Inventory-Based Rating System™
for Gravel Roads

Center for
Technology & Training

TAMC Michigan
Transportation Asset
Management Council

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Agenda

- Why rate roads?

- Why rate gravel roads?

- Why use the IBR System™?

- IBR System™

- Rating exercises

2
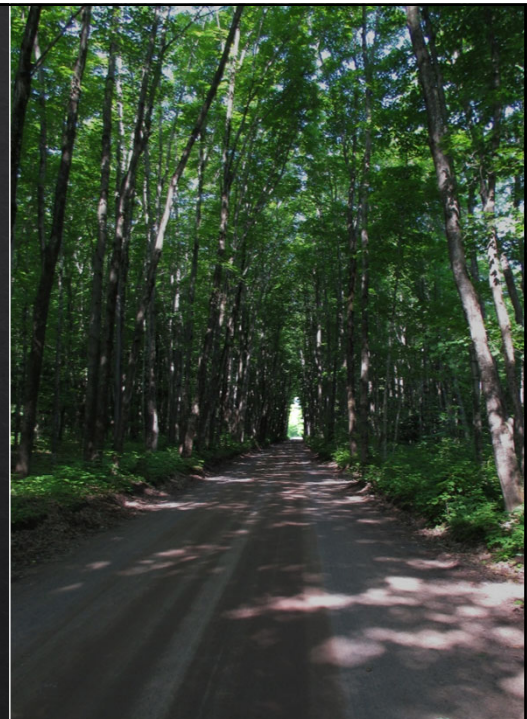
Why Rate Roads?

3

Why Rate Roads?

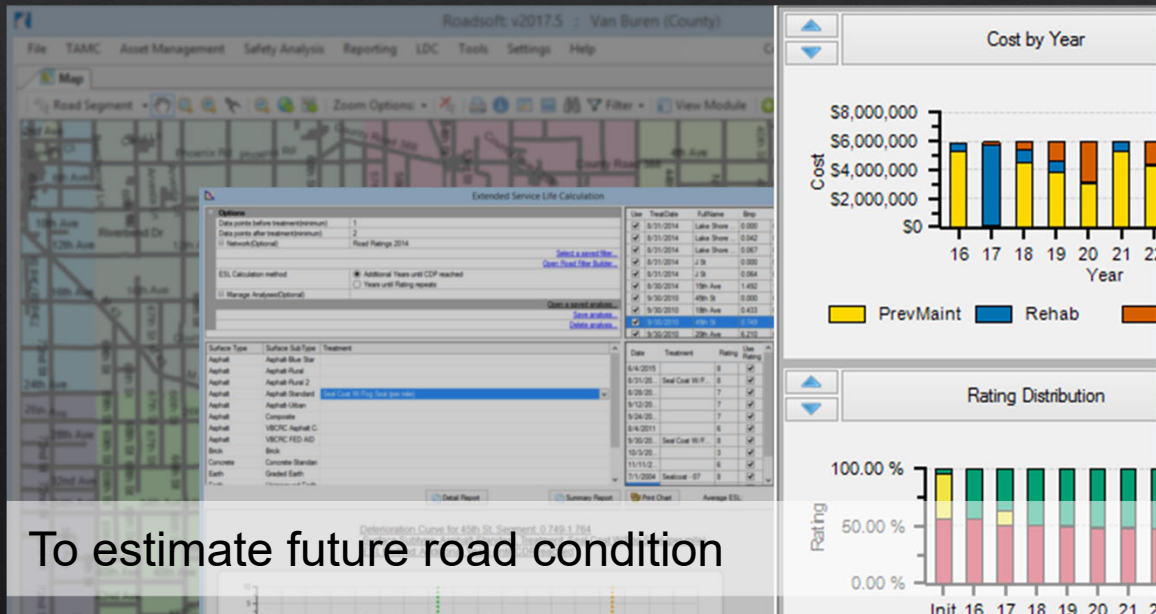To see how road condition is changing

4

Why Rate Roads?

To estimate future road condition

5

Why Rate Roads?

To measure effectiveness of past improvements

6

Why Rate Roads?

To determine what/where/when improvements are needed

7

Why Rate Roads?

To submit data to the TAMC

8

Why Rate Roads?

All public roads in Michigan will be managed using the principles of asset management.

— Public Act 499 (2002) Summary

To submit data to the TAMC

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Why Rate Roads?

MDOT & local agencies must report to the TAMC the following:
- Road and bridge condition
- 3-year project plan
- Expenditures

— Public Act 199 (2007) Summary

To submit data to the TAMC

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Why Rate Roads?

Asset management plan for all roads, bridges, culverts and traffic signals required after October 1, 2020

– Public Act 325 (2018) Summary

To submit data to the TAMC

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What is the TAMC?

A supporter of excellence in managing Michigan's transportation assets by:

- developing a pavement management system
- advising the Michigan Infrastructure Council, the State Transportation Commission, and the Legislature

Michigan
Transportation Asset
Management Council

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What is the TAMC?

A supporter of excellence in managing Michigan's transportation assets by:

- promoting asset management principles
- promoting tools and practices for road-owning agencies

TAMC Michigan Transportation Asset Management Council

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TAMC Annual Report to the Legislature

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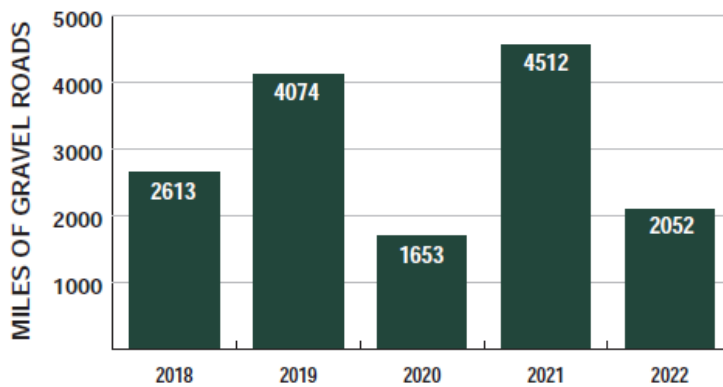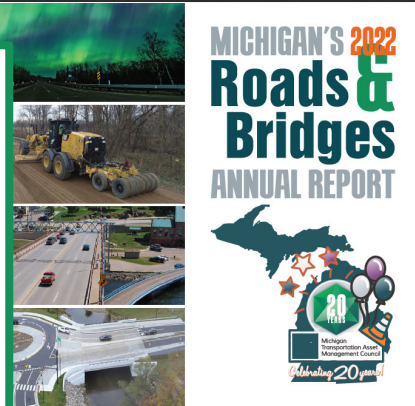## TAMC Annual Report to the Legislature

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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
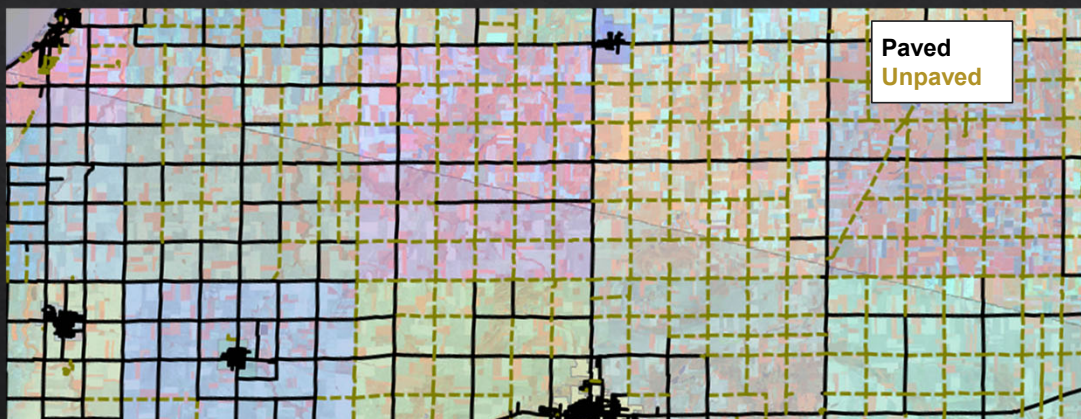- agency rater does agency's own roads

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Why Rate *Gravel* Roads?

Why Rate Gravel Roads

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Why Rate *Gravel* Roads?

Paved
Unpaved

Gravel roads comprise half of non-fed-aid network*
(33% of entire Michigan road network)

*Source: Transportation Asset Management Council; Michigan's Roads & Bridges 2013 Annual Report

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Why Rate *Gravel* Roads?

