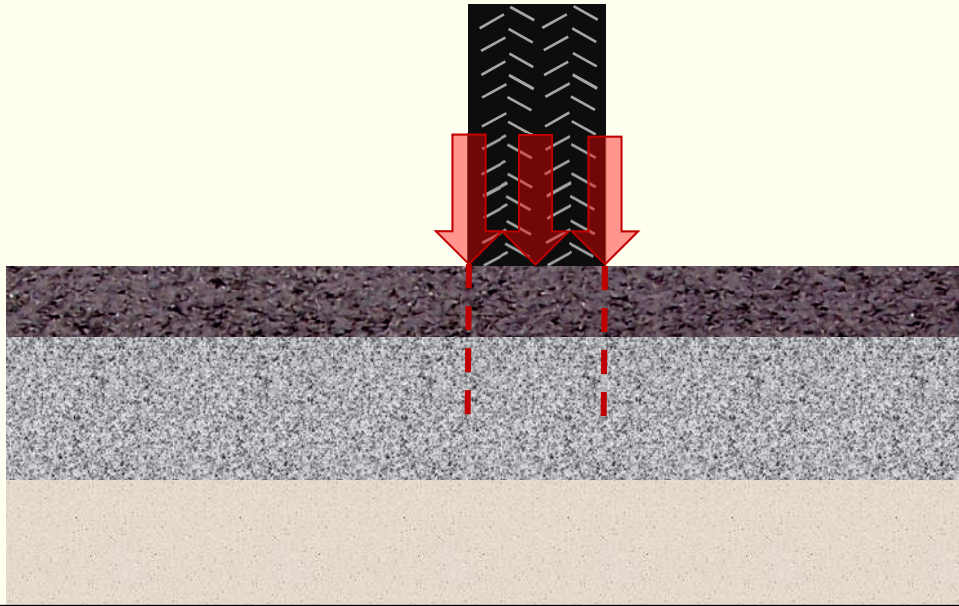
Structural Related Asphalt Distress

Structural Distress – Shear Cracking



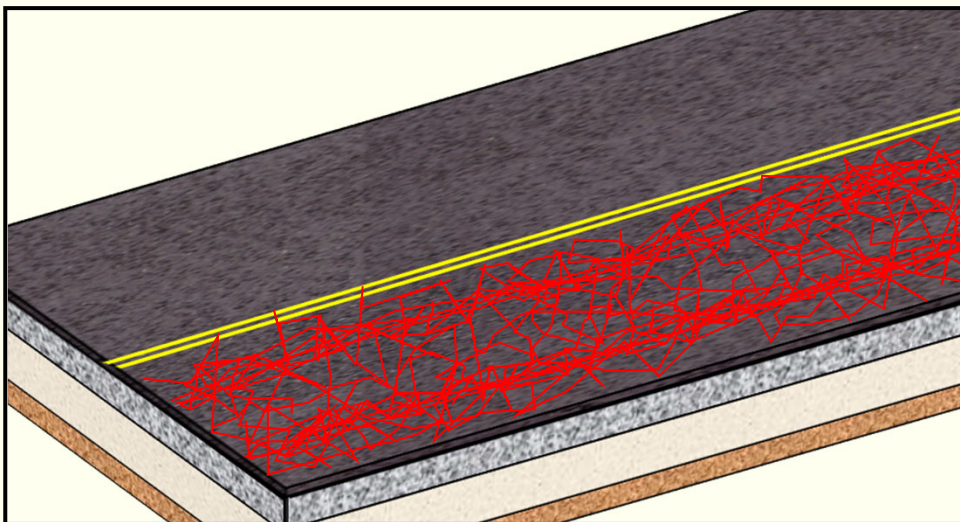
Structural Related Asphalt Distress

Shear Cracking



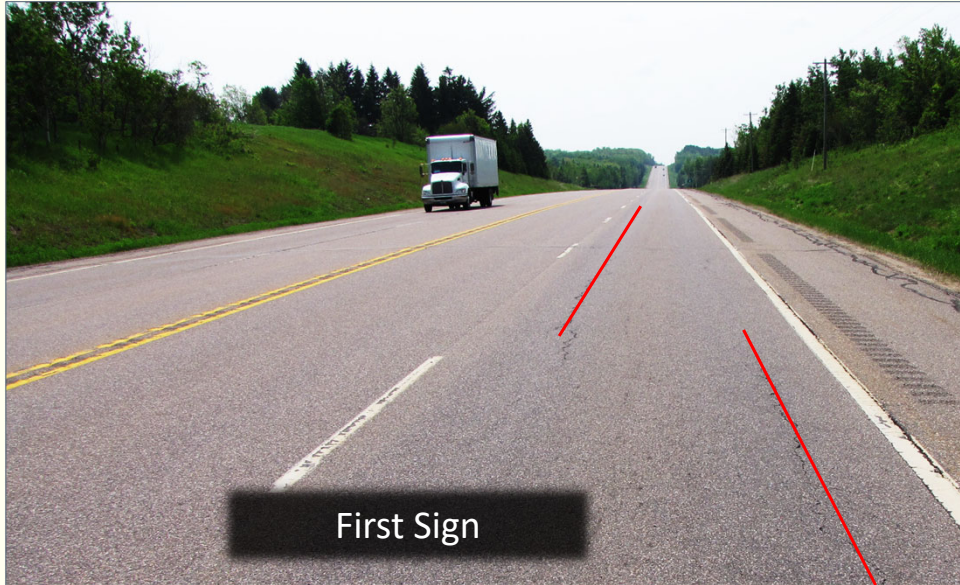
Structural Related Asphalt Distress

Load Related Distress Progression



Structural Related Asphalt Distress

Shear Crack Progression



Structural Related Asphalt Distress

Shear Crack Progression



Structural Related Asphalt Distress

Shear Crack Progression

Severe



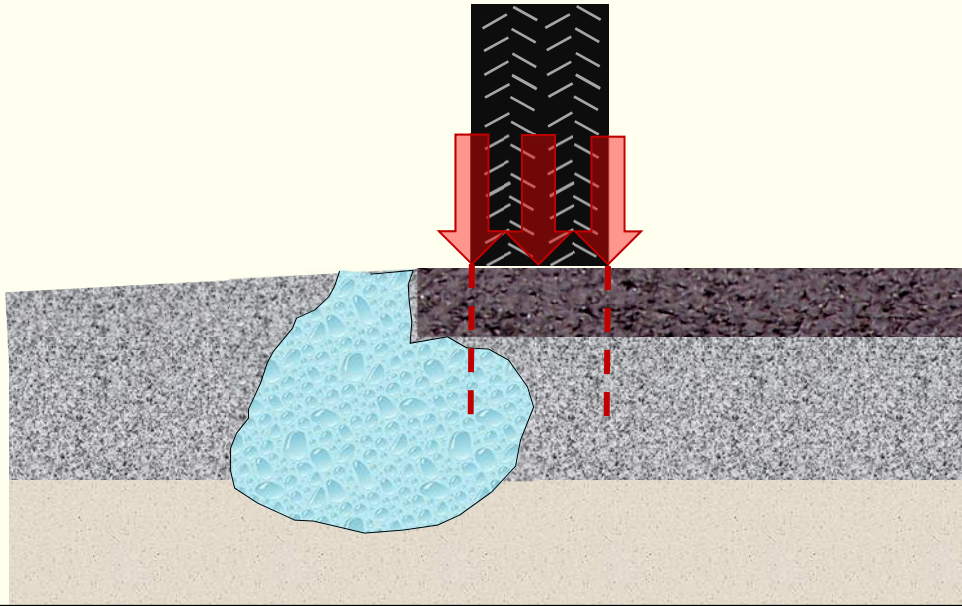
Structural Related Asphalt Distress

Structural Distress – Edge Cracking



Structural Related Asphalt Distress

Edge Cracking



Structural Related Asphalt Distress

Edge Cracking



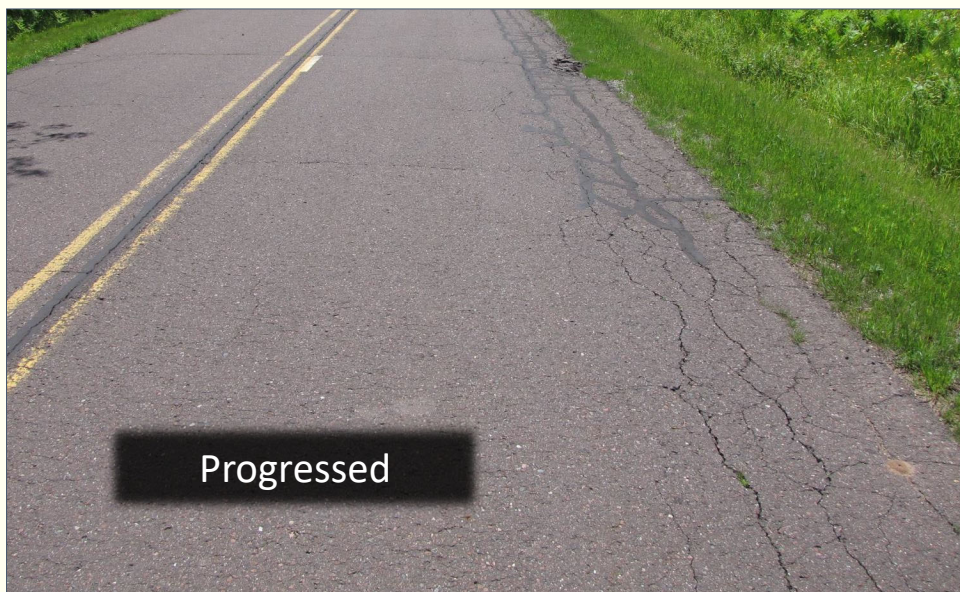
Structural Related Asphalt Distress

Edge Cracking



Structural Related Asphalt Distress

Edge Cracking



Structural Related Asphalt Distress

Structural Distress – Alligator Cracking



Structural Related Asphalt Distress

Alligator (Fatigue) Cracking



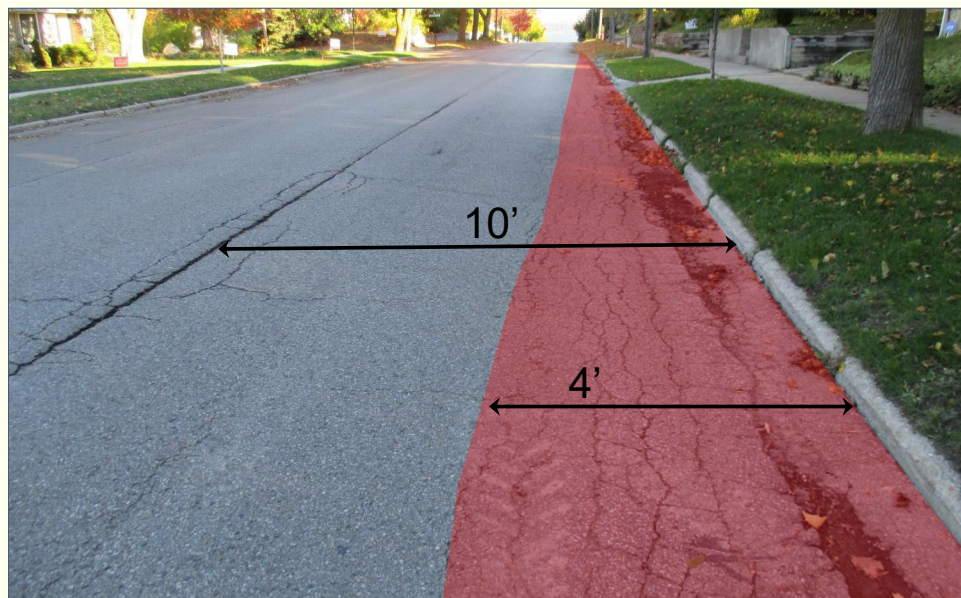
Structural Related Asphalt Distress

Alligator (Fatigue) Cracking



Structural Related Asphalt Distress

Percent of Worst Lane



Structural Related Asphalt Distress

Asphalt Distress Types



Limited Extent – Surface Distress



Raveling



Flushing or Bleeding



Polishing

Limited Extent Asphalt Distress

Surface Distress - Raveling

Slight



Limited Extent Asphalt Distress

Surface Distress - Raveling

Moderate



Limited Extent Asphalt Distress

Surface Distress - Raveling



Limited Extent Asphalt Distress

Surface Distress – Flushing / Bleeding



Limited Extent Asphalt Distress

Surface Distress – Flushing / Bleeding



Extensive to Severe

Limited Extent Asphalt Distress

Surface Distress – Polishing



Slight to Moderate

Limited Extent Asphalt Distress

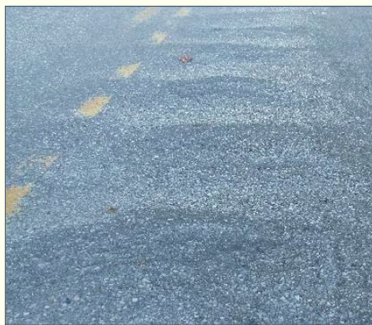
Surface Distress – Polishing



Extensive to Severe

Limited Extent Asphalt Distress

Limited Extent – Structural Distress



Slippage

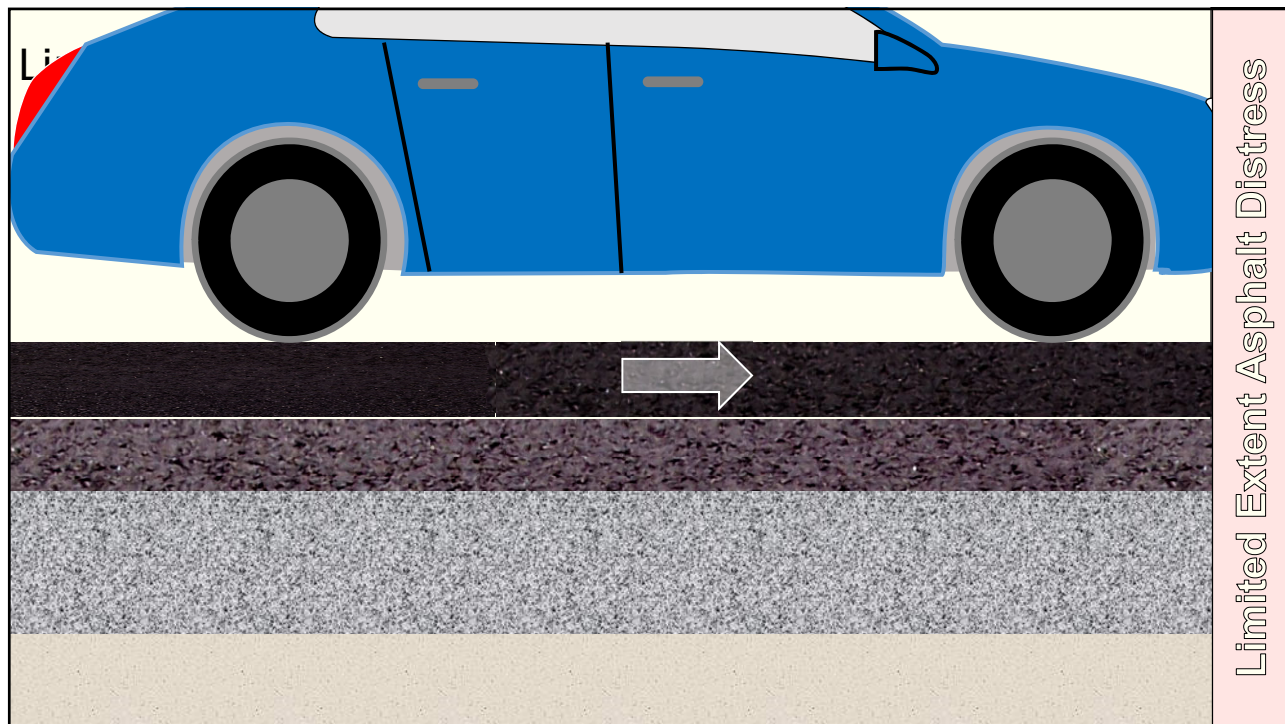


Frost Heave



Differential Settlement

Limited Extent Asphalt Distress



Limited Extent – Layer Slippage

First Signs



Limited Extent Asphalt Distress

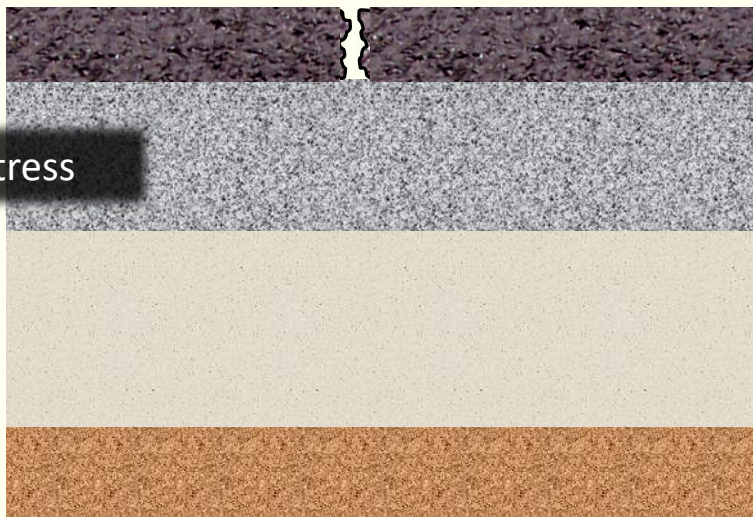
Limited Extent – Layer Slippage



Advanced

Limited Extent Asphalt Distress

Limited Extent– Frost Heave

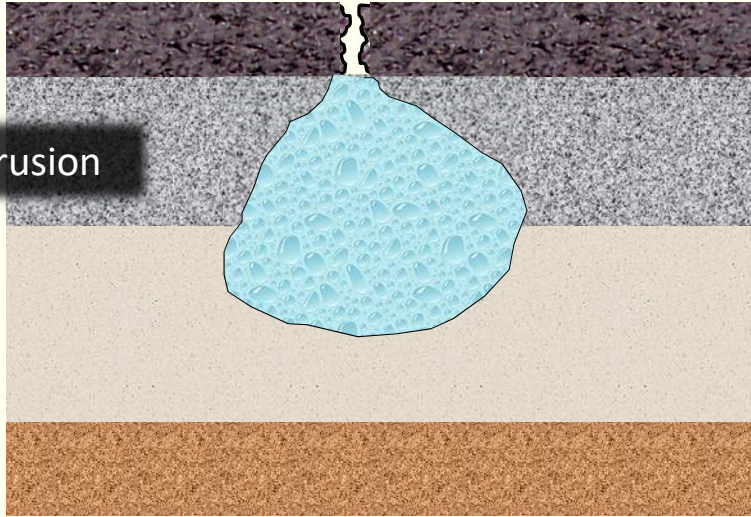


First Distress

Limited Extent Asphalt Distress

Limited Extent – Frost Heave

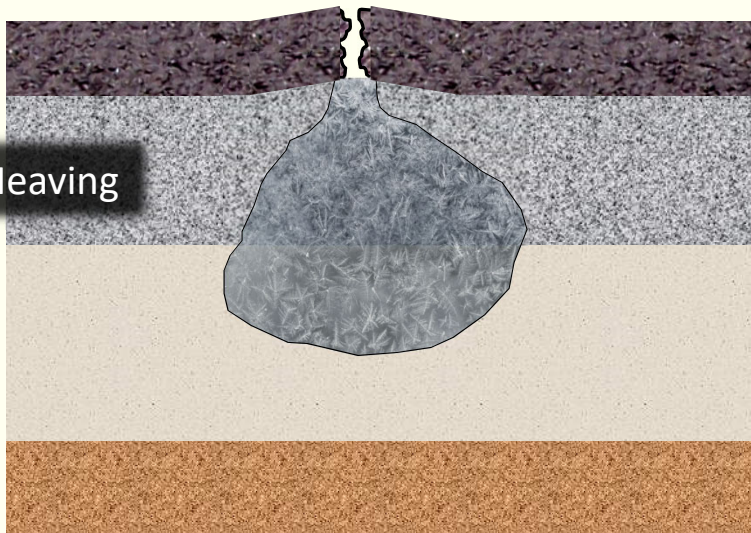
Water Intrusion



Limited Extent Asphalt Distress

Limited Extent – Frost Heave

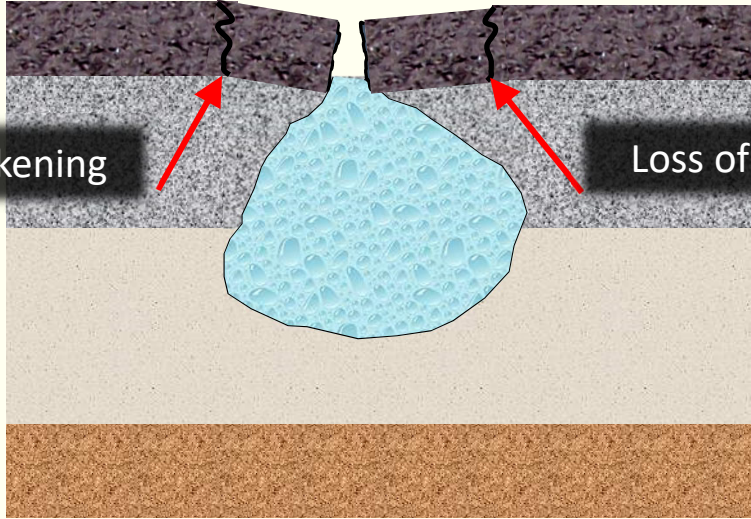
Localized Heaving



Limited Extent Asphalt Distress

Limited Extent – Frost Heave

Base Weakening

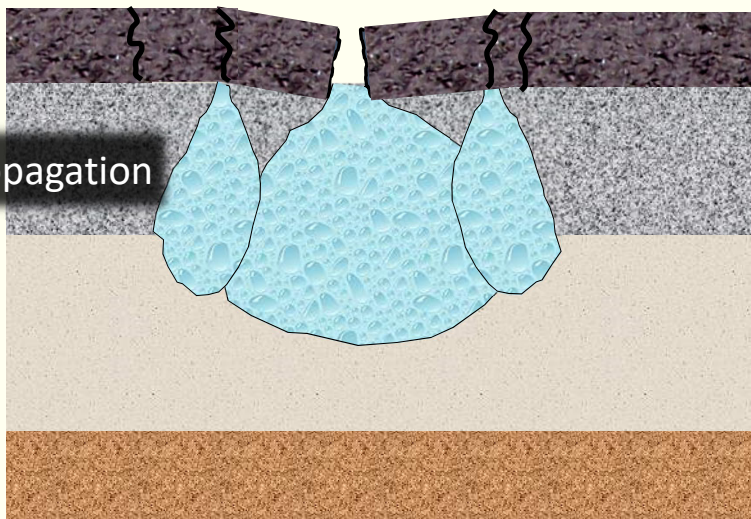


Loss of Support

Limited Extent Asphalt Distress

Limited Extent – Frost Heave

Distress Propagation



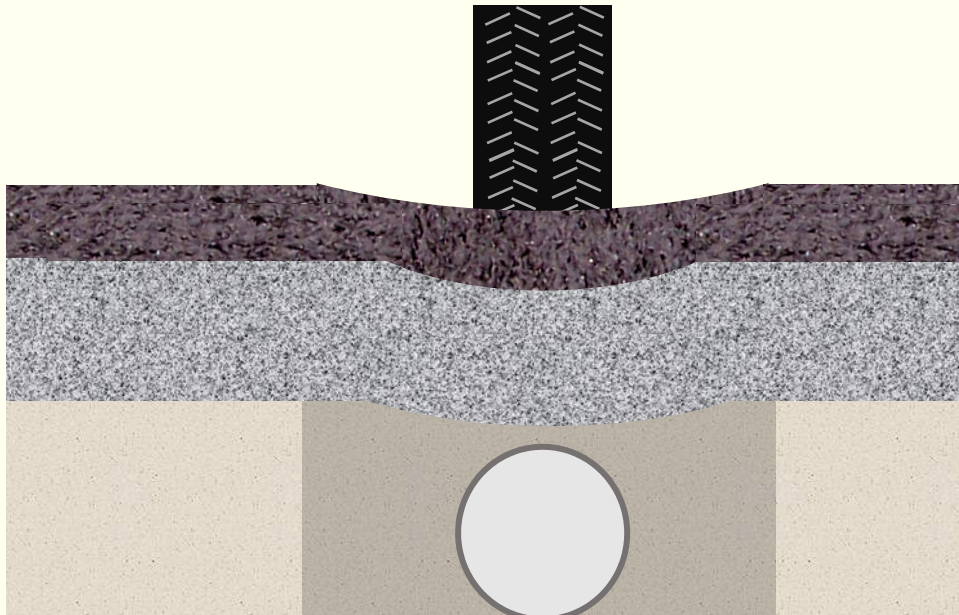
Limited Extent Asphalt Distress

Limited Extent – Frost Heave



Limited Extent Asphalt Distress

Limited Extent – Differential Settlement



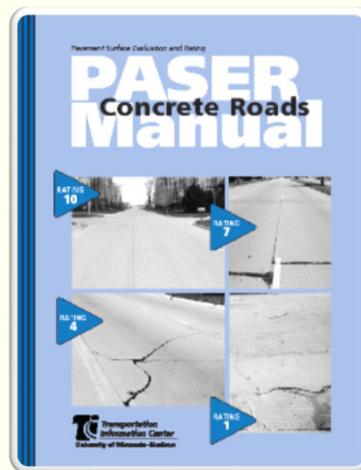
Limited Extent Asphalt Distress

Limited Extent – Differential Settlement



Limited Extent Asphalt Distress

Concrete Pavement



Concrete Distress Types

Concrete Deformations

Concrete Cracking

Concrete Joint Distress

Concrete Surface Distress

Concrete Deformations



Buckles



Durability Cracking

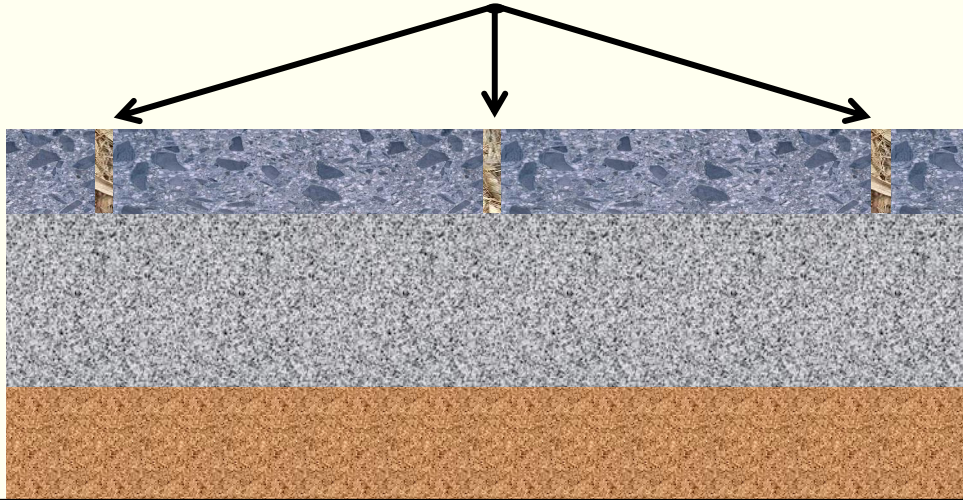


Faulting

Concrete Deformations

Deformations – Buckles

Non-compressible Material



Concrete Deformations

Deformations – Buckles



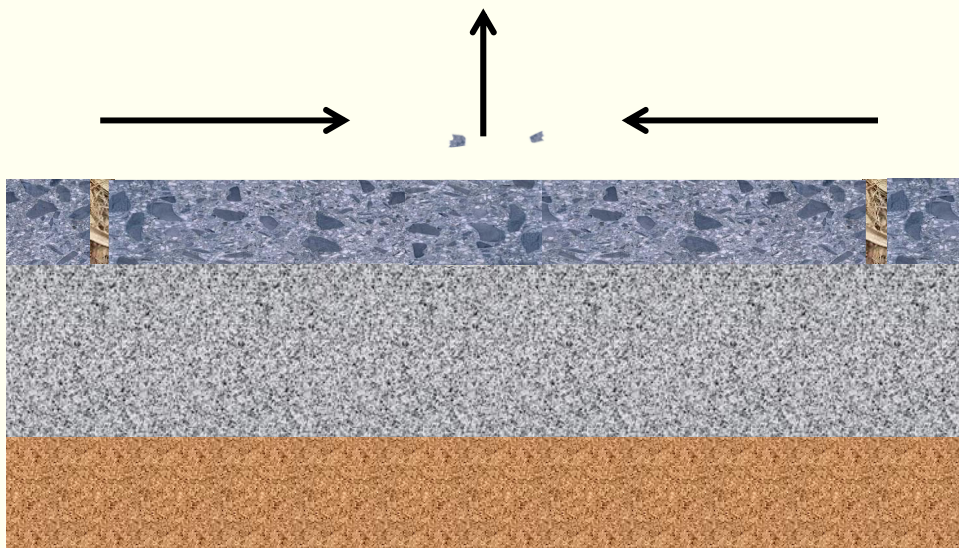
Concrete Deformations

Deformations – Buckling (Tenting)



