applied pavement TECHNOLOGY

How Should You Assess Your Roads?

2017 Illinois Transportation and Highway Engineering Conference

Local Roads and Streets Track; February 28, 2017

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Pandora's Box

A process that generates many complicated problems as the result of unwise interference in something

Key Concepts

- Why road assessment is necessary and important
- Selection of appropriate measures
- Using data to make accountable decisions

Why Is Road Assessment Necessary and Important ?

- For Asset Management, must know
  - Asset inventory
  - Asset condition
- Things change
  - Rate of deterioration
  - Added assets
  - M&R work
- Justification of Needs
  - Budgeting
  - Work planning
  - Competition for funds

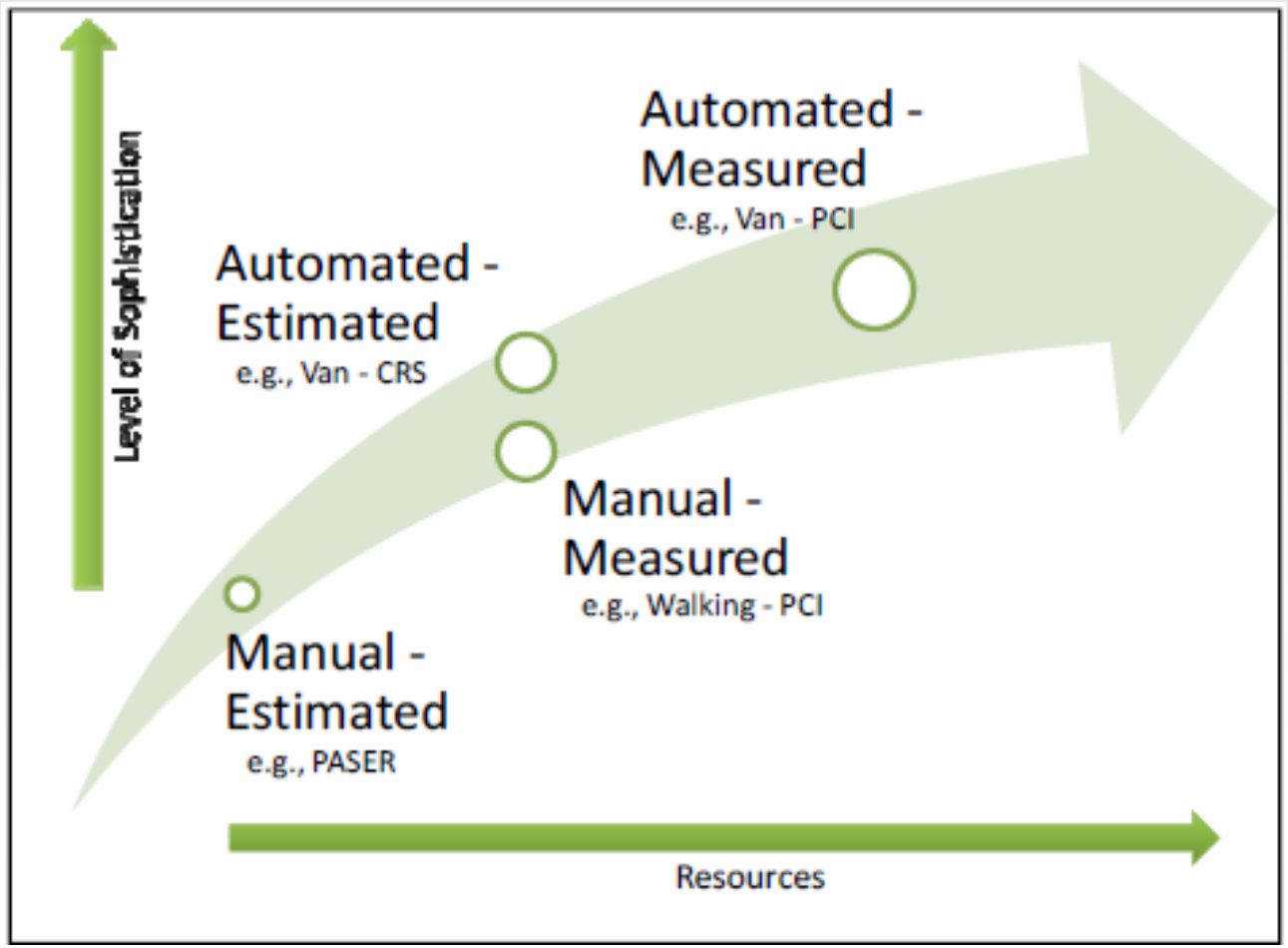
Selecting Appropriate Measures

- What specific information do you need to make decisions?
  - Individual distresses
  - Profile and rutting
  - Indices
  - Images
  - Other assets
- Typically, More Detail = More $$

Other Considerations

- Size of network
- Complexity of analyses
- Pavement management tool (may determine measure)
- GIS integration
- Outsource or In-house
- Web-based or desktop
- Available budget

Balancing Detail with Available Resources



Ref: Research Report ICT-11-094-1; Implementing Pavement Management Systems for Local Agencies; Wolters, A., Zimmerman, K., Schlatter, K., Rietgraf, A.

Data Collection Method

Automated Data Collection	Walking Manual Survey	Windshield Survey
Limited exposure of surveyors	Surveyors exposed to traffic	Limited exposure of surveyors
Images	Limited/No images	Limited/No images
Profile and rutting (if so equipped)	Typically no measures of rutting or profile	Typically no measures of rutting or profile
$$$$	$$$	$$
Will not meet all ASTM D6433 requirements	Better resolution of low severity distress, raveling, bleeding	Limited data detail – typically more qualitative

Measures - Options

- Pavement Serviceability Rating (PSR)
- Pavement Surface Evaluation and Rating (PASER)