Show investments on unpaved network
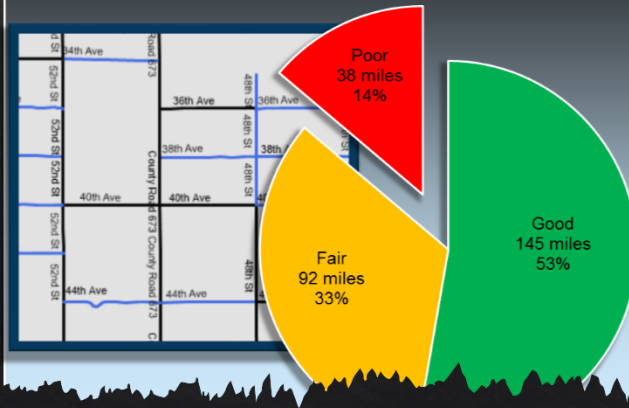
19

Why Rate *Gravel* Roads?

Aid in planning where upgrades are needed

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Why Rate *Gravel* Roads?

38 miles of our County gravel roads need drainage improvements

Poor
38 miles
14%

Good
145 miles
53%

Fair
92 miles
33%

Why Better Drainage?

Without proper drainage roads will fail quicker, Lorem ipsum dolor sit amet, duo in diam nonumes incorrupte. Sed id dicamo cu, an nullam lucilius has.. Vix id propriae electram liberavisse, stet tota cu vel. No adhuc placerat eloquentiam his, wisi definitiones in eos, eu dico animal admodum mel.

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Communicate to the public

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Why Use the IBR System™?

Why IBR

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Why Use the IBR System for Unpaved Roads?

Other systems have:
- frequent data collection needs
- unstable network-level measurements

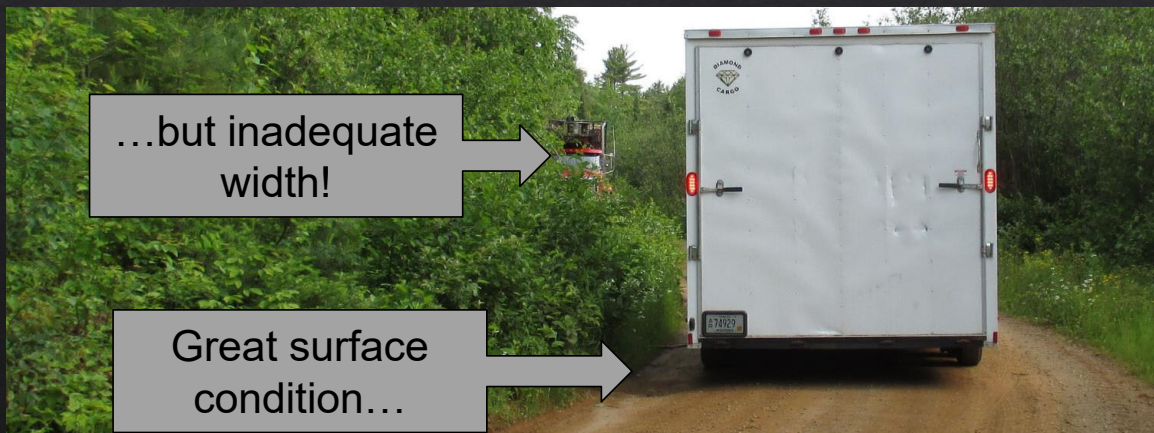

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Why Use the IBR System for Unpaved Roads?

Other systems:
- Focus heavily on surface distress
- Disregard other important factors

…but inadequate width!

Great surface condition…

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Why Use the IBR System for Unpaved Roads?

Other systems:

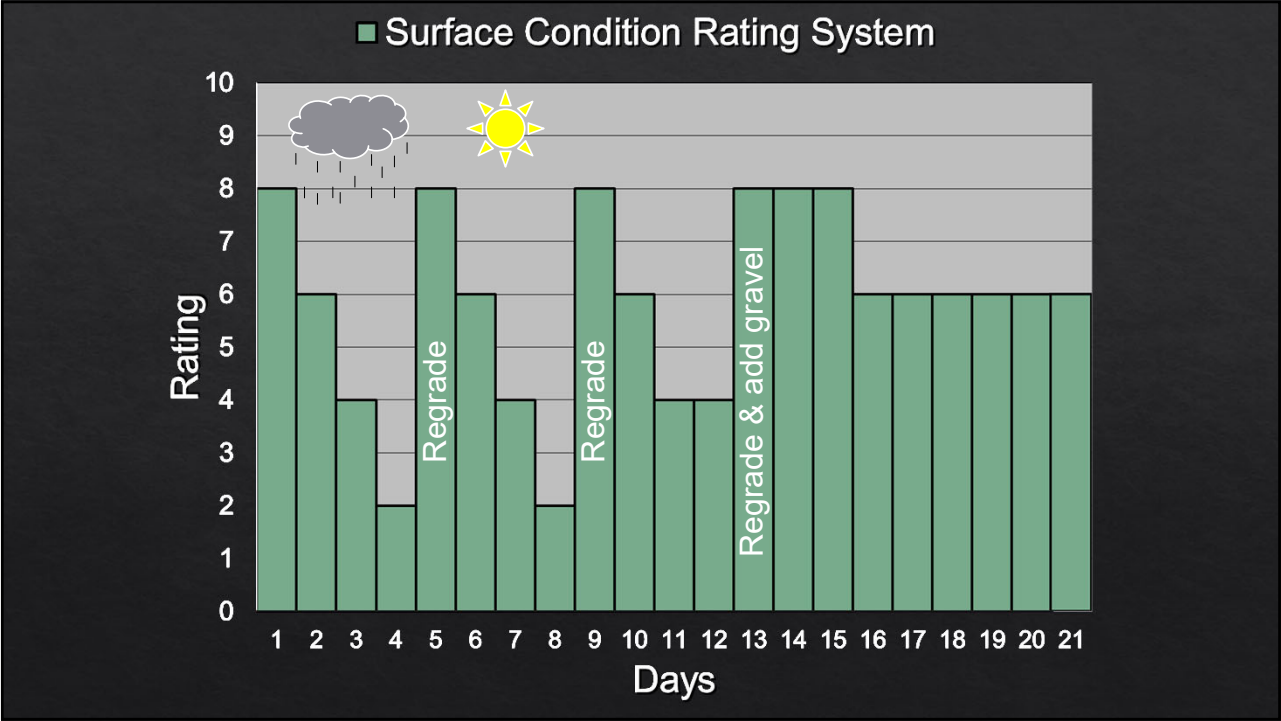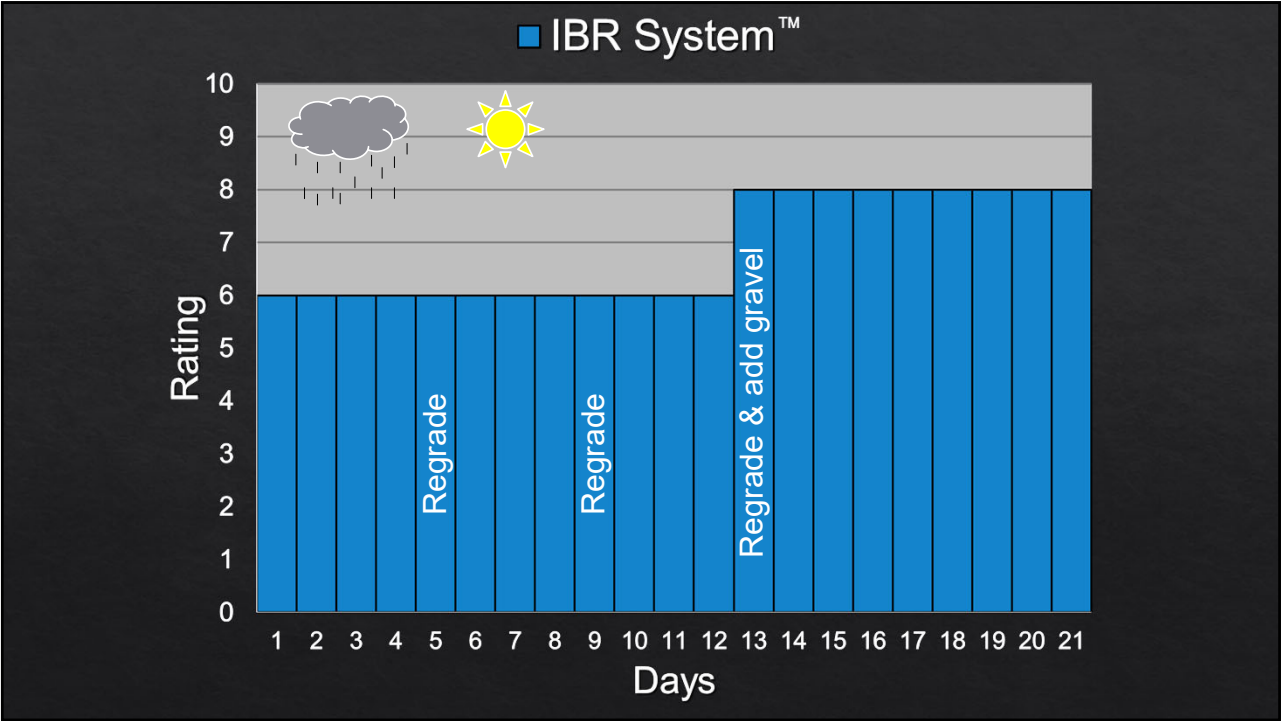- are not directly related to change in value or usability of the asset

