Eastern Tribal Technical Assistance Program Center (Eastern TTAP)

University of Wisconsin – Madison

EASTERN TTAP
Eastern Tribal Technical Assistance Program

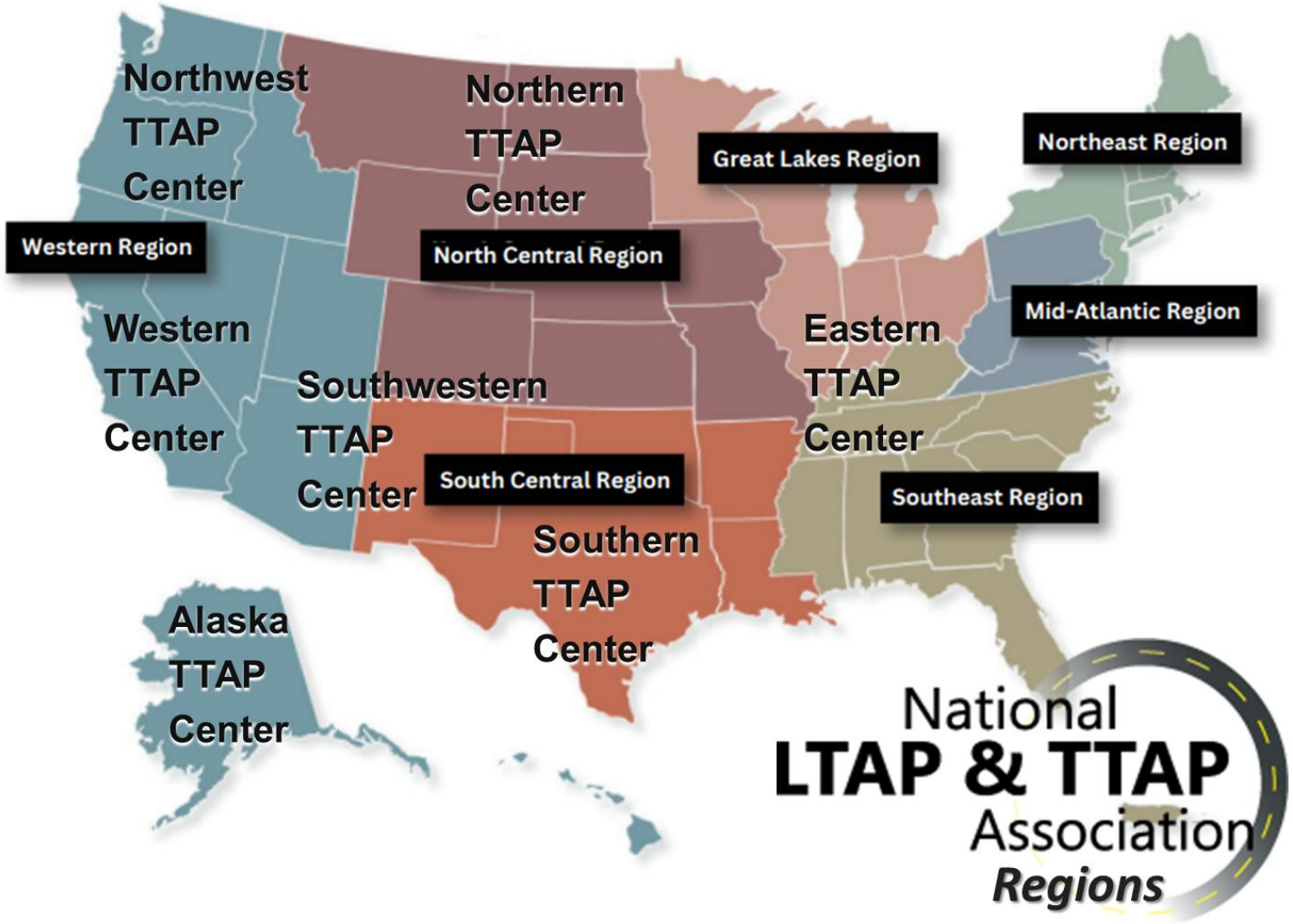
TTAP Success Stories & Opportunities

How to connect with TTAP?

- FHWA Program Managers
- TTAP Center Needs Assessment, Annual Work Plan, Newsletters
- TTAP Working Groups
- NLTAPA Regional network

Upcoming Opportunities

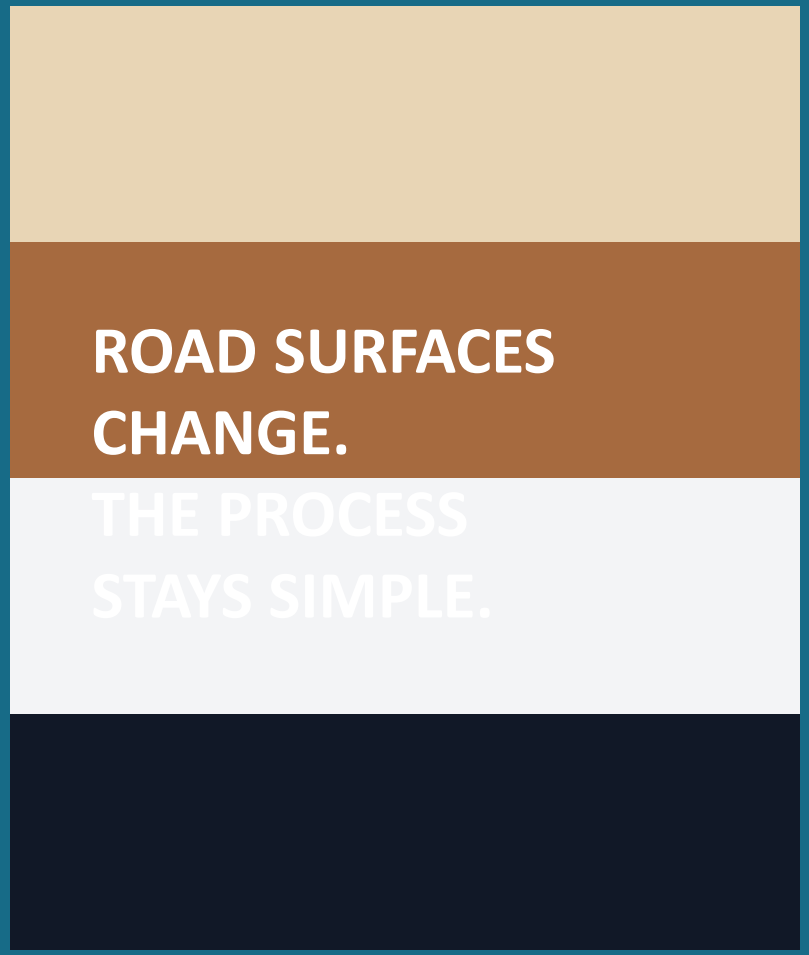
- TTAP Road Scholars Program
- NCRRS Road Safety Champion Program- Tribal Track
- Tribalsafety.org *relaunch*
- Regional Workshops



Pavement Management

Practical Strategies for Tribal Roads

Paved + gravel roads • condition • treatment • priorities



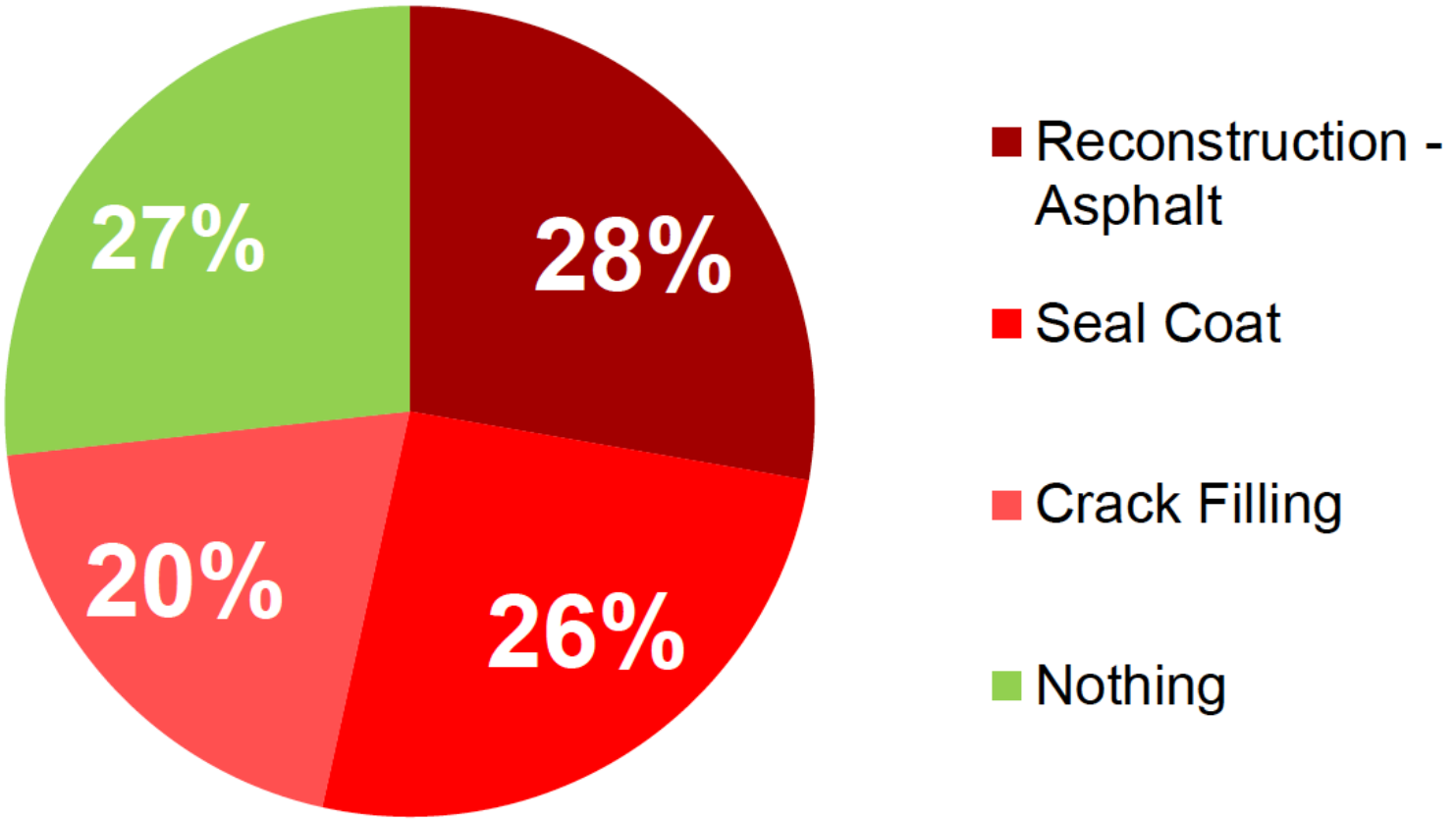
Eastern Tribal Technical Assistance Program

TODAY'S OUTCOME

By the end, you can make a defensible road decision

- Recognize common paved and gravel road distress
- Separate drainage, surface, and structural problems
- Match the treatment to the cause and condition
- Build a simple, repeatable priority list
- Leave with a 90-day starting plan

73% of Town PAVED System Needs Maintenance



Source: WisDOT Paved Road Totals WTA Data Request 2016
PASER Asphalt Roads Manual UW-Madison Transportation Information Center

One management loop works for every road

1

Inventory

Know what you own and why it matters.