Concrete Deformations

Deformations – Buckles



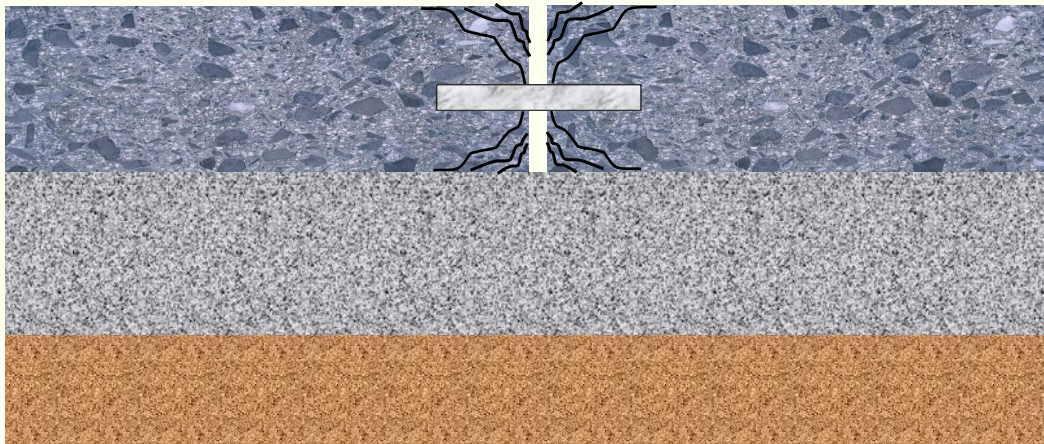
Concrete Deformations

Deformations – Durability Crack



Concrete Deformations

Deformations – Durability Crack

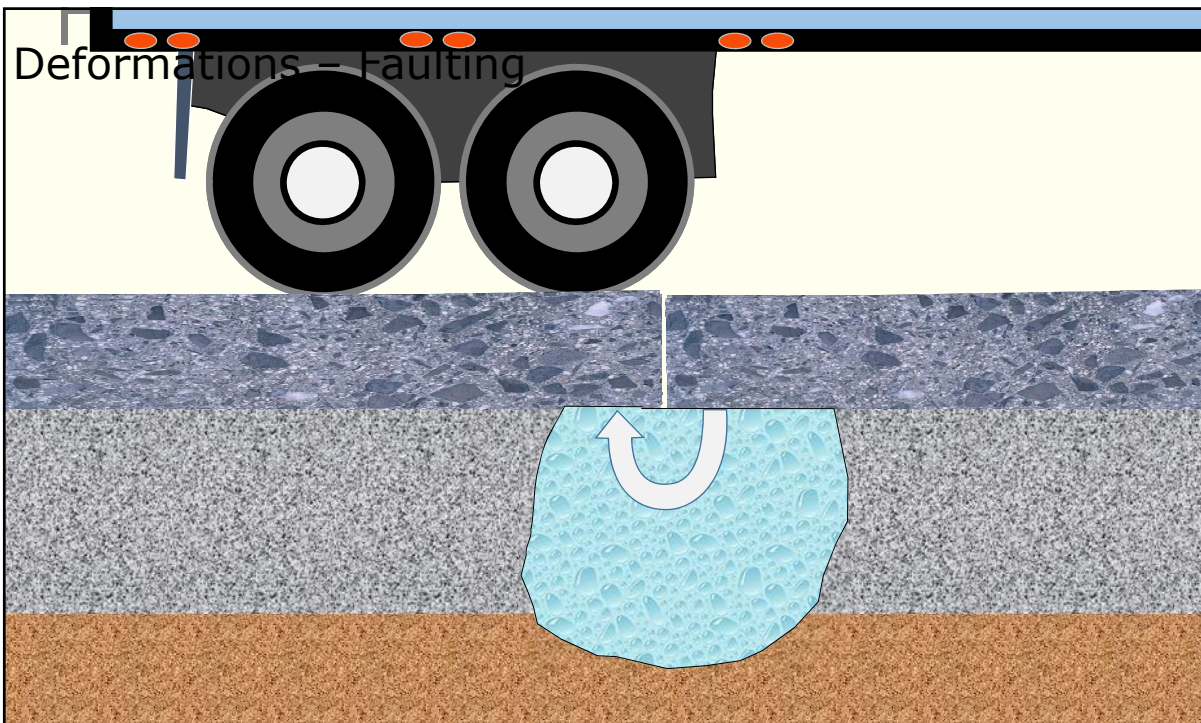


Concrete Deformations

Deformations – Faulting

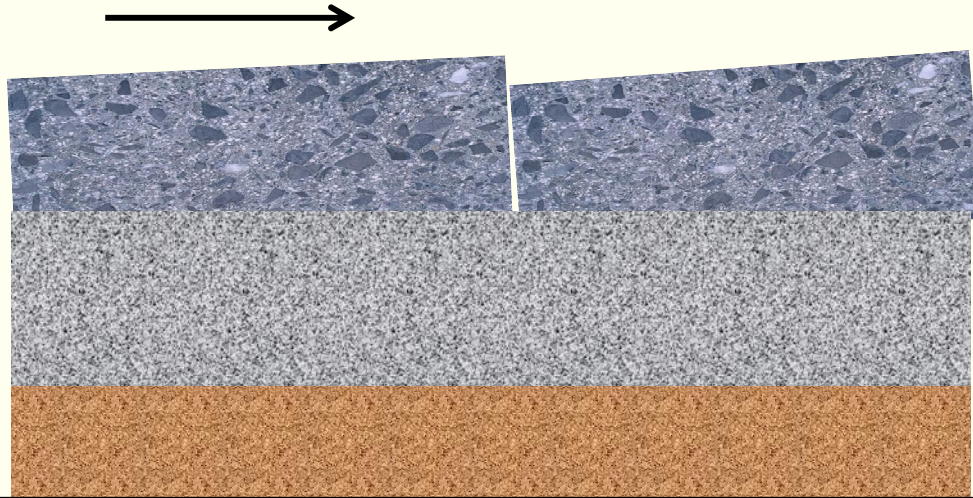


Concrete Deformations



Concrete Deformations

Deformations – Faulting



Concrete Deformations

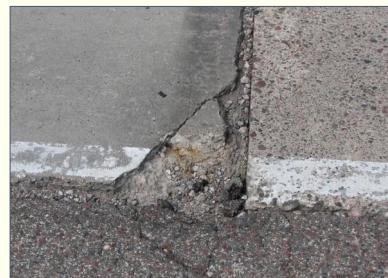
Concrete Cracking



Transverse



Meander



Corner

Concrete Cracking

Concrete Cracking – Transverse



Concrete Cracking

Concrete Cracking - Transverse



Concrete Cracking

Concrete Cracking - Meander



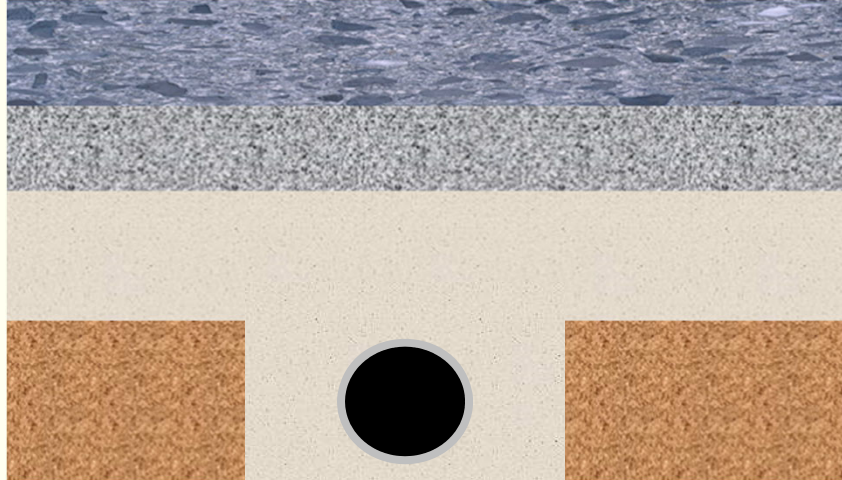
Concrete Cracking

Concrete Cracking - Meander



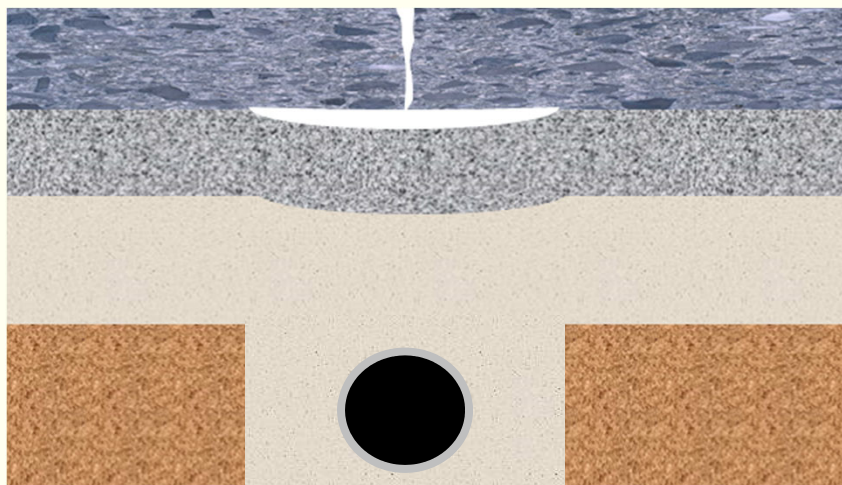
Concrete Cracking

Settlement – Utility Trench



Concrete Cracking

Settlement – Utility Trench



Concrete Cracking

Meander Crack – New Construction



Concrete Cracking

Concrete Cracking – Corner Break



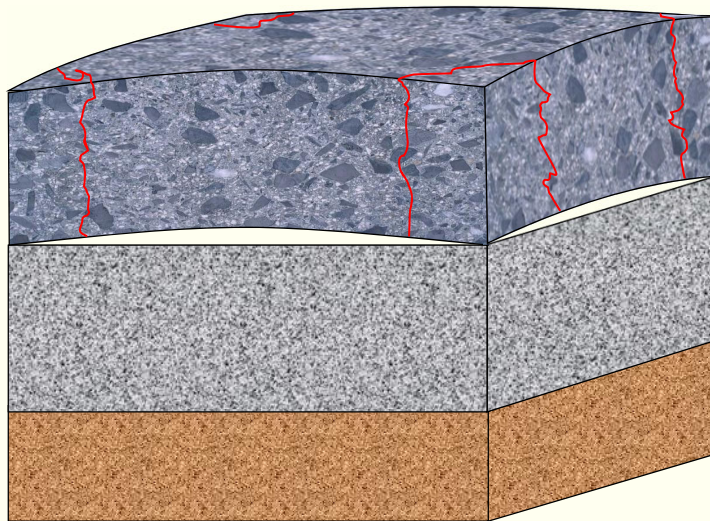
Concrete Cracking

Concrete Cracking – Corner Break



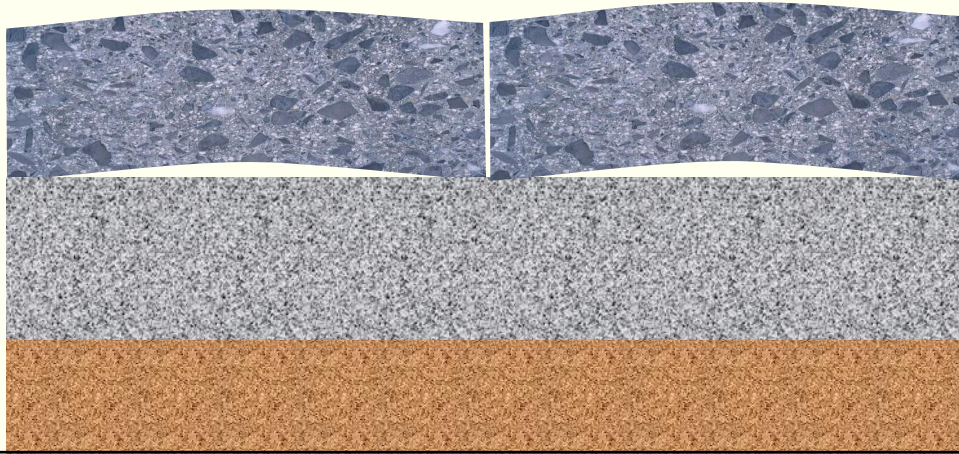
Concrete Cracking

Concrete Cracking – Slab Curling / Corner Break



Concrete Cracking

Concrete Cracking – Slab Curling / Corner Break



Concrete Cracking

Concrete Joint Distress



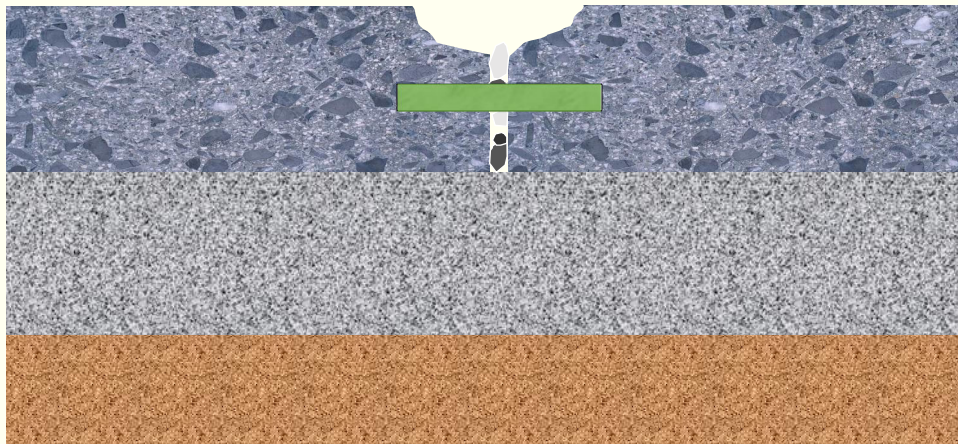
Concrete Joint Distress

Typical Concrete Joint



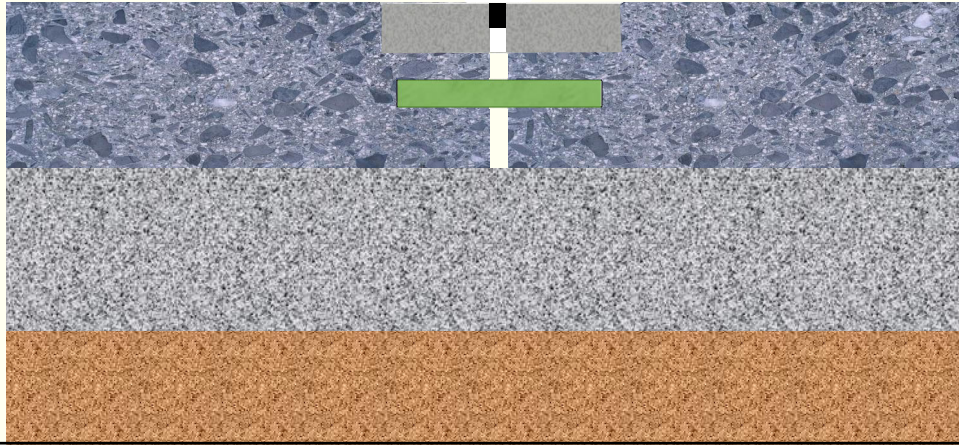
Concrete Joint Distress

Cause of Joint Spall – Incompressible Materials



Concrete Joint Distress

Partial Depth Joint Repair



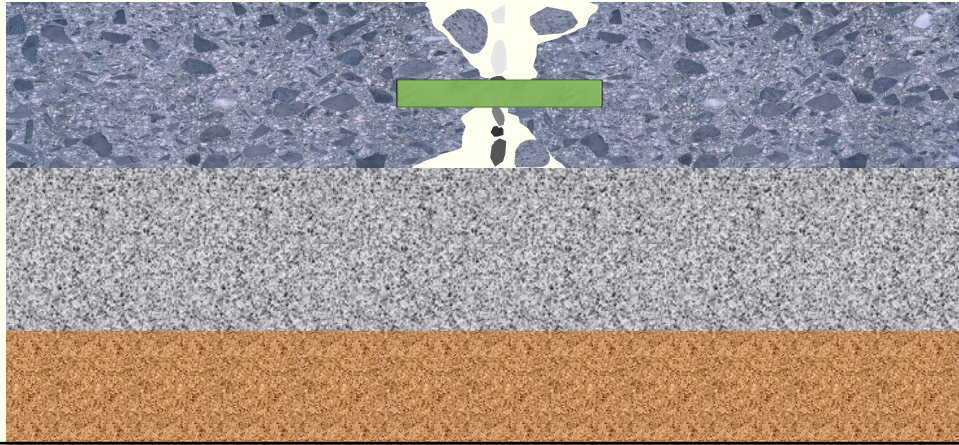
Concrete Joint Distress

Partial Depth Joint Repair



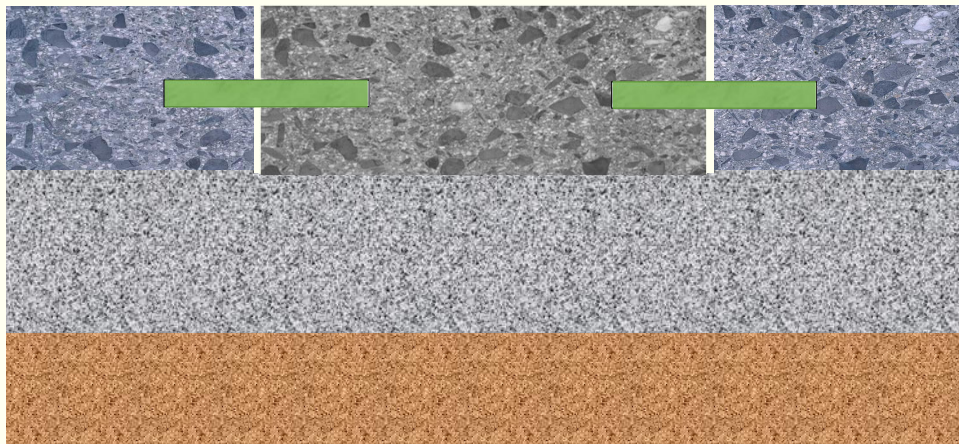
Concrete Joint Distress

Full Depth Needed



Concrete Joint Distress

Full Depth Joint Repair



Concrete Joint Distress

Full Depth Joint Repairs



Concrete Joint Distress

Joint Distress – Spalling



First Sign

Concrete Joint Distress

Joint Distress - Spalling



Concrete Joint Distress

Joint Distress - Spalling



Concrete Joint Distress

Joint Distress – Spalling



Concrete Joint Distress

Concrete Surface Distresses



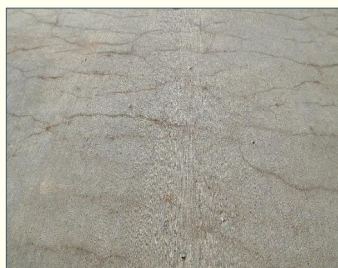
Shallow Steel



Scaling



Pop-out



Map Cracking

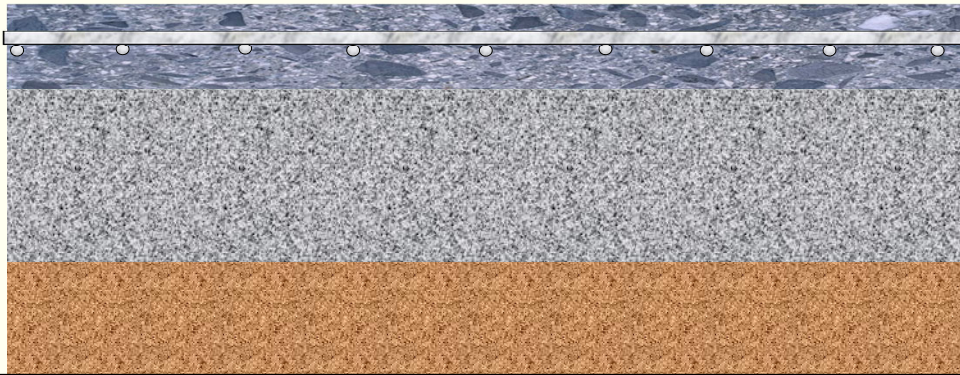


Polishing

Concrete Surface Distress

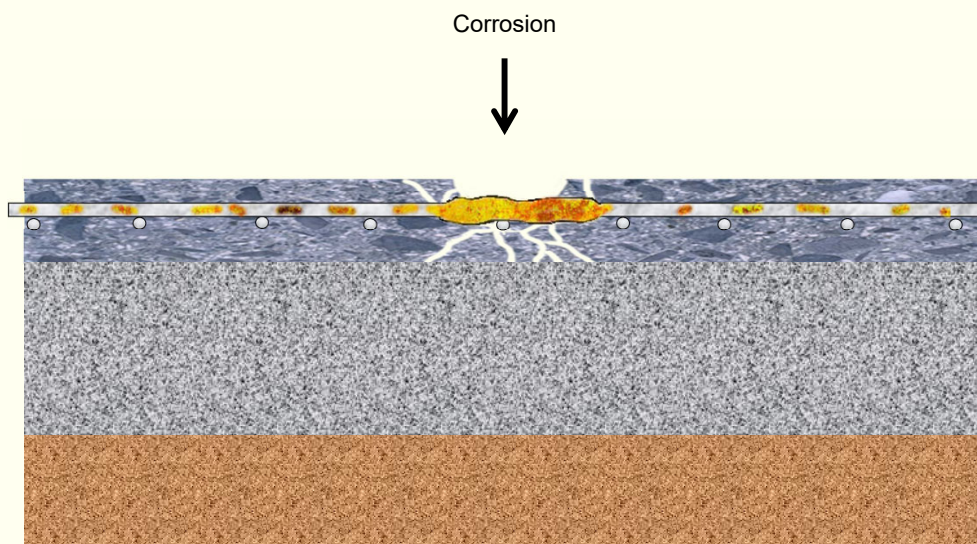
Surface Distress – Shallow Reinforcement

Concrete Surface Distress



Surface Distress – Shallow Reinforcement

Concrete Surface Distress



Surface Distress – Shallow Reinforcement



Concrete Surface Distress

Surface Distress – Shallow Reinforcement



Concrete Surface Distress

Surface Distress – Shallow Reinforcement



Concrete Surface Distress

Surface Distress – Scaling



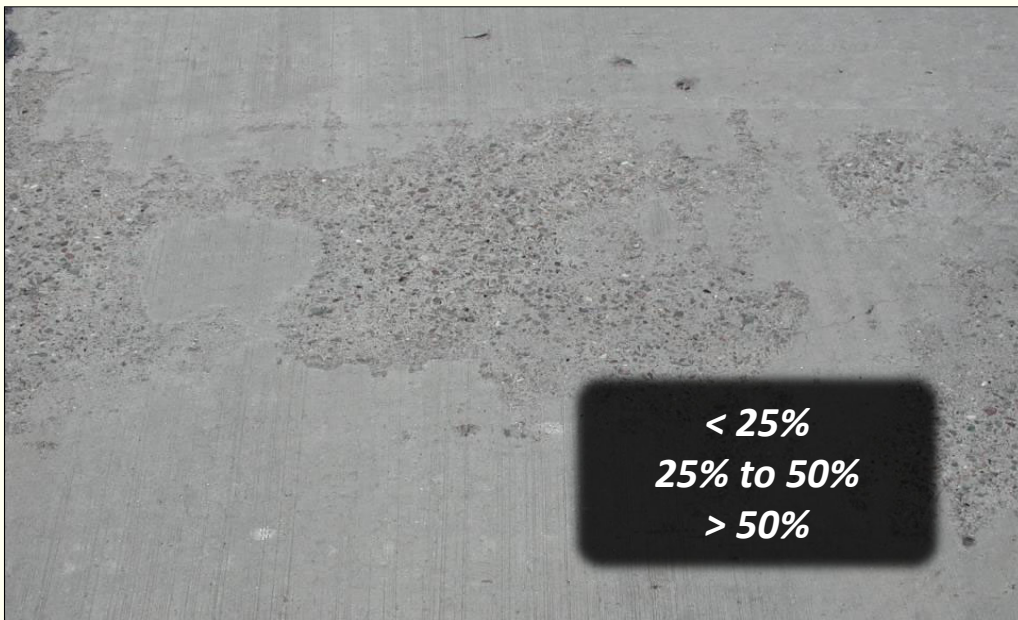
Concrete Surface Distress

Surface Distress - Scaling



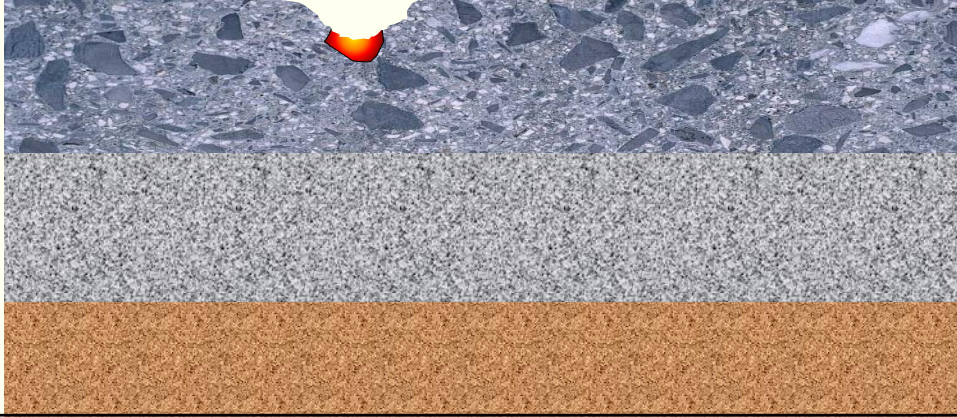
Concrete Surface Distress

Surface Distress – Scaling



Concrete Surface Distress

Surface Distress – Pop Outs



Concrete Surface Distress

Surface Distress – Pop Outs



Concrete Surface Distress

Surface Distress – Map Cracking



Concrete Surface Distress

Surface Distress – Polishing



Concrete Surface Distress

Surface Distress – Polishing



Concrete Surface Distress

Sealcoat Pavements

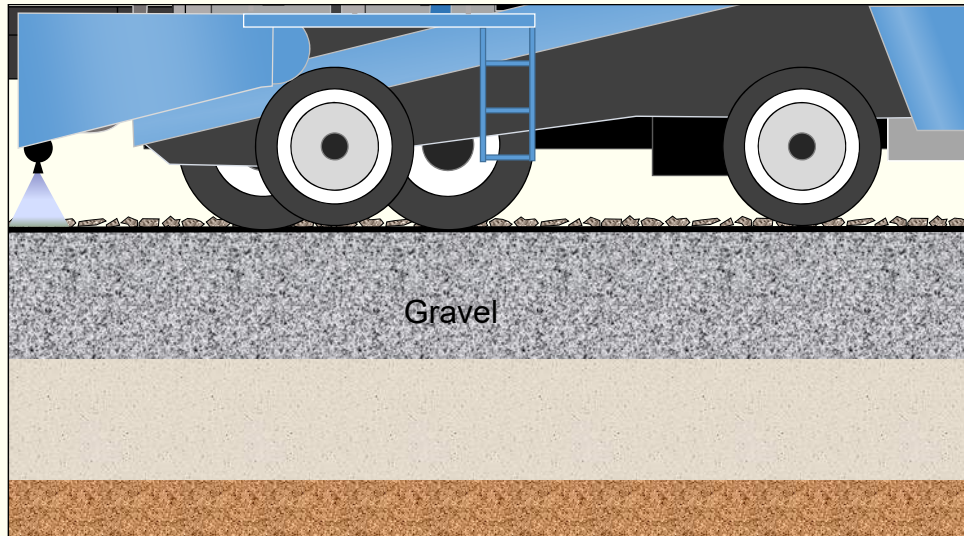
Michigan Sealcoat Rating Guide

Rating	Condition/Defects	Remedy/Action	Typical Age (Years)
10	New construction	None	
9	Like new	None	
8	Flare tips of distress Edge distress (spalls)		
7	Loss distress - 10% Rating of 7 to 10	Apply to open spaces patching and double applications sealcoat	6 to 8
6	Loss distress - 10% Rating of 6 to 7	Wedge and re-apply to open spaces patching and double or triple applications sealcoat	7 to 9
5	Loss distress - 10% Rating of 5 to 6	Wedge and re-apply to open spaces patching and double or triple applications sealcoat	8 to 10
4	Loss distress - 10% Rating of 4 to 5	Reconstruct by cracks and slope prior to seal wetcoat surface, possible water to gravel	
3	Loss distress - 10% Rating of 3 to 4	Reconstruct by cracks and slope prior to seal wetcoat surface, or water to gravel	
2	Loss distress - 10% Rating of 2 to 3	Reconstruct by cracks and slope prior to seal wetcoat surface, or water to gravel	
1	Extensive distress - 10% of surface area	Reconstruct by cracks and slope prior to seal wetcoat surface, or water to gravel	
0	Max. extent		

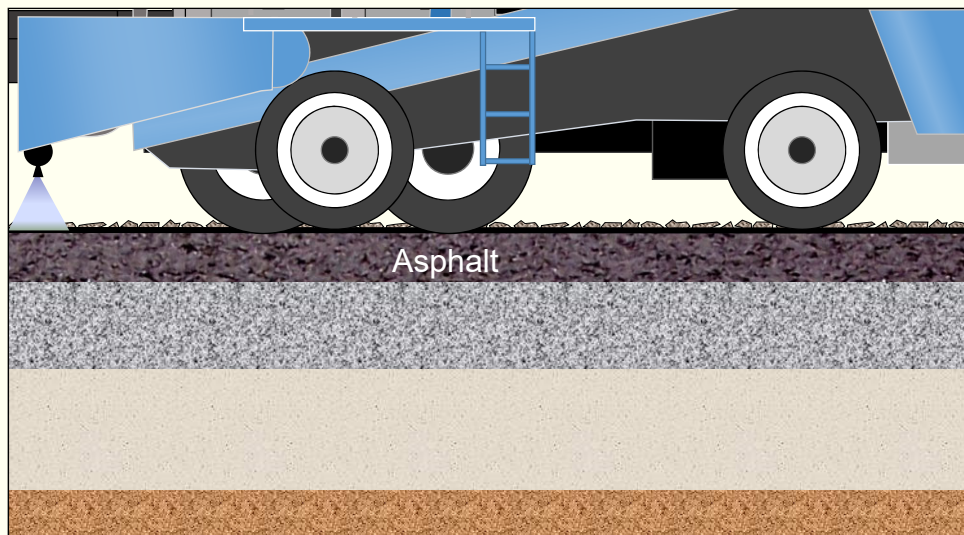
Source: To be used for Michigan T&E data collection on wetcoat pavement condition of P&E Sealcoat distress

Michigan Transportation Board Management Council Michigan Technology & Training 2020 Center for Technology & Training

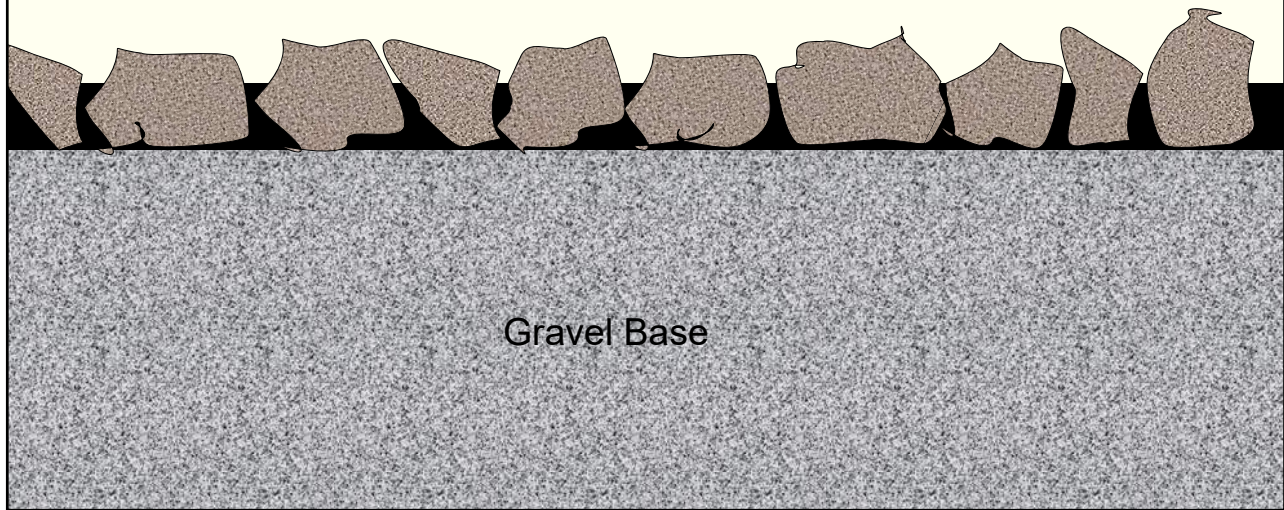
Chip Seal Pavement



Chip Seal on HMA



Sealcoat Pavement Close Up



Asphalt vs. Sealcoat



← Sealcoat

Hot Mix Asphalt →



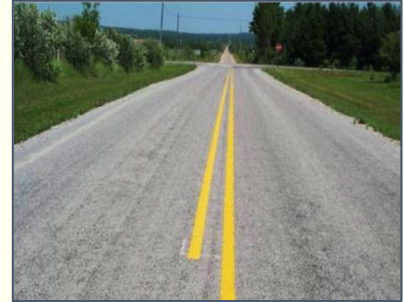
Sealcoat Distress Types



Edge Distress

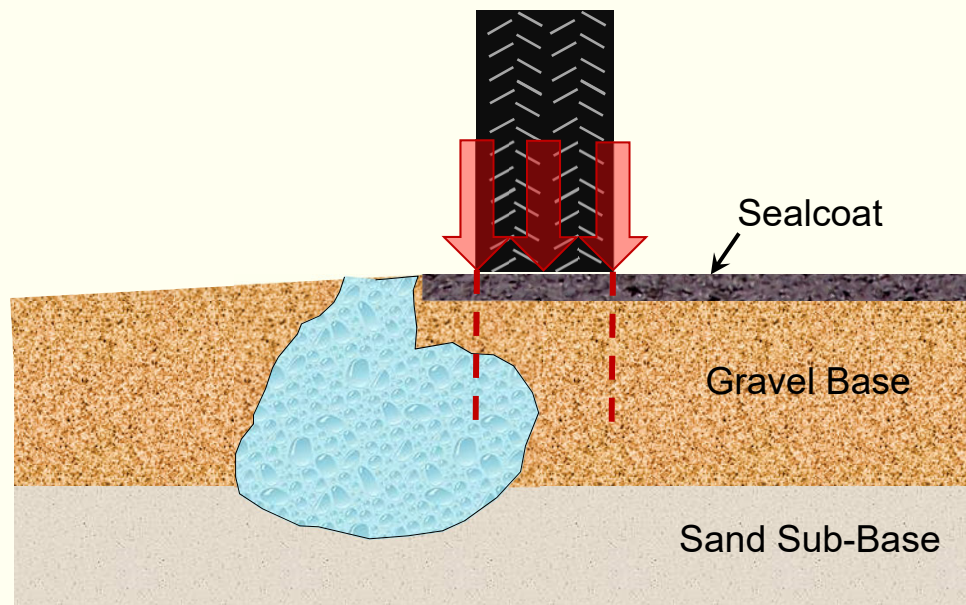


Lane Distress



Raveling

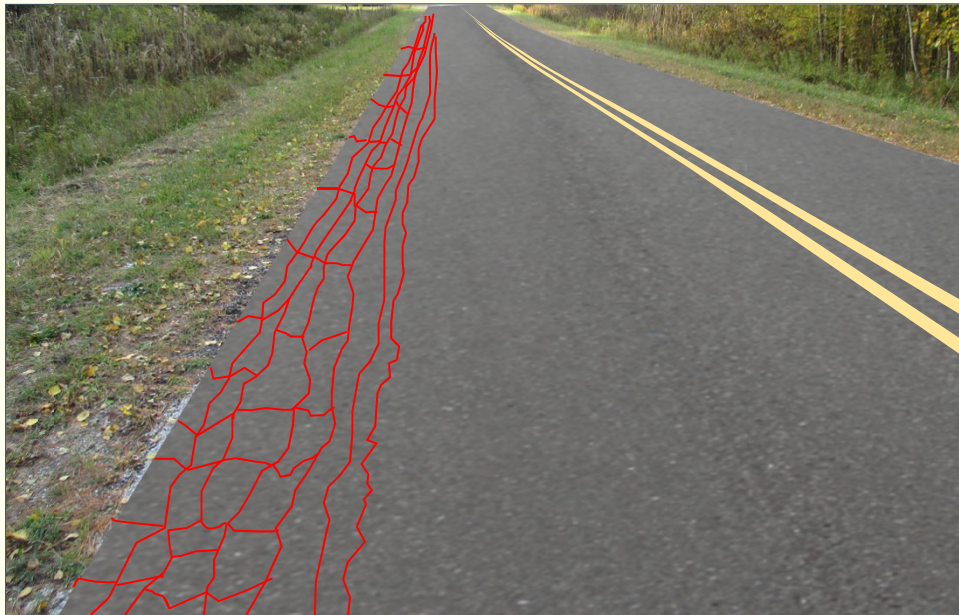
Edge Distress



Edge Distress Progression



Edge Distress Progression



Edge Distress



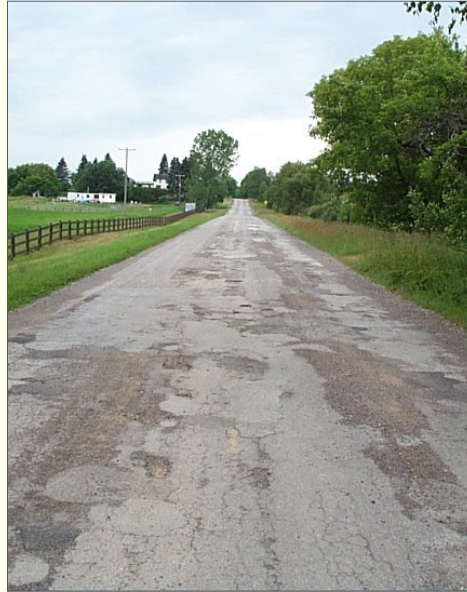
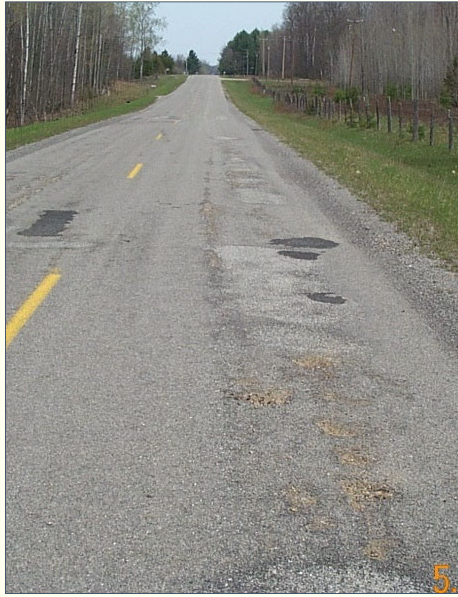
Lane Cracking

Percent of Worst Lane



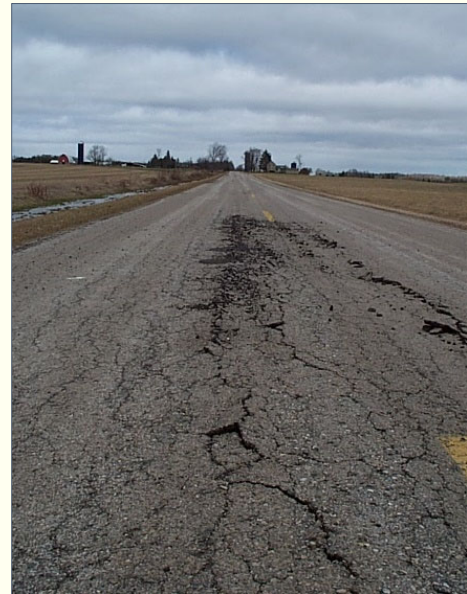
Raveling

Percent of Worst Lane



Rutting

Depth in Inches



Upcoming Trainings & Final Thoughts

IBR Training – February 2nd, March 8th, June 21st

Master the Roadsoft Data Collection Cycle for MPO/RPO – TBD

Review PASER Manuals prior to next training



Michigan Technological University • Department of Civil & Environmental Engineering

PASER Training

Part 2: Pavement Rating Introduction and Council Update



Michigan
Transportation Asset
Management Council

TAMC Data Collection Training Program

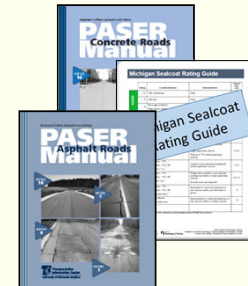
PASER for Paved Roads

Part 1: Distress Identification

Part 2: Pavement Rating Intro & Council Update

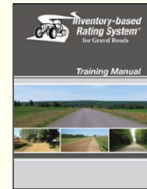
Part 3: Rating and Data Collection Rules

Part 4: Rating Exercises



Inventory-Based Rating for Gravel Roads

See ctt.mtu.edu for upcoming trainings



PASER Training Part 2 Agenda

Rating System Overview

Rating Demonstration

Reasons to Rate Roads

News from  Michigan
Transportation Asset
Management Council

Data Collection Business Rules

Overview of Rating Systems

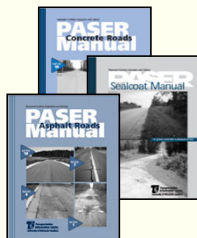
that are used to rate pavements

Road Rating Systems

There are many systems available



Distress Identification Manual



PASER



International Roughness Index



Pavement Condition Index



Present Serviceability Index

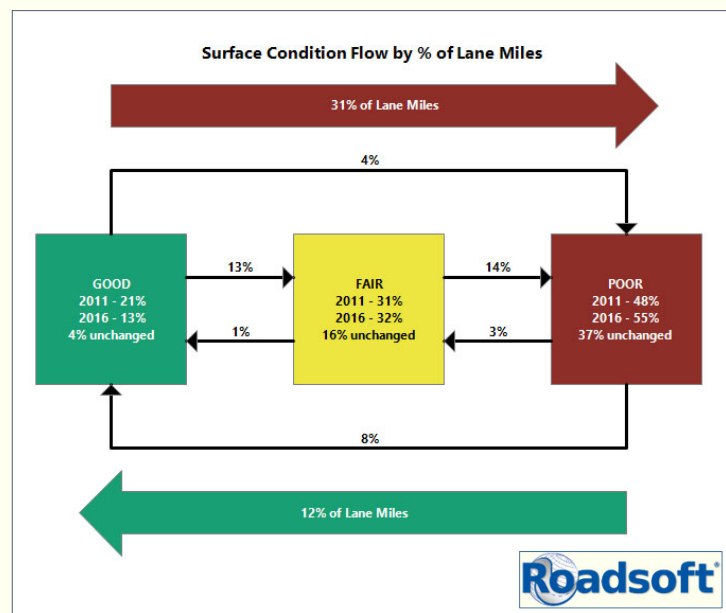
Some systems are end of life measures



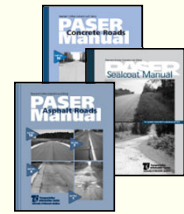
Only collect “decision making” data!