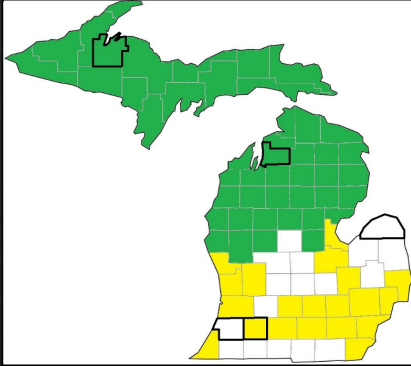25

Example Road Segment

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Why Use the IBR System for Unpaved Roads?

Inventory Based Rating System Pilot Data Collection and Implementation Report

December 8, 2015

MichiganTech
Department of Civil and
Environmental Engineering

Center for
Technology & Training

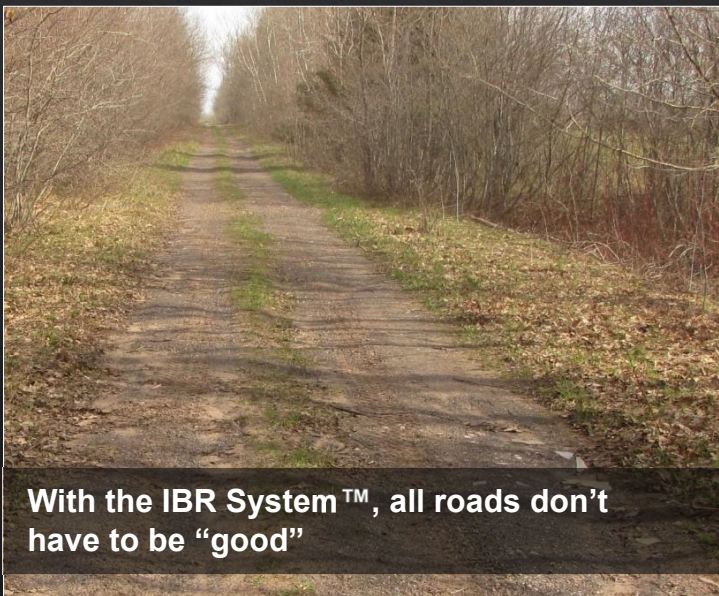Michigan Technological University
1400 Townsend Drive
Houghton, MI 49931

Authors:

Tim Colling, PhD., PE

John Kiefer, PE

Pete Torola, PE

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Why Use the IBR System for Unpaved Roads?

With the IBR System™, all roads don't have to be "good"
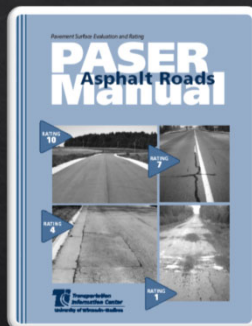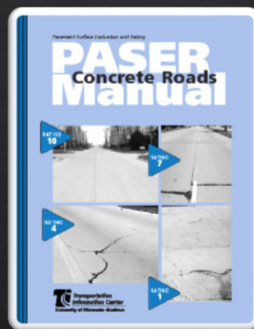
SEASONAL ROAD
NOT SNOWPLOWED
BY THE
HOUGHTON
COUNTY ROAD
COMMISSION

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IBR System™ for Unpaved Roads

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Paved Roads Use PASER

Michigan Sealcoat Rating Guide

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PASER

PASER can be used as a treatment selection tool

Good

Condition Rating

Preventative Maintenance

Heavy Maintenance
Light Rehabilitation

Heavy Rehabilitation

Asset Replacement

Poor

Time
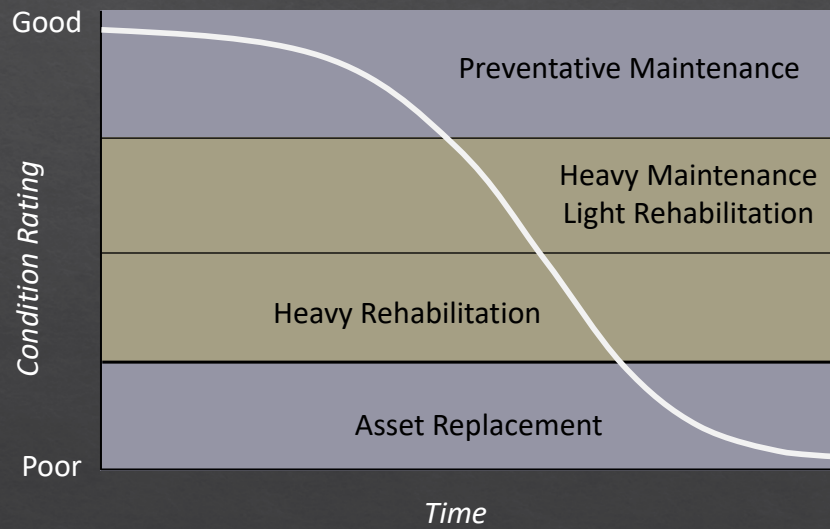
33

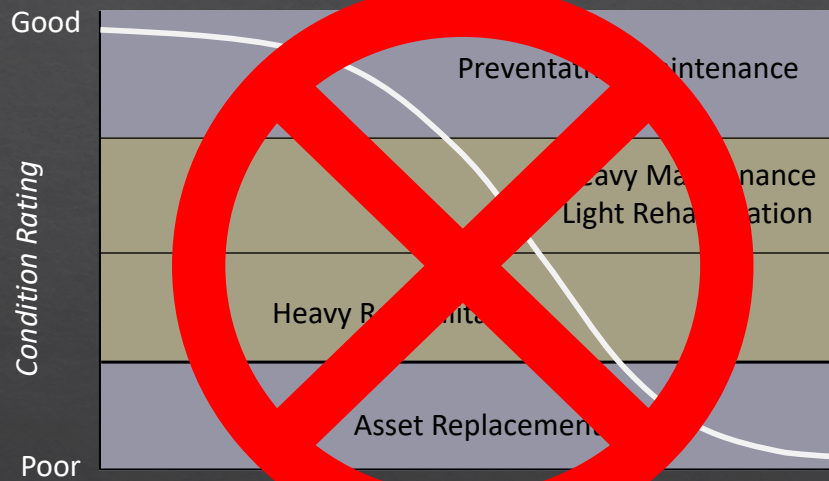## Unpaved Roads Use IBR System™
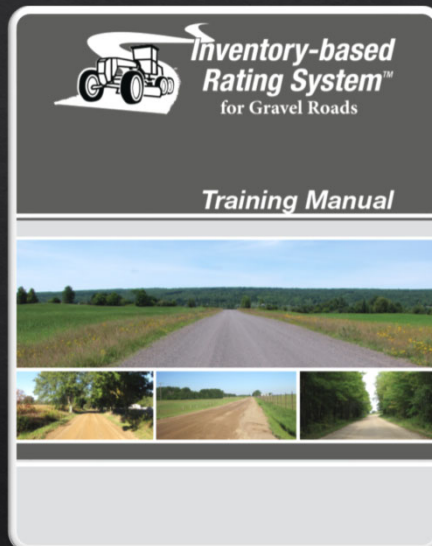
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PASER versus IBR System™

IBR System™ is not a treatment selection tool

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Preparing for Rating

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Preparing for Rating

Rating Team
Road Owner
RPO/MPO

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Preparing for Rating: Understanding the Data Collection Policy