2

Inspect

Use the same observations every time.

3

Decide

Treat the cause at the right time.

4

Track

Record work and learn what lasts.

A Tribal road network carries more than traffic

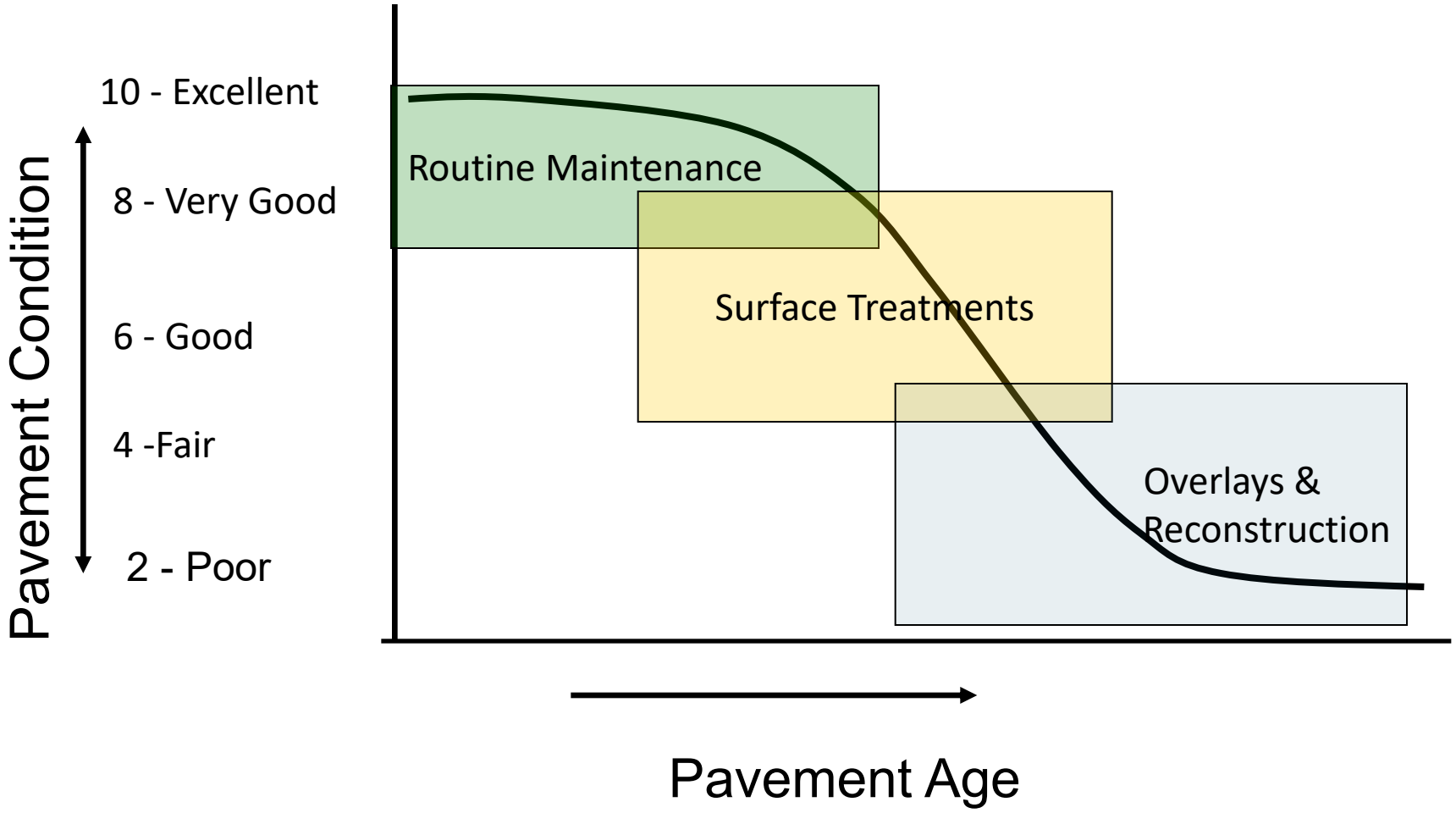
THE ROAD CONNECTS

- Homes, schools, clinics
- Jobs and essential services
- Emergency response routes
- Ceremonial and cultural places

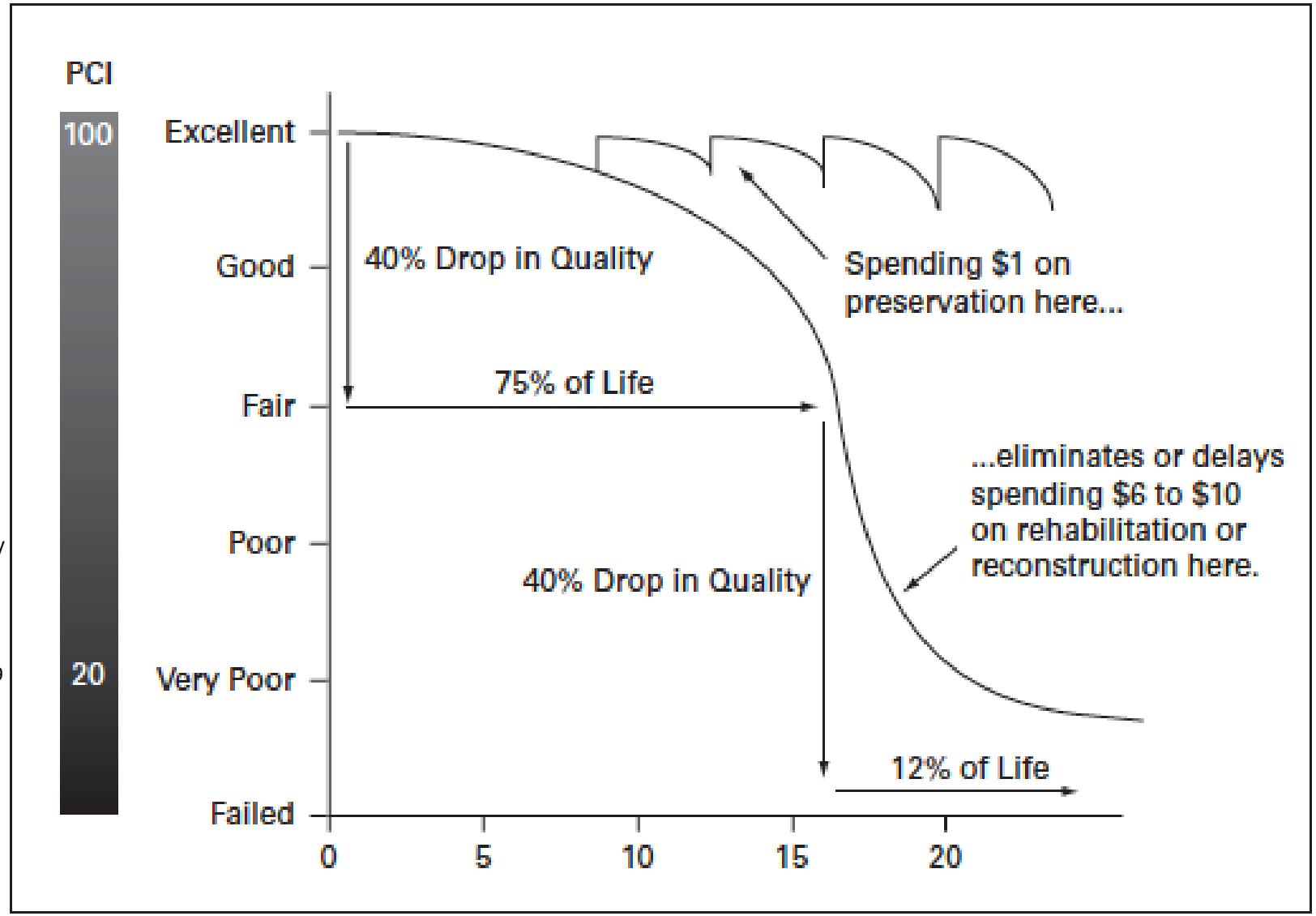
THE DECISION MUST RESPECT

- Tribal sovereignty and priorities
- Seasonal access and climate
- Limited crews and equipment
- Funding rules and coordination

Pavement Rating Related to Maintenance or Repair Strategy

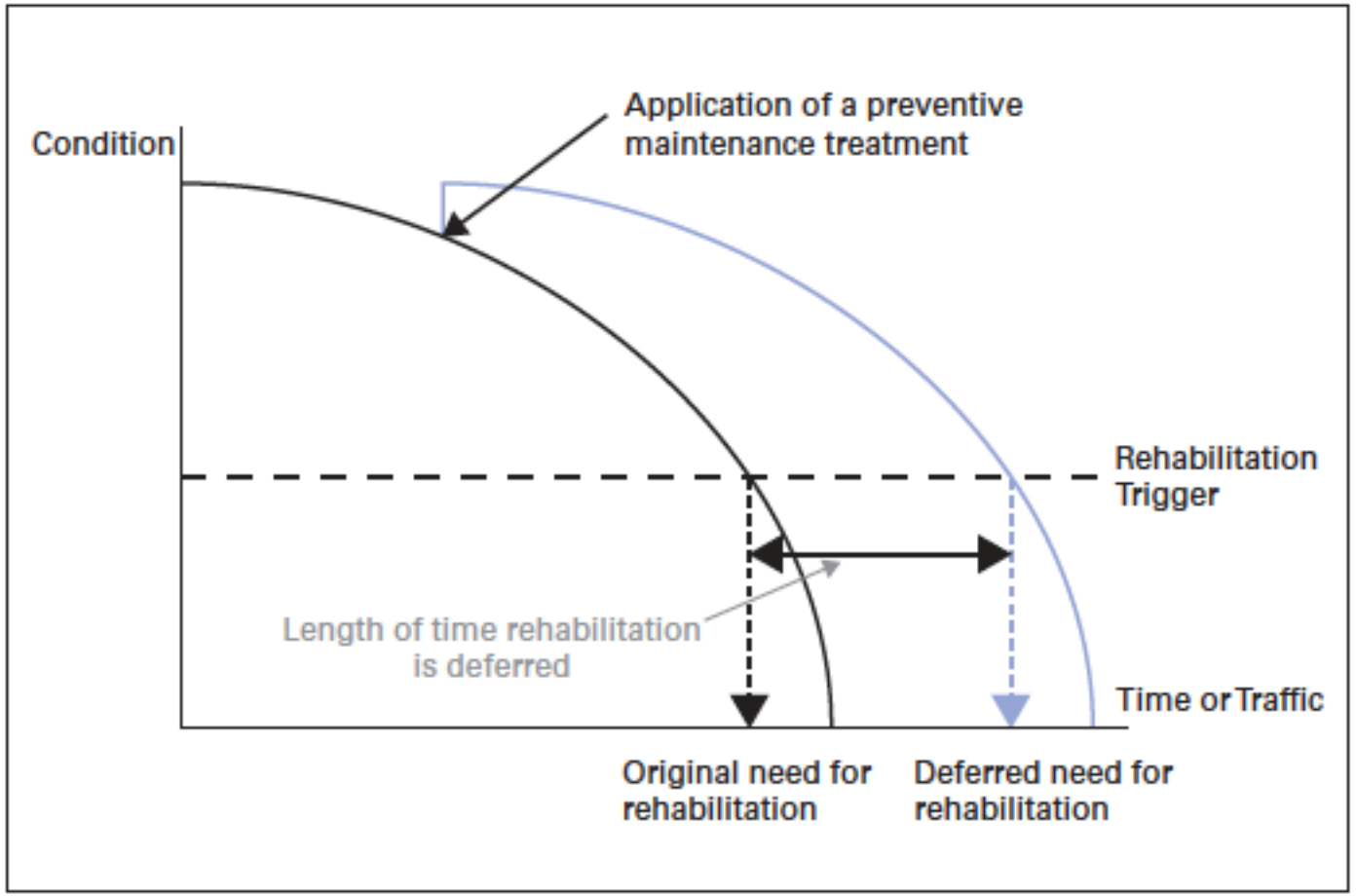


Preventive Maintenance extends useful life



Source
Pavement Preservation Compendium II
Federal Highway Administration
SEPTEMBER 2006
Publication No. FHWA-IF-06-049