Data should:

- Evaluate outcomes
- Direct decisions
- Convey information
- Tell your story



PASER is a visual inspection system



Determine Distress:

Type

What is it?

Extent

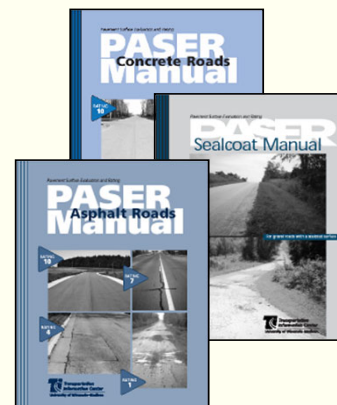
How much?

Severity

How bad?

PASER Estimating

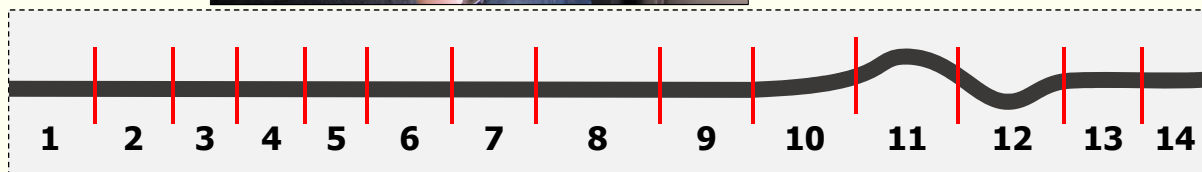
- Segments are not consistent
- Rate overall condition
- Ignore isolated distresses
- All distresses may not be there
- Split segments with caution

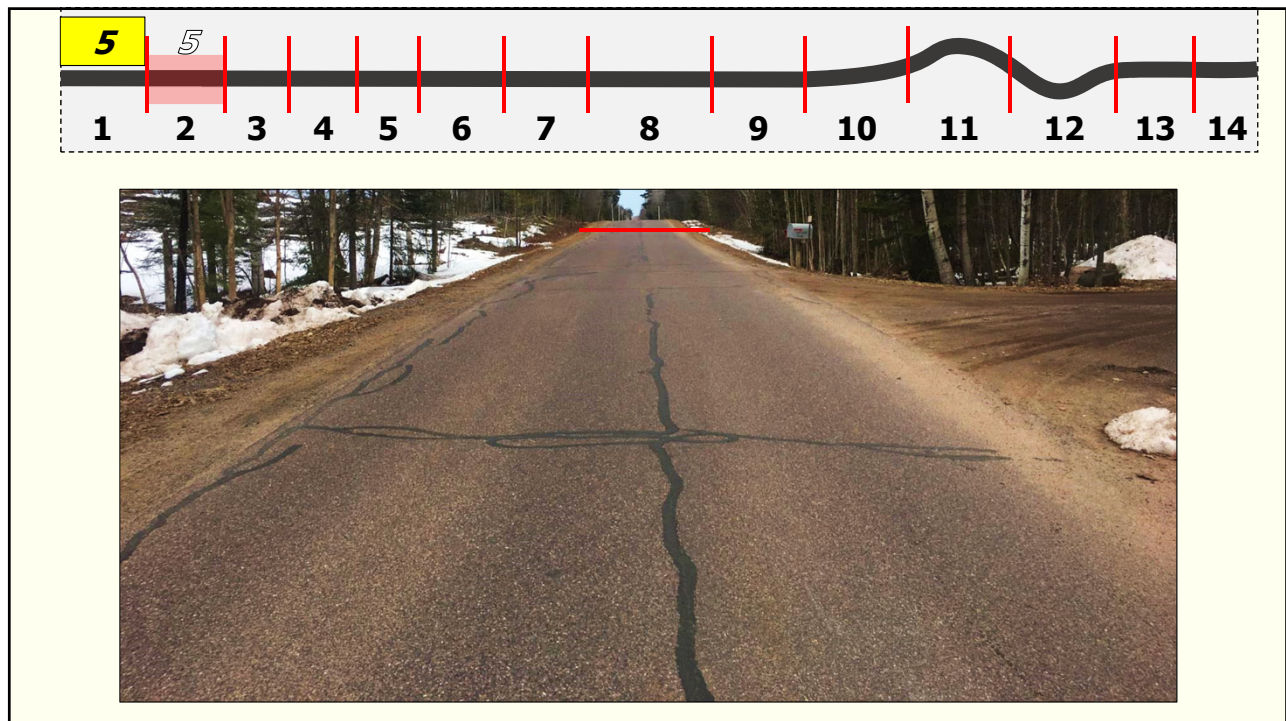
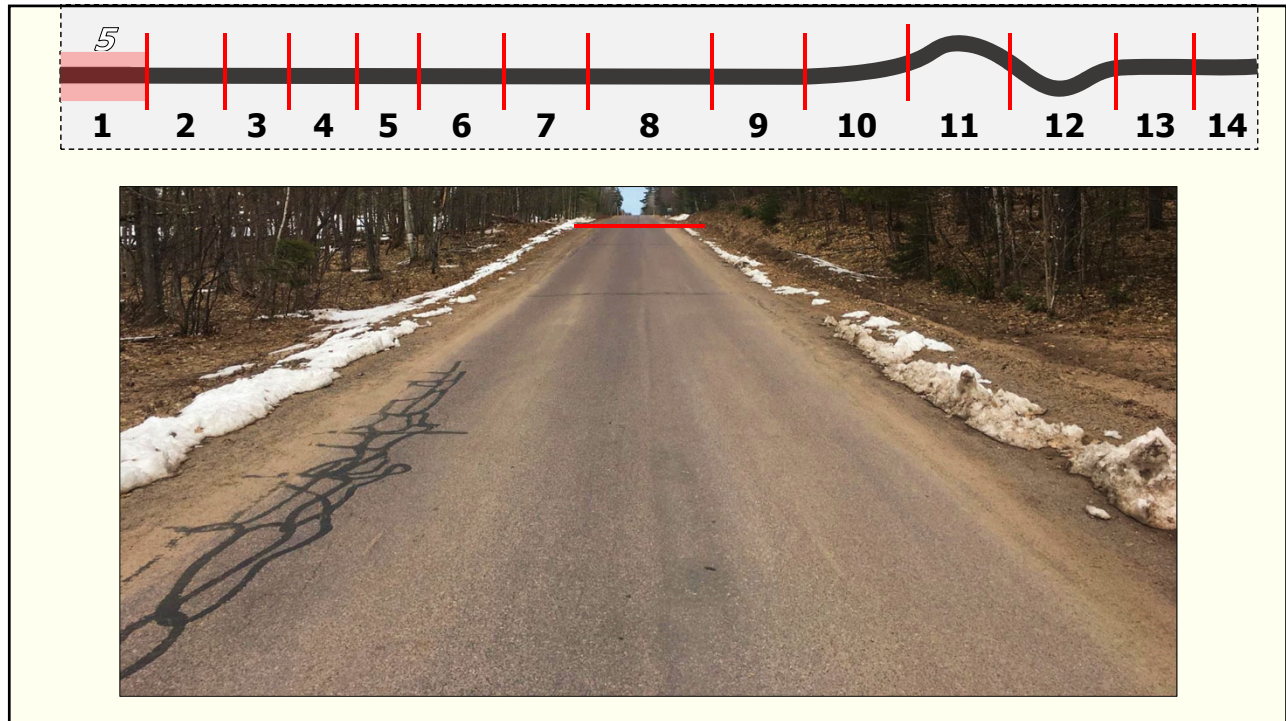


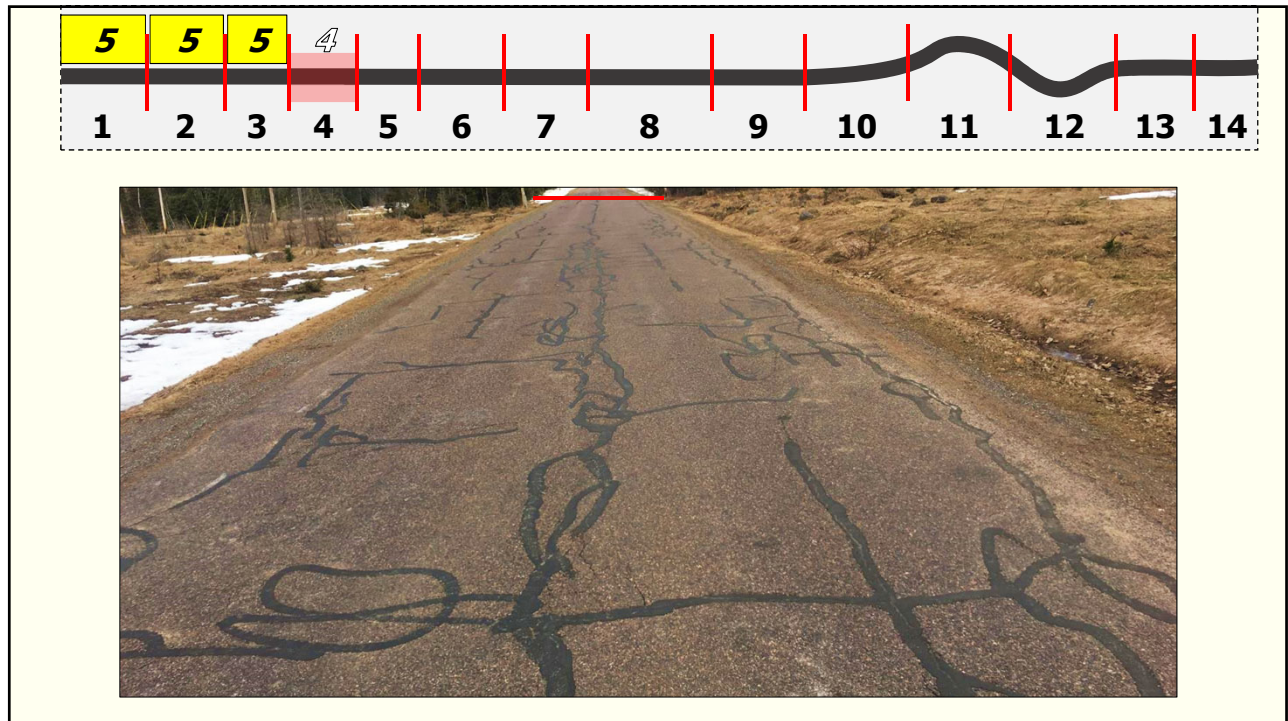
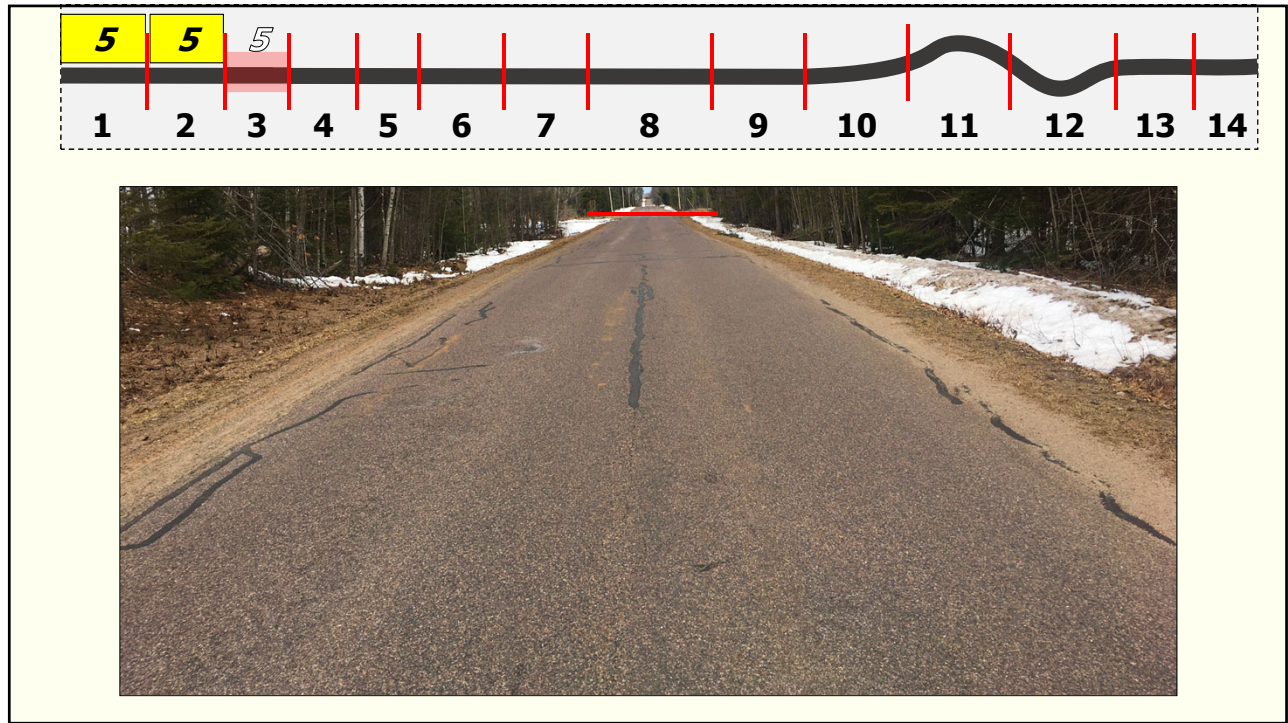
Rating Demonstration

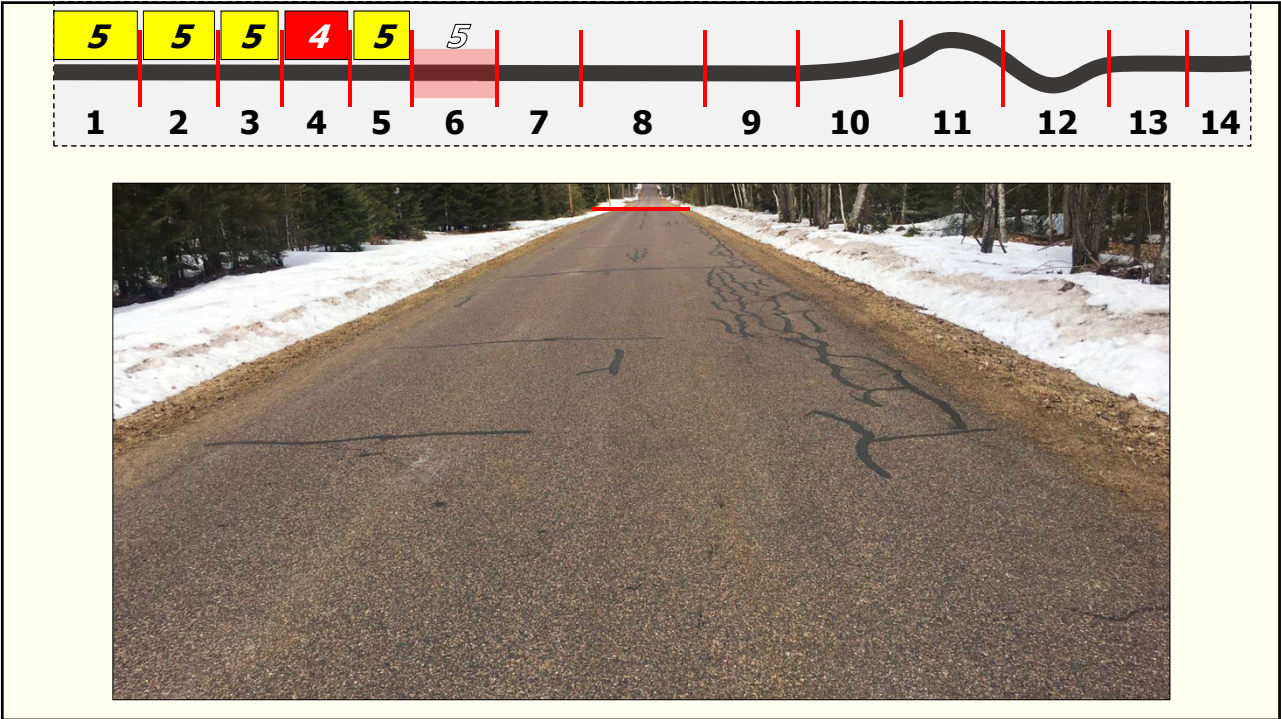
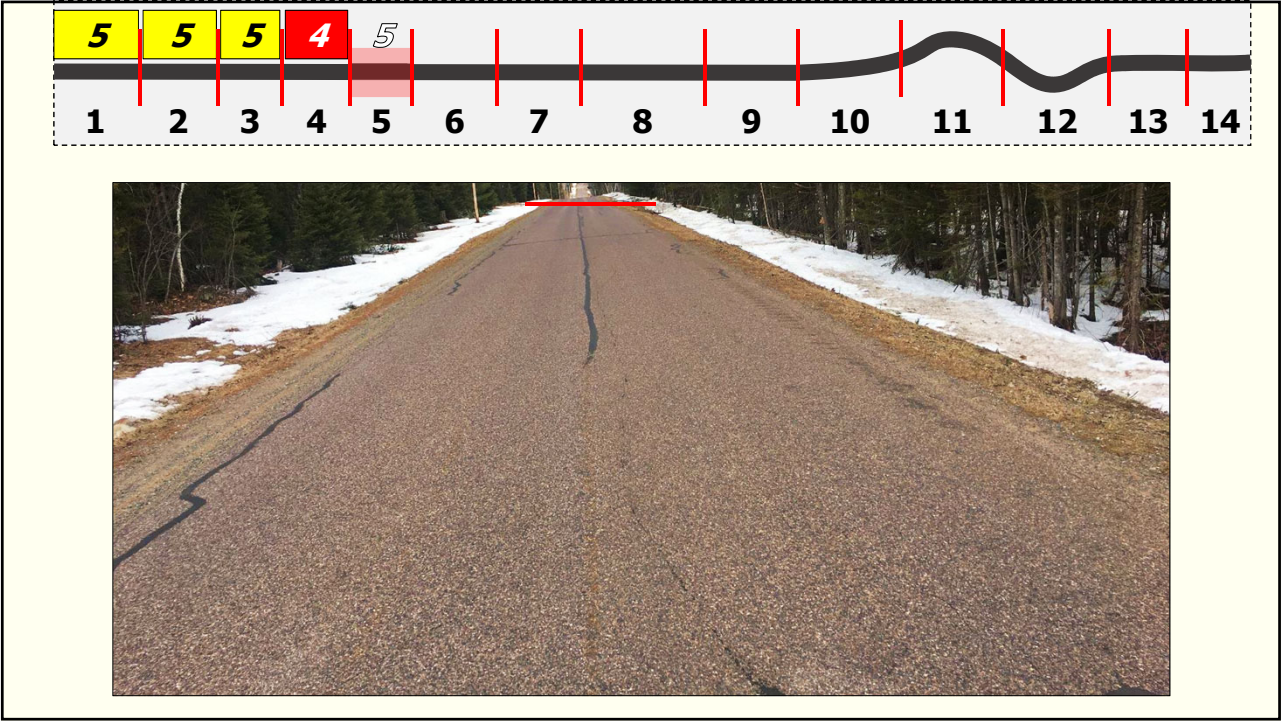
of using PASER on an actual segment

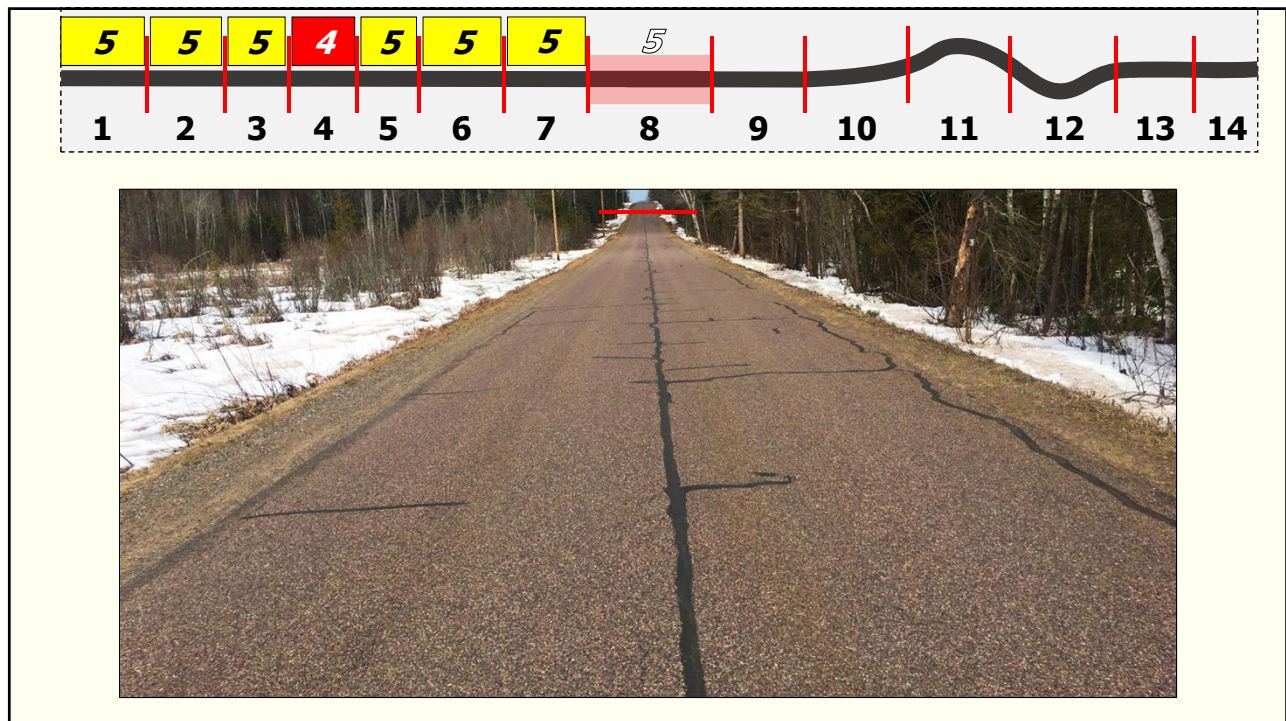
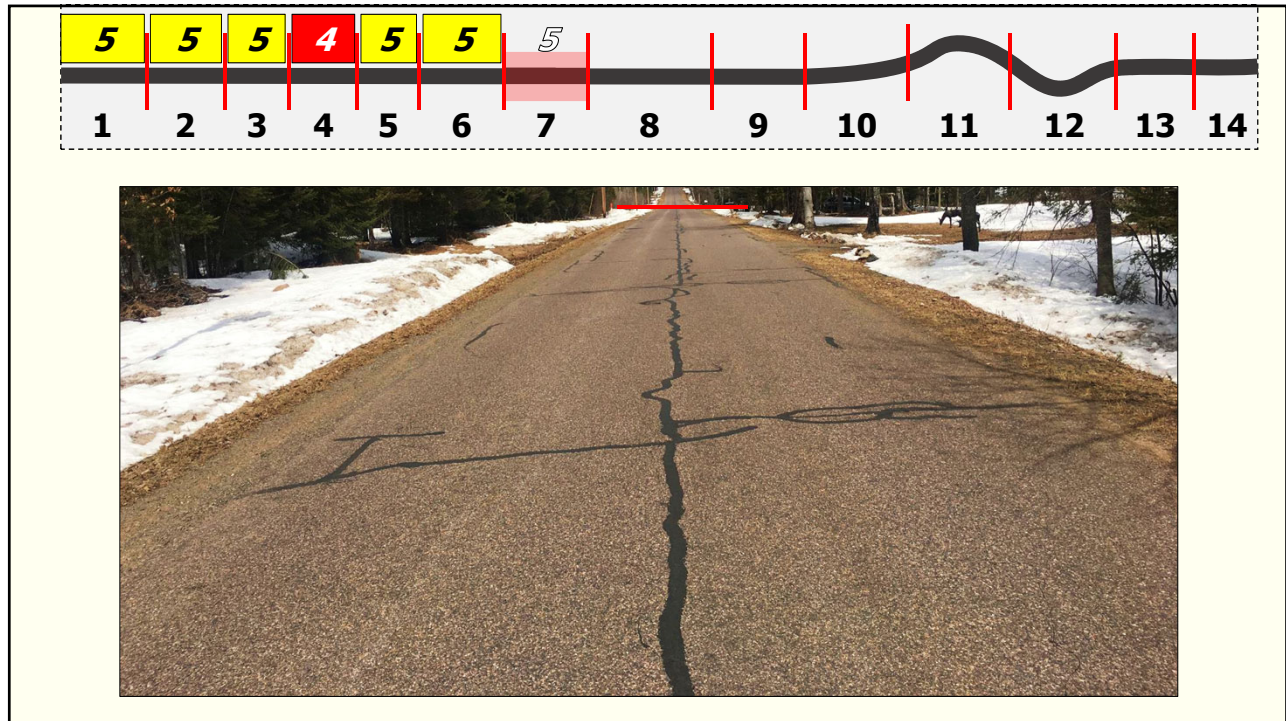
Rating Demonstration

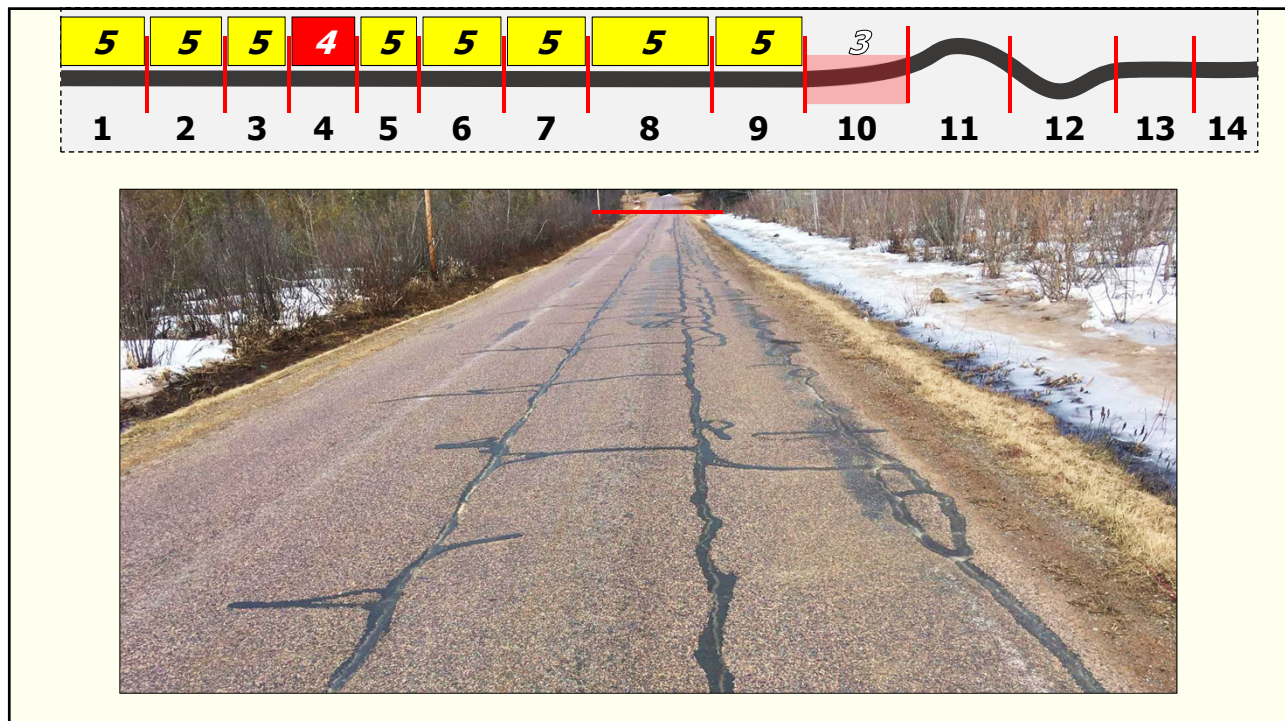
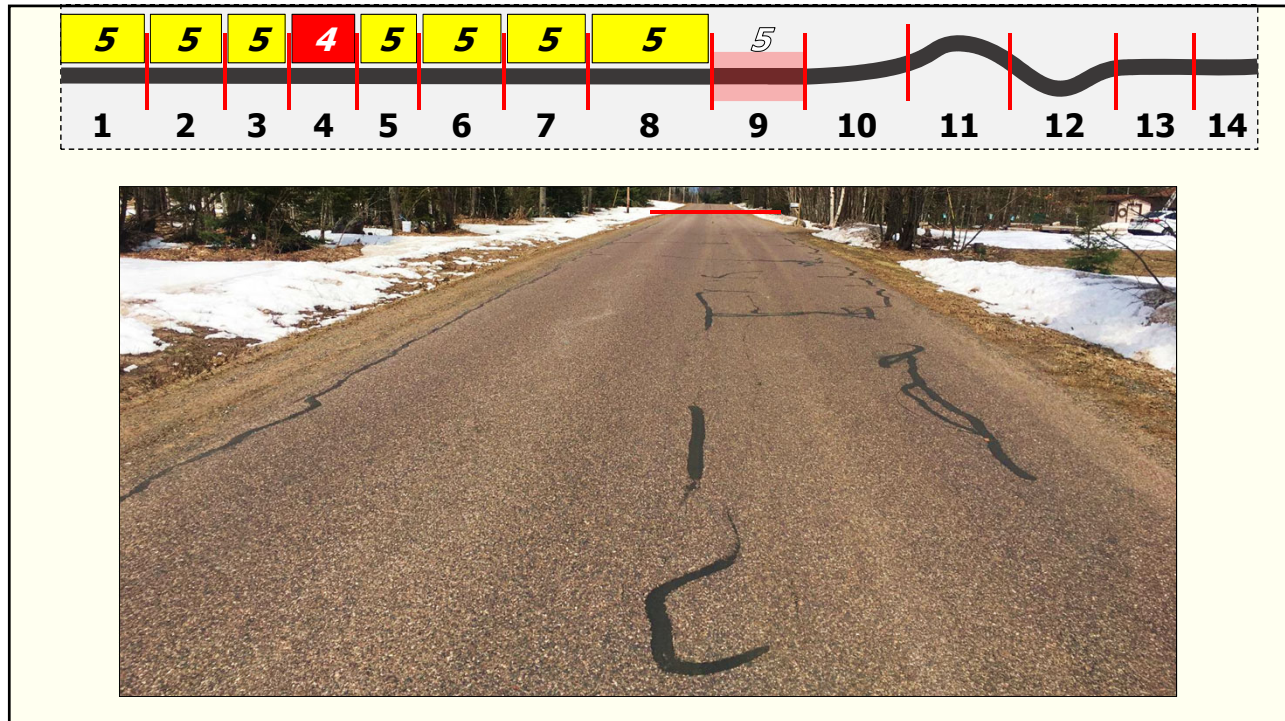


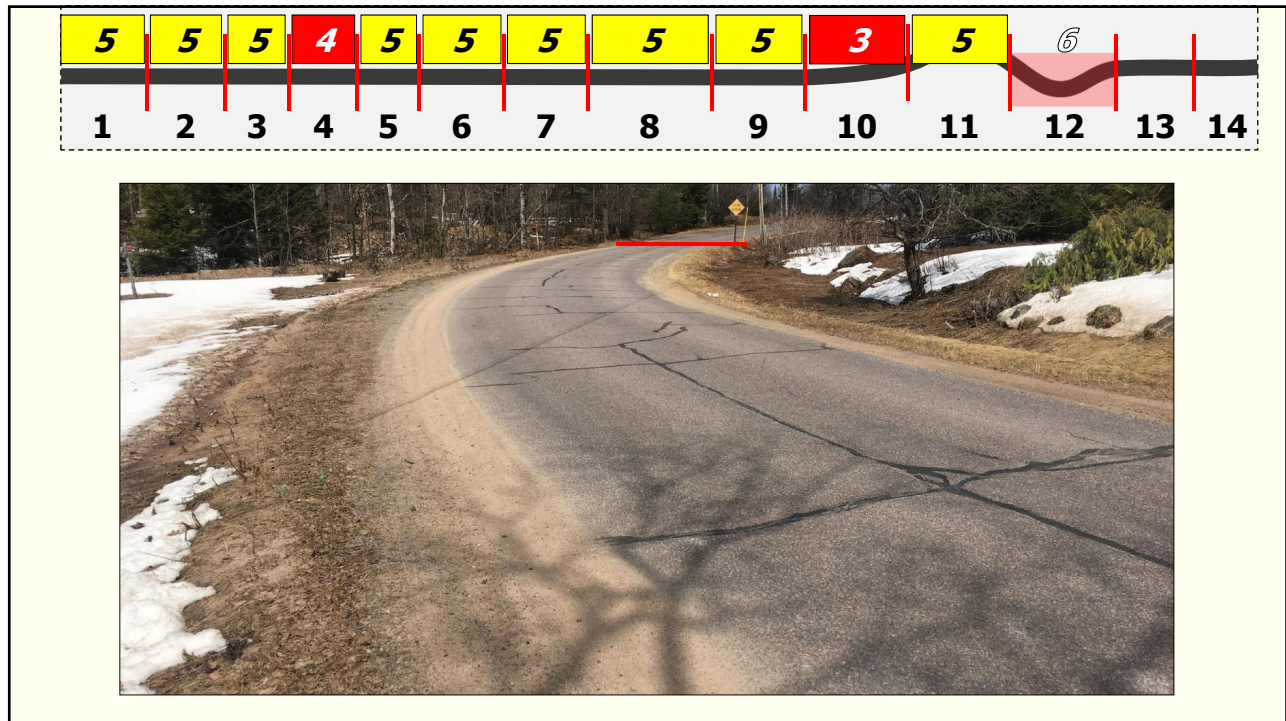


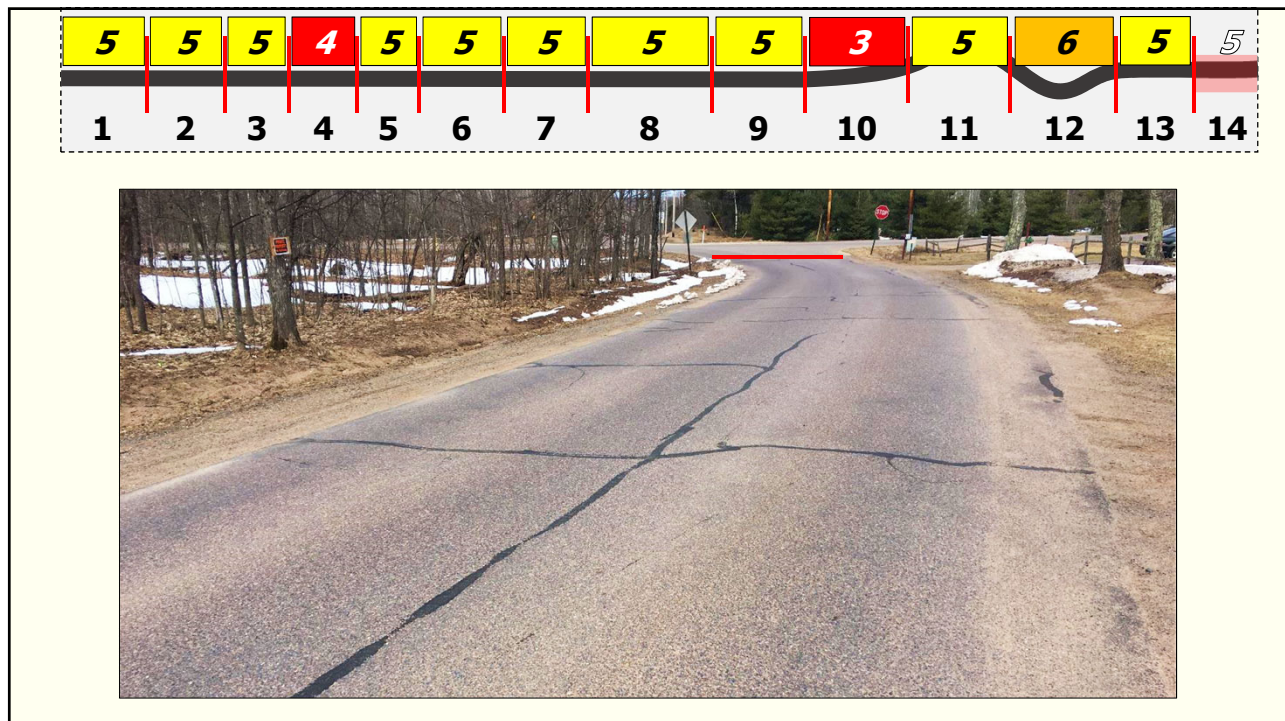
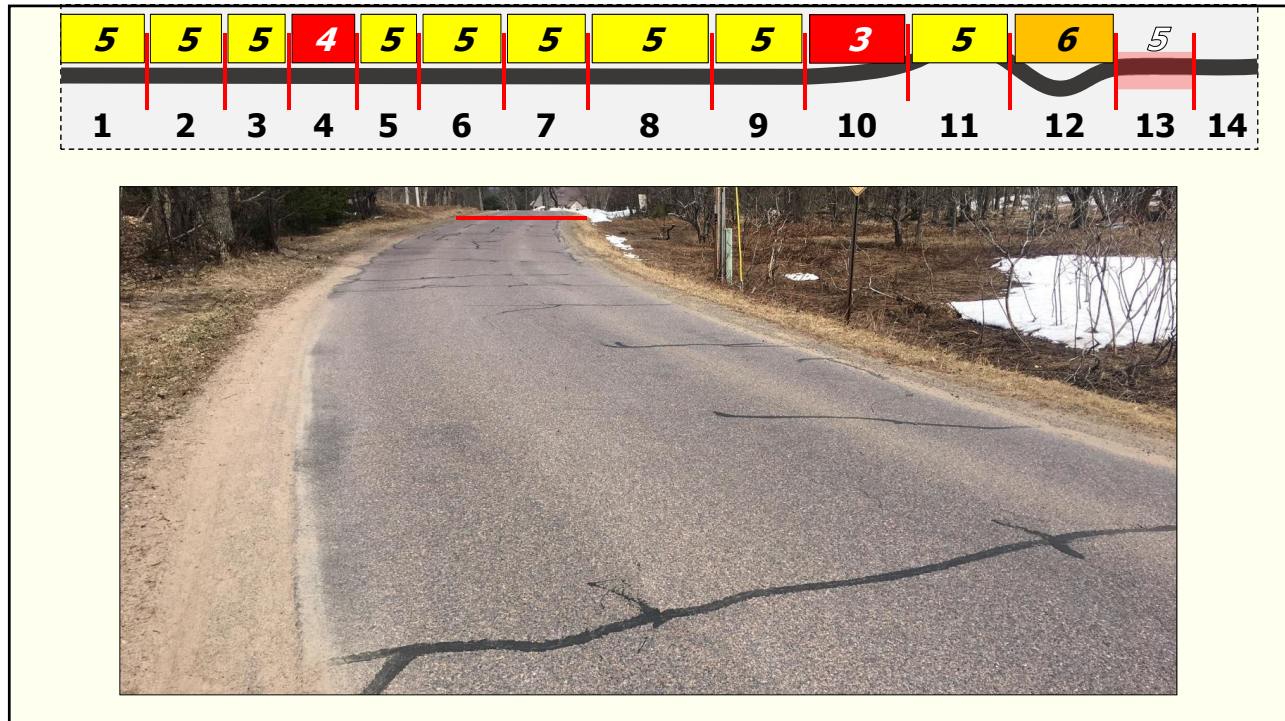




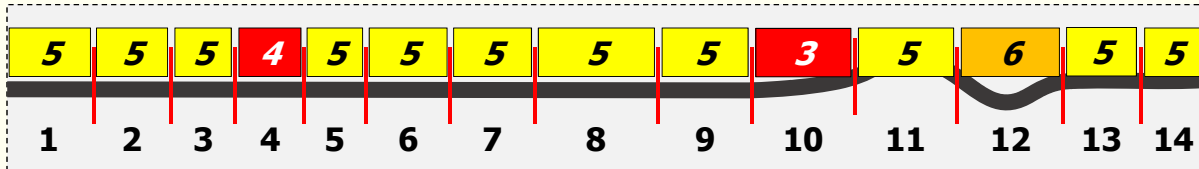








What were the distresses?