All rating team members must have attended:
1. PASER - trained or certified in 2021, 2022, 2023, or 2024
2. IBR training - every 3 years

See the TAMC Data Collection Policy for more details:
www.michigan.gov/mic/tamc
    TAMC Policies

TAMC
Michigan
Transportation Asset
Management Council

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Preparing for Rating: Understanding the Funding Structure

Local Agencies reports to Planning Originations

Planning Organization reports to TAMC

MDOT staff uses MDOT time coding

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Preparing for Rating:
Understanding the Role of the TAMC Coordinator

Reimbursement
Certification
Data collection policy
Reporting requirements

Michigan
Transportation Asset
Management Council

TAMC Help Desk
Ph: (517) 335-3741
MDOT_TAMC@Michigan.gov

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Preparing for Rating:
Start & End Dates

START: First Monday of April

Weather permitting
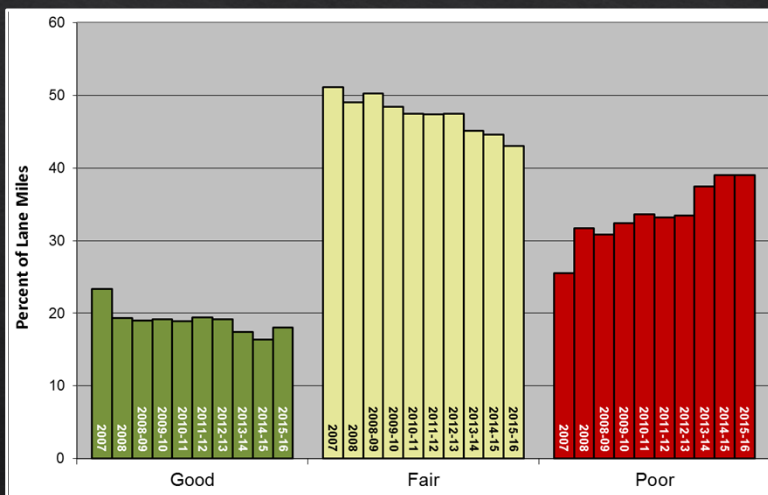
END: First Friday of December

Last day to collect

SUBMISSION: Second Friday of December

Last day RPO/MPO to submit to CSS

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IBR System™ Goals

To provide a network-level performance metric like paved roads

Chesbro: Transportation Asset Management Council   22 Jan 2017

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Measured Elements (or Features)…
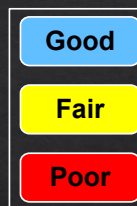
Surface Width

Drainage Adequacy

Structural Adequacy

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Measured Elements Receive an Assessment…
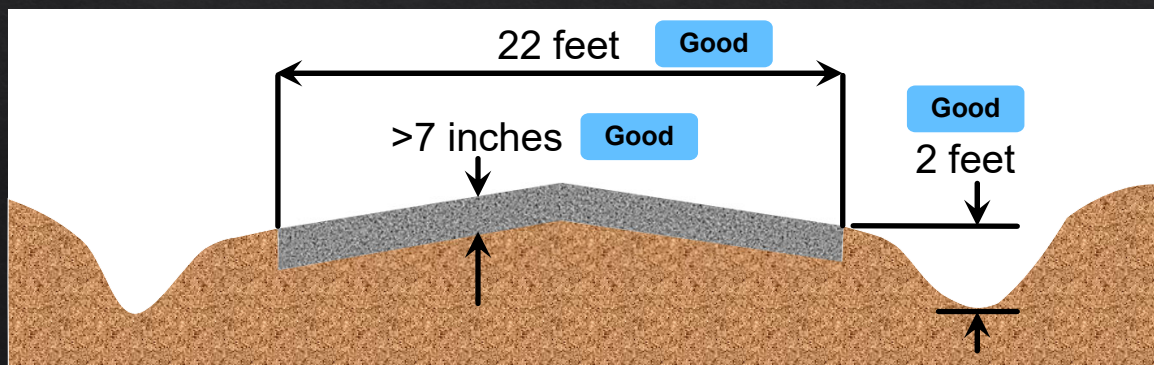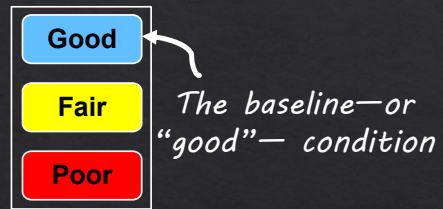
Surface Width

Drainage Adequacy

Structural Adequacy

Good
Fair
Poor

✓ "good" structural adequacy

✓ "good" drainage adequacy

✓ "good" surface width

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…based on a Baseline Condition…

Baseline—or "good"—condition determined by characteristics considered acceptable by most road users

Good
Fair
Poor

The baseline—or "good"— condition

22 feet — Good

>7 inches — Good

Good
2 feet

45

…to Generate an IBR Number

Width	Drain	Struc	IBR #
Good	Good	Good	10*
Good	Good	Good	9
Good	Good	Fair	8
Good	Good	Poor	7
Good	Fair	Good	9
Good	Fair	Fair	8
Good	Fair	Poor	6
Good	Poor	Good	7
Good	Poor	Fair	6
Good	Poor	Poor	5
Fair	Good	Good	8
Fair	Good	Fair	7
Fair	Good	Poor	6
Fair	Fair	Good	7
Fair	Fair	Fair	6
Fair	Fair	Poor	5
Fair	Poor	Good	6
Fair	Poor	Fair	5
Fair	Poor	Poor	4
Poor	Good	Good	5
Poor	Good	Fair	4
Poor	Good	Poor	3
Poor	Fair	Good	4
Poor	Fair	Fair	3
Poor	Fair	Poor	2
Poor	Poor	Good	3
Poor	Poor	Fair	2
Poor	Poor	Poor	1

Rating Lookup Chart

*Segment is < 1 year old

✓ "good" surface width
✓ "good" drainage adequacy
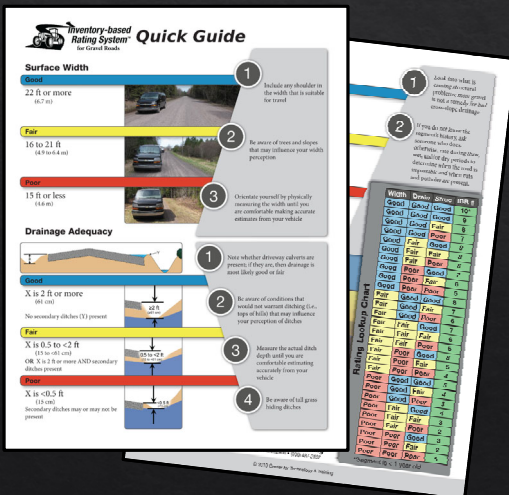✓ "good" structural adequacy

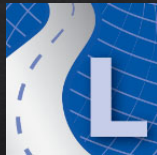IBR number = 9

46
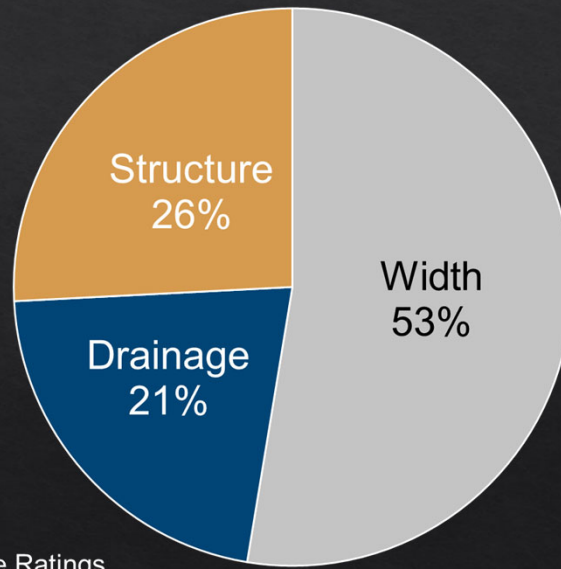
47
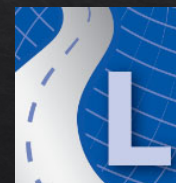
48

IBR Number: Roadsoft/LDC Tools

Laptop Data Collector

* use latest versions

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IBR Number: Roadsoft/LDC Tools