Preventive Maintenance extends useful life



Source Pavement Preservation Compendium II
Federal Highway Administration
SEPTEMBER 2006
Publication No. FHWA-IF-06-049

01

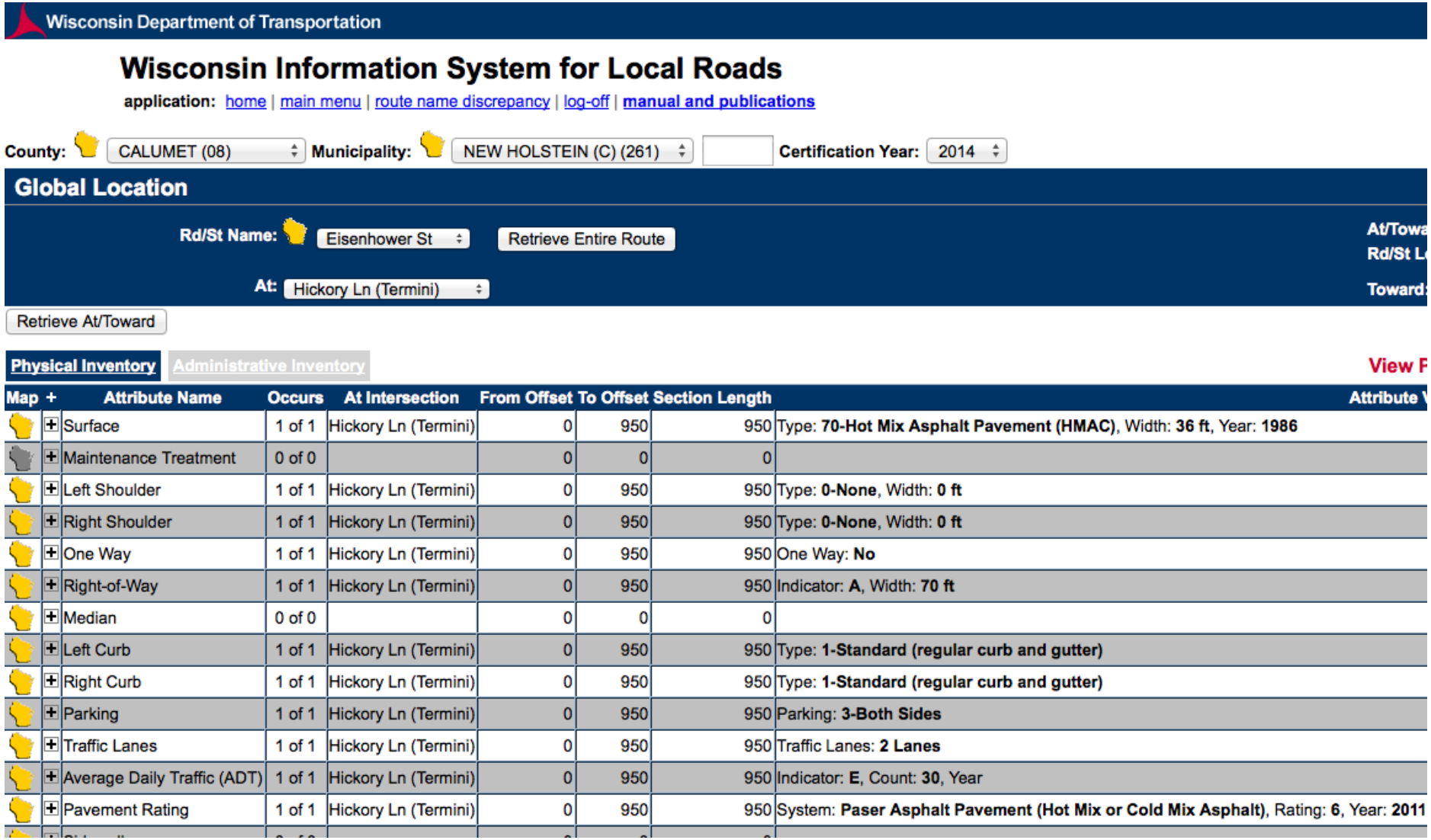
Start with the system

Build a small, usable inventory before chasing perfect data.

The minimum useful road inventory

Road segment	What to record	Why it matters	Easy source
Location	From / to; length	Defines the work unit	Map + odometer
Surface	Paved, gravel, earth	Sets inspection method	Field check
Function	Access, school, emergency	Captures consequence	Local knowledge
Condition	Good / fair / poor	Triggers response	Windshield survey
Features	Culverts, slopes, bridges	Reveals risk points	Photos + GPS

WISLR



Wisconsin Department of Transportation

Wisconsin Information System for Local Roads

application: home | main menu | route name discrepancy | log-off | manual and publications

County: CALUMET (08) Municipality: NEW HOLSTEIN (C) (261) Certification Year: 2014

Global Location

Rd/St Name: Eisenhower St Retrieve Entire Route

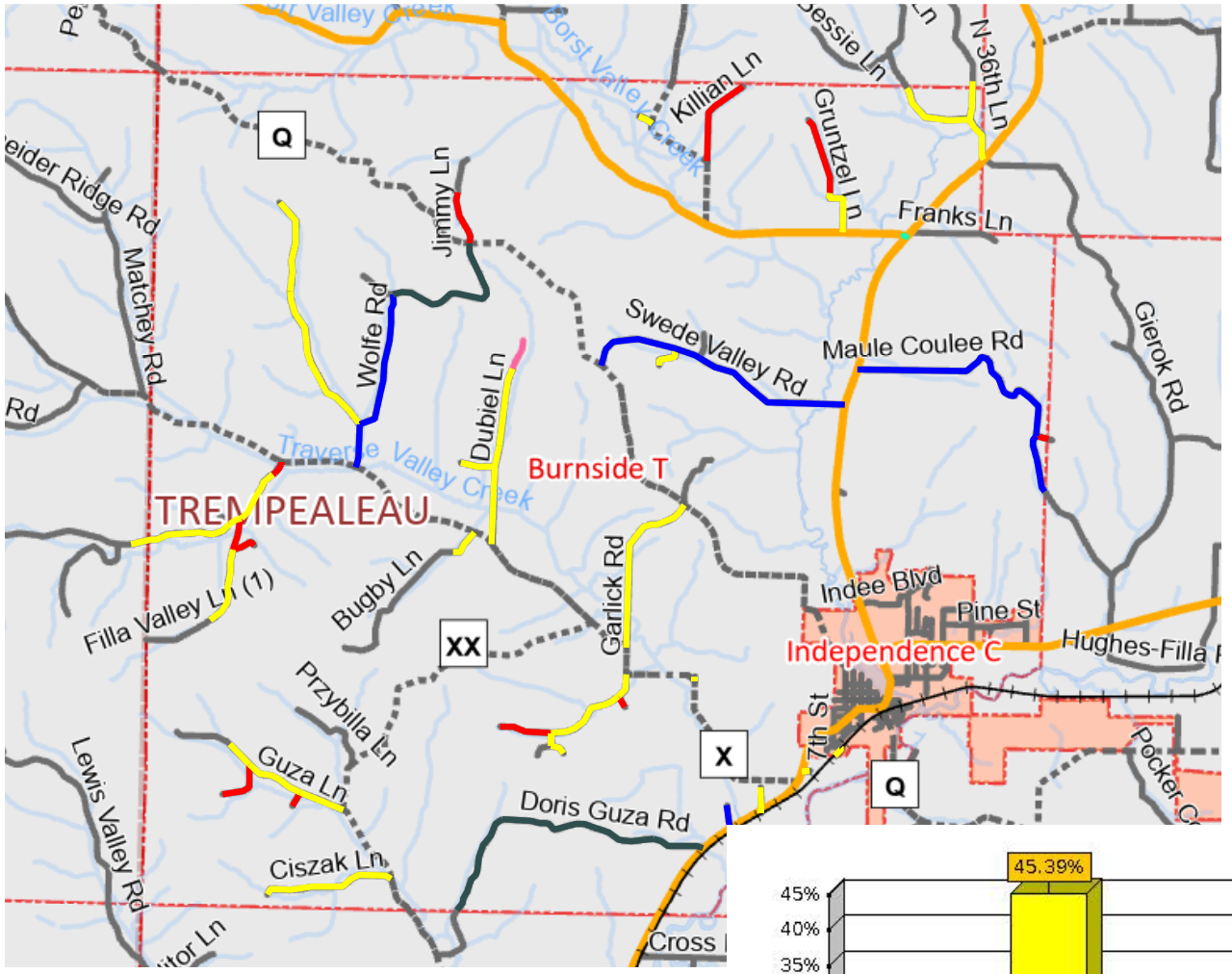
At: Hickory Ln (Termini)