Edge Distress Transverse Cracks
 Block Cracking
 Alligator Cracking
 Rutting

Using PASER

PASER is a visual system

Rate the most consistent condition

All distresses may not be present

Reasons to Rate Roads

and what you can do with the data

Why is TAMC Rating Roads?



Foundations of Road Rating in Michigan

- PA 499 (2002)
 - All public roads in Michigan will be managed using the principles of asset management
 - Created Transportation Asset Management Council (TAMC)
- PA 199 (2007)
 - TAMC shall develop a pavement management system
 - MDOT and LA reporting to the council is mandatory
 - Road and Bridge condition
 - 3 year project plan
 - Expenditures

TAMC Annual Report To Legislature



MICHIGAN'S 2020 Roads & Bridges ANNUAL REPORT



Michigan
Transportation Asset
Management Council

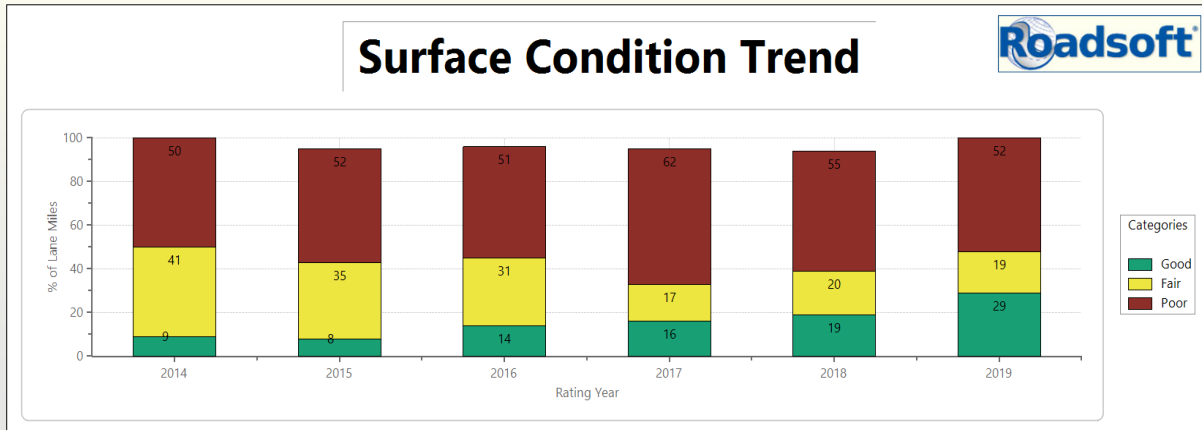


"All public roads in Michigan will be managed using the principles of asset management"
- Public Act (PA) 499 of 2002 created the Michigan TAMC

Michigan.gov/TAMC

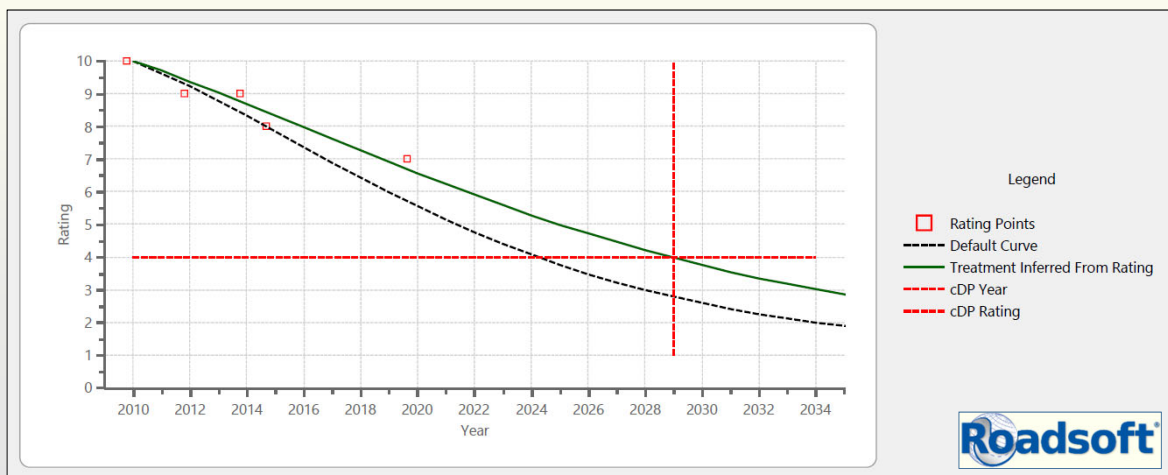
Why Should You Rate Roads?

See how road condition is changing



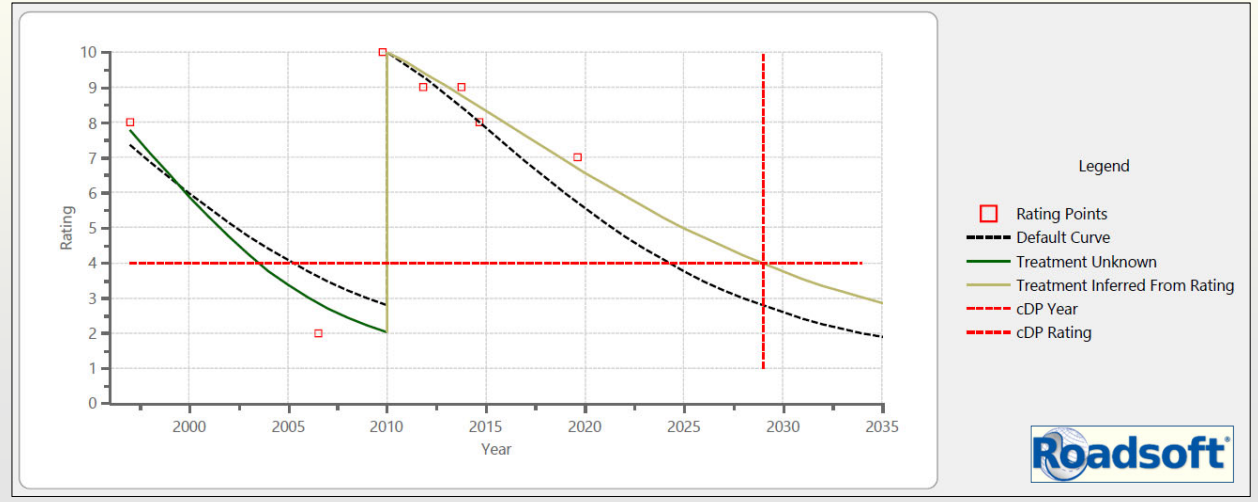
Why Should You Rate Roads?

Estimate future road conditions



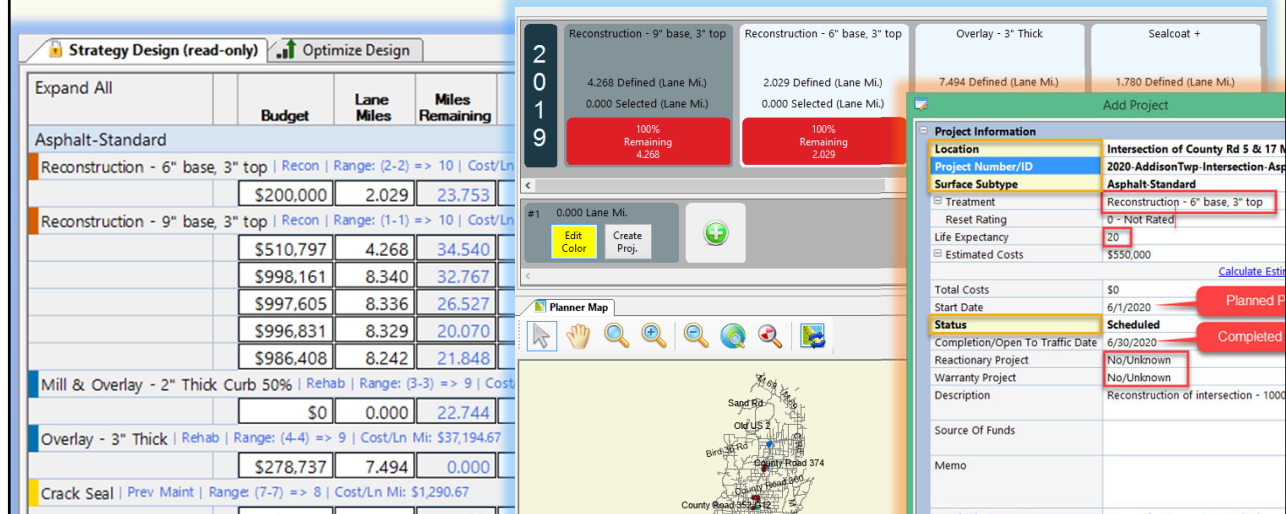
Why Should You Rate Roads?

Measure effectiveness of past improvements



Why Should You Rate Roads?

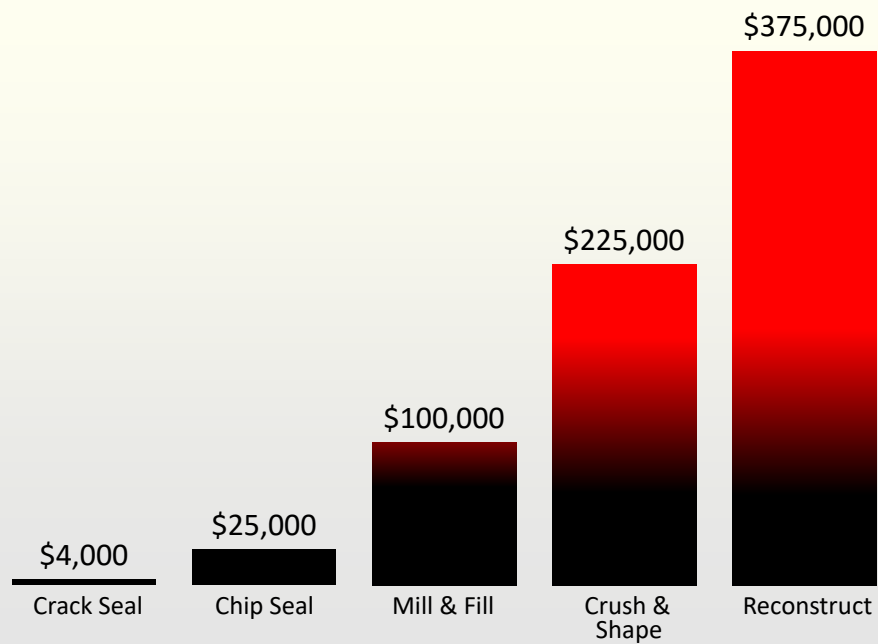
Determine What, Where and When improvements are needed

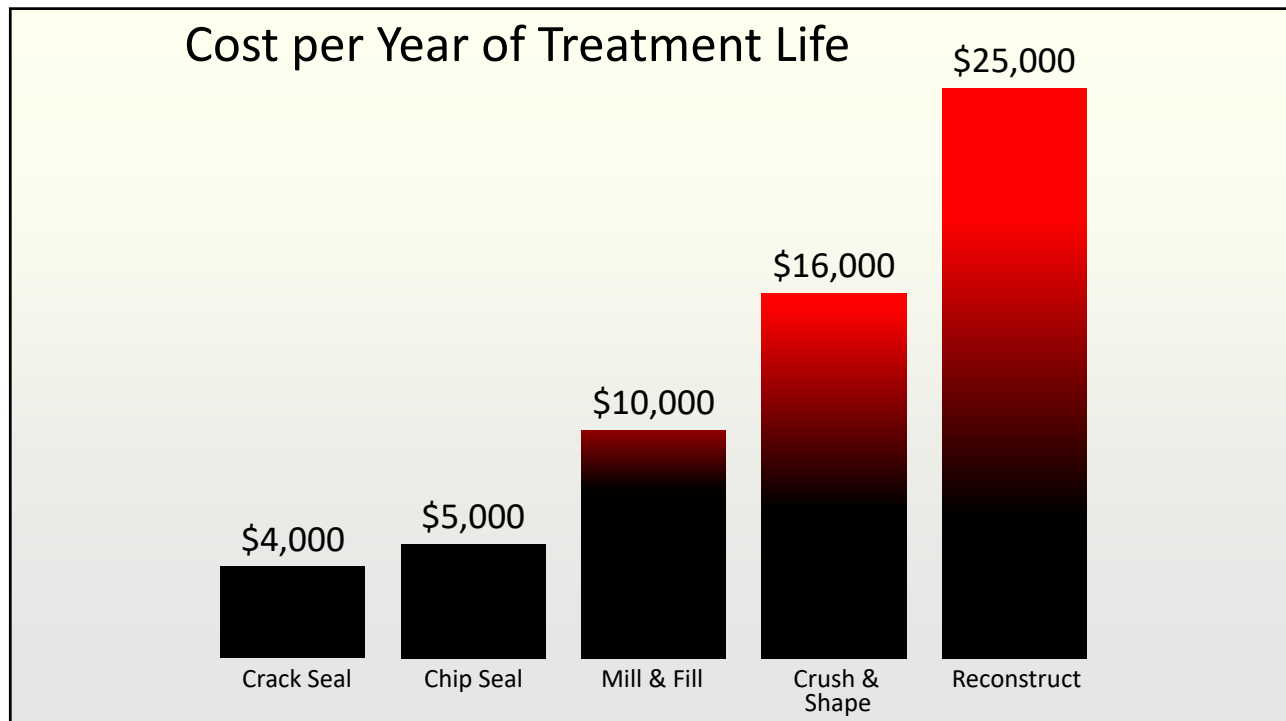
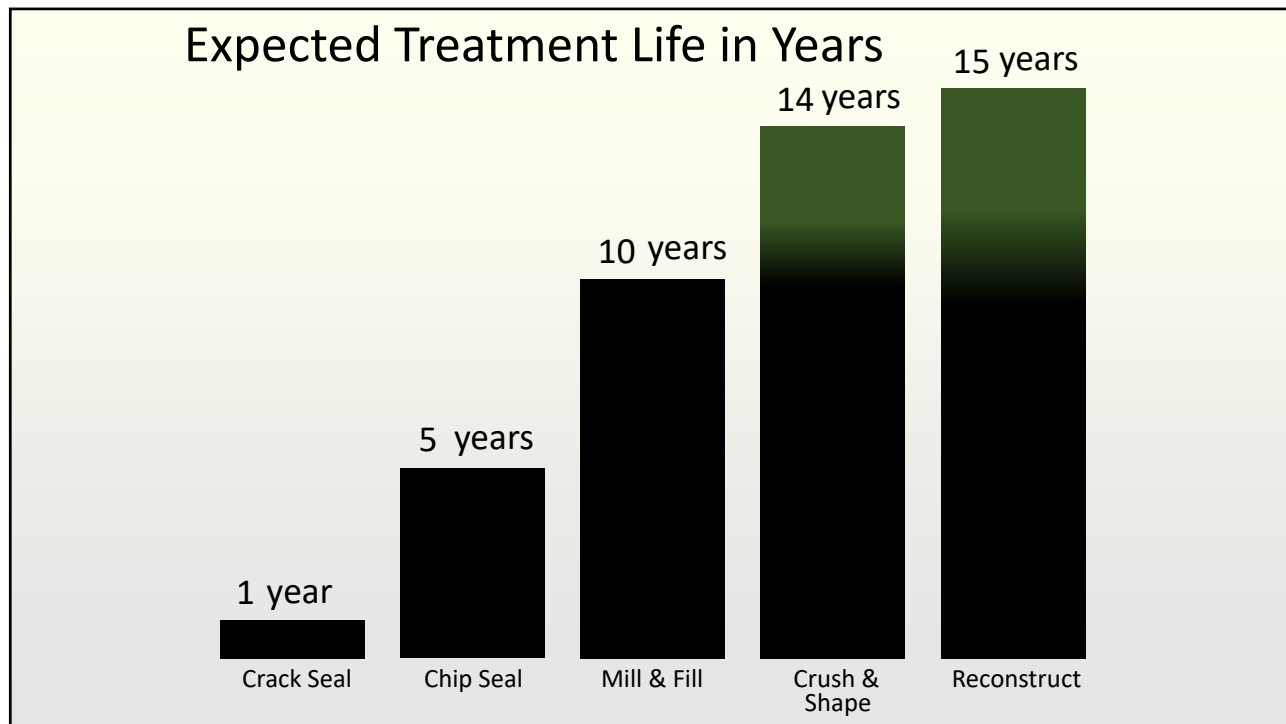


Cost Effectiveness of Treatments



Initial Construction Cost





Rating Roads in Michigan

TAMC uses PASER for Asphalt and Concrete

MI Specific Sealcoat Guide for Sealcoat

Inventory-Based Rating System™ for Unpaved



Michigan
Transportation Asset
Management Council

Update



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PASER Training

Part 3: Rating and Data Collection Rules



Michigan
Transportation Asset
Management Council

TAMC Data Collection Training Program

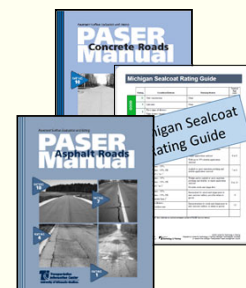
PASER for Paved Roads

~~Part 1: Distress Identification~~

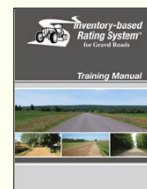
~~Part 2: Pavement Rating Intro & Council Update~~

Part 3: Rating and Data Collection Rules

Part 4: Rating Exercises



Inventory-Based Rating for Gravel Roads



See ctt.mtu.edu for upcoming trainings

PASER Training Part 3 Agenda

Business Rules

Rules for Rating

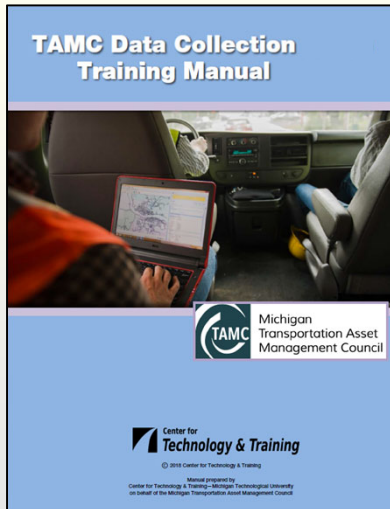
Rating Tips

Collection Reminders

Business Rules

when collecting data for TAMC's data collection effort

Reporting Data: TAMC Data Collection



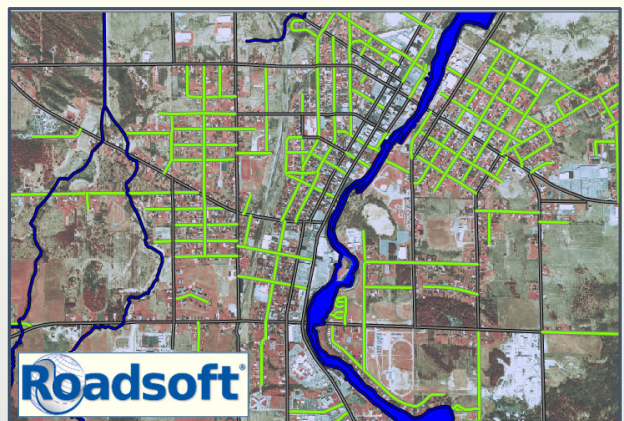
<https://www.ctt.mtu.edu/sites/default/files/resources/paser/tamc-data-collection-manual.pdf>

Reporting Data: Tale of Two Data Collections

- TAMC federal-aid data collection

- Non-federal-aid data collection

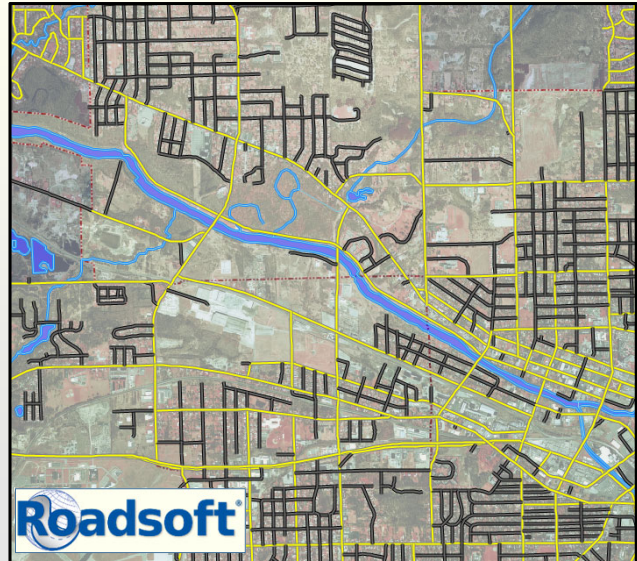
- Agency decides what to collect
- Agency must get approval first to be eligible for reimbursement
- Agency rater does agency's own roads



Reporting Data: What to Rate

Federal-aid network

- Rate 50% of federal-aid-eligible roads for 2022 (paved and unpaved)



Reporting Data: How to Rate

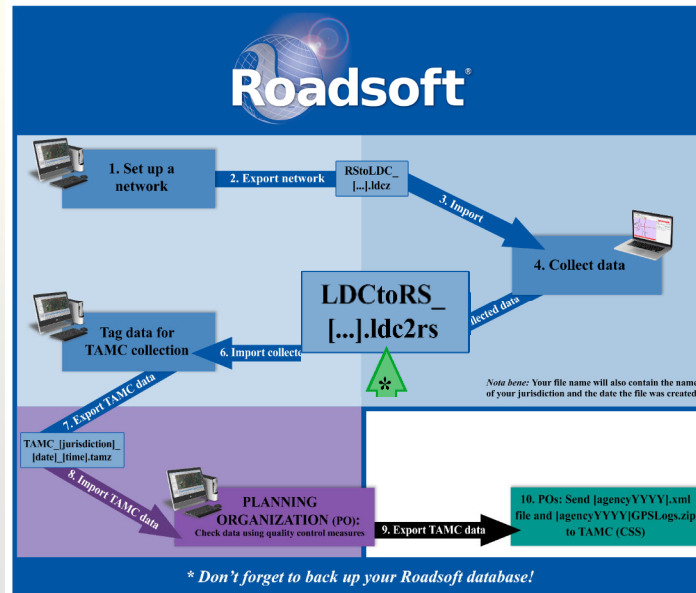
Tools

- Roadsoft and the Laptop Data Collector
 - Roadsoft 2021.X*
 - Roadsoft LDC 2021.X*
 - GPS
 - Framework version 21



*where X = latest version

Reporting Data: How to Rate



Reporting Data: How to Rate

Group	Field	Operator	Value(s)
1	Federal-aid	=	Yes

Reporting Data: When to Collect & Submit

First Monday in APRIL

Begin collection



Last Friday in NOVEMBER

Complete collection



First Friday in DECEMBER

Submit data to CSS



Reporting Data: Funding

- Agencies report time and expenses through planning organization (PO)
- PO reports to the 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		Date:
Name:	Date:	
MDOT Rep -		
Region/MPO Rep -		
County Rep -		
City/Village Rep -		

Please check the following work type:

OFFICE WORK:		FIELD WORK:	
---------------------	--	--------------------	--

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

Example

Reporting Data: Required Information

- Crew first and last names
- Surface type
- Number of lanes
- PASER number/IBR score

The screenshot displays the Roadsoft Laptop Data Collector v2020.10 interface. On the left, a 'Login' window is open with the following fields:

- Database: RStoLDC_Houghton(County)_2020_10_20_14_ (with a 'Load Database' button)
- Local Crew: John Wayne (dropdown menu)
- Region Crew: John Doe (dropdown menu)
- MDOT Crew: Andrew Jackson (dropdown menu)

The main interface shows a map of a road network. A specific road segment is highlighted in green, labeled '4.255 - 6.156 (10037 ft.)' and 'PR#1182706 : Princess Point Rd'. To the right of the map, there are several data entry fields:

- 'Delete' button
- 'Adjust' button
- 'Split' button
- 'Inventory' tab selected, with 'Rating' and 'History' tabs also visible.
- 'Undo Rating' button
- 'Update Rating' button
- 'Surface Subtype' dropdown menu set to 'Asphalt-Standard'
- 'Number of Lanes' dropdown menu set to '2'
- 'Surface Rating' section with a row of buttons numbered 1 through 10. The button '3' is currently selected and highlighted in blue.

Reporting Data: Rating Team

Federal-aid Data Collection (need two team members)

- Local Agency
- PO (RPO/MPO)

Non-federal-aid Data Collection*

- Local Agency

- All team members must be trained
- Team members may designate others as their representative
- Two person team must represent different agencies
- Collection Policy is on the Council Policies webpage (under About Us)
- * NFA agencies approved for TAMC reimbursement shall consist of a minimum of two.

Reporting Data: Training Requirements

PASER

- Trained or Certified in 2019, 2020, 2021
- Trained in 2022

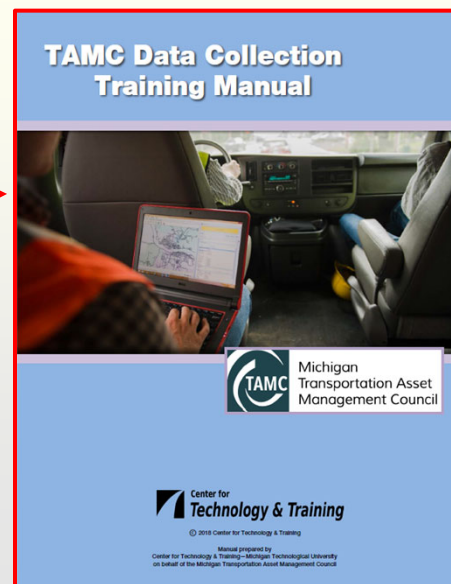
IBR

- Need to have been trained within 3 years of data collection

https://www.michigan.gov/documents/tamc/Policy_for_Collection_of_Roadway_Surface_Condition_Data_Dec_10_2020_710224_7.pdf

Reporting Data: Non-federal-aid data

- The TAMC needs properly tagged data
- The TAMC may reimburse collection
- Follow the manual!



<https://www.ctt.mtu.edu/sites/default/files/resources/paser/tamc-data-collection-manual.pdf>

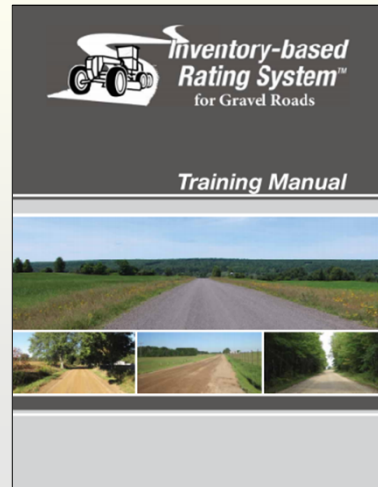
Rules for Rating

effectively and consistently

Pavement Types



Brick and Gravel



Rate Distress Not Ride



Rate Distress Not Importance



Which Lane To Rate?



Which Pavement Type to Rate?



Which Pavement Type to Rate?



What if the Road is Under Construction?



How Many Lanes?



Report as two lanes

Agree or Disagree



Report as 3 lanes

Agree or Disagree



Report as 2 lanes

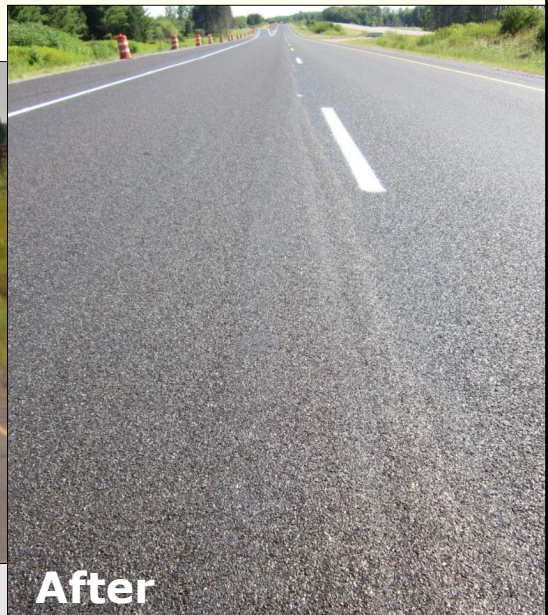


Agree or Disagree

How do you rate after a new seal coat?



Before



After

Ghost cracks influence ratings.