- Pavement Condition Rating (PCR)
- IDOT Condition Rating Survey (CRS)
- Pavement Condition Index (PCI)
- Overall Condition Index – OCI
- Individual Distresses
- Custom

Present Serviceability Rating (PSR)

- Developed at the AASHO Road Test
- Subjective
- Windshield survey
- 0 – 5 Scale
- Simple and reproducible
- Provides no indication of appropriate repair
- No longer widely used

0.0 – 1.0	Very Poor
1.0 – 2.0	Poor
2.0 – 3.0	Fair
3.0 – 4.0	Good
4.0 – 5.0	Very Good

Pavement Surface Evaluation and Rating (PASER)

- Developed by Univ. of Wisconsin-Madison Transportation Information Center
- Looks for key distresses, keyed to potential treatment measures
- 1 – 10 Scale, Windshield survey
- Relatively fast and effective
- Rating manuals available for training and guidance
- Used predominantly in IN, MI, WI

Surface rating	*Visible distress**	*General condition/ treatment measures*
10 Excellent	None.	New construction.
9 Excellent	None.	Recent overlay. Like new.
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 ¼").	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 ¼") due to reflection or paving joints. Transverse cracks (open ¼") 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 filling.
6 Good	Slight raveling (loss of fines) and traffic wear. Longitudinal cracks (open ¼"– ½"), some spaced less than 10'. First sign of block cracking. Sight 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 ½") 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")
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 (½" 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 (1" or 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.

Pavement Condition Rating (PCR)

- Term sometimes used generically; differences by state
- Identifies type, and estimates severity and extent for predominant distresses (OH)
- Score calculated using distress weighting and severity and extent deducts to get total deduct (OH)
- Typically 1 – 100 Scale, Windshield/Shoulder survey
- Used in OH, NC, WA, although uncertain if it is calculated in the same manner