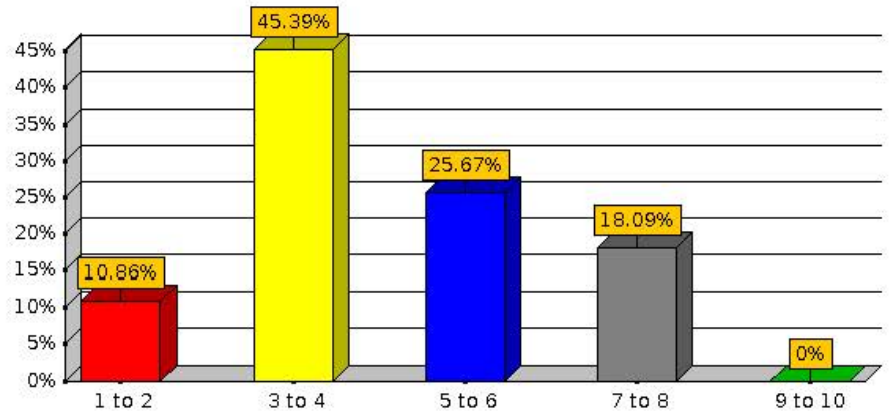
Retrieve At/Toward

Physical Inventory | Administrative Inventory

Map	+	Attribute Name	Occurs	At Intersection	From Offset	To Offset	Section Length	Attribute
	+	Surface	1 of 1	Hickory Ln (Termini)	0	950	950	Type: **70-Hot Mix Asphalt Pavement (HMAC)**, Width: **36 ft**, Year: **1986**
	+	Maintenance Treatment	0 of 0		0	0	0	
	+	Left Shoulder	1 of 1	Hickory Ln (Termini)	0	950	950	Type: **0-None**, Width: **0 ft**
	+	Right Shoulder	1 of 1	Hickory Ln (Termini)	0	950	950	Type: **0-None**, Width: **0 ft**
	+	One Way	1 of 1	Hickory Ln (Termini)	0	950	950	One Way: **No**
	+	Right-of-Way	1 of 1	Hickory Ln (Termini)	0	950	950	Indicator: **A**, Width: **70 ft**
	+	Median	0 of 0		0	0	0	
	+	Left Curb	1 of 1	Hickory Ln (Termini)	0	950	950	Type: **1-Standard (regular curb and gutter)**
	+	Right Curb	1 of 1	Hickory Ln (Termini)	0	950	950	Type: **1-Standard (regular curb and gutter)**
	+	Parking	1 of 1	Hickory Ln (Termini)	0	950	950	Parking: **3-Both Sides**
	+	Traffic Lanes	1 of 1	Hickory Ln (Termini)	0	950	950	Traffic Lanes: **2 Lanes**
	+	Average Daily Traffic (ADT)	1 of 1	Hickory Ln (Termini)	0	950	950	Indicator: **E**, Count: **30**, Year
	+	Pavement Rating	1 of 1	Hickory Ln (Termini)	0	950	950	System: **Paser Asphalt Pavement (Hot Mix or Cold Mix Asphalt)**, Rating: **6**, Year: **2011**

WISLR – Wisconsin Information System for Local Roads





Inspect at the moments when roads tell the truth

ROUTINE

- A windshield survey on a set cycle
- Same route, direction, and rating scale
- Stop for photos at repeat locations
- Include operator observations

EVENT-BASED

- During or just after heavy rain
- During spring thaw / breakup
- After freeze–thaw cycles
- After wildfire, flooding, or heavy hauling

Use one simple rating language across the network

GOOD	FAIR	POOR
Routine maintenance	**Early distress**	**Frequent or severe distress**
Preserve it	Plan treatment	Investigate cause

Add severity + extent only when the team can rate them consistently.

Photos become evidence when they are repeatable

PHOTO STANDARD

- Same location and direction
- Include a scale: cone, ruler, boot, lane width
- Capture the road and the drainage context
- Name: road – station – date – issue

ONE PHOTO WITHOUT A LOCATION IS A MEMORY.

A REPEAT PHOTO IS A RECORD.

02

Read the road

Distress is a clue. Diagnose the cause before selecting a treatment.

Water is usually the first suspect

LOOK FOR WATER

- Standing at the edge or in wheel paths
- Blocked or damaged culverts
- Ditches that hold rather than carry water
- Erosion at outlets and slopes

THEN ASK WHY

- Is the crown or cross-slope lost?
- Is the outlet lower and open?
- Is water entering from uphill?
- Is the base or subgrade saturated?

Paved road clues: what the pattern may mean

What you see	Likely clue	Check next	Avoid the reflex
Longitudinal edge cracks	Weak edge / poor drainage	Shoulder support; ditch	Seal only
Alligator cracking	Structural fatigue	Extent; base; drainage	Thin overlay only
Transverse cracks	Temperature / joints	Width; movement; moisture	Ignore until potholes
Rutting or shoving	Instability / loading	Depth; mix; heavy route	Level without diagnosis
Potholes	Advanced water + breakup	Surrounding failed area	Patch wet/loose material

Gravel road clues: what the pattern may mean

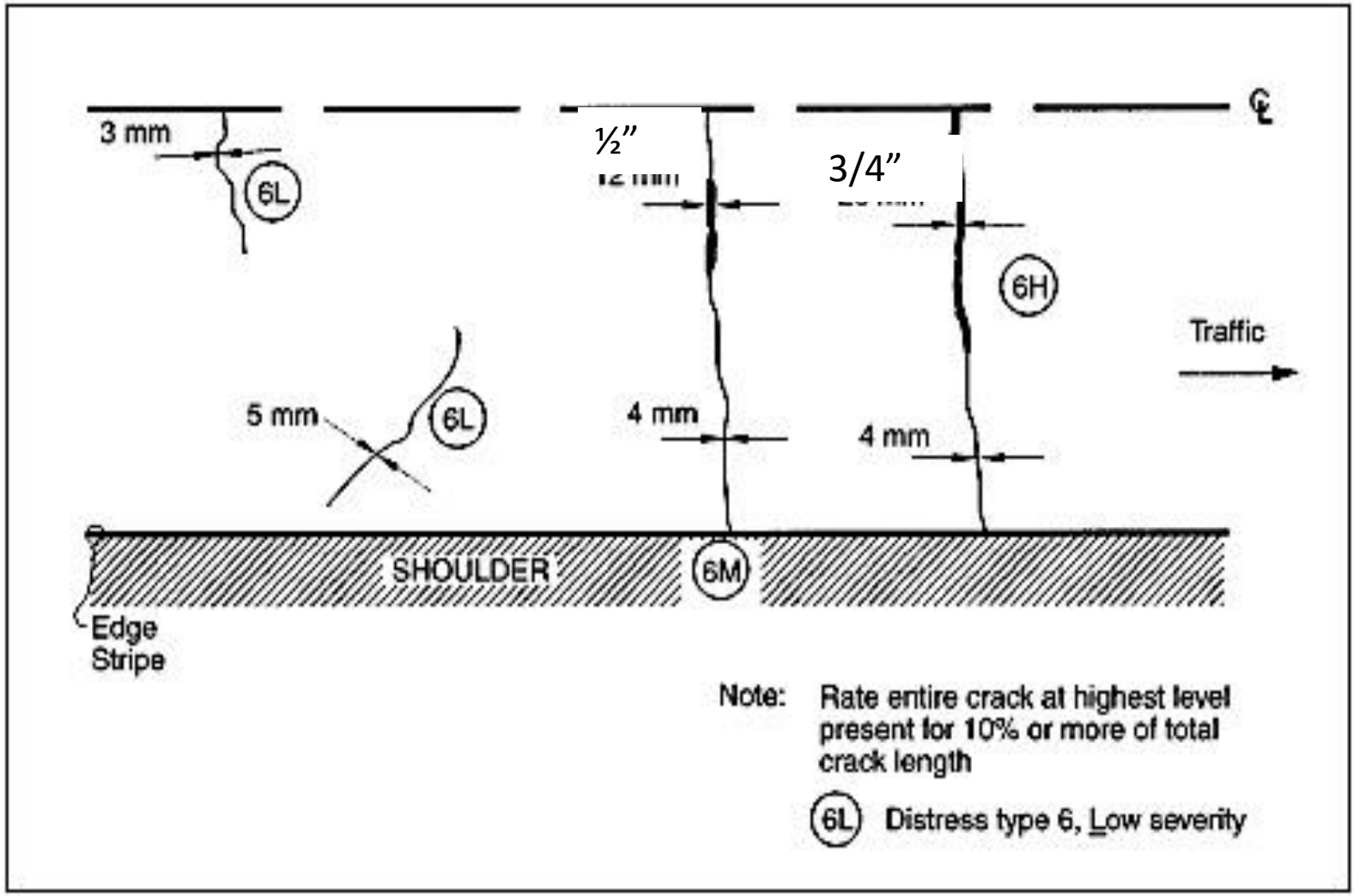
What you see	Likely clue	Check next	First response
Potholes	Water trapped; poor mix	Crown; drainage; fines	Cut full depth, reshape
Washboards	Loose surface + traffic	Moisture; speed; gradation	Scarify and reshape
Ruts	Weak/wet layer or traffic	Depth; subgrade; drainage	Drain, dry, rebuild layer
Loose aggregate	Low binder / segregation	Gradation; blade practice	Recover and remix
Dust	Fine loss / dry surface	Material; traffic; climate	Manage material + dust

Severity × extent tells you how big the response should be

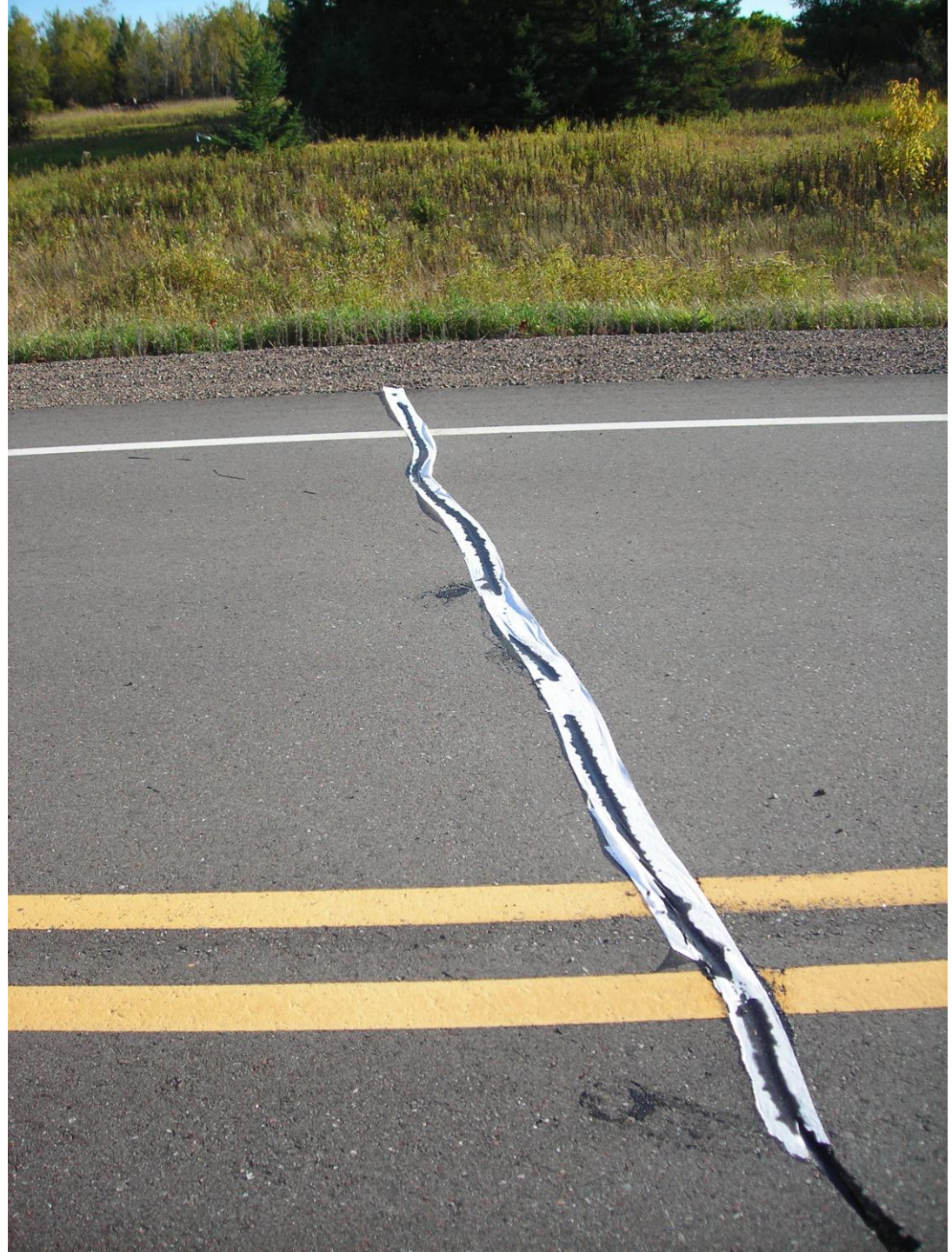
LOW	**Minor; isolated**	Routine maintenance
MODERATE	**Noticeable; recurring**	Planned treatment
HIGH	**Severe; widespread**	Engineering review