Agree or Disagree



Photo Credits: Larry Brown, Allegan CRC

Rating Tips

for using visual distress rating systems

Driving

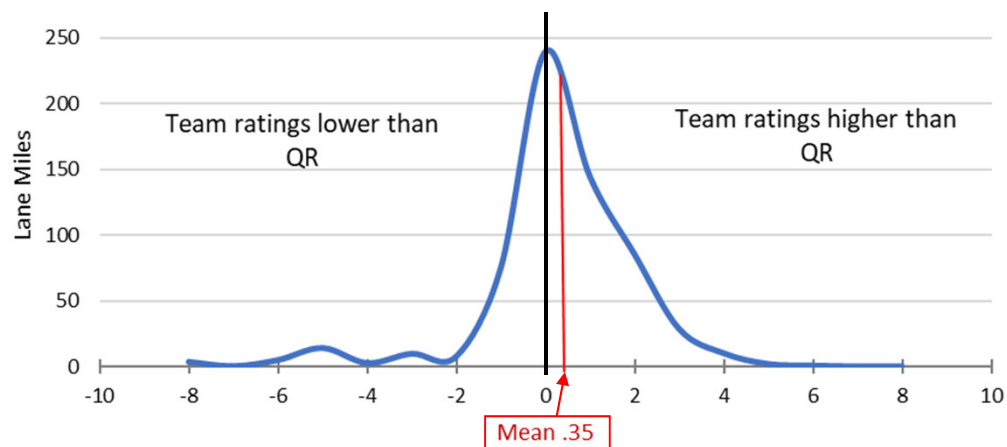
Drive the segment again if needed

Slow down



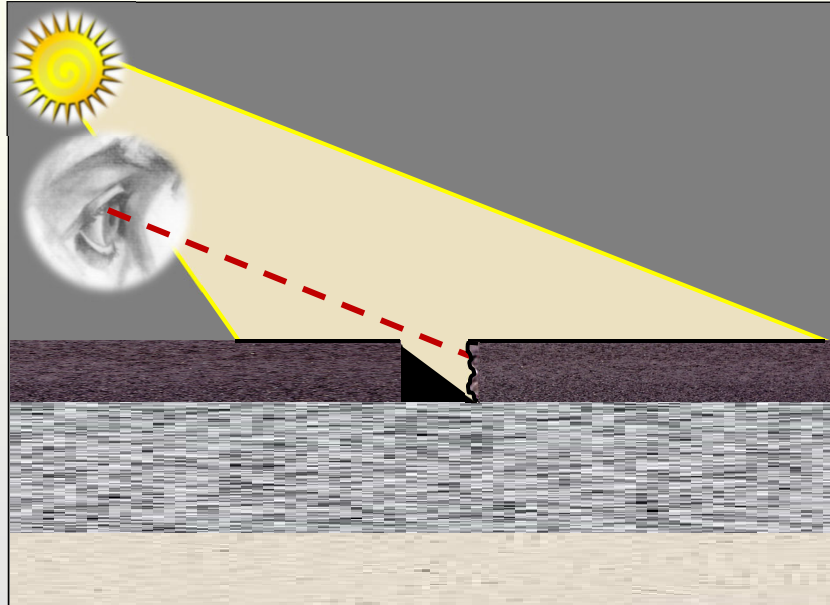
Team Rating minus QC Rating

2019 Team Ratings Minus Quality Ratings Weighted by Lane Miles

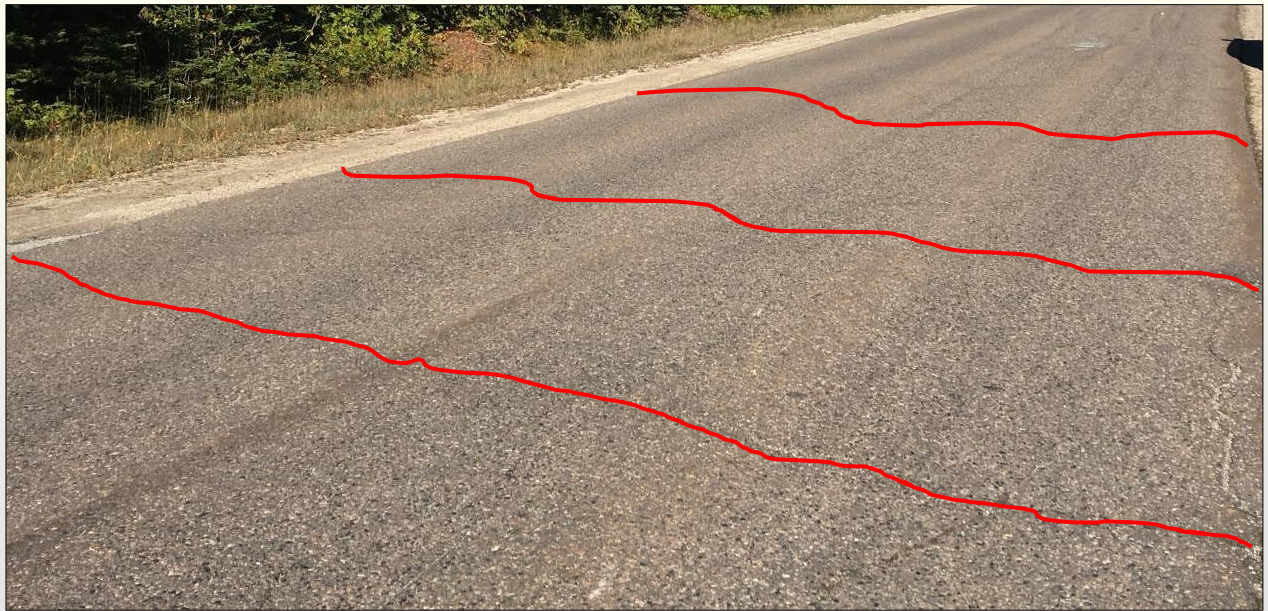


Costa: 2020

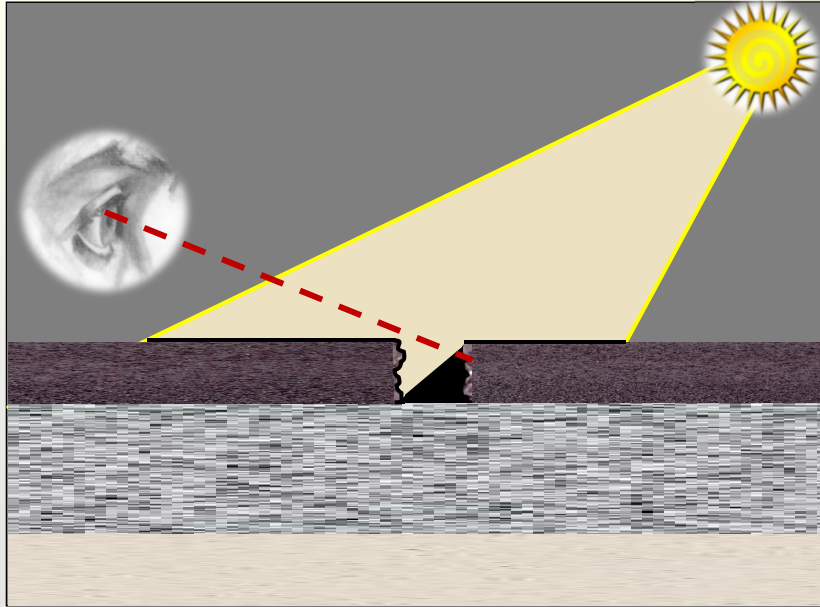
Sun Behind



Sun Behind



Into The Sun



Into The Sun



Same Location – Different Perspective

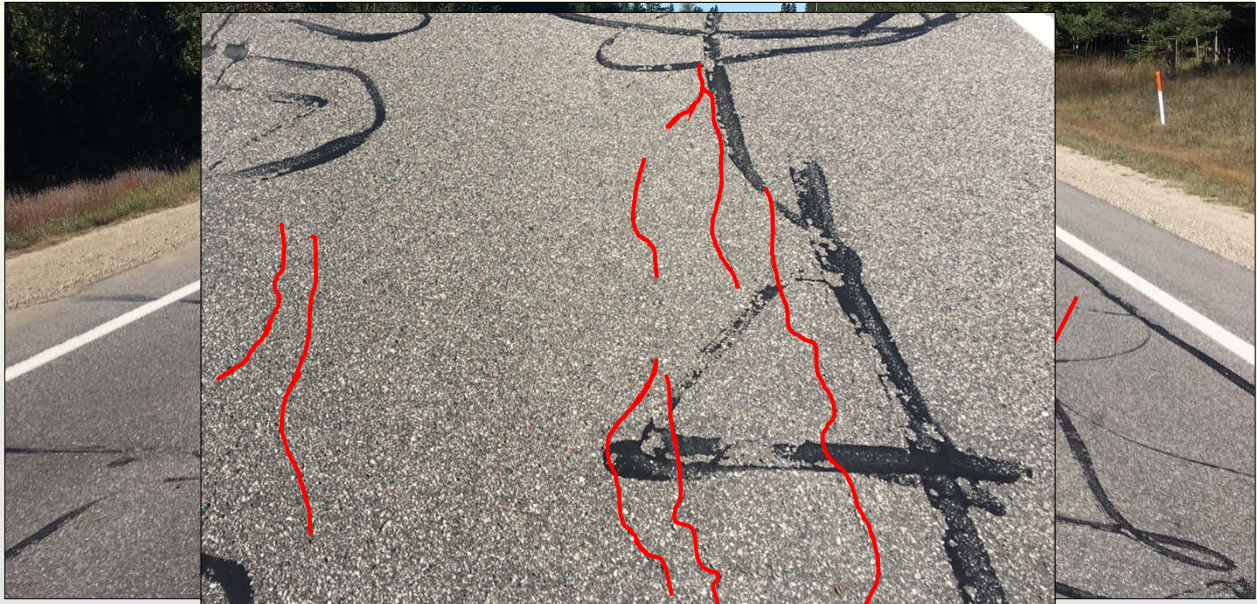
Sun Behind



Sun in Front



What About These?



Tree Shade



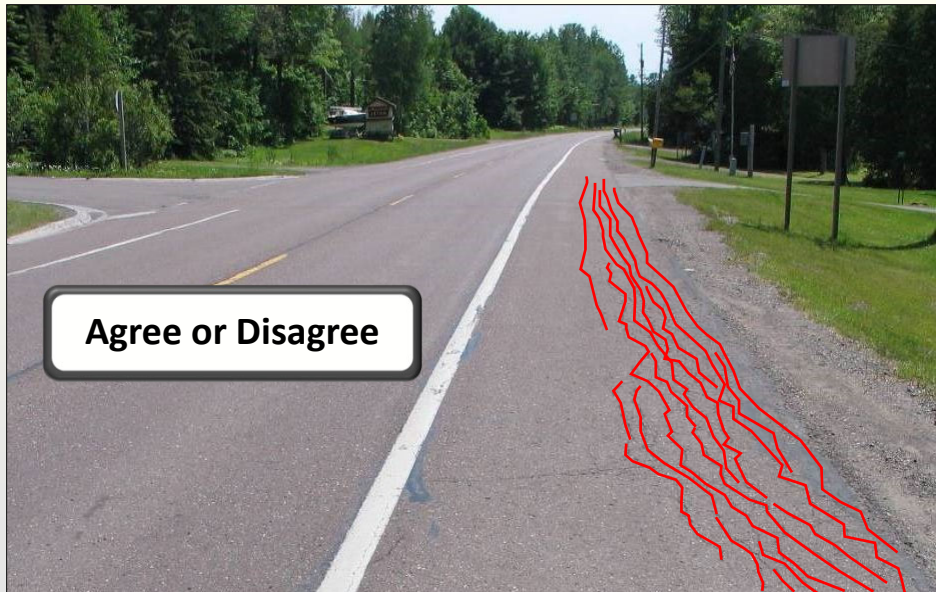
Wet Pavement



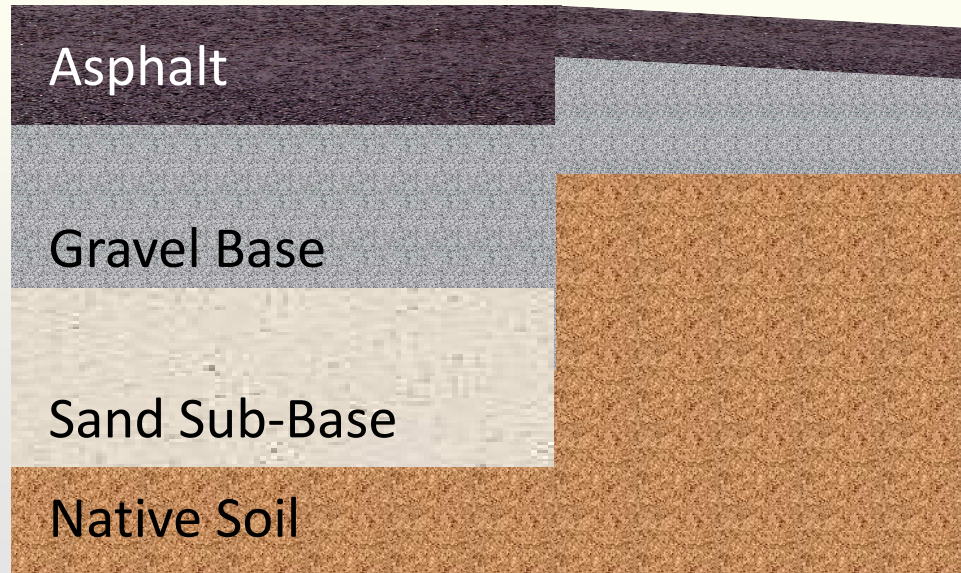
Light Colored Pavement



These cracks influence the rating.



Paved Shoulders



Collection Reminders

when collecting data for TAMC's data collection effort

Data Collection Policy

PASER

Trained or Certified in 2019, 2020, 2021

Trained in 2022

IBR

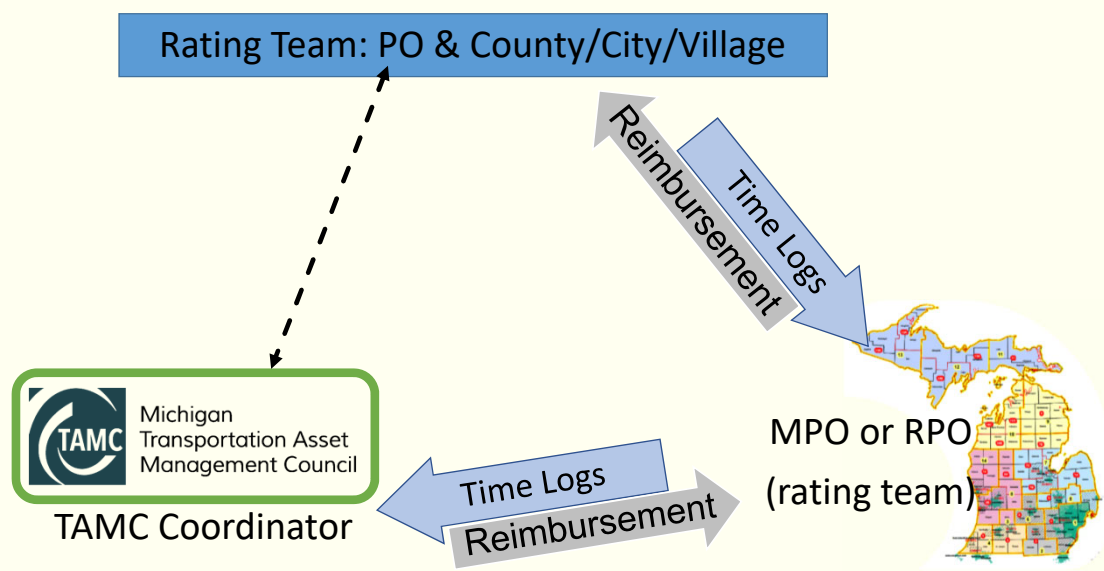
Need to have been trained within 3 years of data collection

https://www.michigan.gov/documents/tamc/Policy_for_Collection_of_Roadway_Surface_Condition_Data_Dec_10_2020_710224_7.pdf



Michigan
Transportation Asset
Management Council

Training & Data Collection Effort Is Funded



Rating Team Reminders

Federal Aid

2 Member Team:

Local Agency

PO (RPO/MPO)

Non Federal Aid

Local Agency



- All team members must be trained
- Team members may designate others as their representative
- Two person team must represent different agencies
- Collection Policy is on the Council Policies webpage (under About Us)
- * NFA agencies approved for TAMC reimbursement shall consist of a minimum of two.

TAMC Coordinator Assists With:

Reimbursement

Certification

Data collection policy

Reporting requirements

Roger A. Belknap,
TAMC Coordinator
 Ph: (517) 230-8192
BelknapR@michigan.gov

Dave Jennett,
TAMC Transportation Planner
 Ph: (517) 335-4583
JennettD@michigan.gov

Collection Important Dates



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

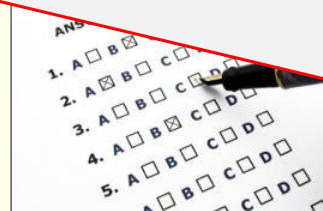
Rater Certification Test

Suspended for 2022

...to training next 3 years
...ence and
training
• Pre-registration requir



Michigan
Transportation Asset
Management Council



Final Exam

Implementation survey
Evaluation
Self-certification
Material request



Upcoming Trainings & Final Thoughts

IBR Training – February 2nd, March 8th, June 21st

Master the Roadsoft Data Collection Cycle for MPO/RPO – TBD

Review TAMC Data Collection Manual prior to next training

Print out PASER Cheat Sheet & MI Sealcoat Rating Guide



Michigan Technological University • Department of Civil & Environmental Engineering

PASER Training

Part 4: Rating Exercises



Michigan
Transportation Asset
Management Council

TAMC Data Collection Training Program

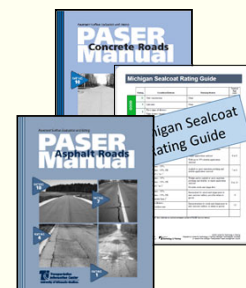
PASER for Paved Roads

~~Part 1: Distress Identification~~

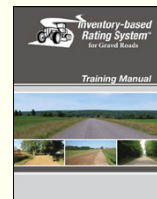
~~Part 2: Pavement Rating Intro & Council Update~~

~~Part 3: Rating and Data Collection Rules~~

Part 4: Rating Exercises



Inventory-Based Rating for Gravel Roads



See ctt.mtu.edu for upcoming trainings

PASER Training Part 4 Agenda

Rating Segment Example

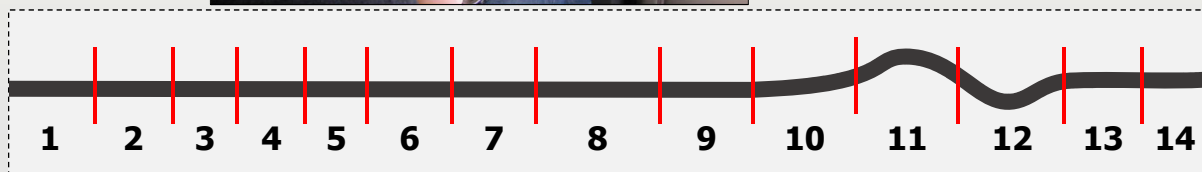
Asphalt Scale and Exercises

Concrete Scale and Exercises

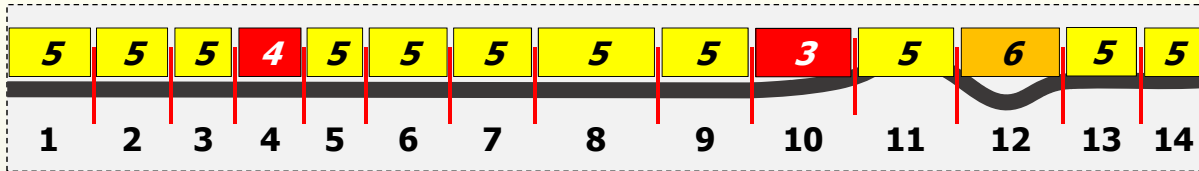
Seal Coat Scale and Exercises

Final Reminders

Rating Demonstration




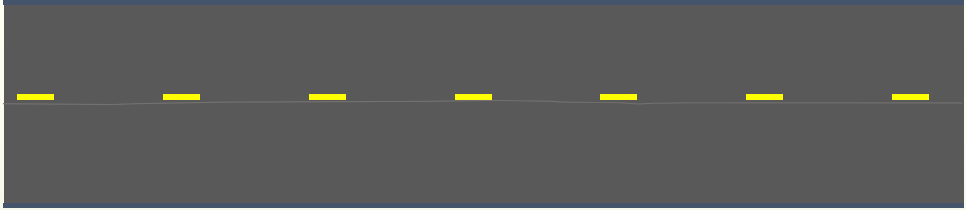
What were the distresses?



Edge Distress Transverse Cracks
Block Cracking
Alligator Cracking
Rutting

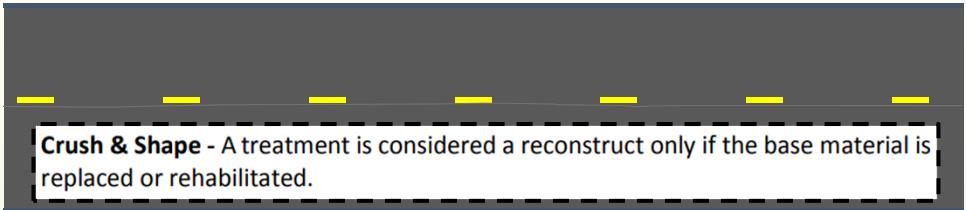

Asphalt Cheat Sheet

Asphalt PASER		
Modified for Michigan TAMC Data Collection • Denotes Priority Distress		
Good	Asphalt 10 New construction (<1 year old) No defects Recent base improvement Possible Action: PPM	Asphalt 9 Like new condition (<1 year old) No defects Recent overlay with or without finish and drain Possible Action: PPM
	Asphalt 7 • Transverse cracks: 10'-40' apart Cracks: open < 1/4" Crack erosion: none or little Surface raveling: none or little Patches: none or few in excellent condition Fast lanes of wear Possible Action: Maintain with crack seal, fog seal	Asphalt 6 • Transverse cracks: <10' apart • Block cracking: 6'-10' blocks (large, stable) Cracks open 1/4" - 1/2" Surface raveling: slight Patches: few in good condition Polishing or flushing: slight, moderate Sound structural condition Possible Action: Maintain with sealcoat
	Asphalt 4 • Block cracking: <1' blocks • Wheel path cracking (longitudinal) • Rutting: 1/2" - 1" deep Transverse cracks: slight erosion Longitudinal cracks: slight erosion Surface raveling: serious Patches: fair condition Fast lanes of structural weakness Possible Action: Structural overlay > 2" Underseal	Asphalt 3 • Block cracking: severe (like alligator) • Alligator cracking: initial, < 25% • Rutting: 1 1/2" - 2" deep Transverse cracks: extensive erosion Longitudinal cracks: extensive erosion Patches: fair/poor condition Potholes: occasional Possible Action: Structural overlay > 2" Patching & repair prior to an overlay Milling to extend overlay life
Fair	Asphalt 5 • Block cracking: 1' - 5' blocks • Longitudinal cracks: first signs, at edge • Secondary cracks: first signs Cracks open < 1/4" Surface raveling: moderate Patches/welding: good condition Flushing & polishing: extensive, severe Sound structural condition Possible Action: Maintain with sealcoat or thin overlay	Asphalt 2 • Alligator cracks: > 25% • Rutting or distortion: > 2" Cracks: closely spaced, with erosion Patches: extensive, in poor condition Potholes: frequent Possible Action: Reconstruction with base repair Crack and shape
	Asphalt 1 Like PASER 2 but with visible base and surface distress: least Possible Action: Reconstruction with base repair	
Poor		
General Rating Tips Rate surface distresses, not ride quality. The nature of cracks in the wheel path, they can be hard to see and do not affect the ride. Disregard the shoulder. Rate only the driving pavement, edge line to edge line. Do not ignore reflective cracks. Rate by measuring the type of crack (e.g. transverse, longitudinal, diagonal). Rate the current surface condition. If construction is in progress (i.e., work is active) but you are driving on the old surface, rate the new surface. (Note: reports by the resident is not construction in progress.) Rate the base with the worst condition when there have differing conditions. For variable surface types, rate the worst base and select it in the Surface Indique. Rate what you see, not what distresses you think might happen in the future. Rate roads with the same severity regardless of their use, ownership, or functional class. Rating often has visual cues like stone wear. Get out and measure using a straight edge and tape measure. Use consistent rating measurement changes are detailed in the TAMC Data Collection Primary Manual's "Michigan-specific Asphalt Road Rating Guide" section, page 7. Composite pavement consists of a concrete pavement overlaid with asphalt. rate it based on the uppermost surface (e.g. asphalt), and rate the surface below as composite. A segment occurs where the uppermost is a 1.5' While there have had concrete just again, in other defects can be present and the condition is "like new". Note, this is not what the CRACK PAGER Manual says. Sealed pavements are not new, even if they are not exposed to sealant applied over again. See page 67 of the TAMC Data Collection Manual for rating sealed pavements. While preventive sealant treatments, do not downgrade an asphalt PASER 1 or 2 or 3 or 4 to an asphalt PASER 1 because of the treatment. Rate it based on the distresses that are visible (see TAMC Data Collection Primary Manual's "Preventive Sealant Treatments on Asphalt PASER 1 section, page 8).		




10

No defects




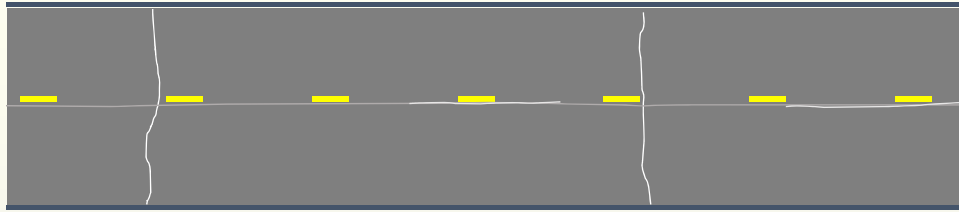
Crush & Shape - A treatment is considered a reconstruct only if the base material is replaced or rehabilitated.



9

Like New





T-Cracks > 40'



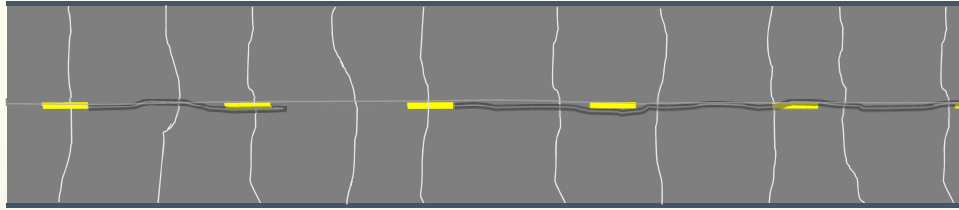
Proactive Sealcoat Treatments

Asphalt 8

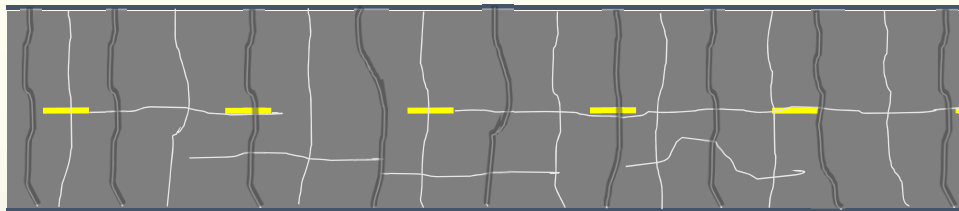
- ◆ Occasional transverse crack >40' apart
- ◆ Crack width tight (hairline) or sealed
- Few if any longitudinal cracks on joints

Recent seal coat or slurry seal (*see below)

Little or no maintenance required

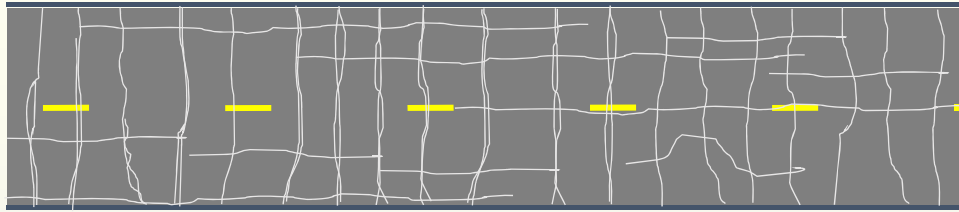


T-Cracks 10'-40'

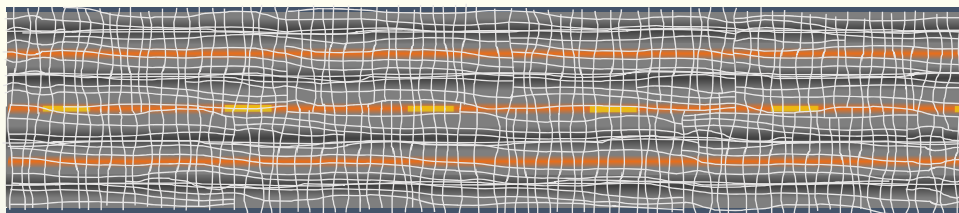


T-Cracks < 10'



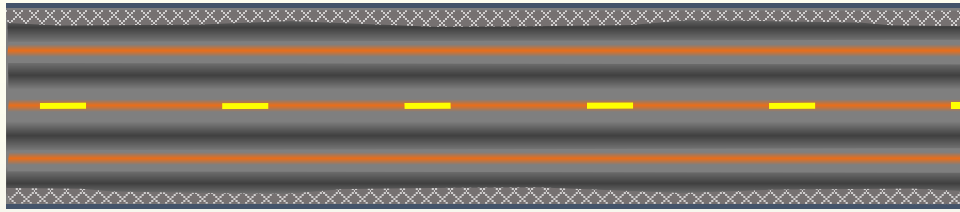


Secondary Cracks

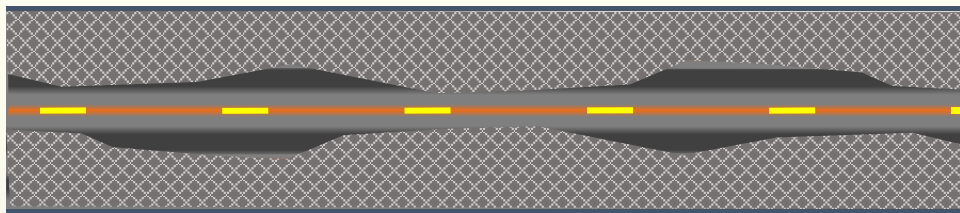


Wheel Path Cracking

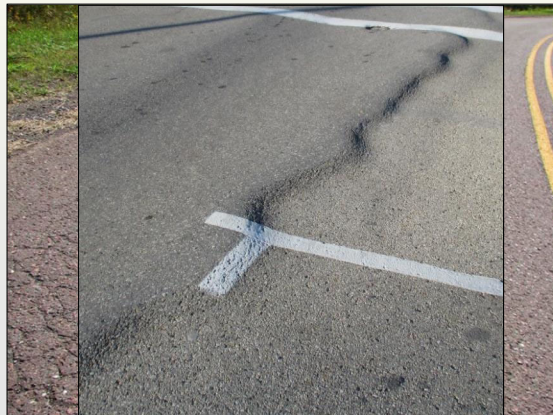


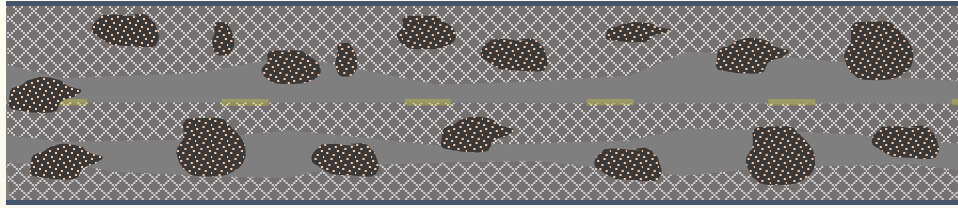


Alligator cracking
1st signs, <25%



Alligator Cracking
> 25%





Same as 2
visible base



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

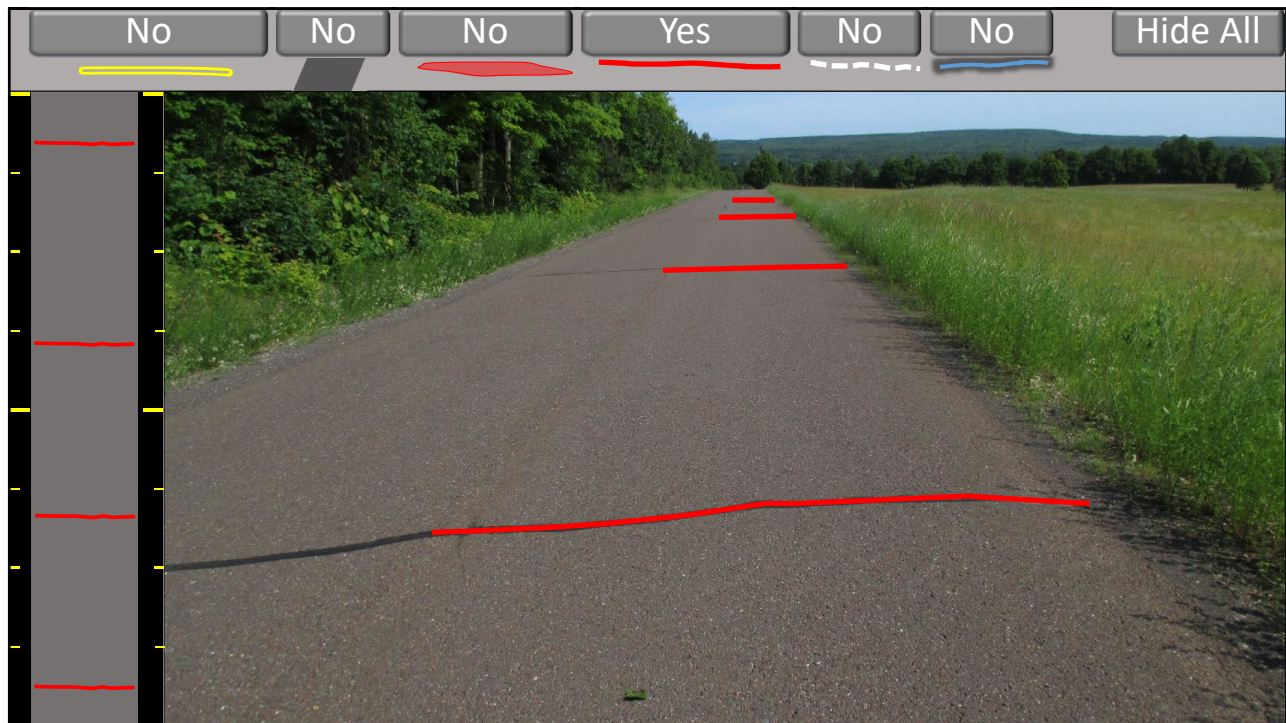
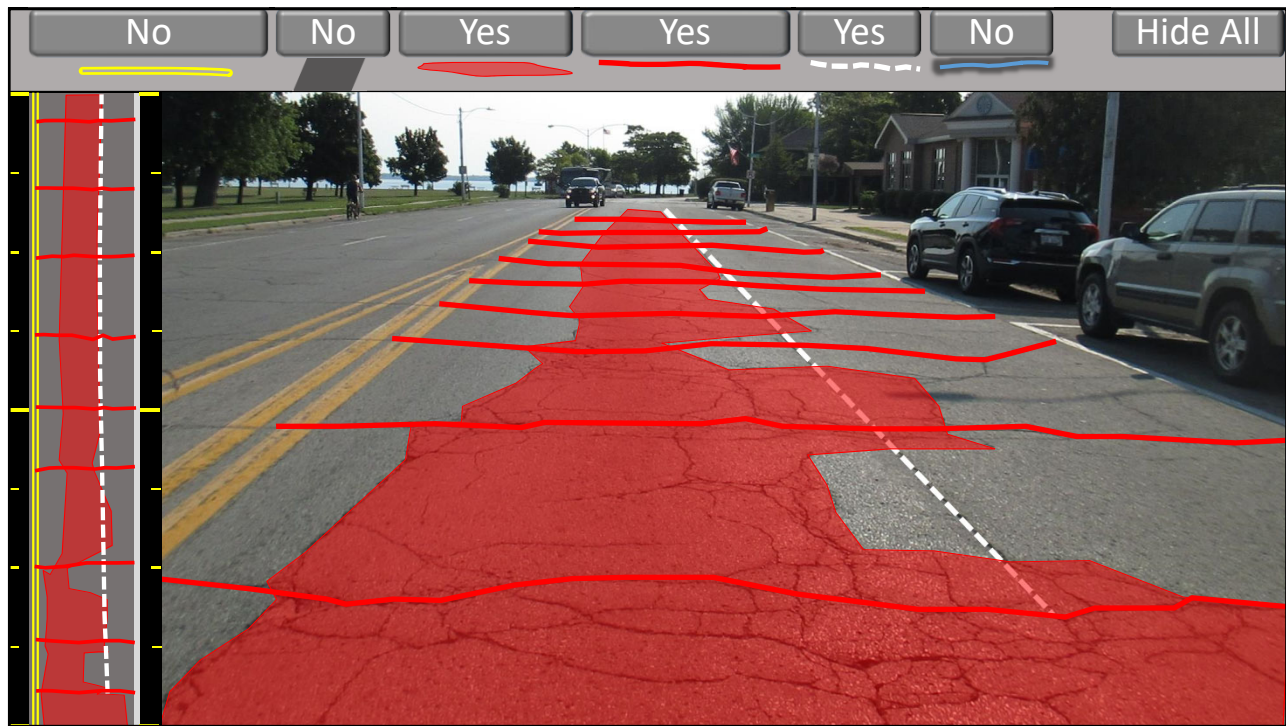