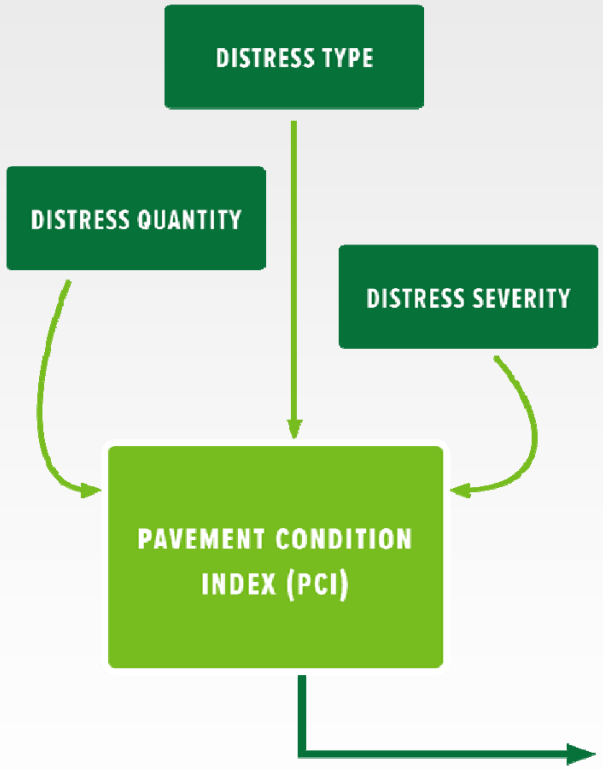
IDOT Condition Rating Survey (CRS)

- Evolved over time to take advantage of technology
- Looks for five predominant distresses in worst traffic lane
- Distress information weighted through CRS Rater software to obtain score.
- 1.0 – 9.0 Scale, 0.1 Increments
- Automated data collection, work station survey
- Rating manuals available for training and guidance

CRS Values	Descriptive Category	CRS Map Color
1.0 to 4.5	Poor	Red
4.6 to 6.0	Fair	Yellow
6.1 to 7.5	Good	Green
7.6 to 9.0	Excellent	Blue

Pavement Condition Index (PCI)

- ASTM D6433
- Walking or Automated Data Collection
- Sample Units (typically)
- Detailed survey documenting type, severity, and amount of each distress
- 0 – 100 Scale
- Used nationally



0–10	Failed
11–25	Serious
26–40	Very Poor
41–55	Poor
56–70	Fair
71–85	Satisfactory
86–100	Good

Overall Condition Index - OCI

- Typically combines PCI and IRI
- For IRI generally requires RSP
- User adjusts weighting, but typically PCI makes up the greater portion
- Generally a 0 - 100 scale
- Many variations on this theme

Individual Distresses

- Rutting
- Roughness
- Fatigue cracking – structural concerns
- Longitudinal and Transverse cracking
- Flushing, Raveling, Weathering
- Broken slabs, corner breaks, punchouts
- What information drives a decision to act?

A Note About Remaining Life

- Some use remaining life as a measure to assess needs
- No standard definition
- Does not provide an indication of mechanism of failure leading to suggested option for repair

Analytical Options

- Spreadsheet
- Public Domain Software (i.e. PAVER, StreetSaver, RoadSoft)
- COTS Software (i.e. VueWorks, Cartegraph, Agile Assets, Road Matrix)
- Selection depends on level of complexity of analysis, performance measure, and budget

Using Data to Make Informed, Accountable Decisions

- Provides a rational engineering decision for selecting projects. – *Stark County*
- Helps identify the right treatments for the right roadways at the right time. – *Edgar County*
- Reduces political pressure to make certain treatment selections. – *Champaign County*
- Serves as a tool to help an agency secure more funding for pavement needs. – *McHenry County*

> "The cost (of pavement management) is worth it. You only have one chance to make the right decision, and pavement management helps you do that."
>
> -Stark County, IL