Also record: safety impact • weather sensitivity • access consequence

Transverse Cracking



24





26




¼ ”


½ ”



RAVELING





Surface Defects



Flushing (Bleeding) – Excess asphalt fills voids, comes to surface in warm weather. This usually results from a problem with the mix design



Polishing - Soft aggregates wear smooth from traffic – not a common problem in Wisconsin

Surface deformation

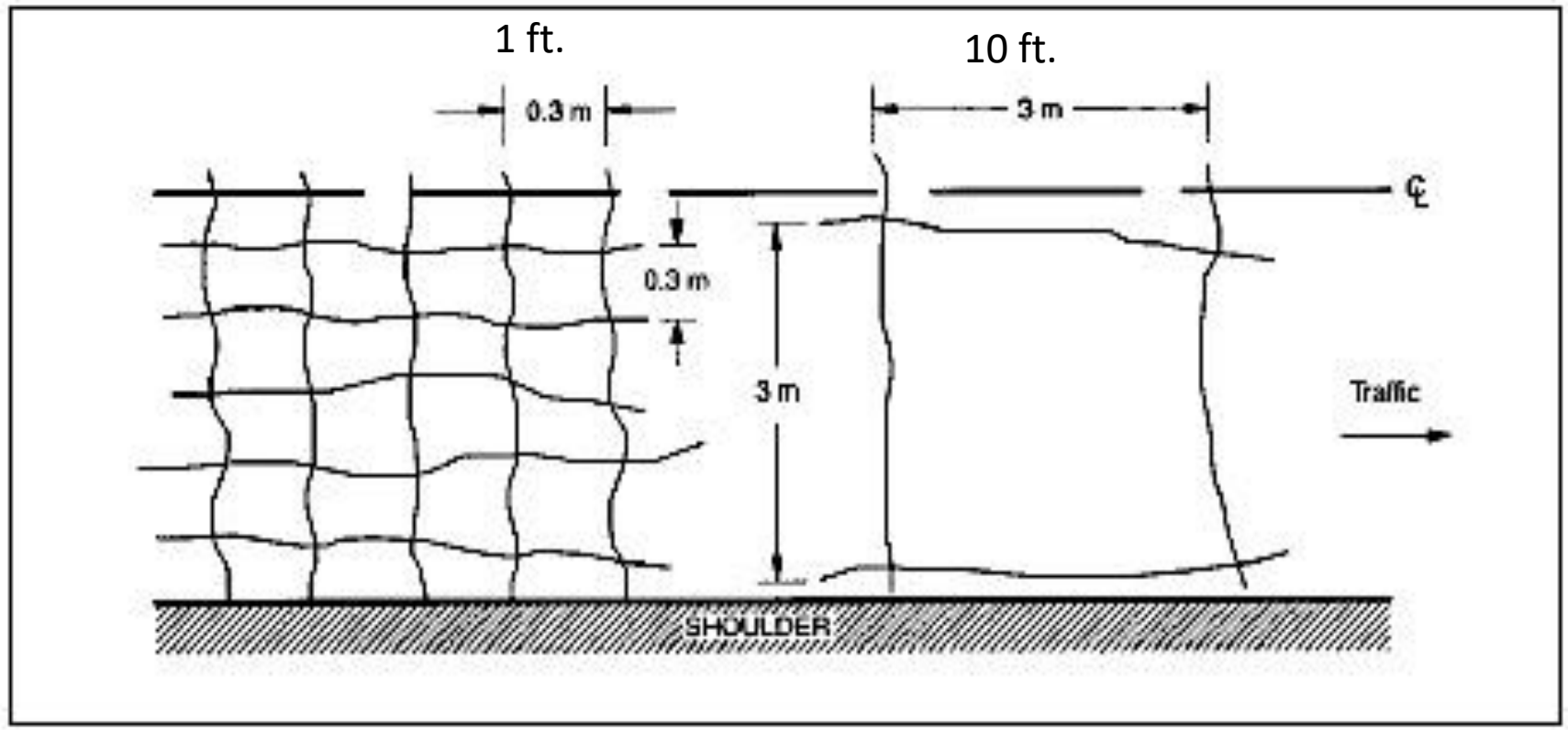








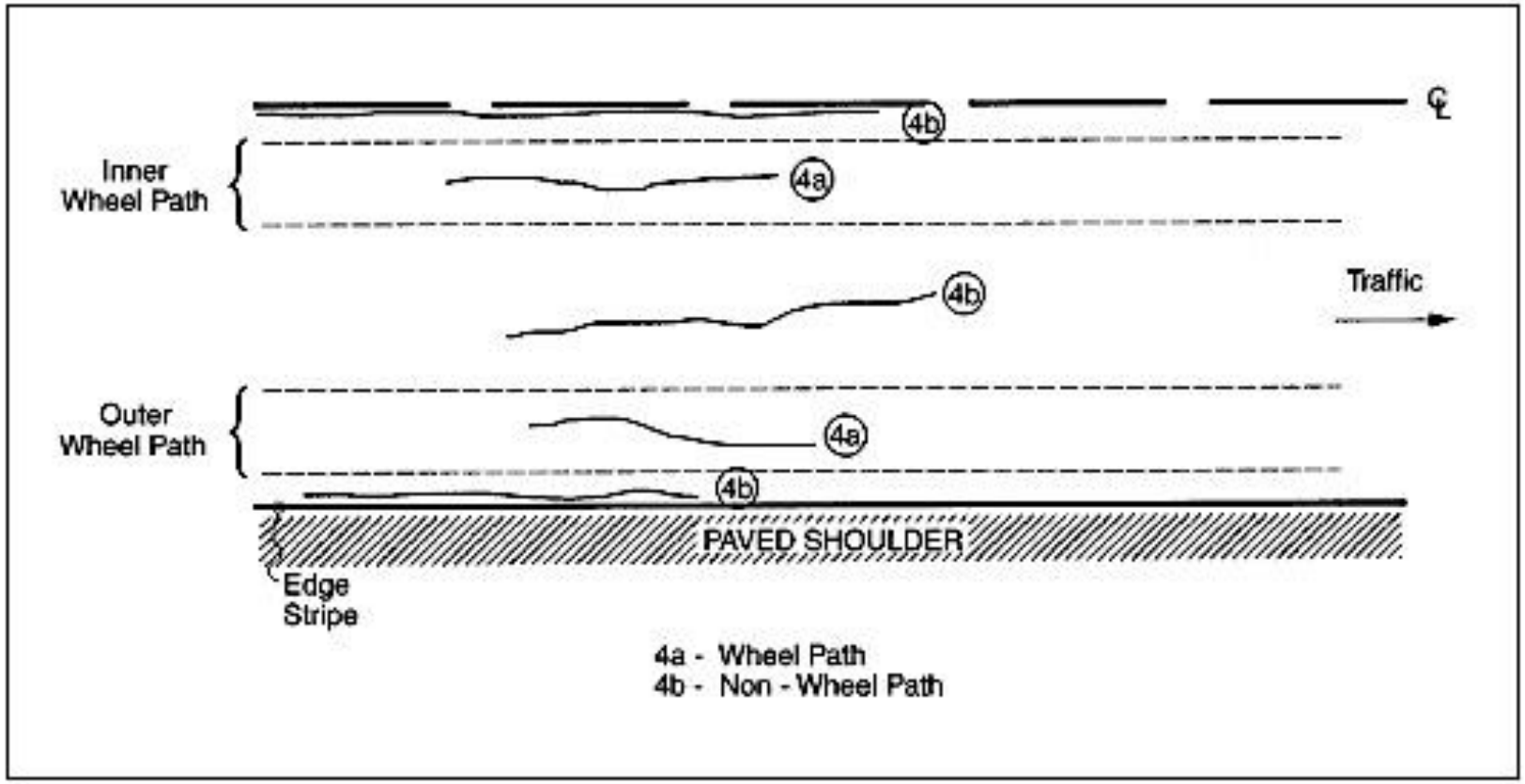
Slippage Cracking


1 ft.
10 ft.
0.3 m
3 m
0.3 m
3 m
Traffic
SHOULDER

Block Cracking



Longitudinal Cracking



Location of the longintudinal pavement crack is important!