Wedging



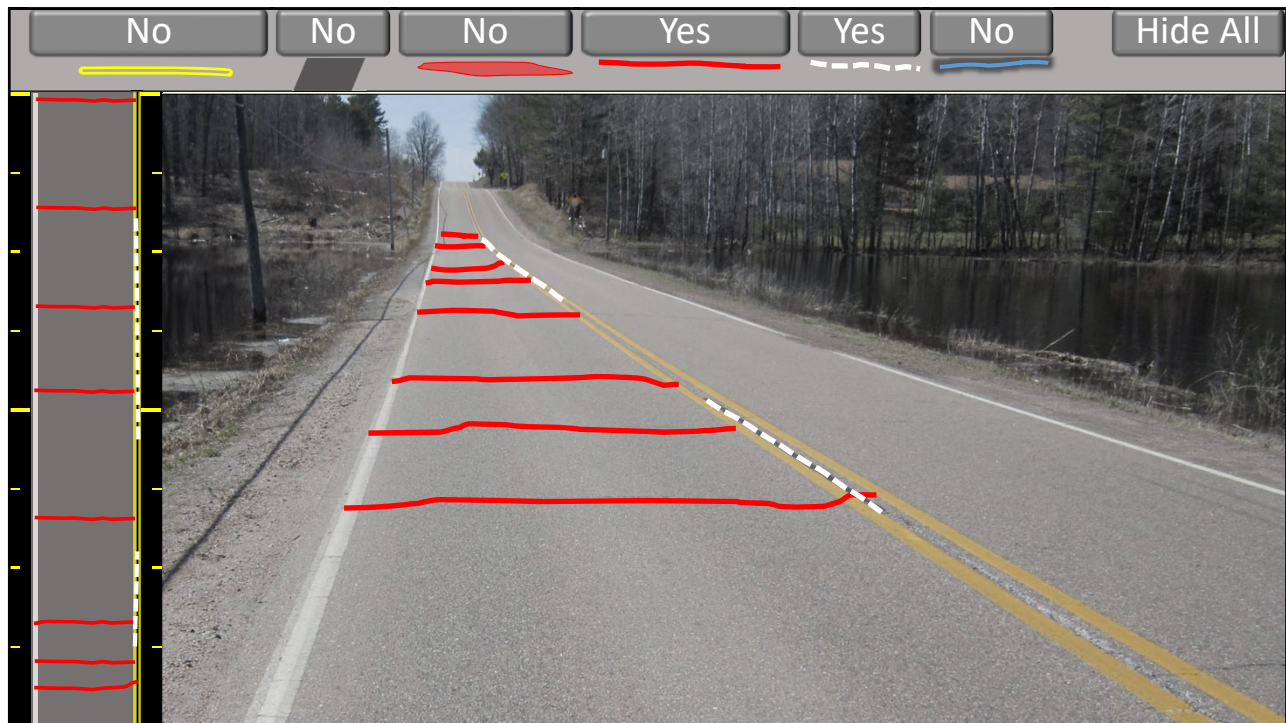
Crack Seal

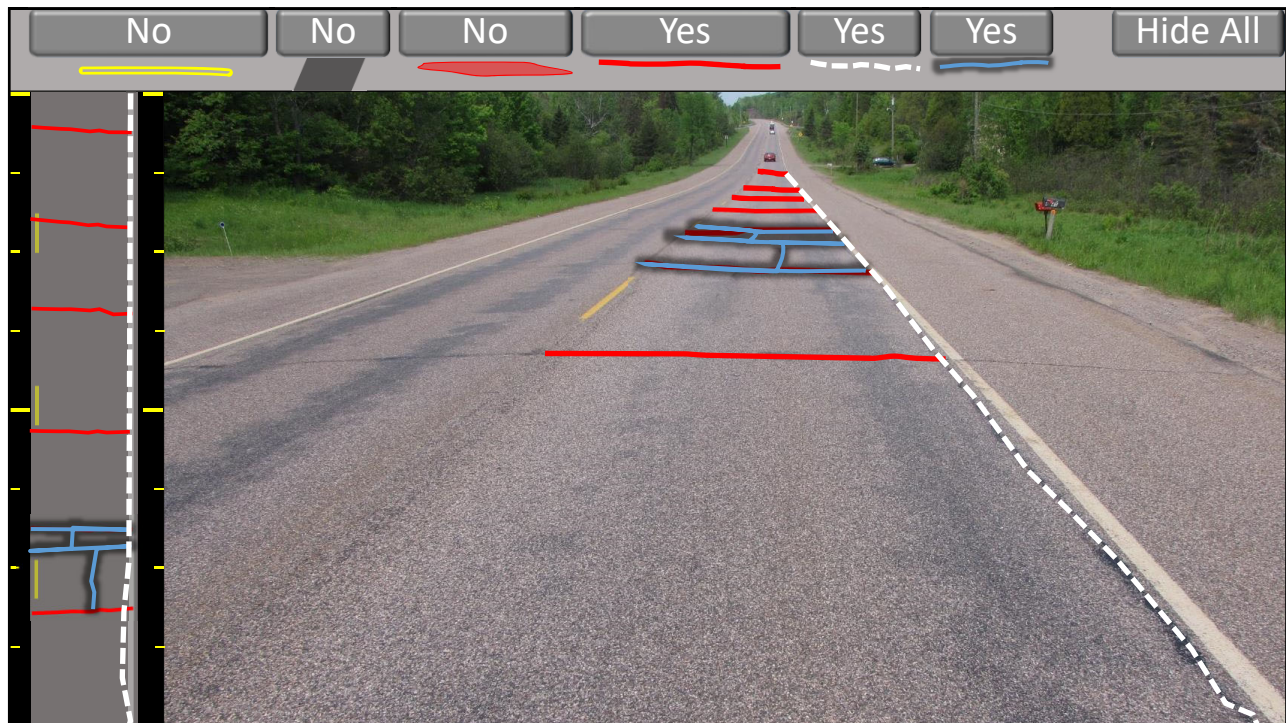
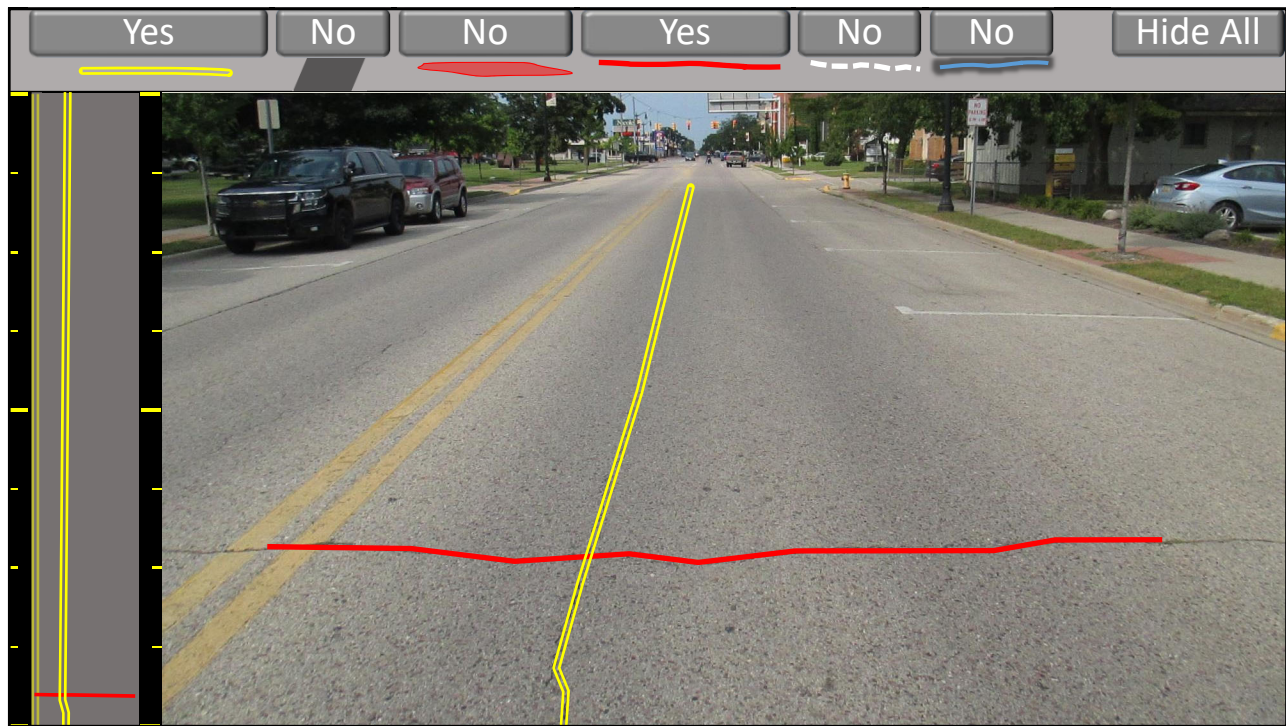


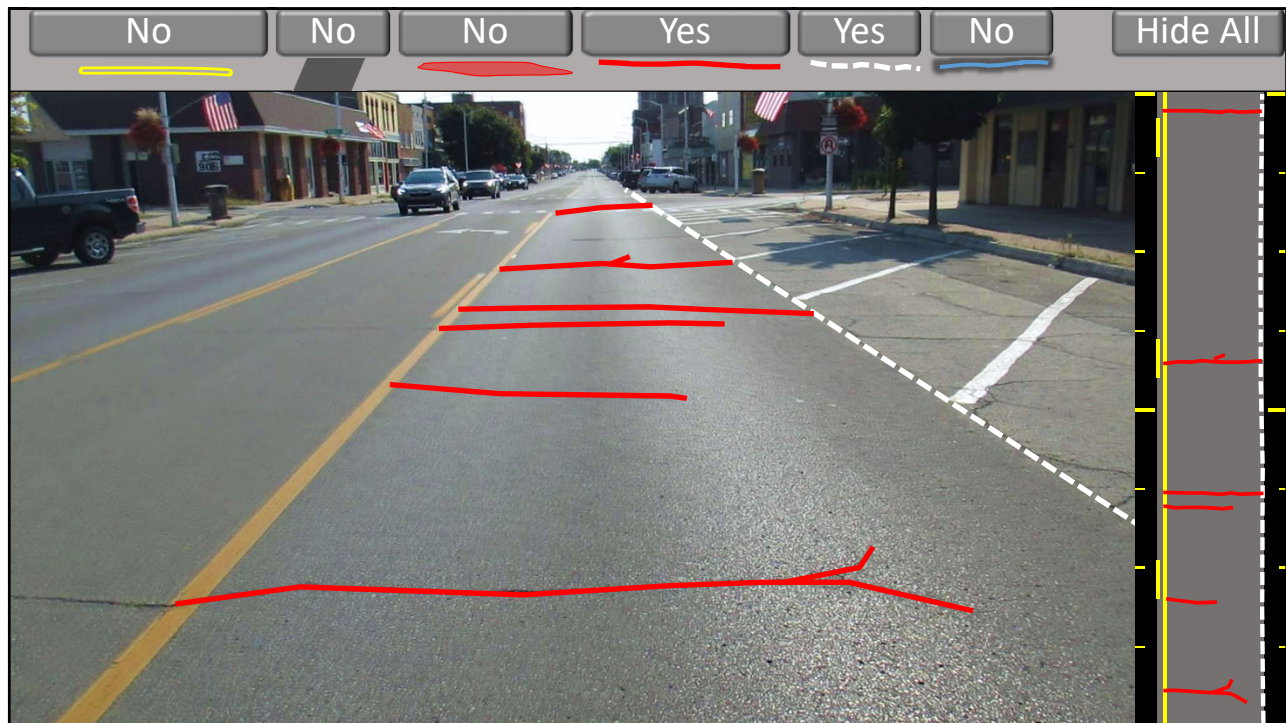
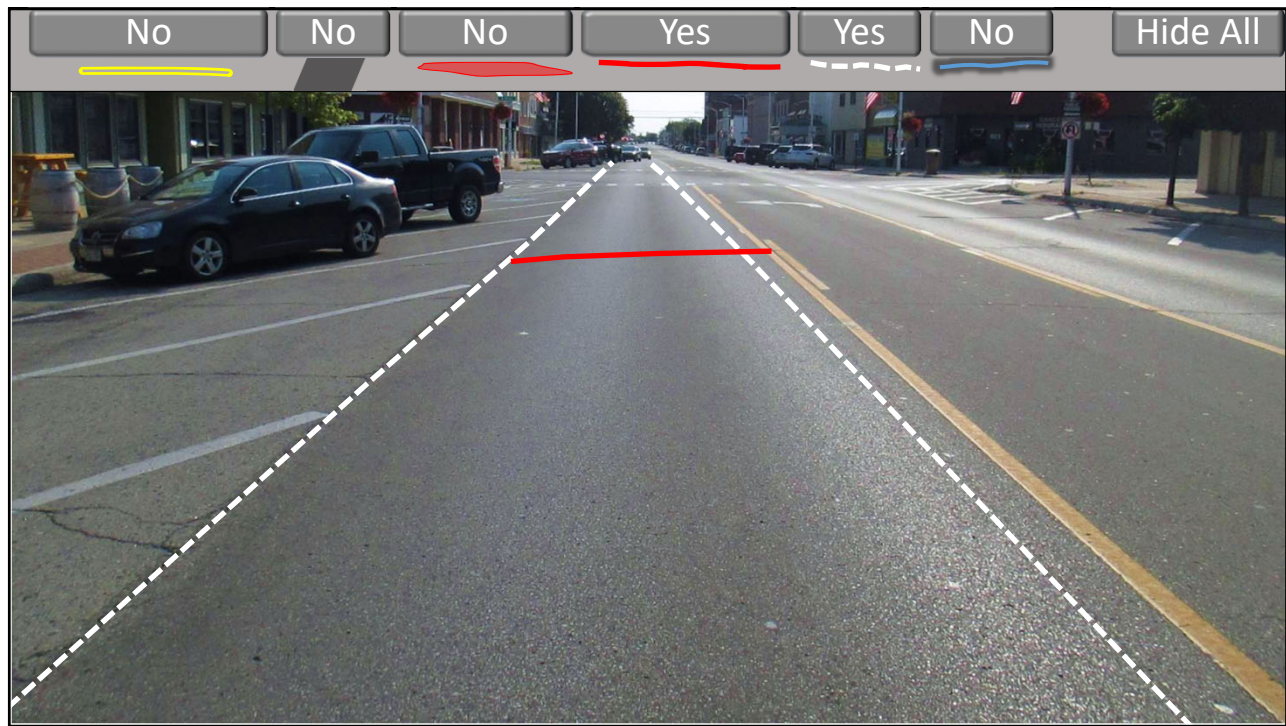


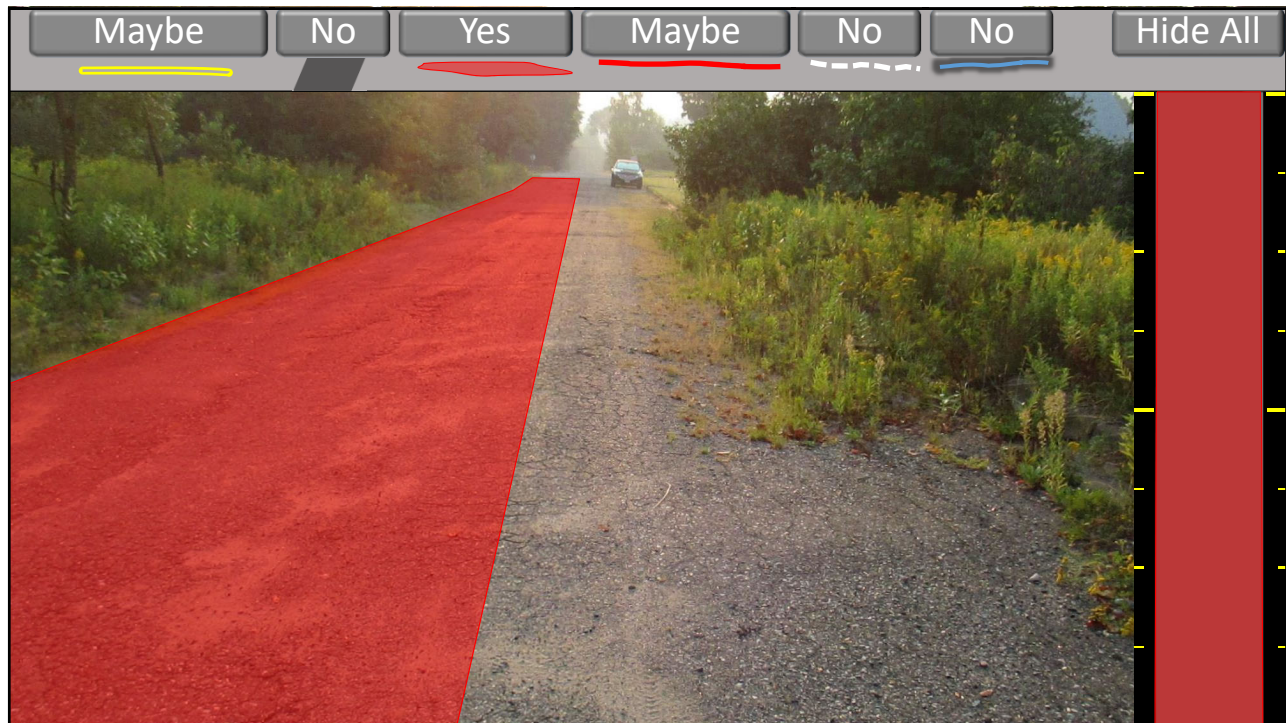
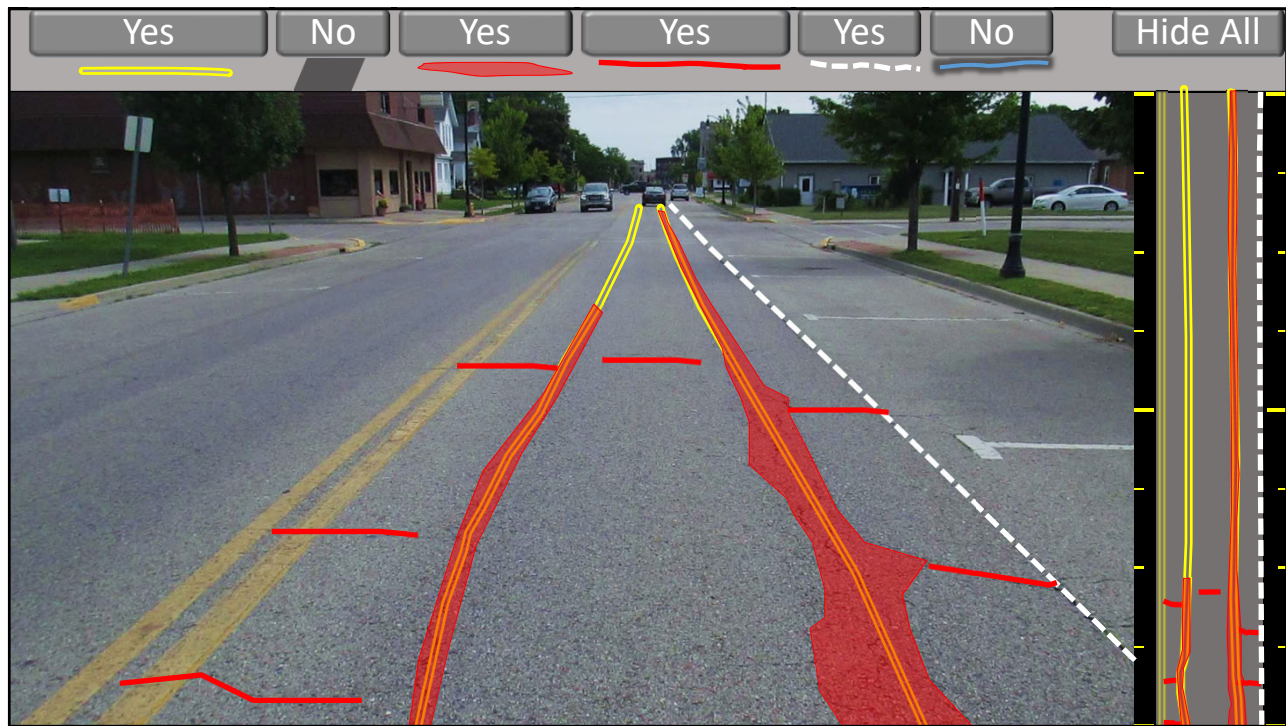






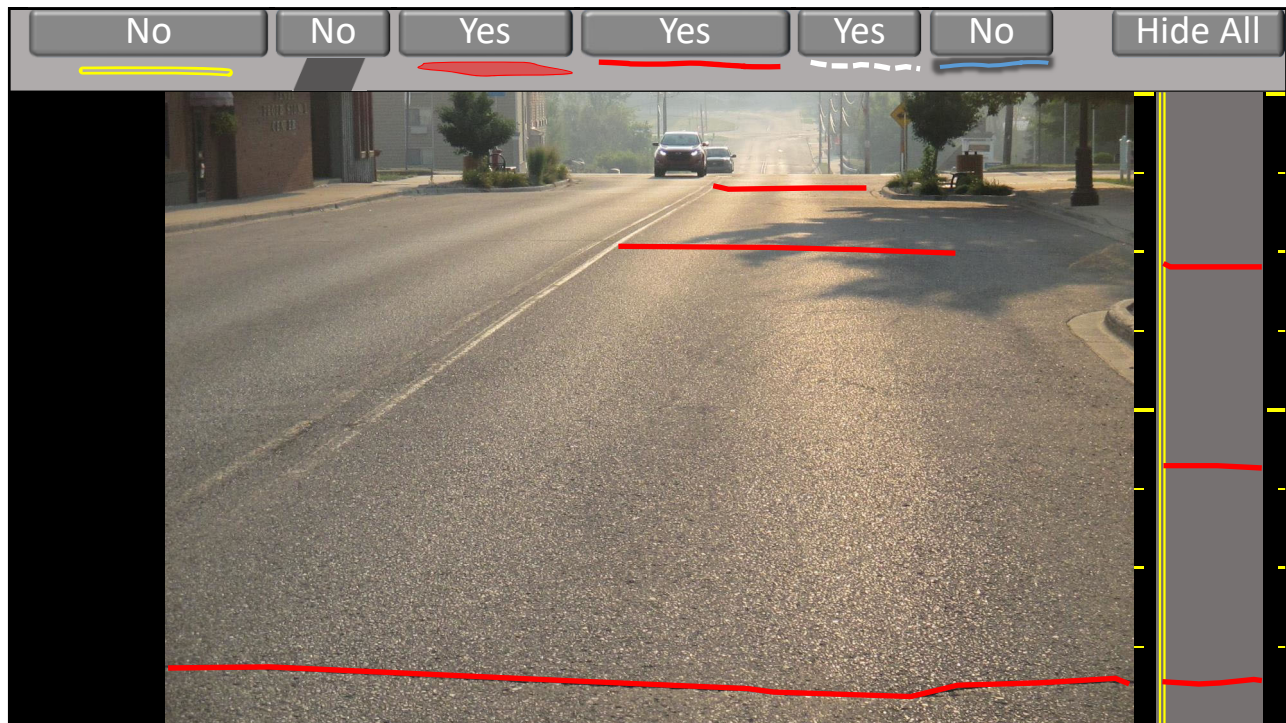
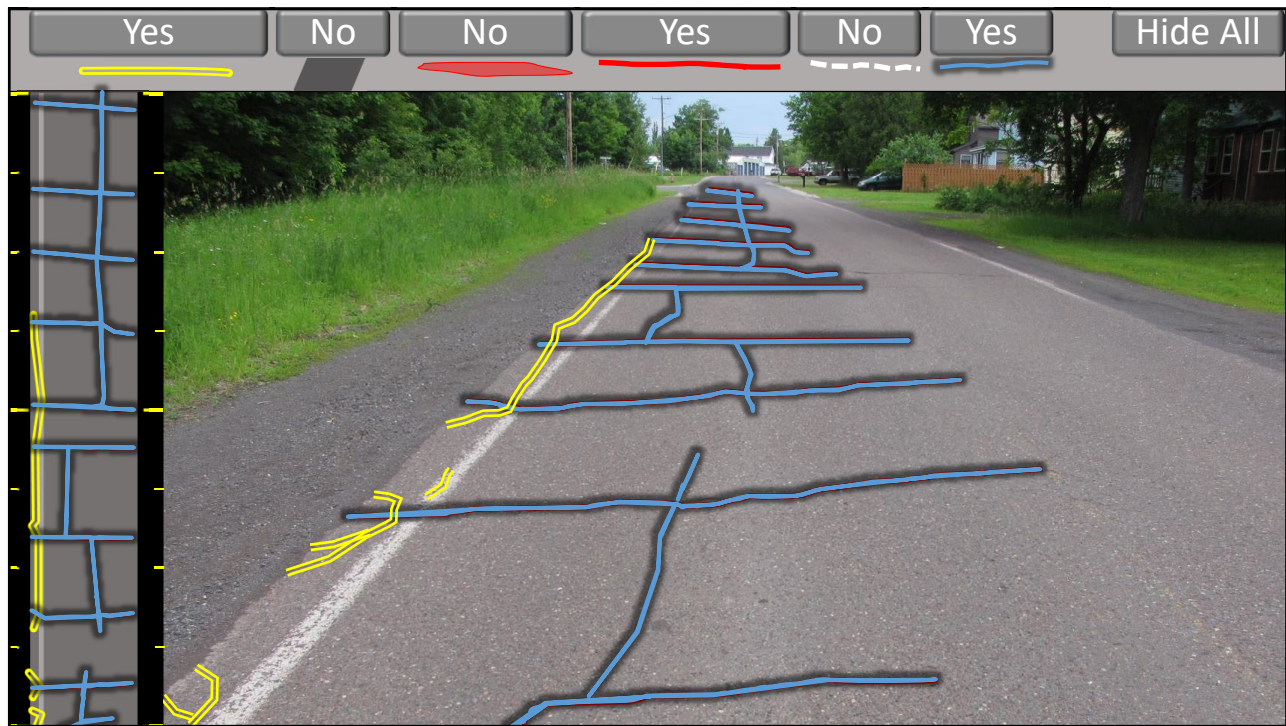


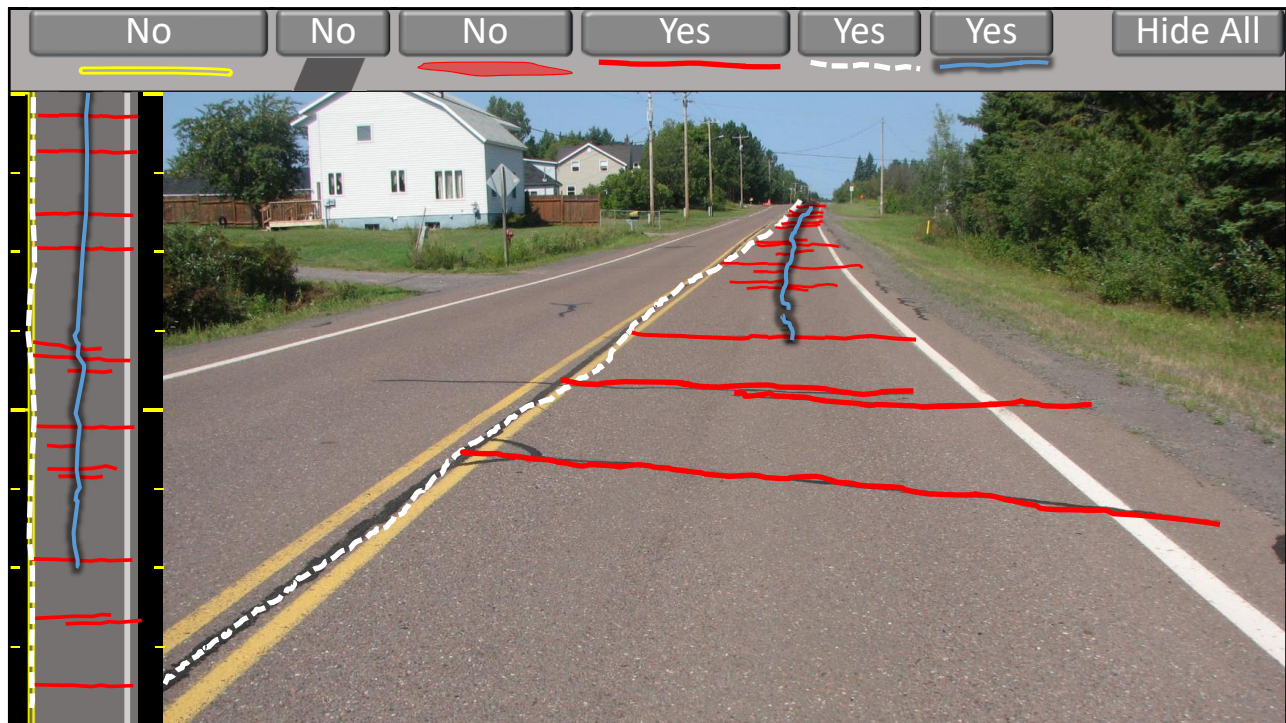
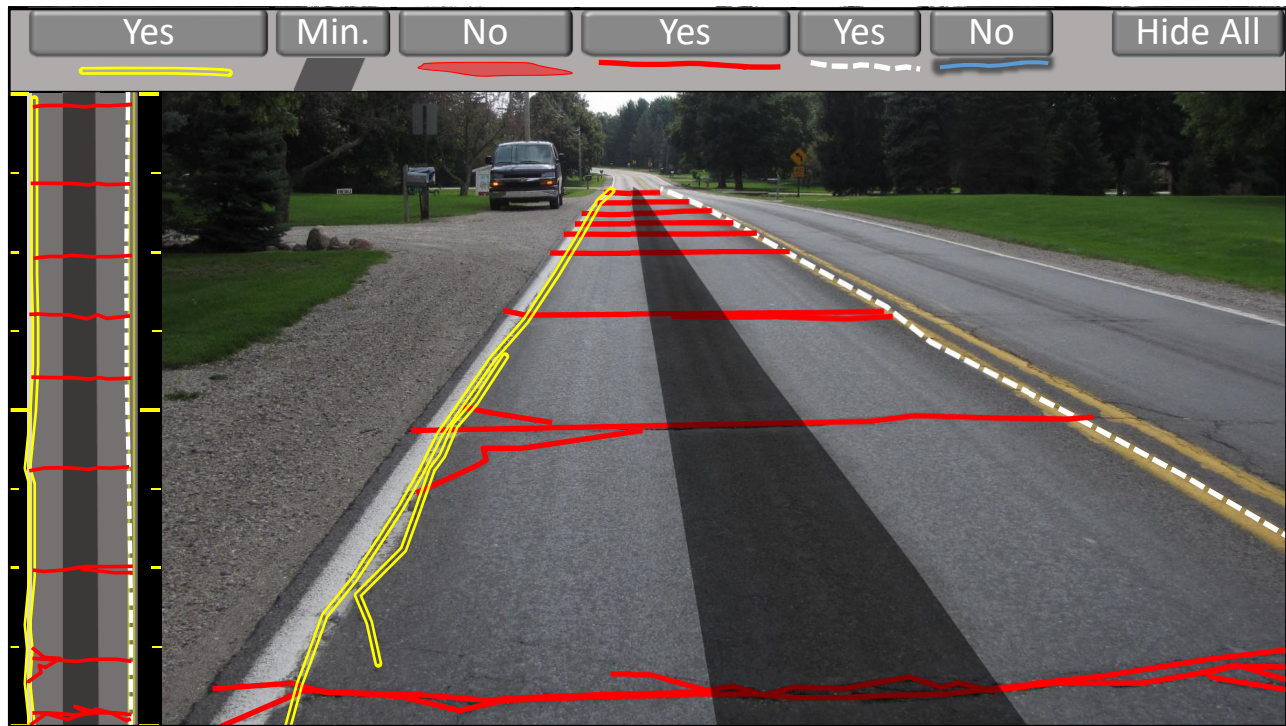






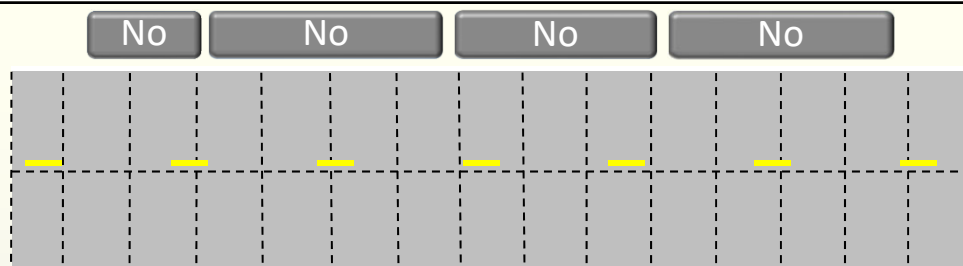






Concrete Cheat Sheet

Concrete PASER		
Modified for Michigan TAMC Data Collection • Denotes Priority Distress		
Good	Concrete 10 New construction (< 1 year old) No defects Recent reconstruction Possible Action: None	Concrete 9 Like NEW (< 1 year old) • Joint rehabilitation: recent, only if no other defects are present Map cracks: slight Pop outs: few Surface wear: light, in wheel path Recent concrete overlay Possible Action: None
	Concrete 8 • Joint sealant: partial loss • Joints: good condition • Transverse cracks: none • Meander cracks: isolated, well-sealed/tight Cracks: at manholes - isolated, well-sealed/tight Map cracks: minor Sealing: slight (first signs) Pop outs: none Surface wear: light Possible Action: Little to no maintenance	Concrete 7 • Full depth repairs: excellent condition • Transverse cracks: isolated • Joints: some open Cracks: at manholes - some Settlement heaves: isolated Sealing: minor Pop outs: could be extensive but could Possible Action: Seal open joints Spot repair surface defects
	Concrete 6 • Transverse joints: open 1/4" • Longitudinal joints: open 1/4" • Transverse & meander cracks: open 1/4" Cracks: at corners - several, well-sealed/tight Shallow reinforcement cracking - first signs Sealing: <25% surface Possible Action: Seal open joints and cracks Overlay surface ravelling areas	Concrete 5 • Jointcrack spalling: first signs • Jointcrack finishing: up to 1/4" Cracks: at corners - multiple, w/ broken pieces Shallow reinforcement spalling Sealing: 25% to 50% surface Polishing: 25% to 50% surface Possible Action: Some partial depth joint repairs or patching may be needed
Fair	Concrete 4 • Jointcrack spalling: opens 1" on several slabs • Jointcrack finishing: up to 1/2" • Transverse or meander cracks: multiple Cracks: at corners - missing pieces or patches Pavement blumps Spalling: >50% surface Map cracks: >50 % surface Sealing: >50% surface Polishing: >50% surface Possible Action: Some full depth repairs Asphalt overlay or extensive surface texturing of surface sealing	Concrete 3 • Joint transverse, and meander cracks: open 1" on most slabs severely spalled • Jointcrack finishing: up to 1" • D-cracking: evident Patches: extensive, fair to poor condition Possible Action: Excavate full depth repairs Some full slab replacement
	Concrete 2 • Joints: failed Settlement heaves: extensive, severe Spalling (of slab cracks): extensive, severe Patches: extensive, failed condition Possible Action: Recycle or rebuild pavement	Concrete 1 Pavement integrity: total loss Potholes: extensive Reinforced joints Possible Action: Total reconstruction
Contact Information Roadoff & LDC Technical Support: 800-487-2102 TAMC Coordinator: Roger Ballweg, 517-230-4192 ballweg@mta.michigan.gov TAMC Website: michigan.gov/tamc Michigan Transportation Asset Management Council Prepared by Center for Technology & Training, Michigan Technological University on behalf of the Michigan Transportation Asset Management Council		