1 to 9 IBR number is generated by Roadsoft
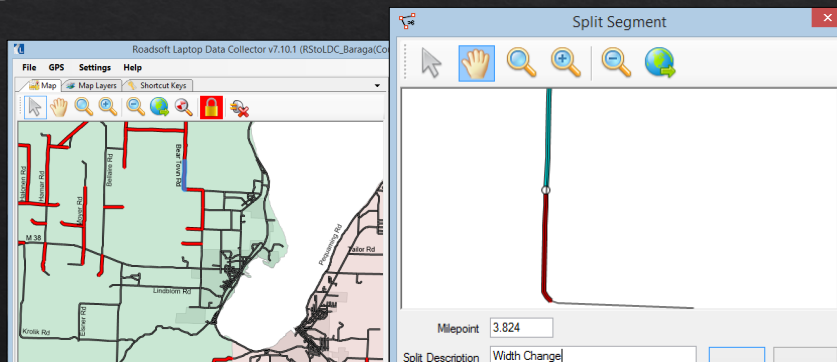

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IBR Number: LDC's IBR Mode
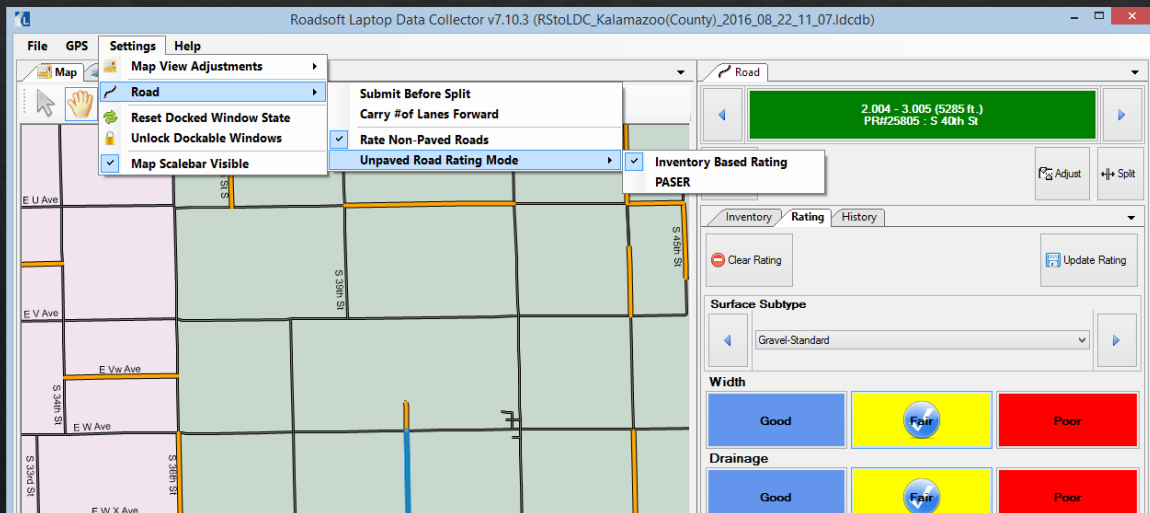
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IBR System™ Assessment Guidance

Unpaved roads can be highly variable so base your assessment on the overall segment

Break the segment if you have a definitive change

Segments should not be smaller than 0.25 miles

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Surface Width Assessment

One driver must pull over to pass

9'

Good	22 feet
Fair	16 to 21 feet
Poor	15 feet or less

26'

55

Surface Width Assessment

9'

Good	22 feet
Fair	16 to 21 feet
Poor	15 feet or less

Include driveable shoulders in SW measurement

26'

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Surface Width Rating Tips

High vegetation

No vegetation

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Surface Width Rating Tips

Flat foreslope

Close vegetation

Orient (calibrate) yourself

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Drainage Adequacy Assessment

Good	Fair	Poor
2 feet or more	0.5 to < 2 feet	Less than 0.5'

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Drainage Adequacy Assessment

Good

2 feet or more

Adequate separation of ditch water from base

Poor

Less than 0.5'

Ditches need to be created
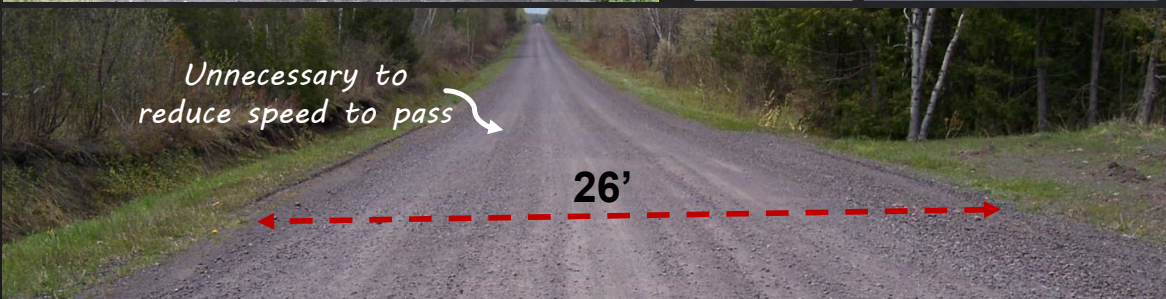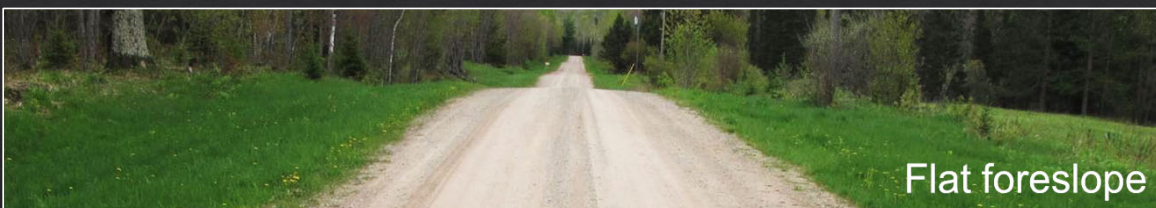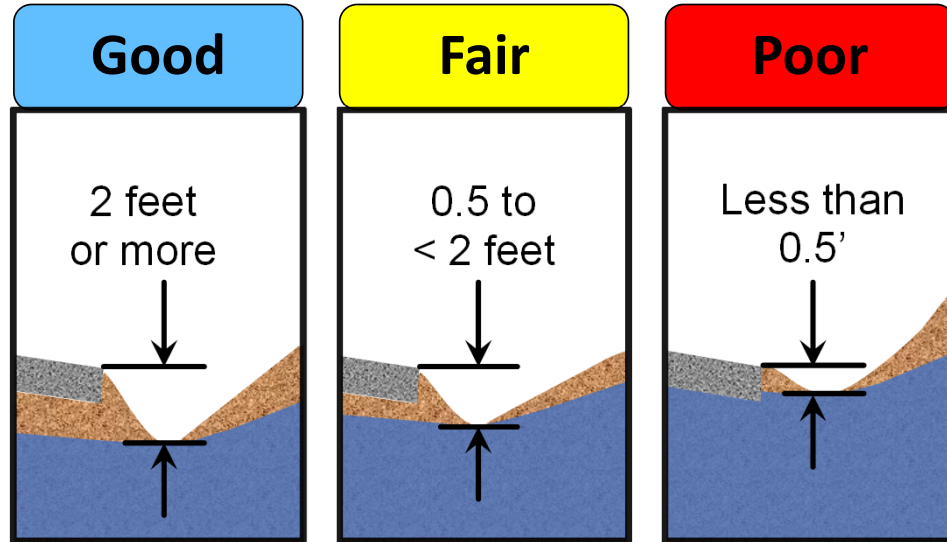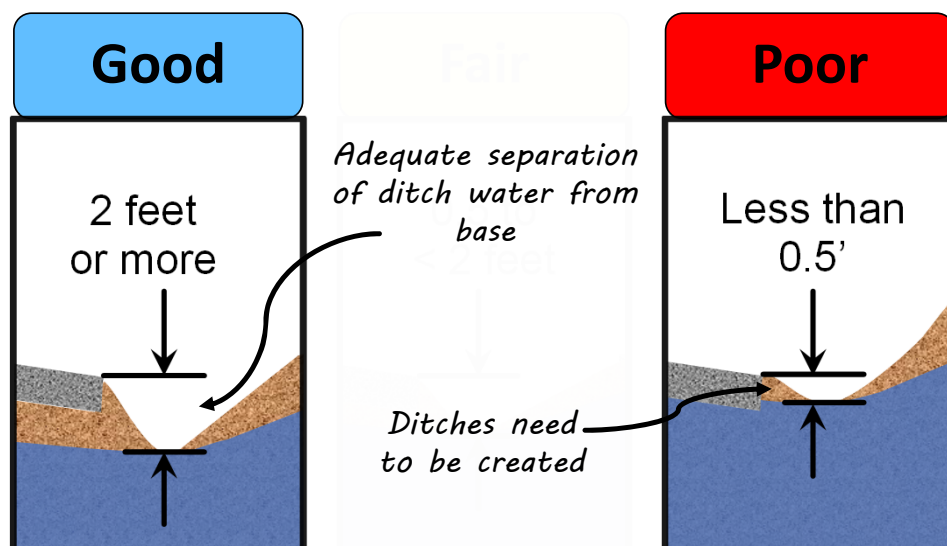
60