Longitudinal Crack At Paving Joint



Longitudinal cracking on pavement edge

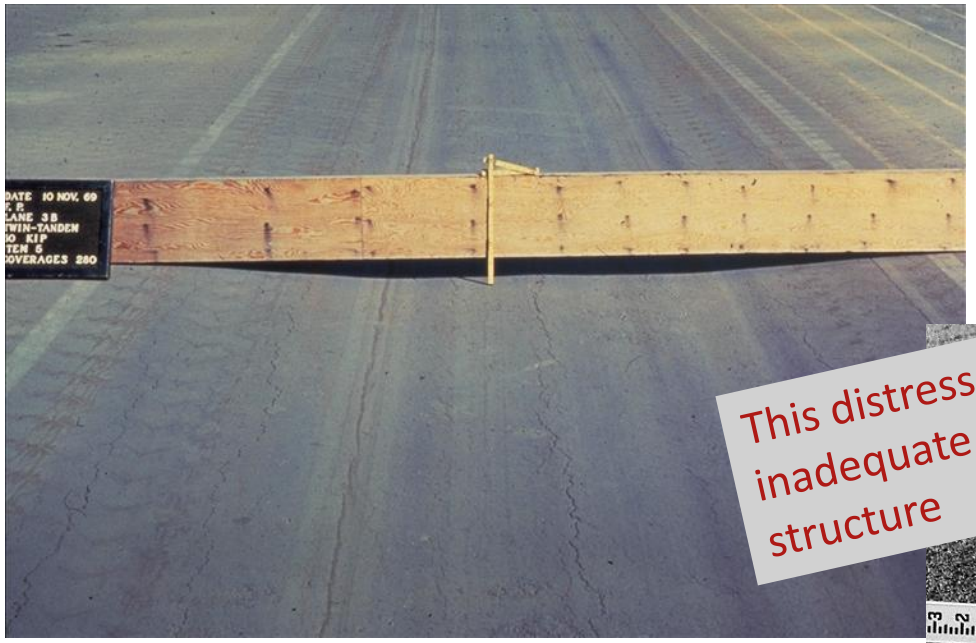



Longitudinal Crack In Wheel Path
This distress indicates inadequate pavement structure

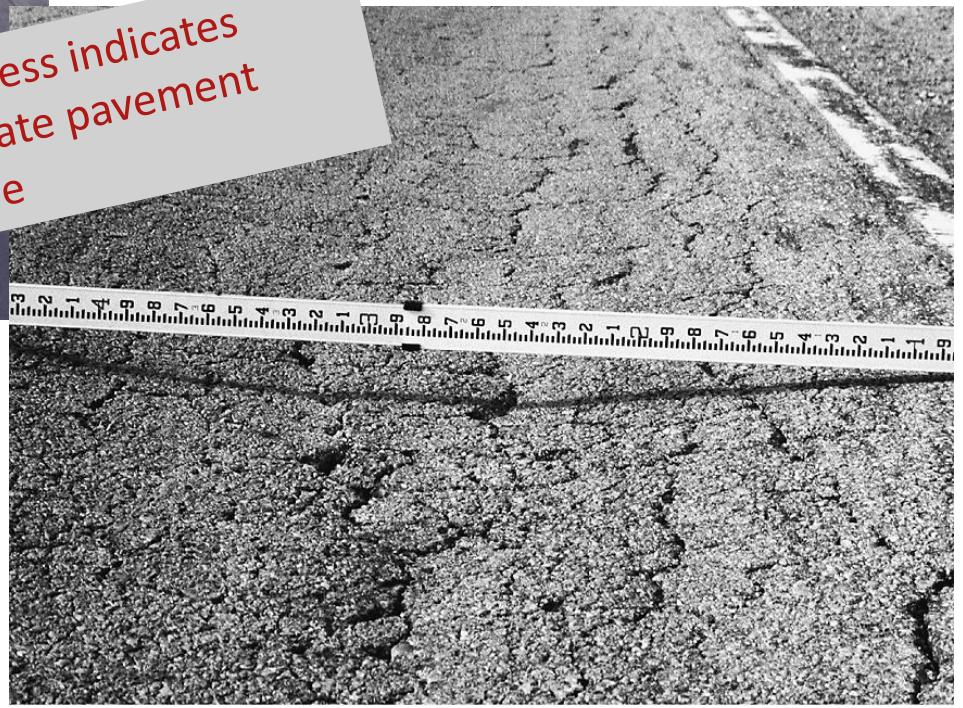

This distress indicates inadequate pavement structure

Rutting





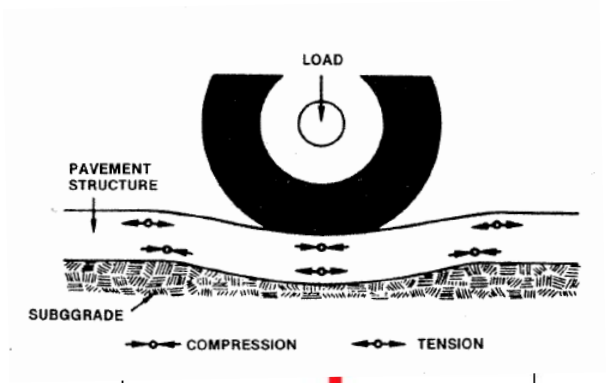
This distress indicates inadequate pavement structure



Fatigue Cracking

- cracking of the pavement from the bottom up due to repeated deflection of the pavement

- fatigue cracking occurs as damage accumulates over multiple deflection cycles



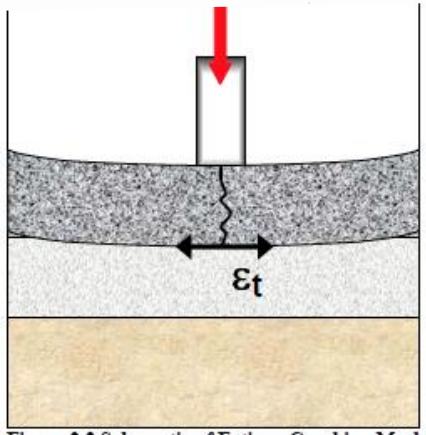


Figure 2.2 Schematic of Fatigue Cracking Mechanism

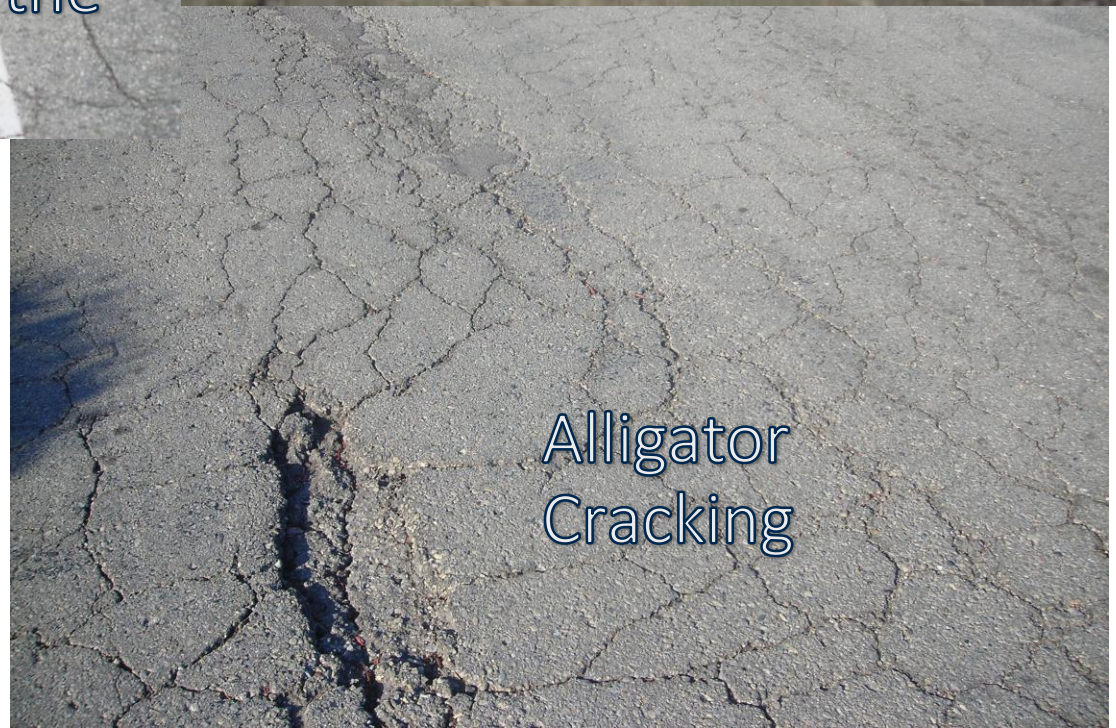
Graphic Source: Methodology And Calibration Of Fatigue Transfer Functions For Mechanistic-empirical Flexible Pavement Design By Angela L. Priest David H. Timm NCAT Report 06-03 December 2006