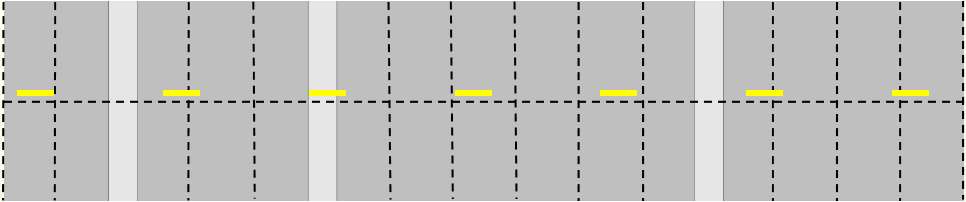


No defects

Less than one year old




No No No No



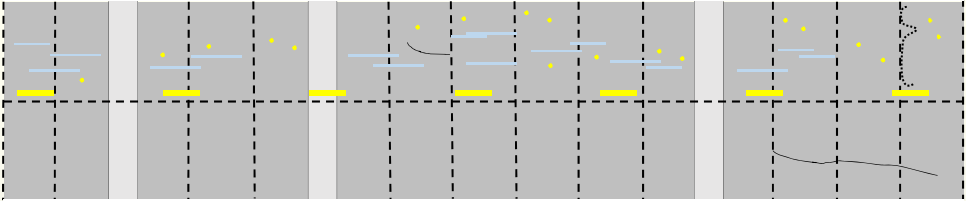
9

Joint rehab completed and no other defects

Like New



No No No No




8

Joints are good

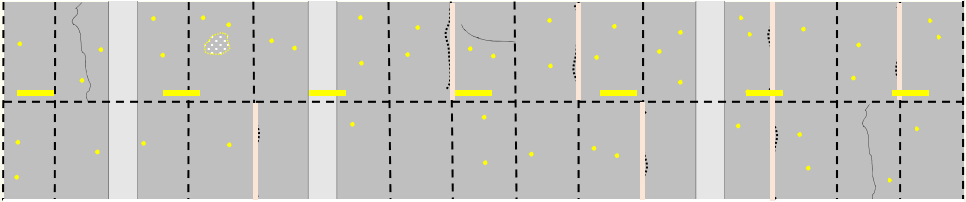
Partial loss of sealant

No transverse

Isolated meander



Yes No No No

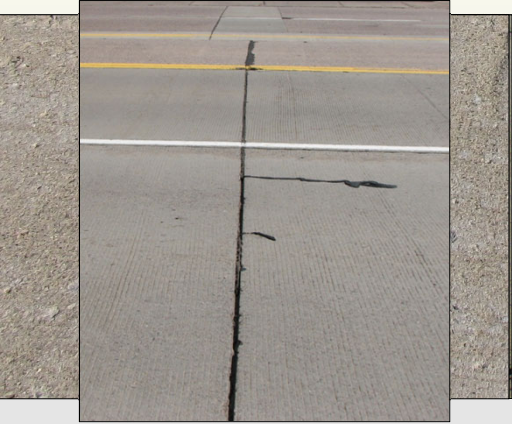


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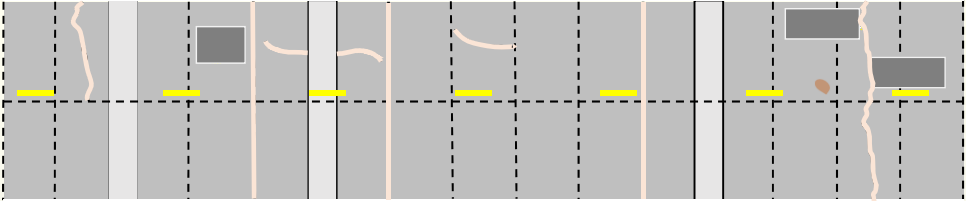
Isolated transverse

Full depth repairs are excellent

Minor scaling



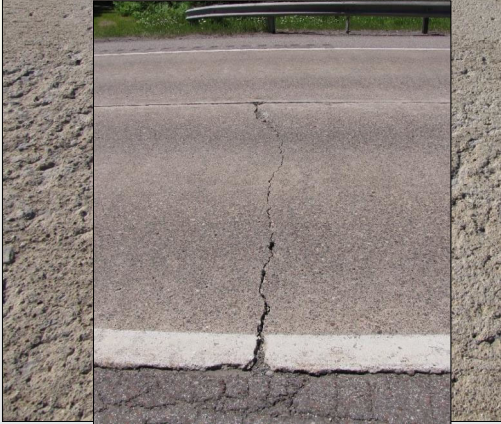
Yes No No Yes



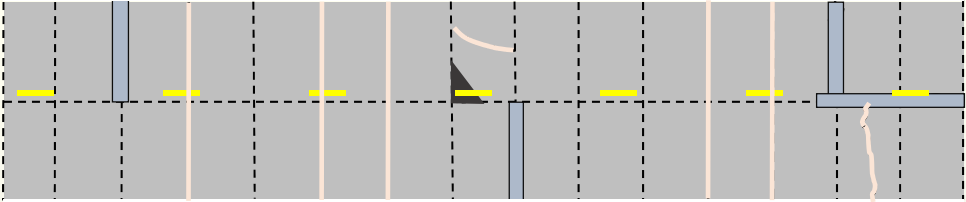
6

Joints and cracks open $\frac{1}{4}$ "

Scaling < 25% of surface



Yes Yes No Not Controlling




5

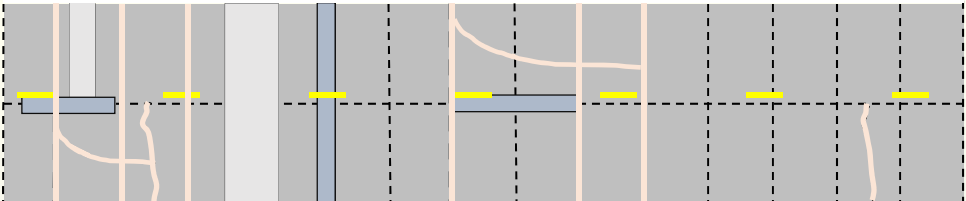
Faulting < ¼"

First signs of spalling

Scaling 25% to 50% of surface



Not Cont. Yes Yes Not Controlling




4

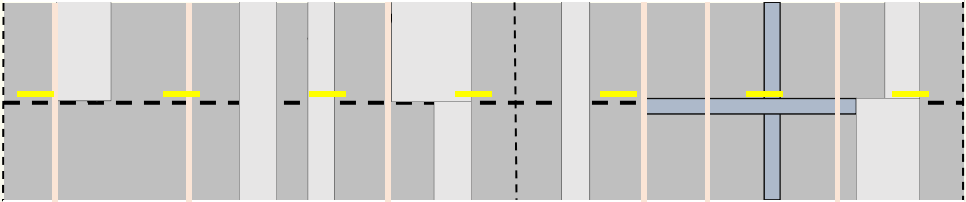
Faulting < ½"

Severe joint/crack spalling

Multiple cracks




Not Cont. Yes Yes Not Controlling

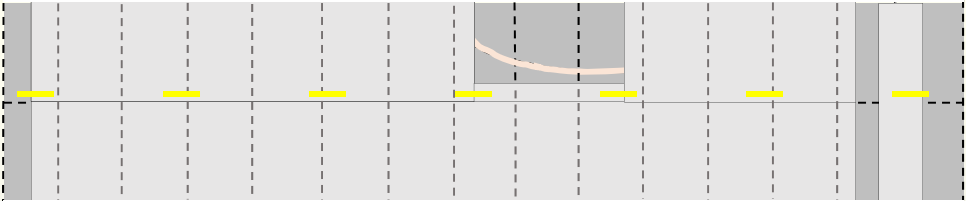


3

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




Not Cont. No Yes Not Controlling



2

Rebuild pavement



Not Cont. No Yes Not Controlling

1

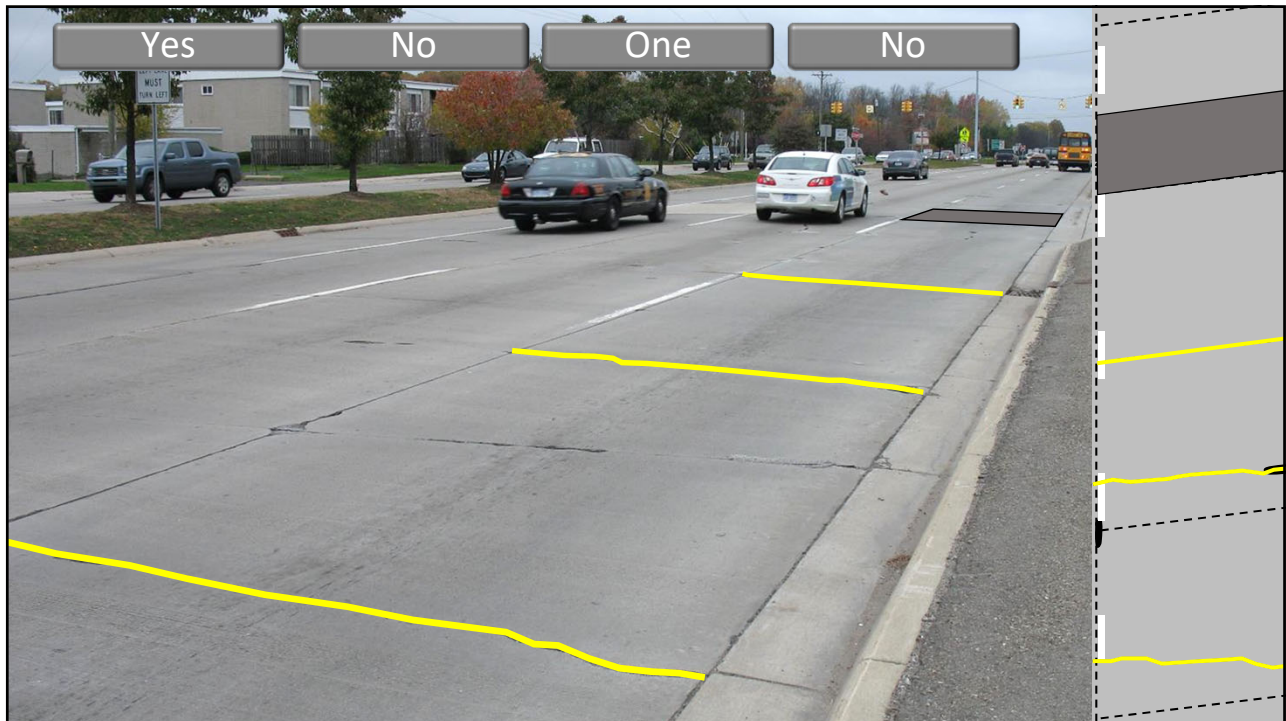
Restricted speeds

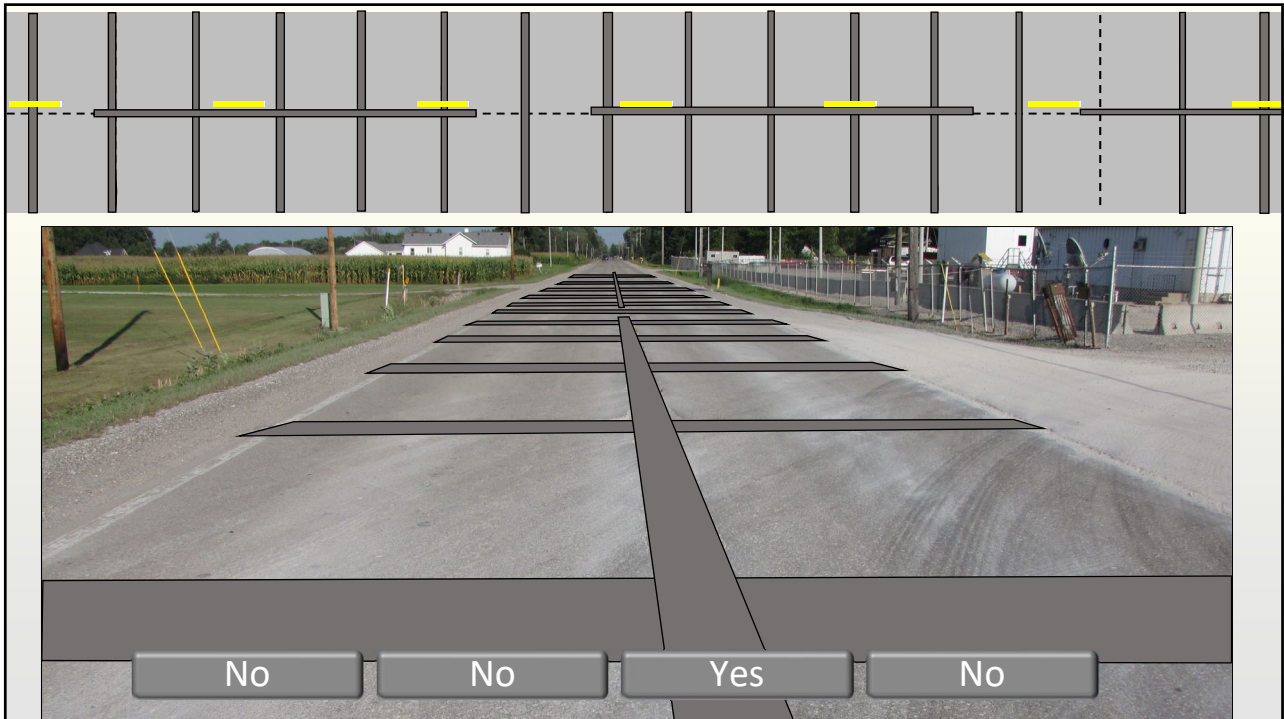
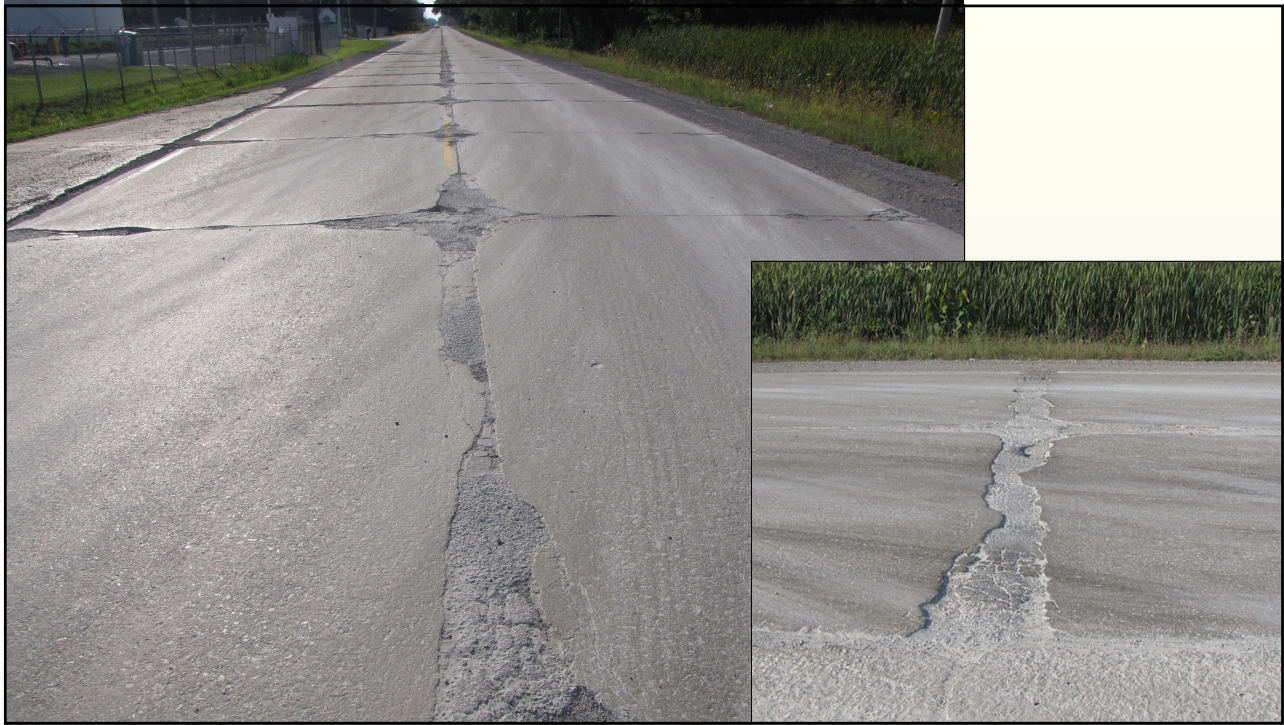
The figure is a 10-column chart illustrating the progression of road damage. The columns are labeled at the top: 'Not Cont.', 'No', 'Yes', and 'Not Controlling'. The first column shows a small crack, the second a larger crack, the third a pothole, the fourth a large pothole, the fifth a deep crack, the sixth a deep crack with a pothole, the seventh a deep crack with a large pothole, the eighth a deep crack with a large pothole and a crack, the ninth a deep crack with a large pothole and a crack, and the tenth a deep crack with a large pothole and a crack. A red box highlights the first column with the number '1' and the text 'Restricted speeds' below it. To the right of the chart is a photograph of a road surface showing a large, deep crack running down the center, with a large pothole on the right side of the crack.

Partial Depth Repair

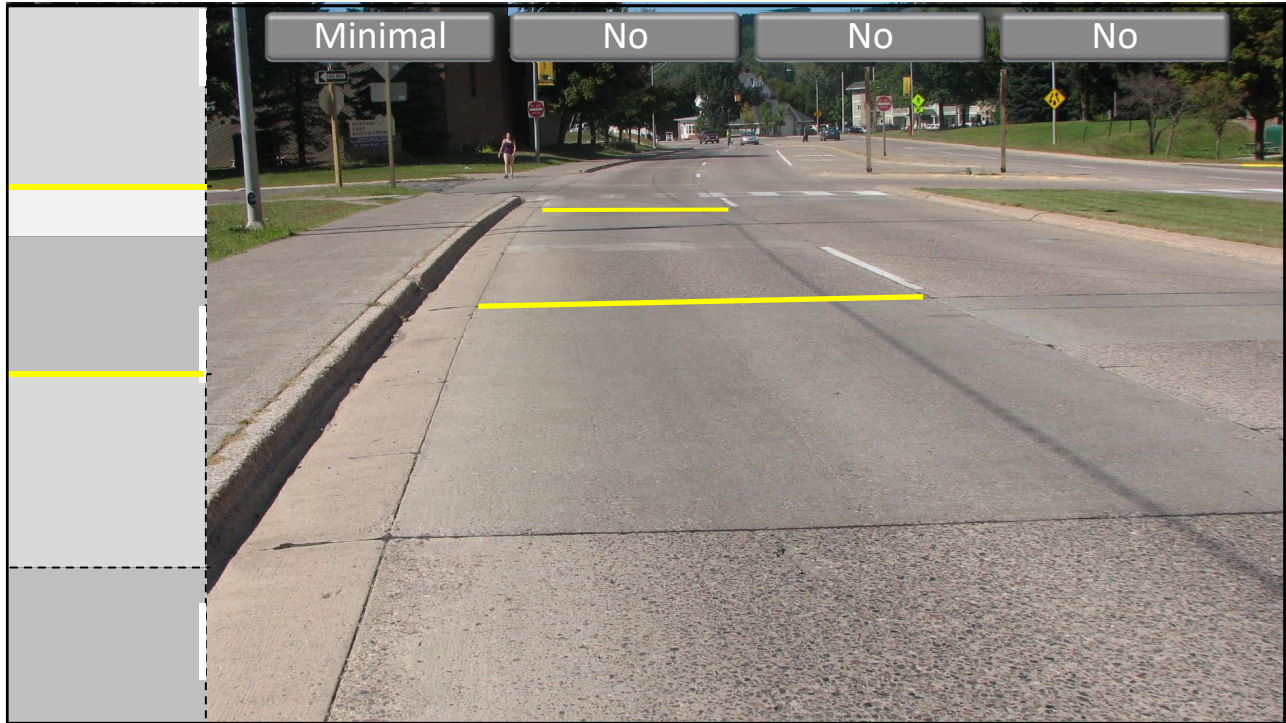


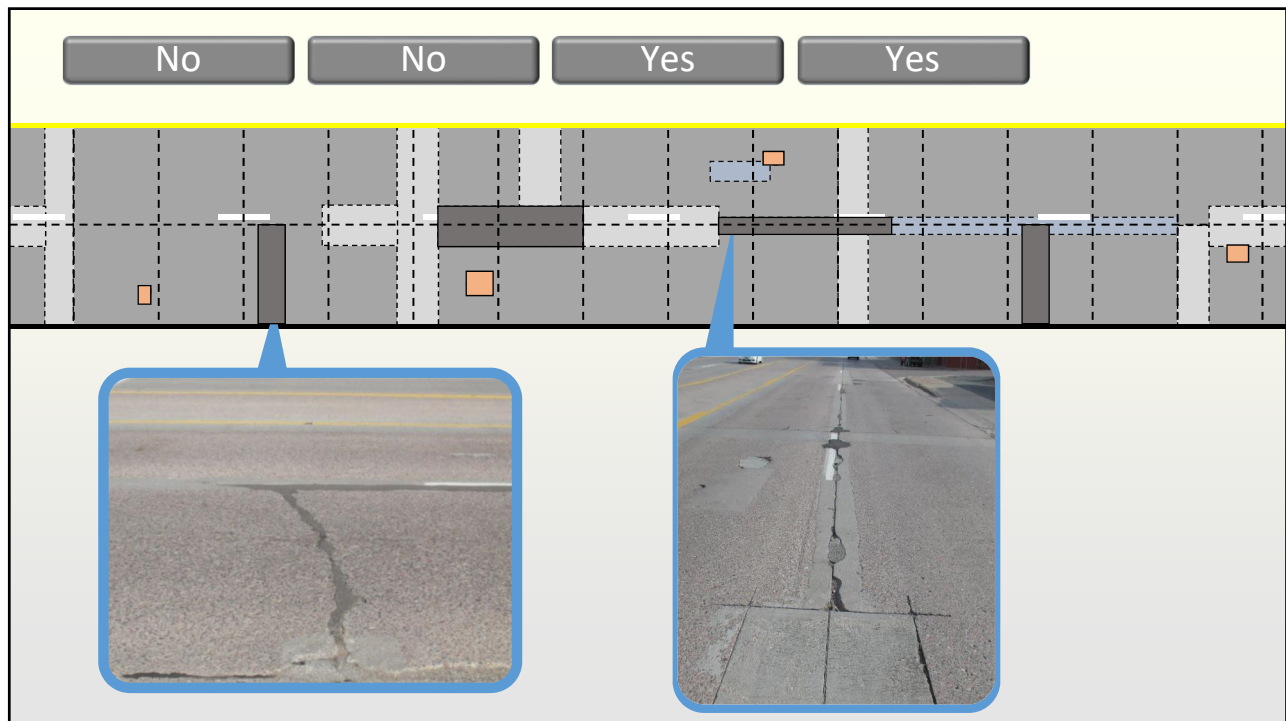
Full Depth Repair







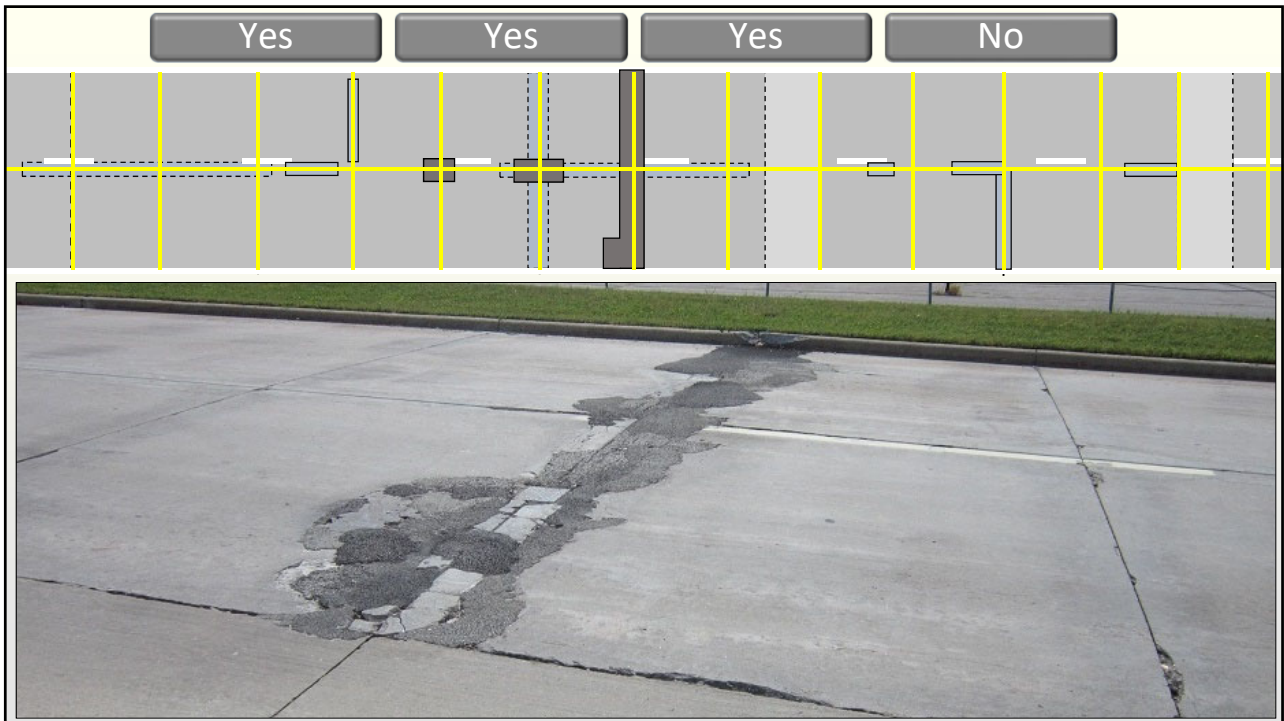




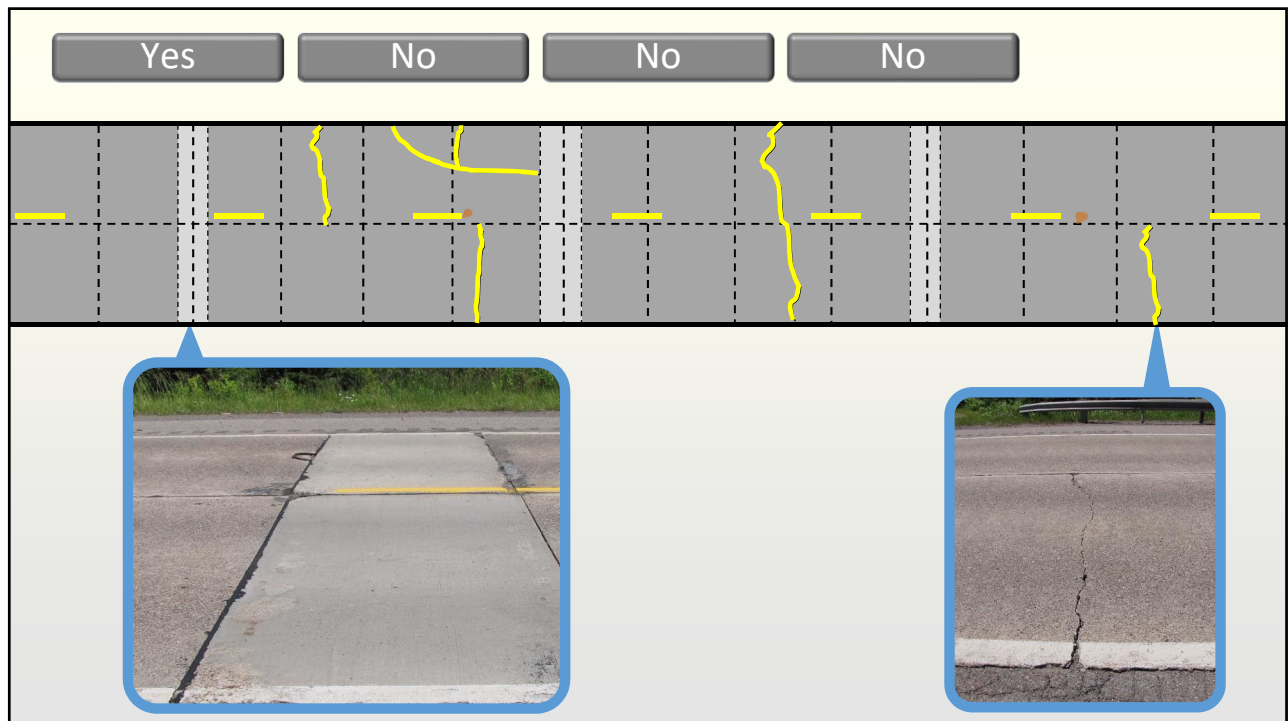
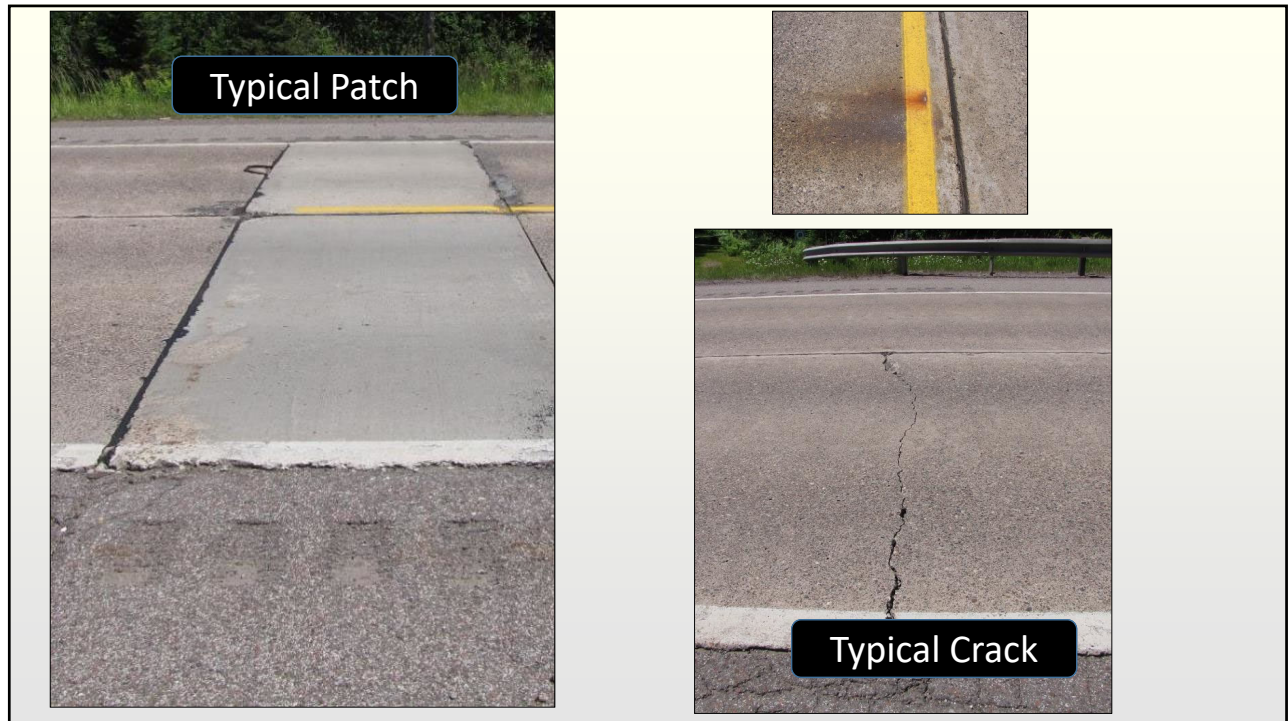