Drainage Adequacy: Secondary Ditches

Secondary ditch

If greater than 6" tall, drop Good to Fair

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Drainage Adequacy Rating Tips

No ditch

2' deep

Rate the worst side

Tall grasses hide ditches

Orient (calibrate) yourself
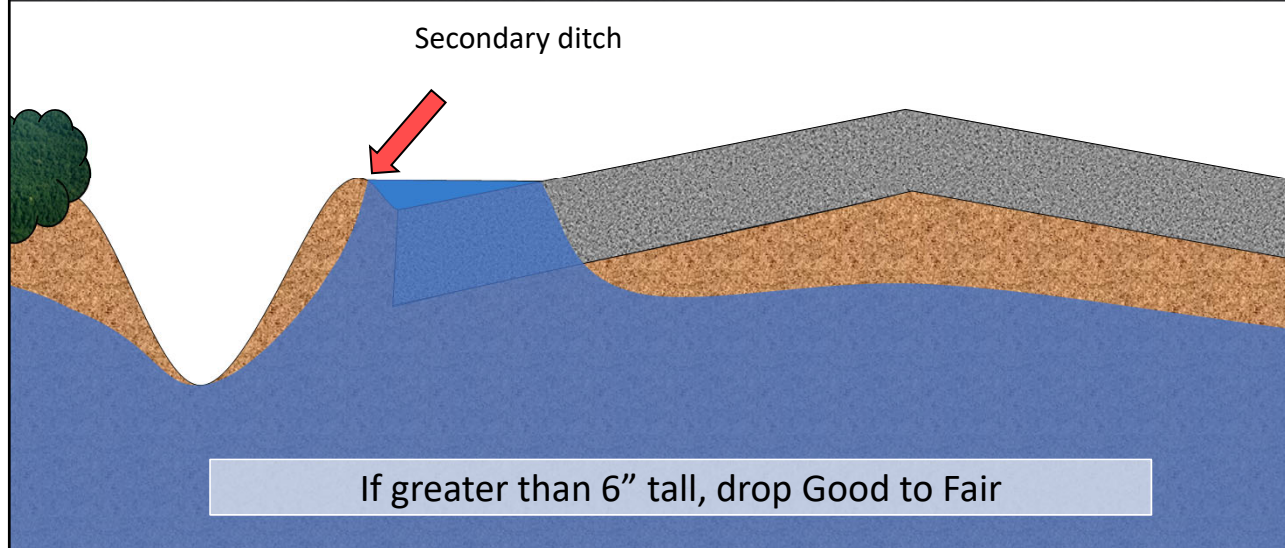
62

Drainage Adequacy Rating Tips

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Structural Adequacy Assessment

Good	> 7 inches gravel
Fair	4-7 inches gravel
Poor	< 4 inches gravel

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Structural Adequacy Cycle of Life

SA influences:
- Surface condition
- Repair frequency

SA is influenced by:
- Traffic volume/loads
- Material properties/thickness
- Roadway drainage
- Construction methods
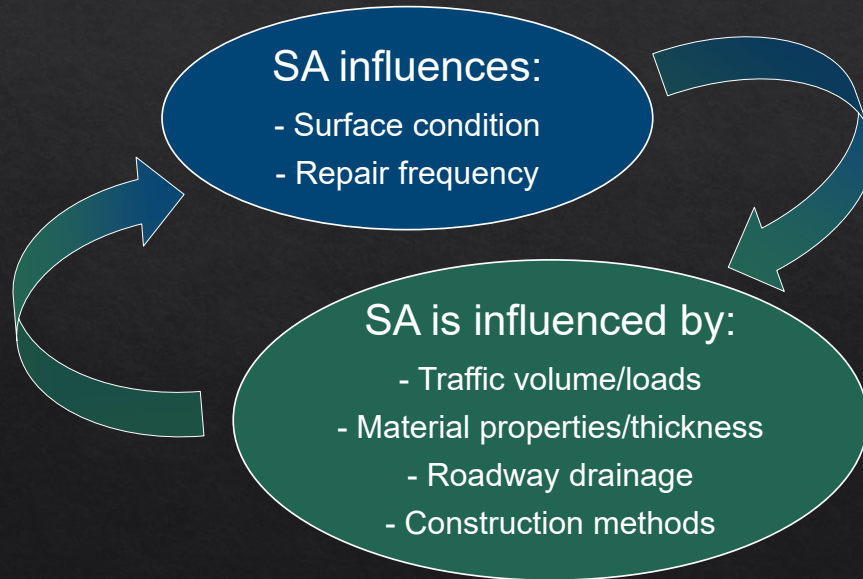
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Structural Adequacy Assessment

Good	> 7 inches gravel
Fair	4-7 inches gravel
Poor	< 4 inches gravel

Traffic Level

Relative Quality of Roadbed Soil	Low	Medium	High
Very Good	6"	11"	15"
Good	7"	12"	17"
Fair	7"	12"	17"
Poor	9"	*	*
Very Poor	10"	*	*

* Higher type pavement design recommended

U.S. Climatic Region III recommended aggregate base thickness from the AASHTO Design Catalogs given in the Gravel Roads Maintenance and Design Manual
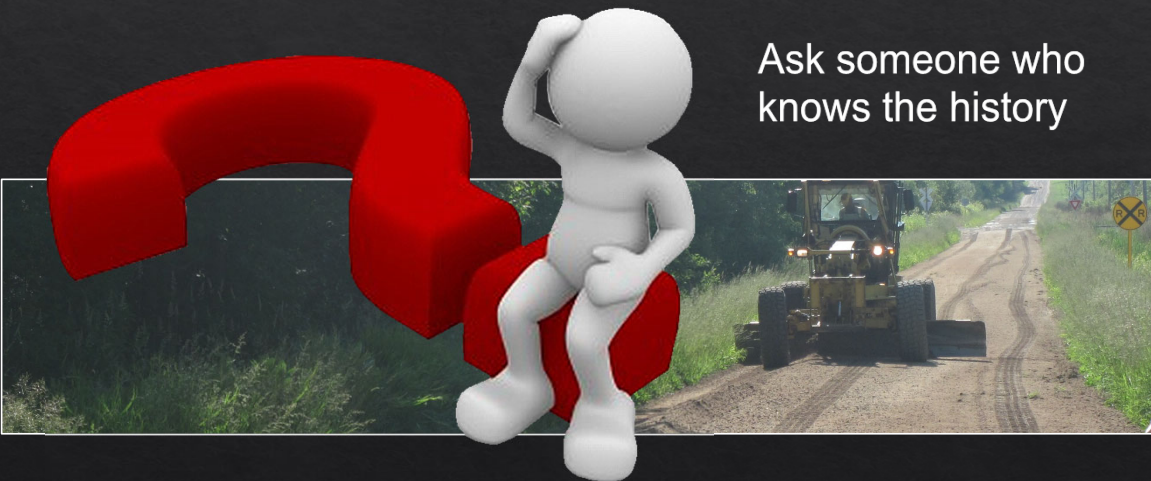
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Structural Adequacy Rating Tips

Investigate the cause before adding gravel

Ask someone who knows the history

Rate during thaw/wet periods

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**Structural Adequacy Assessment:
What if Thickness is Unknown?**

Ask someone who
knows the history

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Structural Adequacy Assessment:
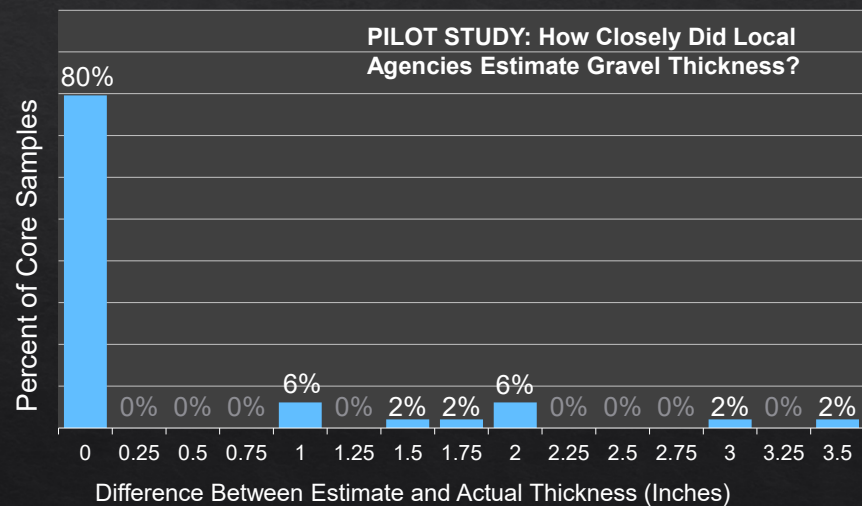## What if Thickness is Unknown?