Weather and Loads:
The Effect They
Have on Roads

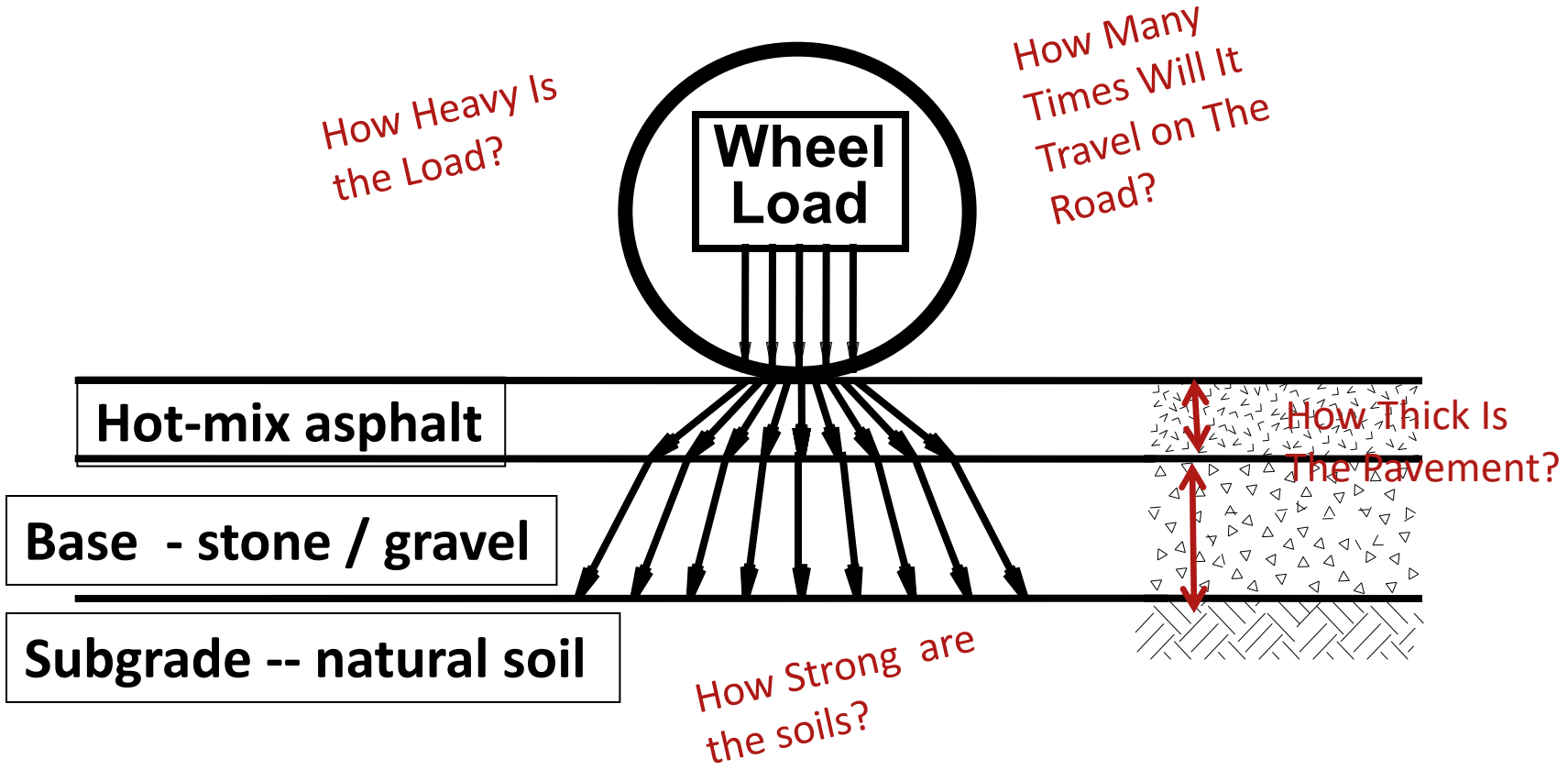




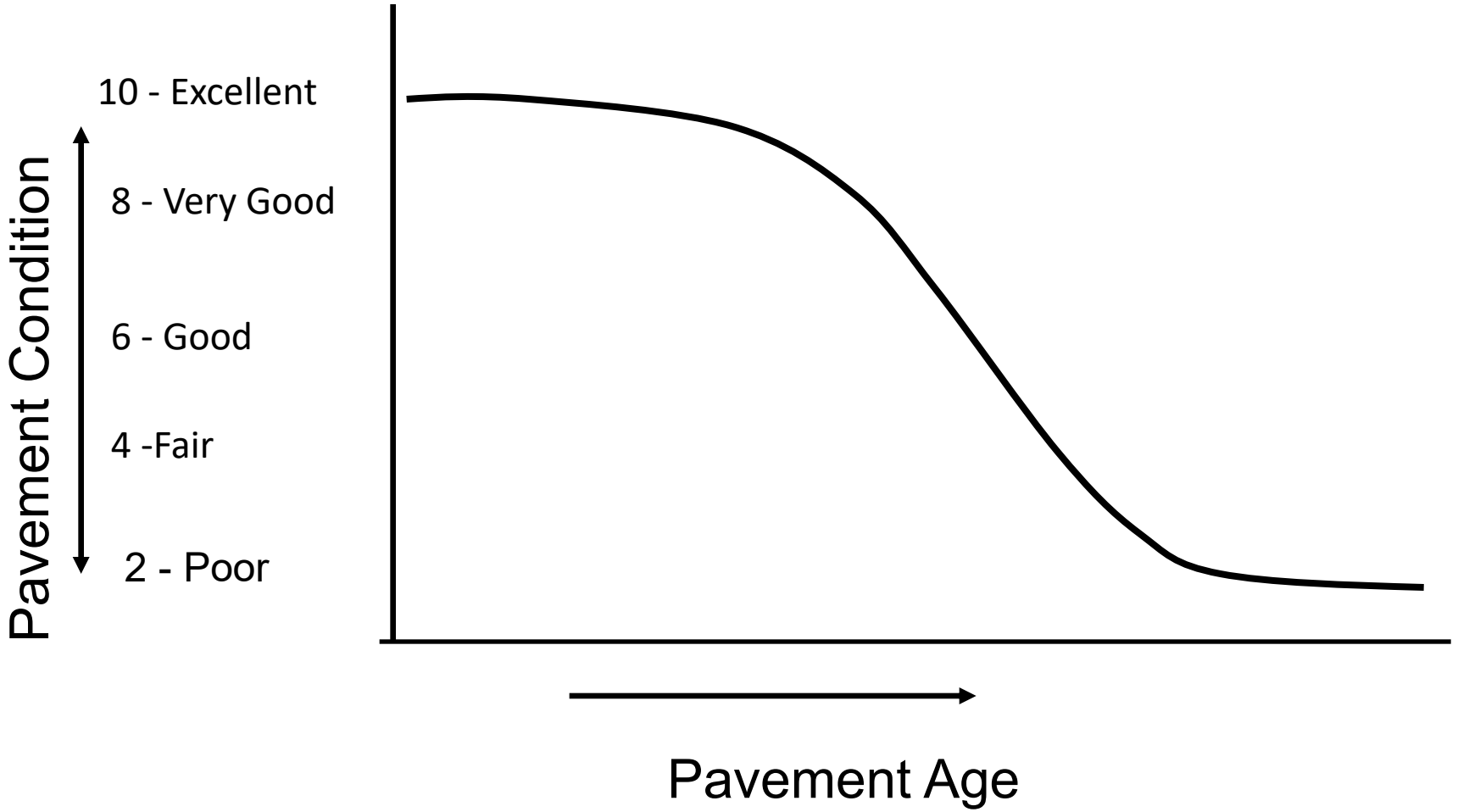
Distresses that Indicate Inadequate Structure



What factors effect determine if fatigue cracking will occur and if it occurs, how fast it will occur?



We limit fatigue cracking by limiting loads, making pavements thicker or using stronger materials


10 - Excellent
8 - Very Good
6 - Good
4 -Fair
2 - Poor
Pavement Condition
Pavement Age

Pavement Rating Related to Maintenance or Repair Strategy

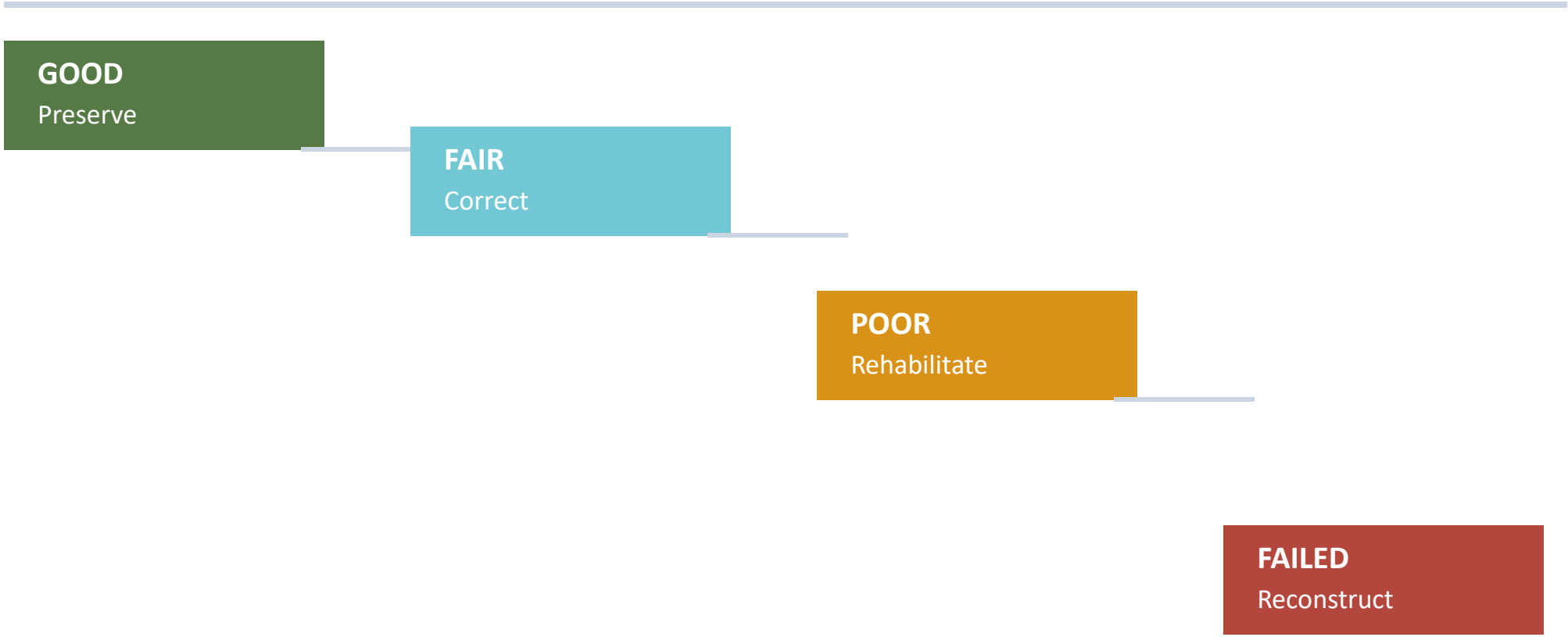
RATINGS ARE RELATED TO NEEDED MAINTENANCE OR REPAIR	
Rating 9 & 10	No maintenance required
Rating 8	Little or no maintenance
Rating 7	Routine maintenance, cracksealing and minor patching
Rating 5 & 6	Preservative treatments (sealcoating)
Rating 3 & 4	Structural improvement and leveling (overlay or recycling)
Rating 1 & 2	Reconstruction

03

Choose the right action

Preserve good roads. Repair fair roads. Rebuild only what has failed.

The cheapest treatment is the one applied at the right time



Cost and disruption generally rise as condition falls.

Paved roads: match condition to a treatment family

Condition / cause	Treatment family	Examples	Key check
Good; aging surface	Preventive	Crack seal; fog/slurry; chip seal	Right pavement + weather
Fair; localized distress	Corrective	Patching; leveling; drainage work	Remove failed material
Fair–poor; surface distress	Rehabilitation	Mill/overlay; thin overlay	Structure still adequate
Poor; structural failure	Major rehab / rebuild	FDR; base repair; reconstruction	Design + utilities + drainage

Gravel roads: fix shape and drainage before adding gravel

Condition / cause	Treatment family	Examples	Key check
Good shape; minor loose material	Routine	Light maintenance; shoulder/ditch upkeep	Work at proper moisture
Lost crown; potholes; washboard	Reshape	Scarify; blend; grade; compact	Cut below defect
Thin/poor wearing course	Regravel	Correct gradation; place; compact	Material quality + depth
Weak base/subgrade	Rehabilitate	Drainage; stabilization; undercut/geotextile	Identify weak layer

Good grading is a sequence—not a drive-by

BEFORE THE BLADE

- Check drainage and outlets
- Choose suitable moisture
- Mark hazards and buried features
- Decide where material must move

WITH / AFTER THE BLADE

- Cut to the bottom of defects
- Recover material from edges
- Restore shape without a high berm
- Blend, compact, and verify drainage

Drainage maintenance protects every surface

OPEN

Culverts and outlets

Restore flow capacity

SHAPE

Ditches and shoulders

Keep water moving away

ARMOR

Erosion-prone outlets

Protect soil where flow concentrates

WATCH

Beaver, debris, ice, vegetation

Inspect before and after storms

Dust control is a management decision

BENEFITS TO SEEK

- Visibility and safety
- Less fine-material loss
- Community health and quality of life
- Lower grading frequency when appropriate