No		No		Yes		No	



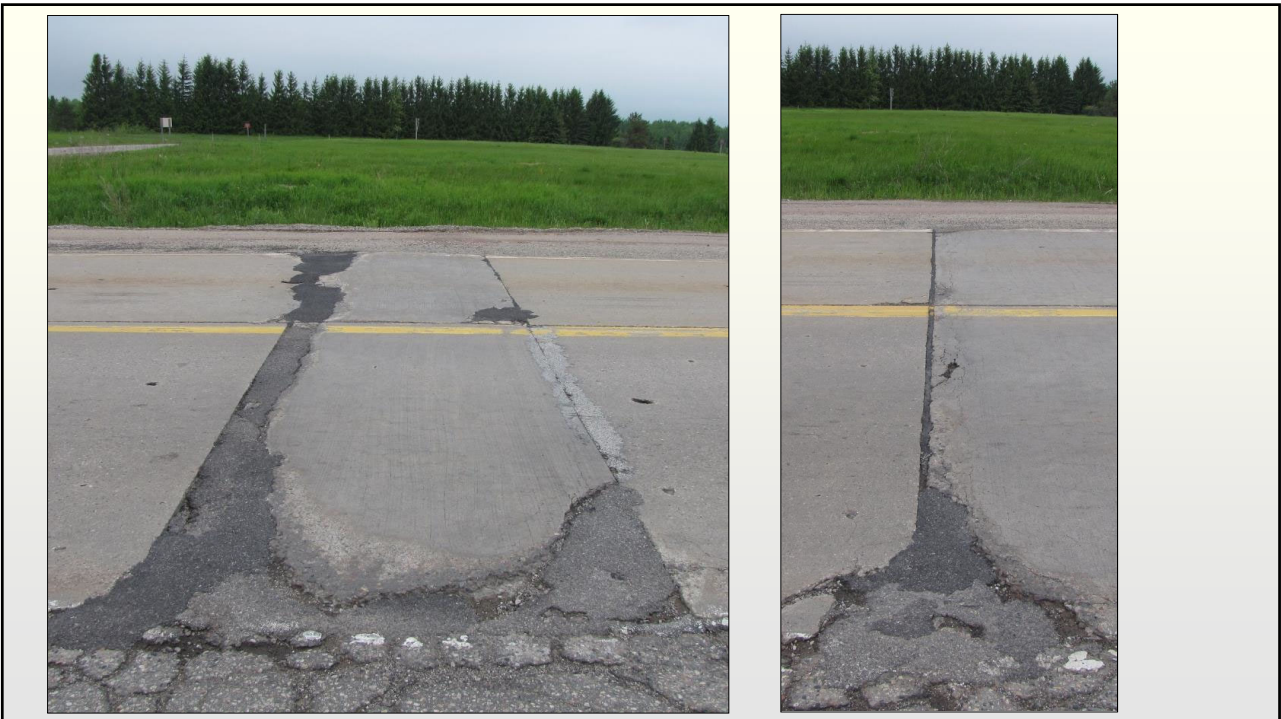


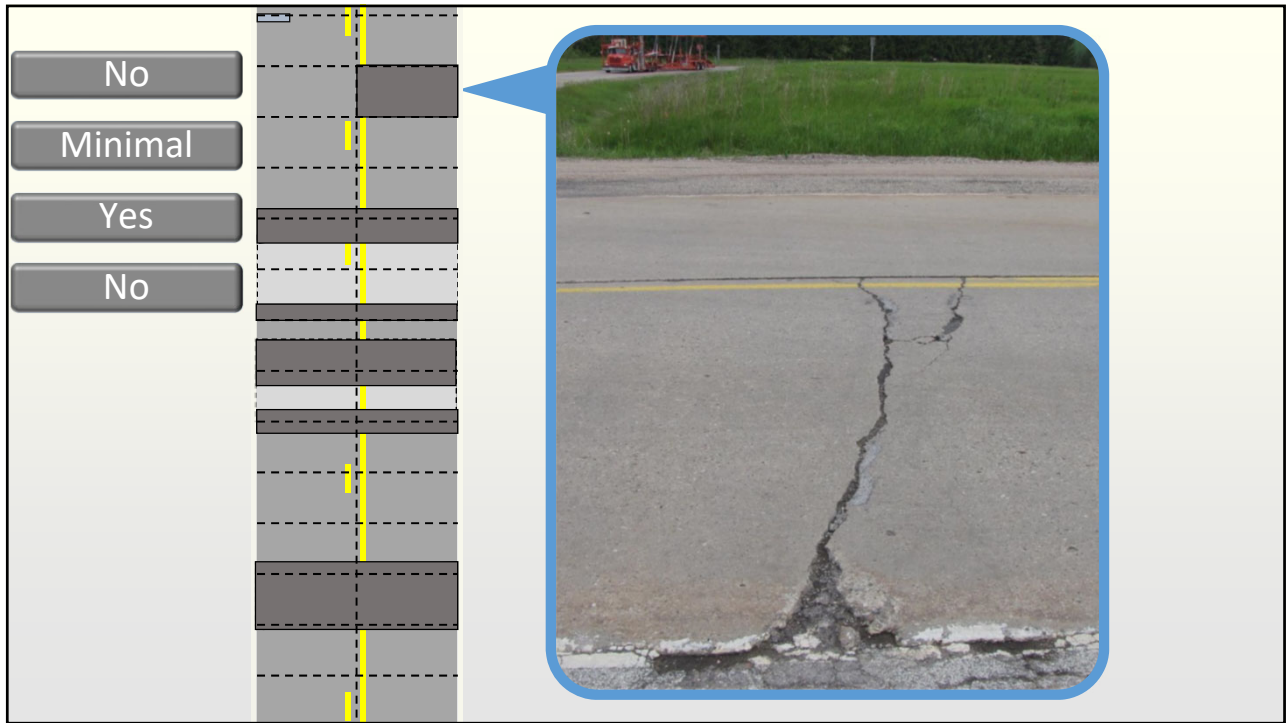




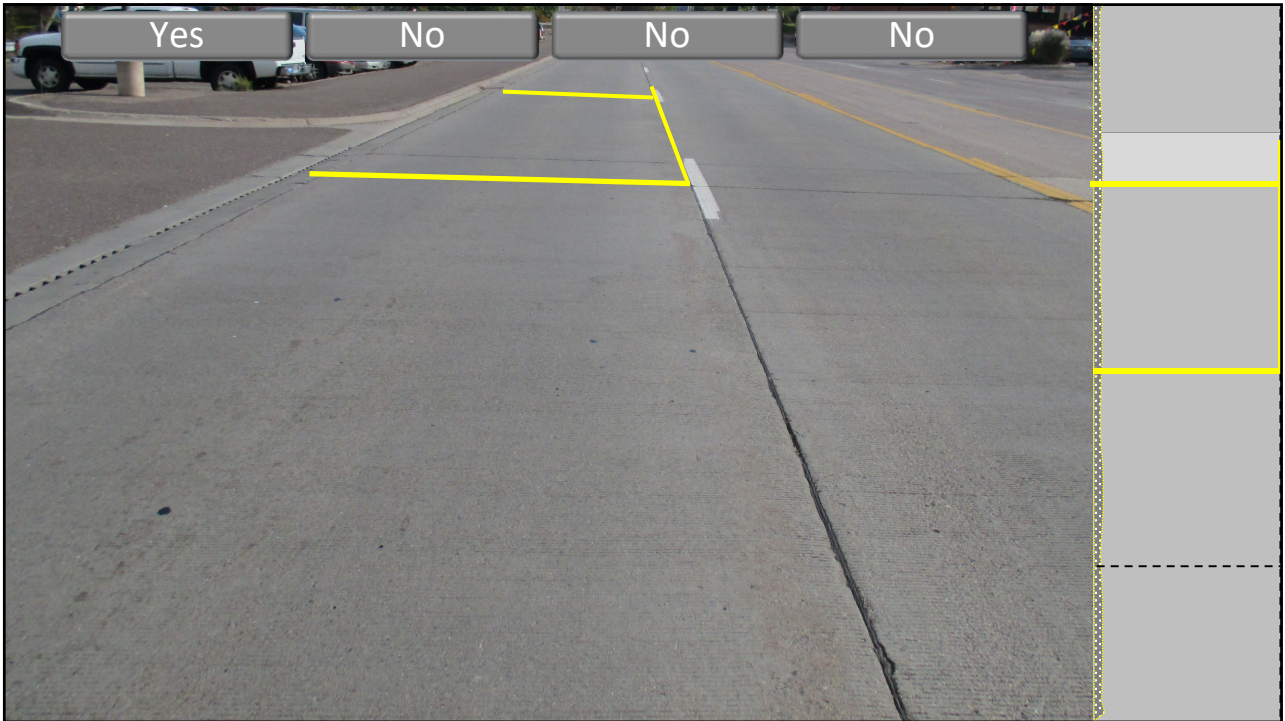
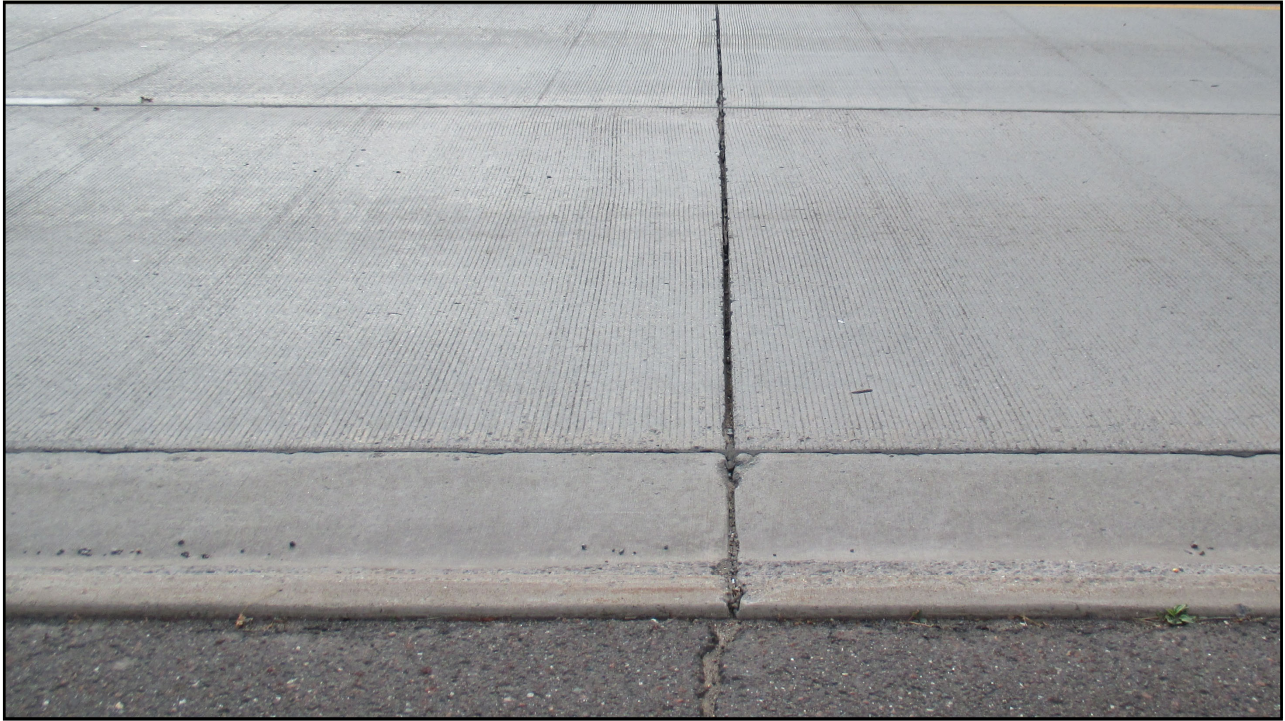




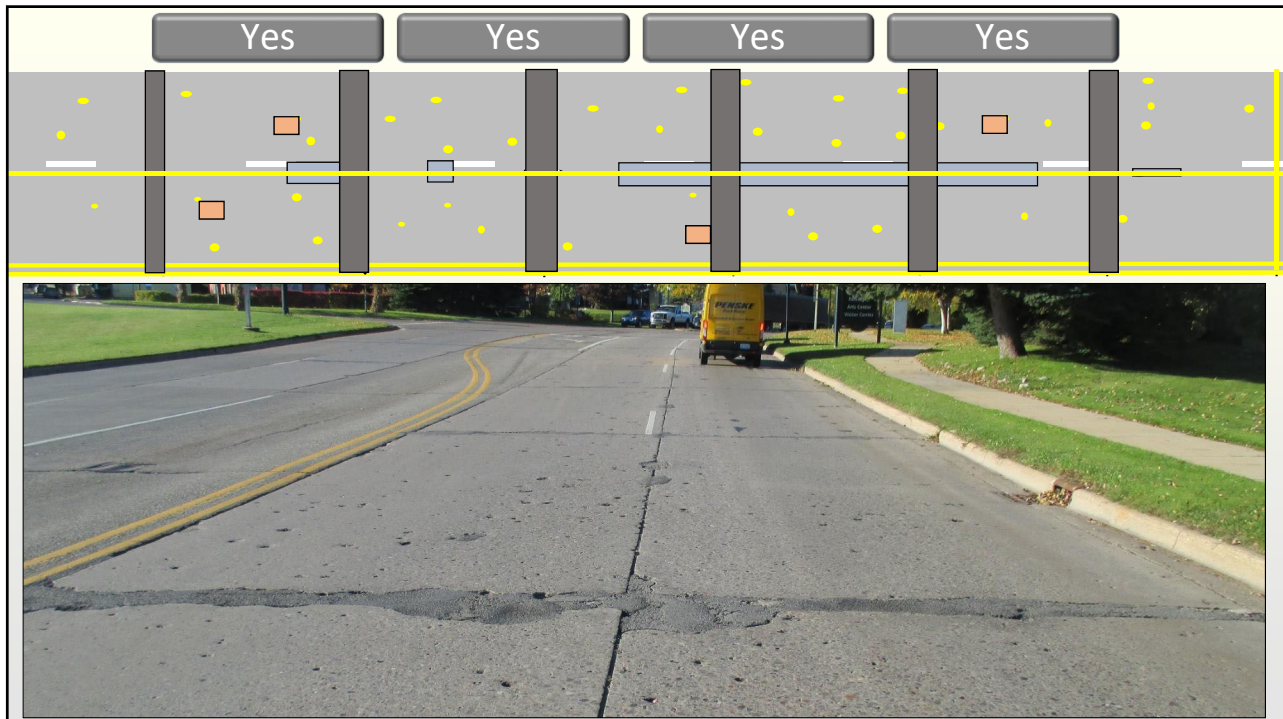


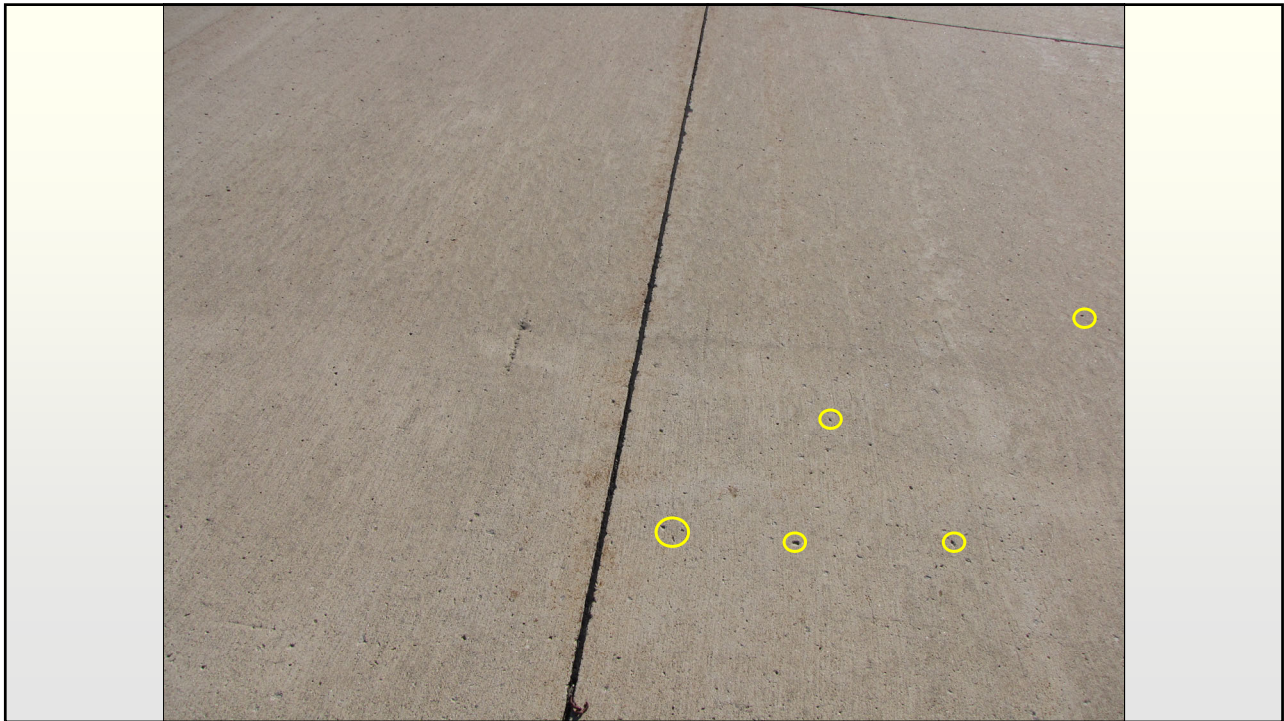


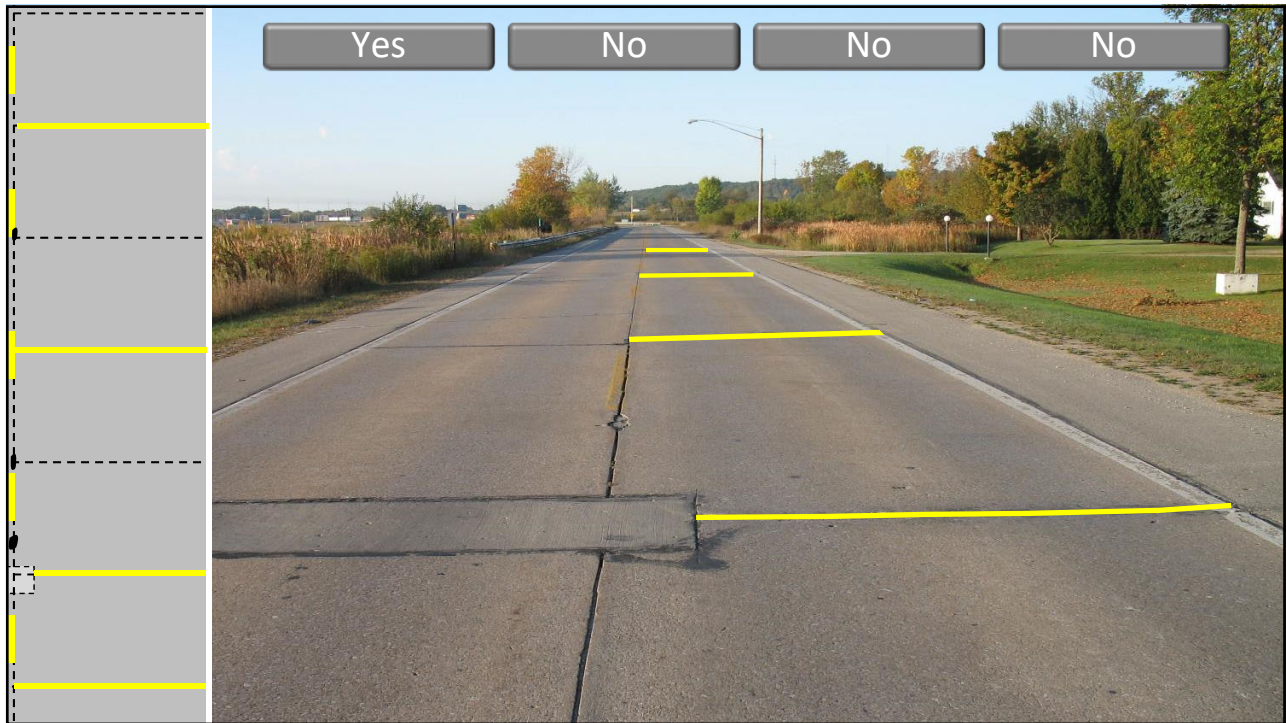




165







Sealcoat Cheat Sheet

Michigan Sealcoat Rating Guide			
Rating	Condition/Defects	Remedy/Action	Typical Age (yrs)
GOOD	10 New construction	None	< 1 year
	9 Like new	None	1 to 3
	8 First signs of distress Edge distress limited	Routine maintenance Minor edge seal	3 to 5
FAIR	7 Minor distress Edge distress <5%, Lane distress <5%, OR Raveling <5%	Minor asphalt or spray-injection patching Possible single-application sealcoat	4 to 6
	6 Moderate distress Edge distress <10%, Lane distress <10%, OR Raveling <10%	Moderate asphalt or spray-injection patching Single-application sealcoat	5 to 7
	5 Distressed Edge distress <20%, Lane distress <20%, OR Raveling <20%	Moderate asphalt or spray-injection patching Single-application sealcoat With up to 50% double-application sealcoat	6 to 8
POOR	4 Edge distress <30%, Lane distress <30%, OR Rutting of 1/2" to 1"	Asphalt or spray-injection patching and double-application sealcoat	7 to 9
	3 Edge distress <50%, Lane distress <50%, OR Rutting of 1" to 2"	Wedge and/or asphalt or spray-injection patching and double- or triple-application sealcoat Possible crack-and-choke first	8 to 10
	2 Edge distress <50%, Lane distress <50%, OR Rutting greater than 2"	Reconstruct by crack-and-choke prior to new sealcoat surface, possible return to gravel	>9
Not Rated	1 Extensive distress >50% of surface area	Reconstruction by crack-and-choke prior to new sealcoat surface, or return to gravel	>10

NOTE: To be used for Michigan TAMP data collection as sealcoat prevents rutting of FAIR Sealcoat Material




Michigan Transportation Asset Management Council | Technology & Training | Prepared by Center for Technology & Training, Michigan Technological University on behalf of the Michigan Transportation Asset Management Council

Seal Coat - Good

 <p>10</p> <p>New construction</p> <p>Less than one year old</p>	 <p>9</p> <p>Like new</p> <p>More than one year old</p>	 <p>8</p> <p>First signs of distress</p> <p>Limited edge distress</p>
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Seal Coat - Fair

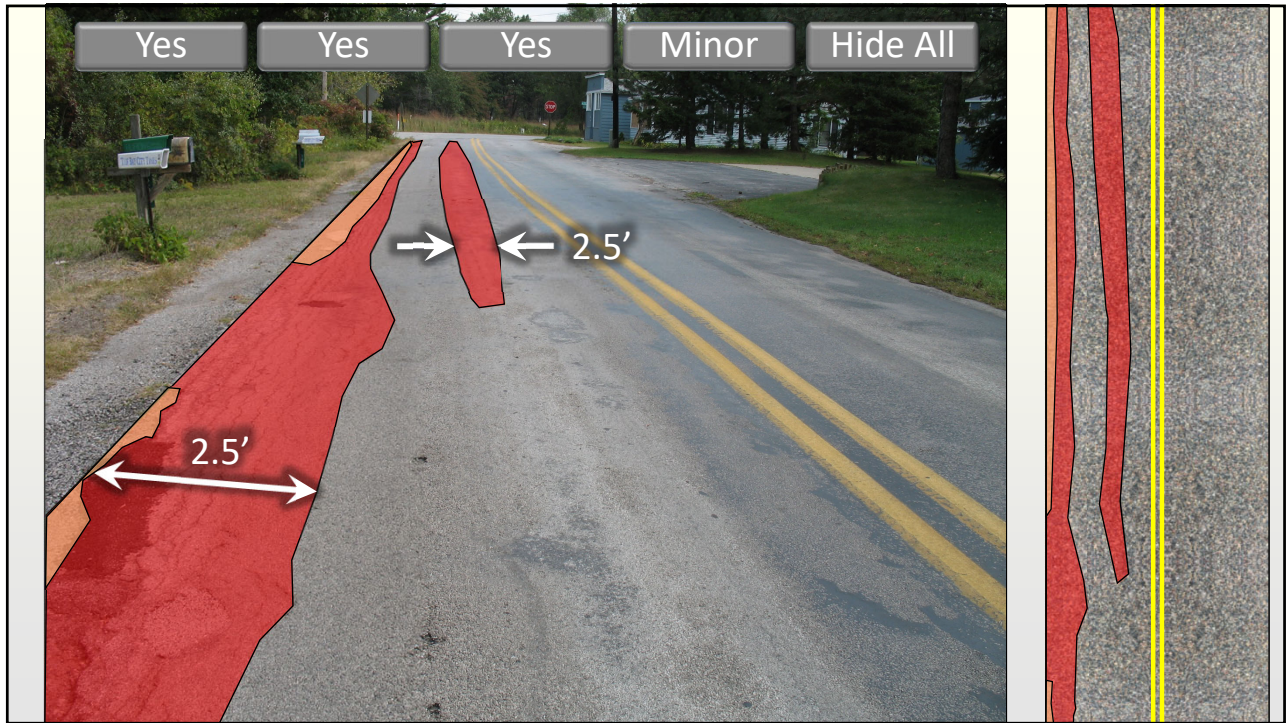
Edge distress, or Lane Distress, or Raveling

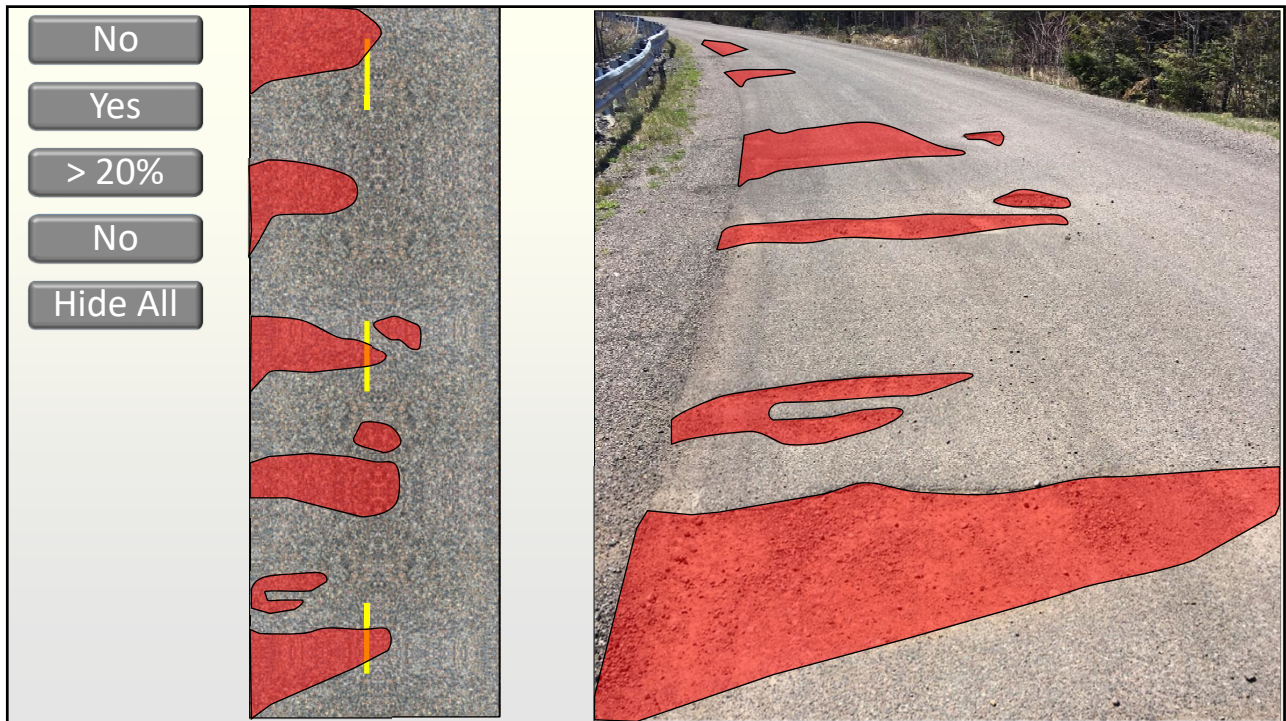
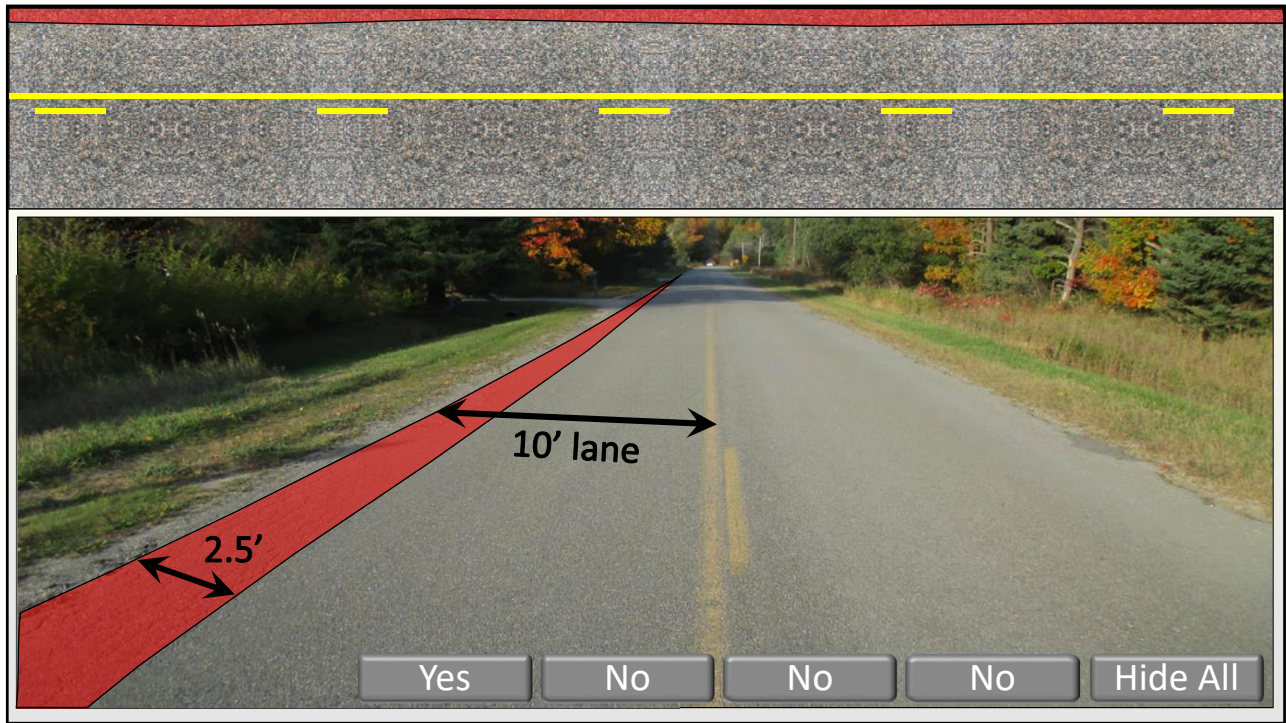
		
<p>7</p> <p>Less than 5%</p>	<p>6</p> <p>Up to 10%</p>	<p>5</p> <p>Up to 20%</p>

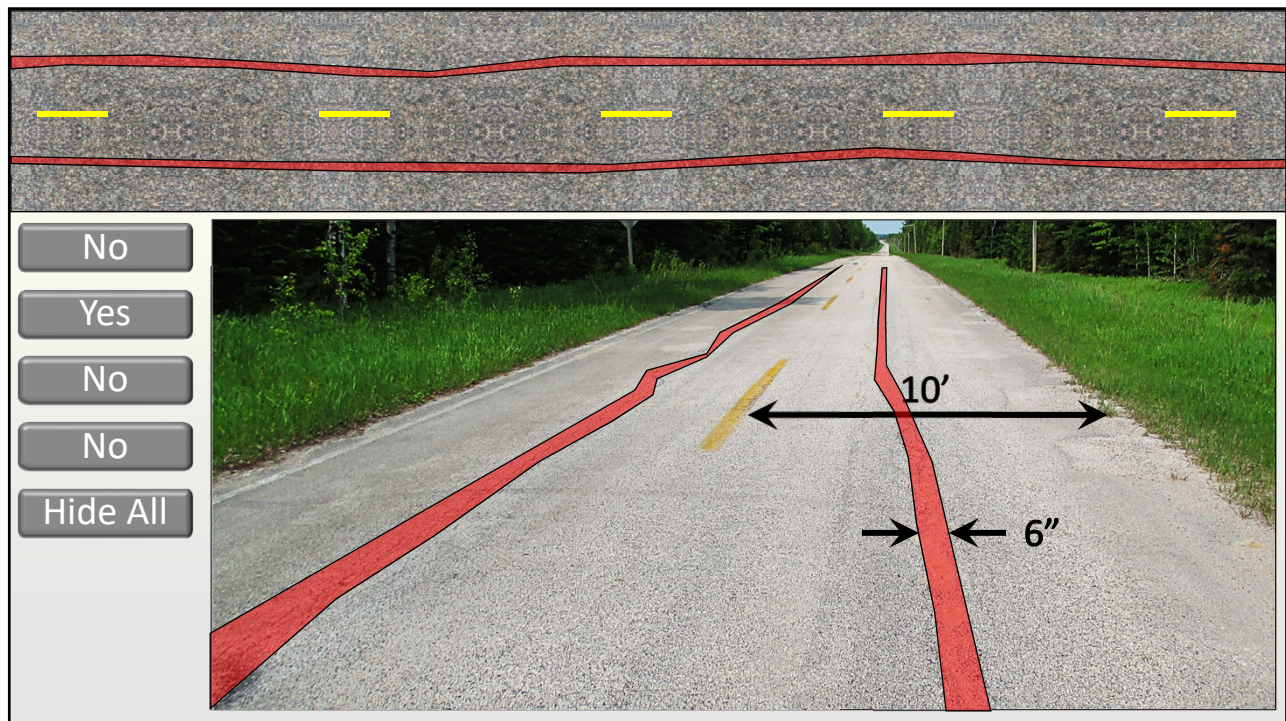
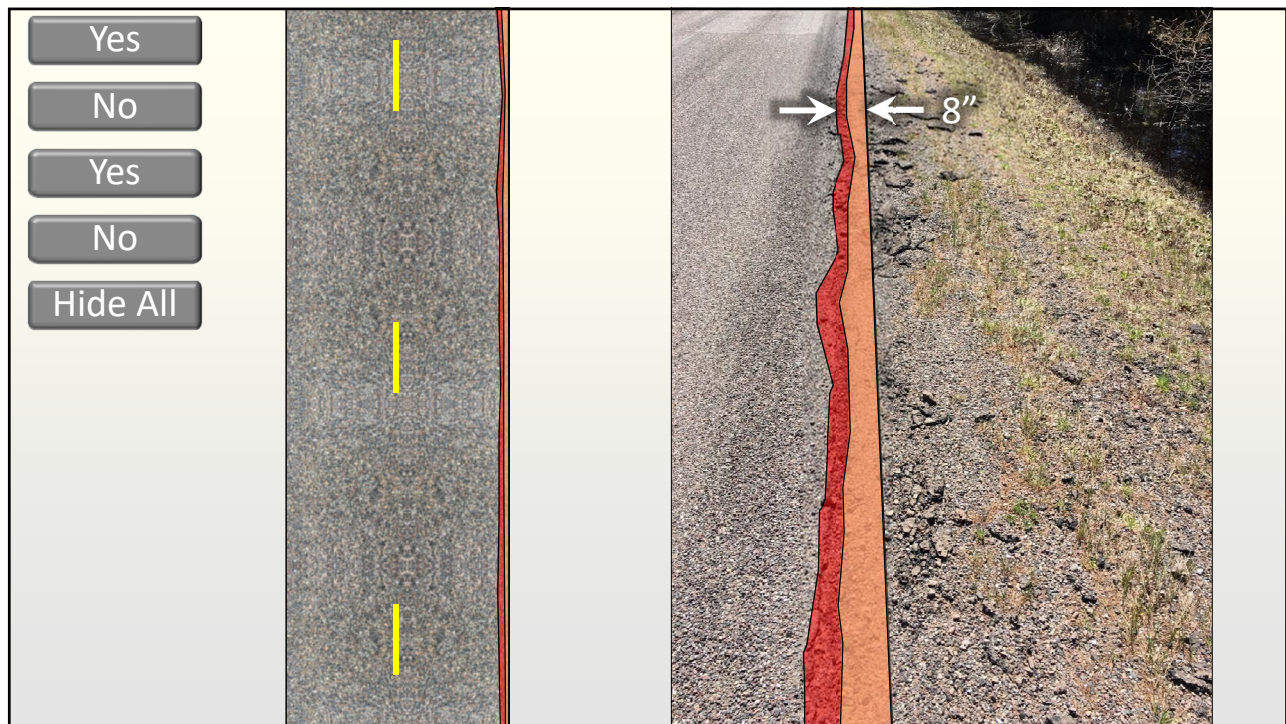
Seal Coat - Poor

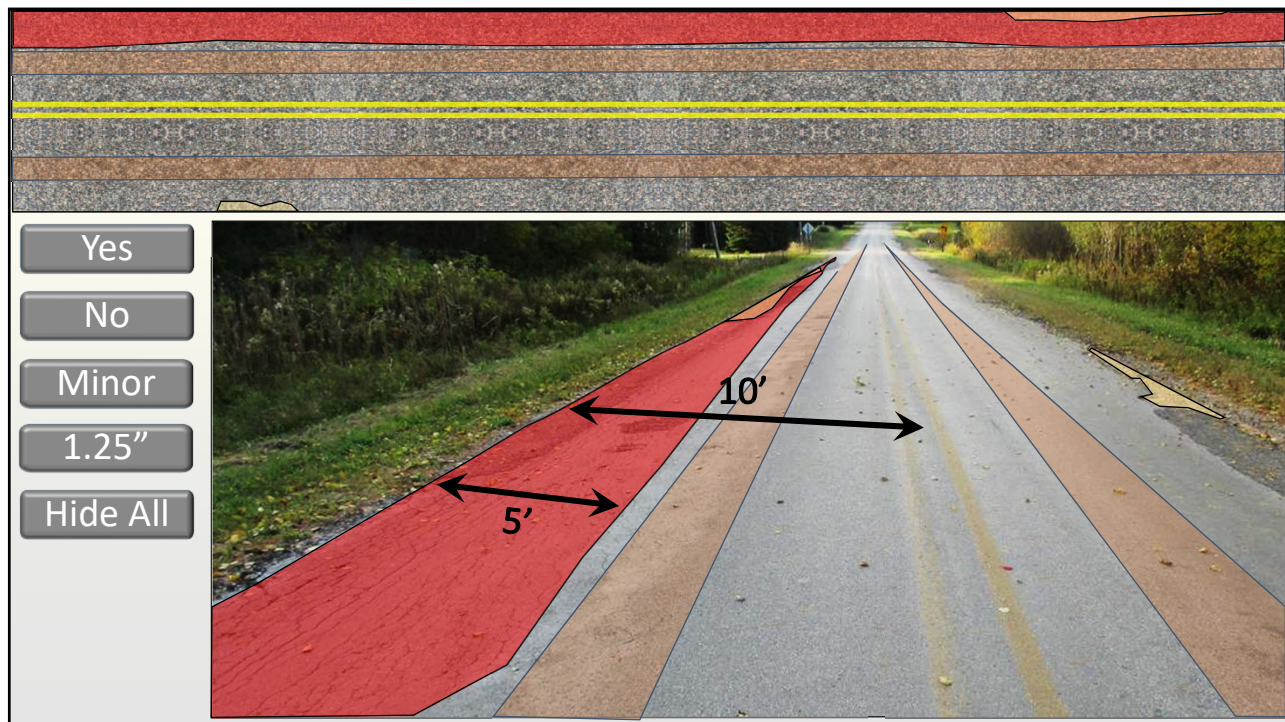
Edge distress, or Lane Distress, or Rutting

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









Upcoming Trainings & Final Thoughts

IBR Training – February 2nd, March 8th, June 21st

Master the Roadsoft Data Collection Cycle for MPO/RPO – TBD

Safety when Rating

Complete Evaluation

Contact Information



Michigan
Transportation Asset
Management Council

www.michigan.gov/tamc



Michigan's
Local Technical
Assistance Program

906-487-2102
LTAP@mtu.edu
www.MichiganLTAP.org



roadsoft@mtu.edu
www.roadsoft.org