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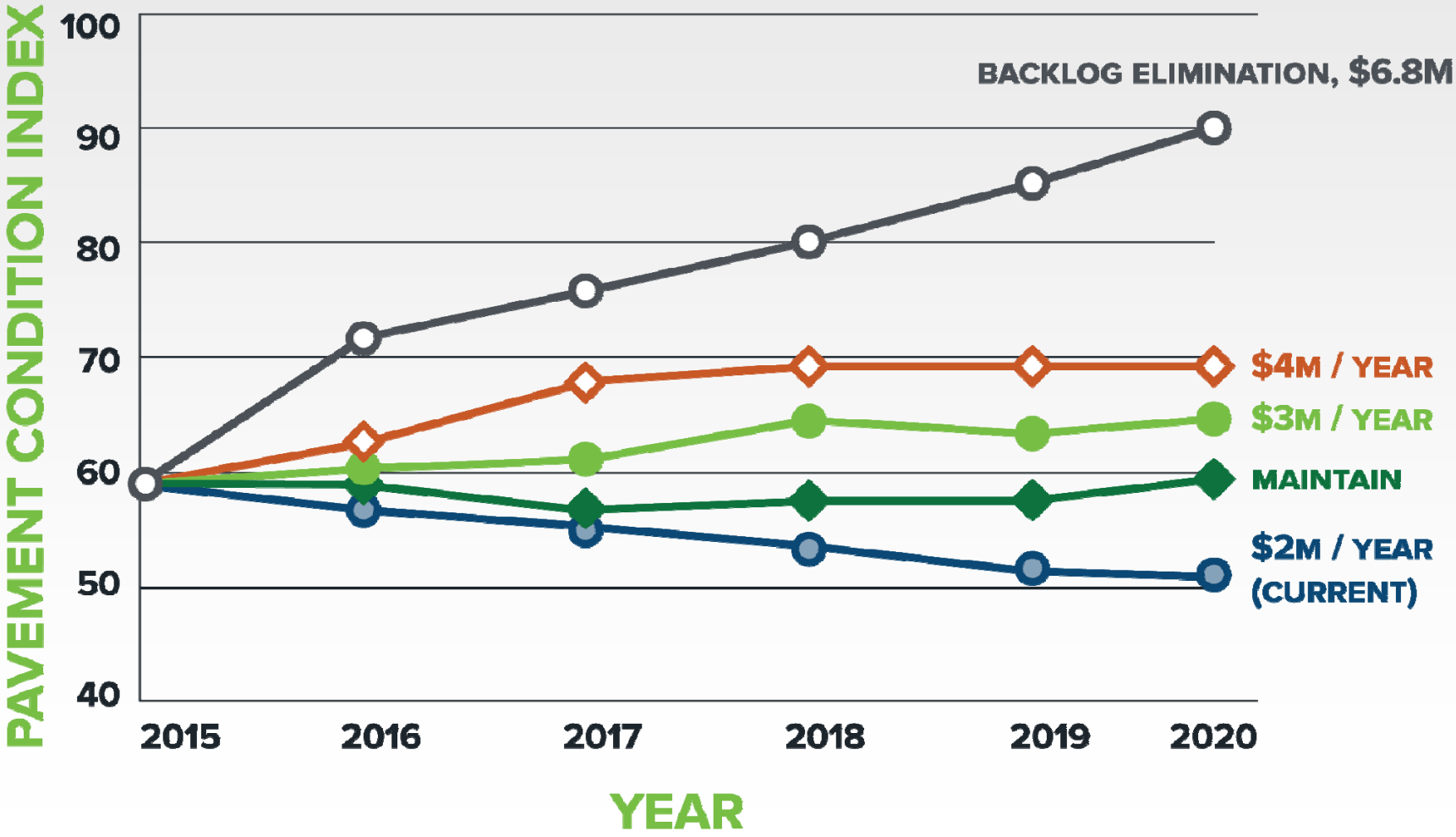

Summary

- Periodic assessment of your transportation assets is necessary and important.
- How you do it should be based on your available budget and the information you need to make decisions.
- Consistency is important – documented process.
- Some choices limit other downstream options so it is wise to make a plan before implementation. This will also identify options for quality management if desired.

Questions?

Need Additional Assistance?

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Thank you!