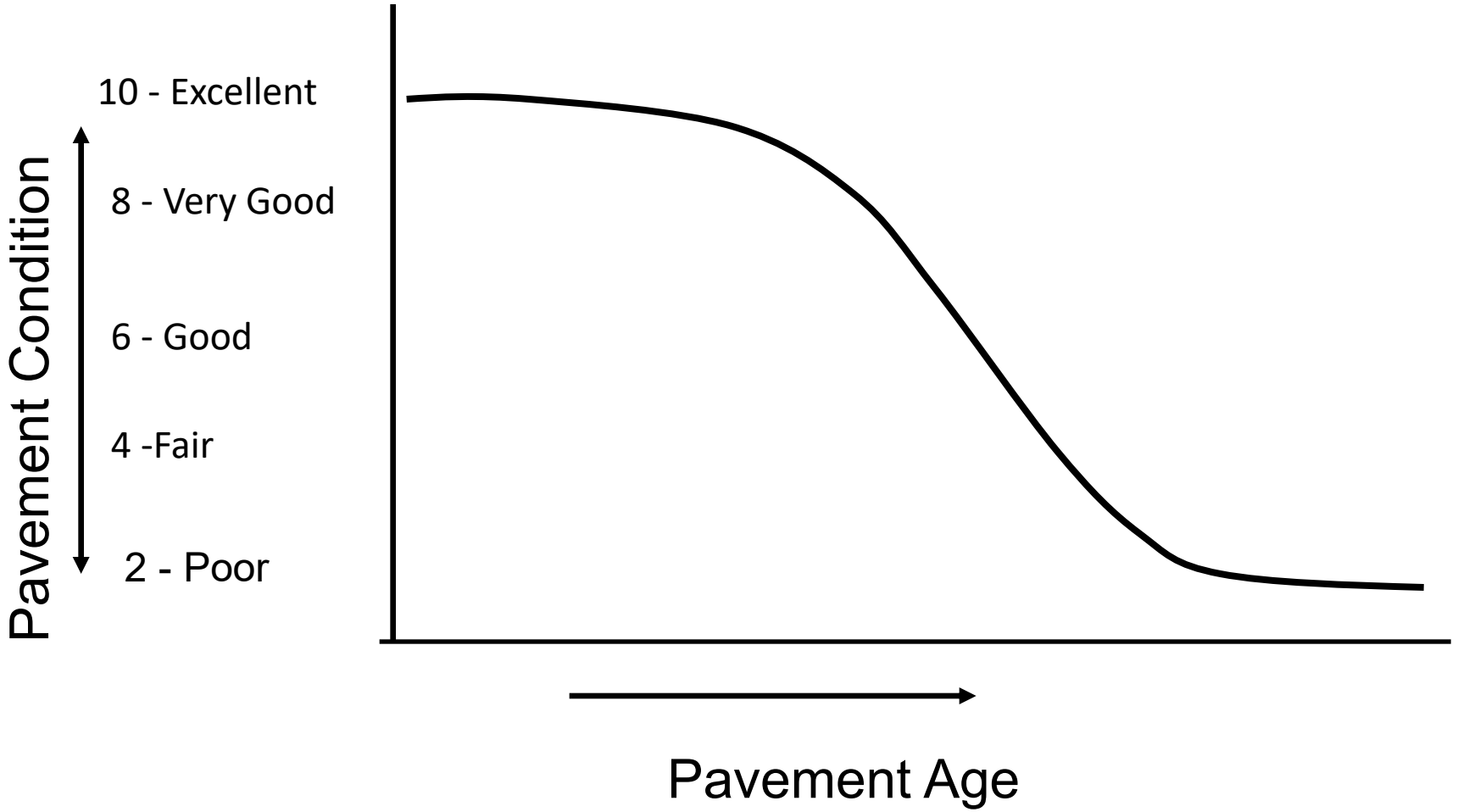
BEFORE SELECTING A PRODUCT

- Traffic and speed
- Climate, moisture, and soil
- Material gradation and road shape
- Water quality, vegetation, cost, reapplication

When should gravel become pavement?

Do not answer with traffic alone.

- Can recurring gravel maintenance meet service expectations?
- What are the lifecycle costs—not only construction cost?
- Can the base, drainage, geometry, and right-of-way support paving?
- What heavy loads, dust impacts, safety needs, and growth are expected?
- Can the Tribe fund preservation after paving?


10 - Excellent
8 - Very Good
6 - Good
4 -Fair
2 - Poor
Pavement Condition
Pavement Age

Pavement Rating Related to Maintenance or Repair Strategy

RATINGS ARE RELATED TO NEEDED MAINTENANCE OR REPAIR	
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Rating 3 & 4	Structural improvement and leveling (overlay or recycling)
Rating 1 & 2	Reconstruction

PASER RATING SYSTEM

Surface Rating #	Surface Rating Name	Distress Descripiton	General Condition	Treatment Recommendation
10	Excellent	None	New Construction	None
9	Excellent	None	Recent Overlay Like New	None



** Individual pavements will not have all of the types of distress listed for any particular rating. They may have only one or two types.*

PASER ratings that would benefit from crack seal, fog seal

Surface Rating #	Surface Rating Name	Distress Descripiton	General Condition	Treatment Recommendation
8	Very Good	No longitudinal cracks except reflection of paving joints. Occasional transverse cracks, widely spaced (40' or greater). All cracks sealed or tight (open less than 1/4").	Recent sealcoat or new cold mix	Little or no maintenance required.
7	Good	Very slight or no raveling, surface shows some traffic wear. Longitudinal cracks (open 1/4") due to reflection or paving joints. Transverse cracks (open 1/4") spaced 10' or more apart, little or slight crack raveling. No patching or very few patches in excellent condition.	First signs of aging	Maintain with routine crack sealing.

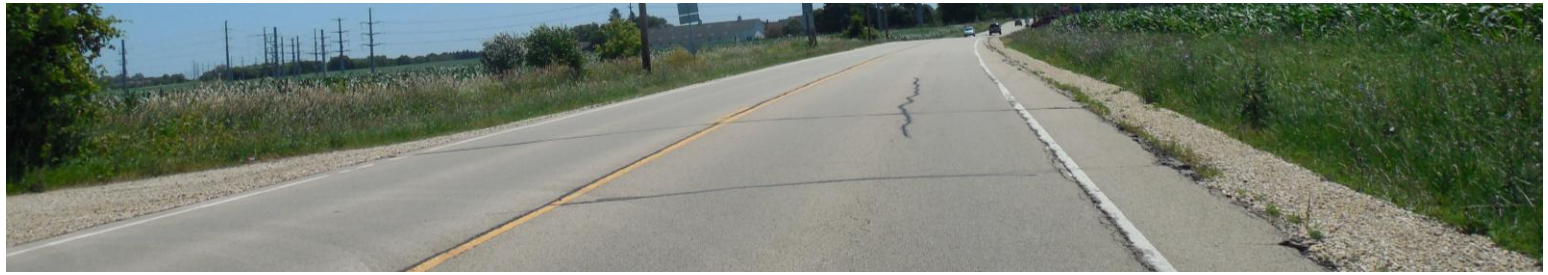
** Individual pavements will not have all of the types of distress listed for any particular rating. They may have only one or two types.*

PASER rating of 7 could also be a surface treatment candidate in an aggressive maintenance program



PASER Ratings that are surface treatment candidates

Surface Rating #	Surface Rating Name	Distress Descripiton	General Condition	Treatment Recommendation
6	Good	Slight raveling (loss of fines) and traffic wear. Longitudinal cracks (open 1/4"–1/2"). Transverse cracks (open 1/4"–1/2"), some spaced less than 10'. First sign of block cracking. Slight to moderate flushing or polishing. Occasional patching in good condition.	Shows signs of aging. Sound structural condition	Could extend life with sealcoat.
5	Fair	Moderate to severe raveling (loss of fine and coarse aggregate). Longitudinal and transverse cracks (open 1/2" or more) show first signs of slight raveling and secondary cracks. First signs of longitudinal cracks near pavement edge. Block cracking up to 50% of surface. Extensive to severe flushing or polishing. Some patching or edge wedging in good condition.	Surface aging. Sound structural condition	Needs sealcoat or thin non-structural overlay (less than 2")



PASER Ratings that Indicate Inadequate Structure

Surface Rating #	Surface Rating Name	Distress Descripiton	General Condition	Treatment Recommendation
4	Fair	Severe surface raveling. Multiple longitudinal and transverse cracking with slight raveling. Longitudinal cracking in wheel path. Block cracking (over 50% of surface). Patching in fair condition. Slight rutting or distortions (1/2" deep or less).	Significant aging and first signs of need for strengthening	Would benefit from a structural overlay (2" or more).
3	Poor	Closely spaced longitudinal and transverse cracks often showing raveling and crack erosion. Severe block cracking. Some alligator cracking (less than 25% of surface). Patches in fair to poor condition. Moderate rutting or distortion (greater than 1/2" but less than 2" deep). Occasional potholes.		Needs patching and repair prior to major overlay. Milling and removal of deterioration extends the life of overlay.
2	Very Poor	Alligator cracking (over 25% of surface). Severe distortions (over 2" deep) Extensive patching in poor condition. Potholes.	Severe deterioration.	Needs reconstruction with extensive base repair. Pulverization of old pavement is effective.
1	Failed	Severe distress with extensive loss of surface integrity.	Failed	Needs total reconstruction

Roads rated 4, 3, 2 or 1 already show symptoms of inadequate structure

04

Set priorities people can understand

Combine condition with safety, access, risk, and stewardship.

Condition is only one part of priority

30	25	20	15	10
CONDITION	**SAFETY**	**ACCESS**	**RISK**	**VALUE**
Severity + extent	Crash / roadside risk	Only route / critical service	Drainage / climate / failure	Cost leverage / coordination

Example weights only—Tribal leadership sets the values.

A transparent project list shows the “why”

Road / segment	Need	Consequence	Recommended action
Cedar Loop 0–2.1	Good pavement; open cracks	Water entry before winter	Crack seal + drainage
Clinic Road 1.2–1.8	Edge failure and rutting	Emergency access	Investigate base; repair
River Road 4–7	Washboard + dust	Homes; school bus	Reshape + material trial
North Access 0–3	Wet ruts each spring	Sole access	Drainage + weak-layer fix

Build three programs—not one wish list

1–2 YEAR WORK PLAN

- Routine and preventive work
- Known drainage corrections
- Designed rehabilitation projects
- Realistic crew and contracting capacity

3–5 YEAR OUTLOOK

- Likely treatment windows
- Funding and grant readiness
- Utility / housing / development coordination
- High-risk routes to investigate

Package work so limited dollars do more

GROUP	Similar treatments near each other
COORDINATE	Utilities, housing, forestry, transit, schools
SEQUENCE	Drainage before surface; base before overlay
RESERVE	Hold capacity for emergencies and spot failures

05

Make it repeatable

A practical program improves every year because the records stay useful.

Every completed job should leave a short record

Record	Minimum detail	What it answers	Useful later
Location + date	Road, limits, work date	Where and when?	History and mapping
Treatment	Materials, depth/rate, method	What did we do?	Specifications
Cost + resources	Labor, equipment, contract, material	What did it take?	Budgeting
Conditions	Weather, moisture, traffic control	Under what conditions?	Performance review
Outcome	Photos + next inspection	Did it work?	Better decisions

A 90-day start does not require new software

1

WEEKS 1–2

Agree on segments and rating words.

2

WEEKS 3–6

Inventory and inspect priority routes.

3

WEEKS 7–10

Build treatment and priority lists.

4

WEEKS 11–13

Brief leadership; schedule first work.

APPLICATION

Field exercise: diagnose before you prescribe

SCENARIO

A 2-mile gravel access road develops recurring spring ruts, summer dust, and potholes near three driveways. Crews add aggregate each year, but problems return.

DISCUSS

- What would you inspect first?
- What evidence would you record?
- What is maintenance vs. investigation?
- How would access affect priority?


A

B




C

D



TAKEAWAY

Five questions to ask on every road

1 What is the road’s community function?

2 Where is the water going?

3 What does the distress pattern tell us?

4 What treatment fits the cause and condition?

5 How will we document and recheck it?

Protect access.
Protect the investment.
Learn from every mile.

A practical pavement management program begins with the next consistent inspection.

Thank You!

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