No extensive field investigation

69

Structural Adequacy Assessment:
What if Thickness is Unknown?

Rely on institutional/local agency knowledge

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Structural Adequacy:
If Thickness is Still NOT Known…

Greater than 3 feet

> 1"

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Structural Adequacy:
If Thickness is NOT Known

Rate during the thaw breakup or after a prolonged rain event

> 1"

Greater than 3 feet

Did not develop during the year	Good
During thaw or very wet period	Fair
During most of the year	Poor

72
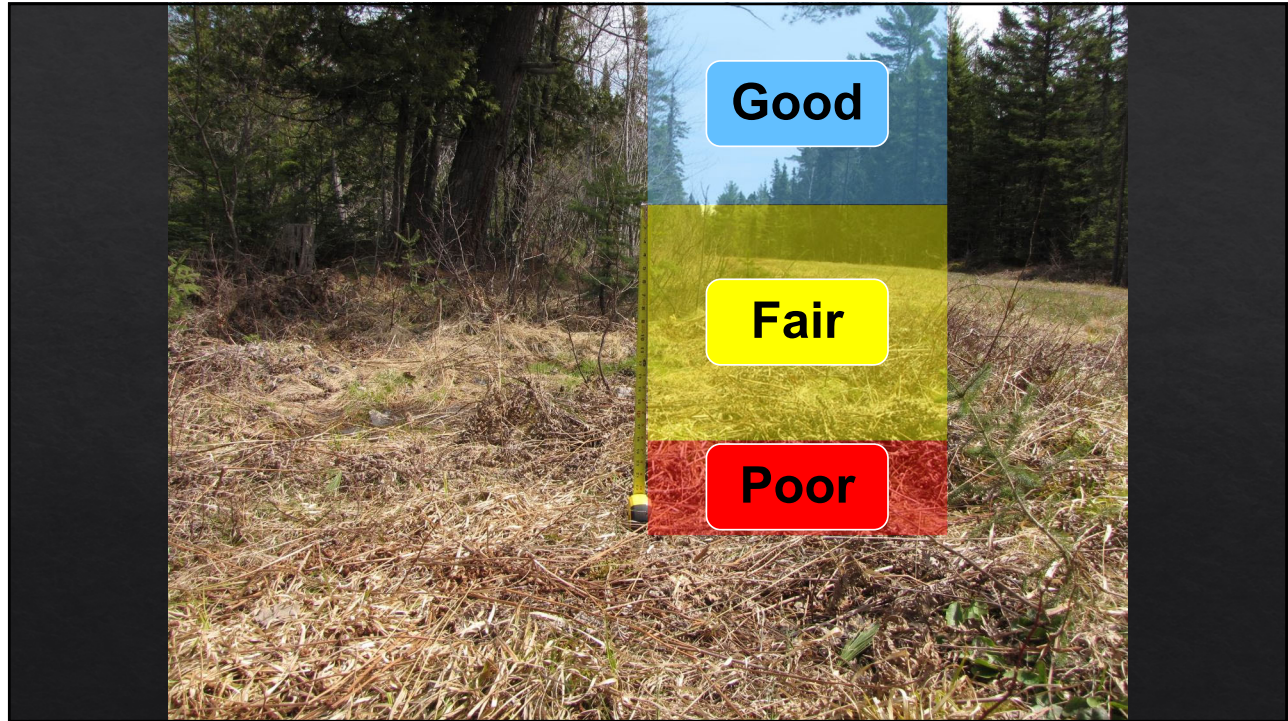
Rating Exercises

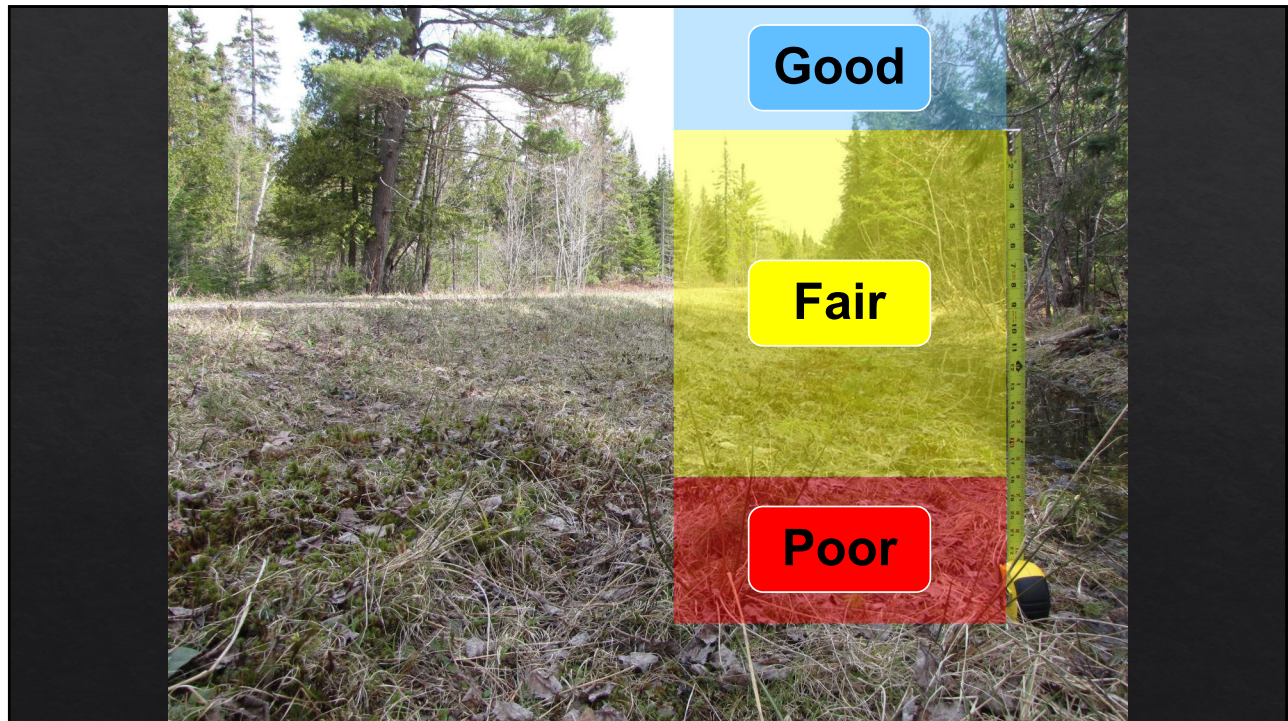*Rating Exercises*

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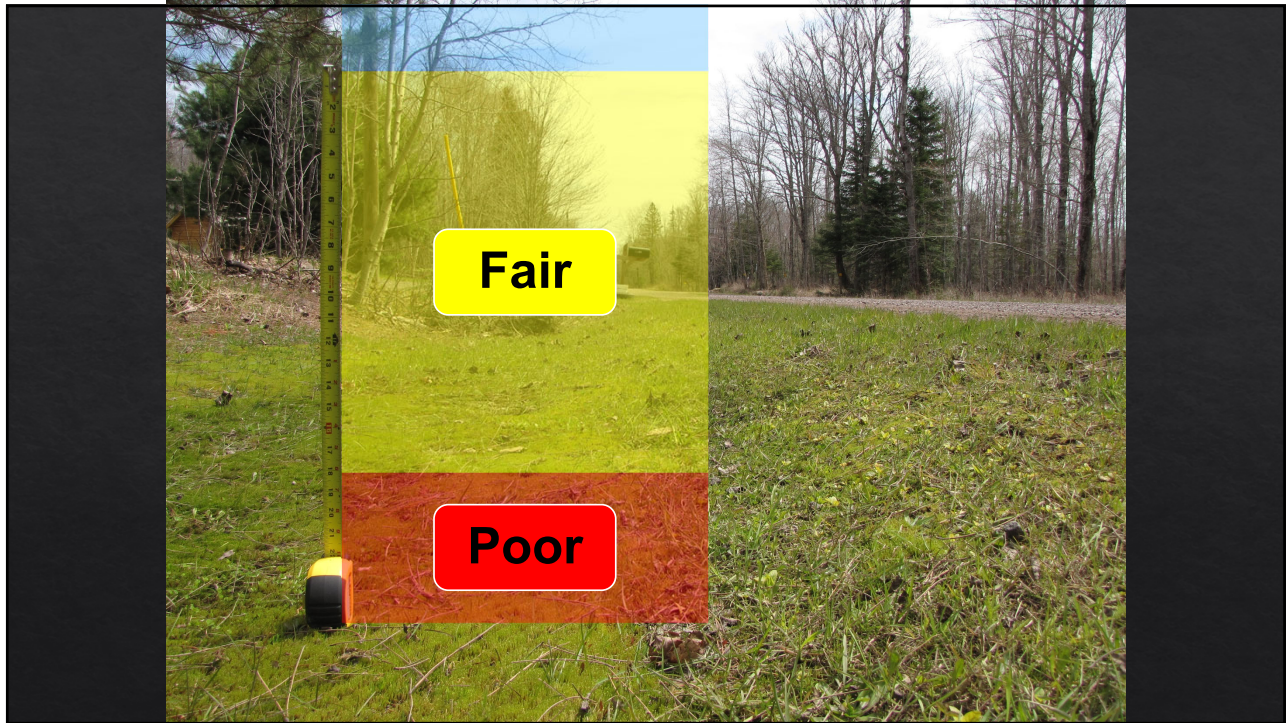
81

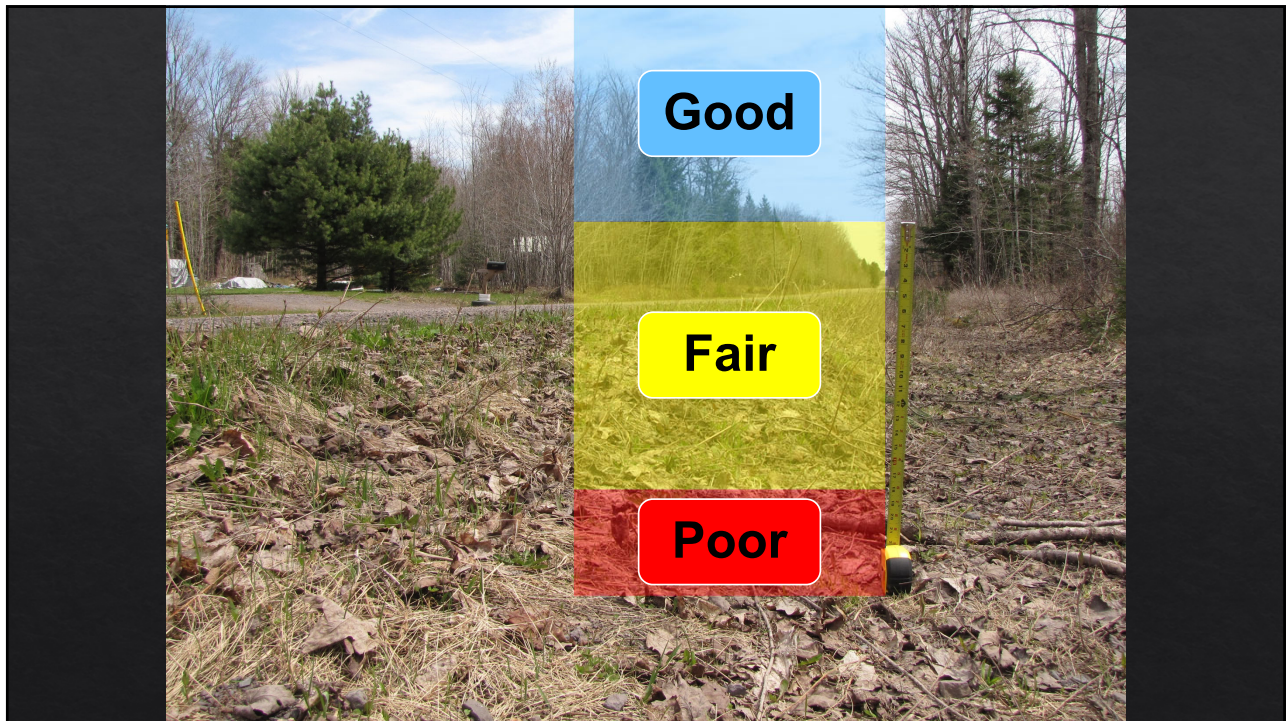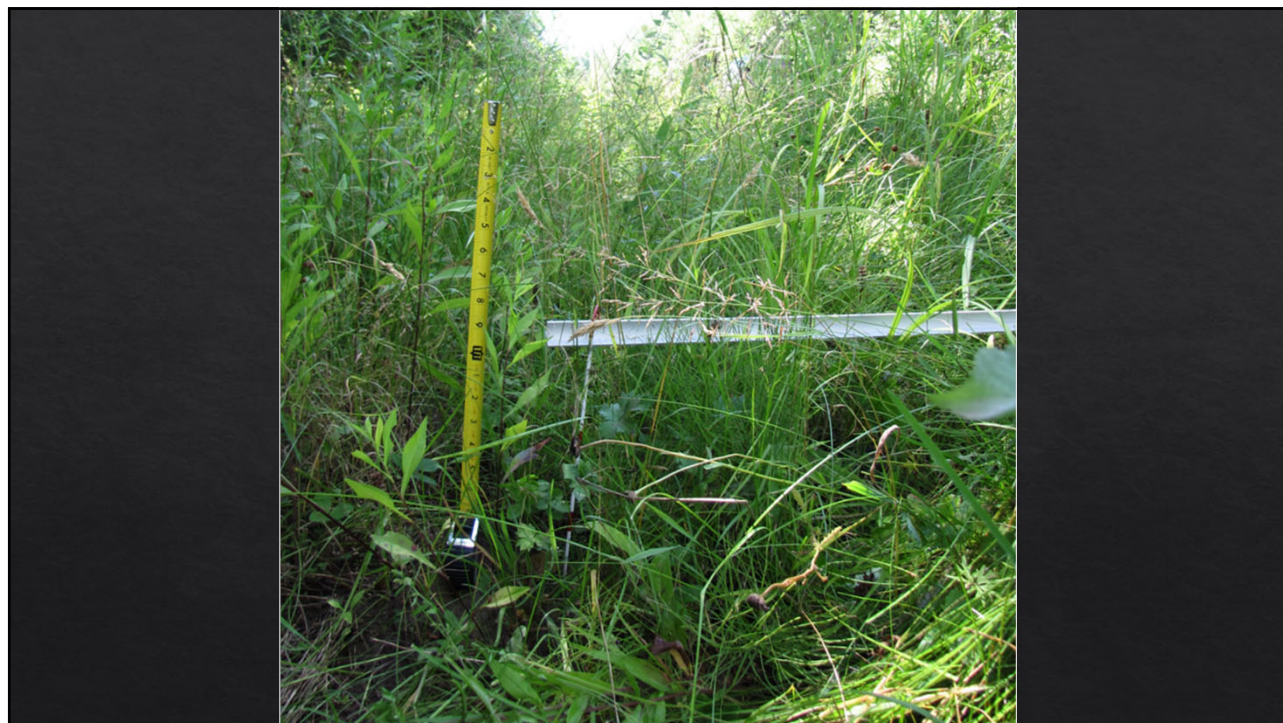82

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92

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Reminders

Collect when vegetation is low

Update IBR number after construction projects

Rate 50% of Fed Aid network

No certification exam for IBR

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TAMC Coordinator Contact Information

Michigan
Transportation Asset
Management Council

TAMC Help Desk
Ph: (517) 335-3741
MDOT_TAMC@michigan.gov

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Inventory-based Rating System™
for Gravel Roads

ctt.mtu.edu/inventory-based-rating-system

Michigan's
Local Technical
Assistance Program

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

Roadsoft

roadsoft@mtu.edu
www.roadsoft.org

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