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Advancement in Pavement Data Analysis for Optimum Treatment Selection

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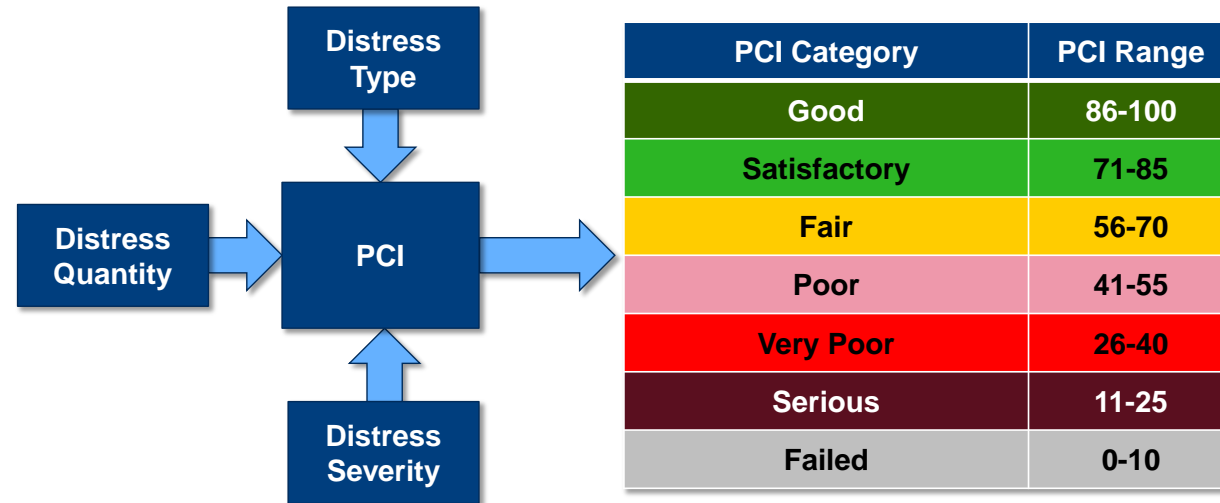
Presentation Overview

- Condition Surveys
- Limitations of conducting PCI surveys at the section level and emphasizes the advantages of analyzing data at the sample level.
- Significance of customized performance curves.
- Importance of Multi Condition Index procedure.
- Benefits of critical maintenance analysis



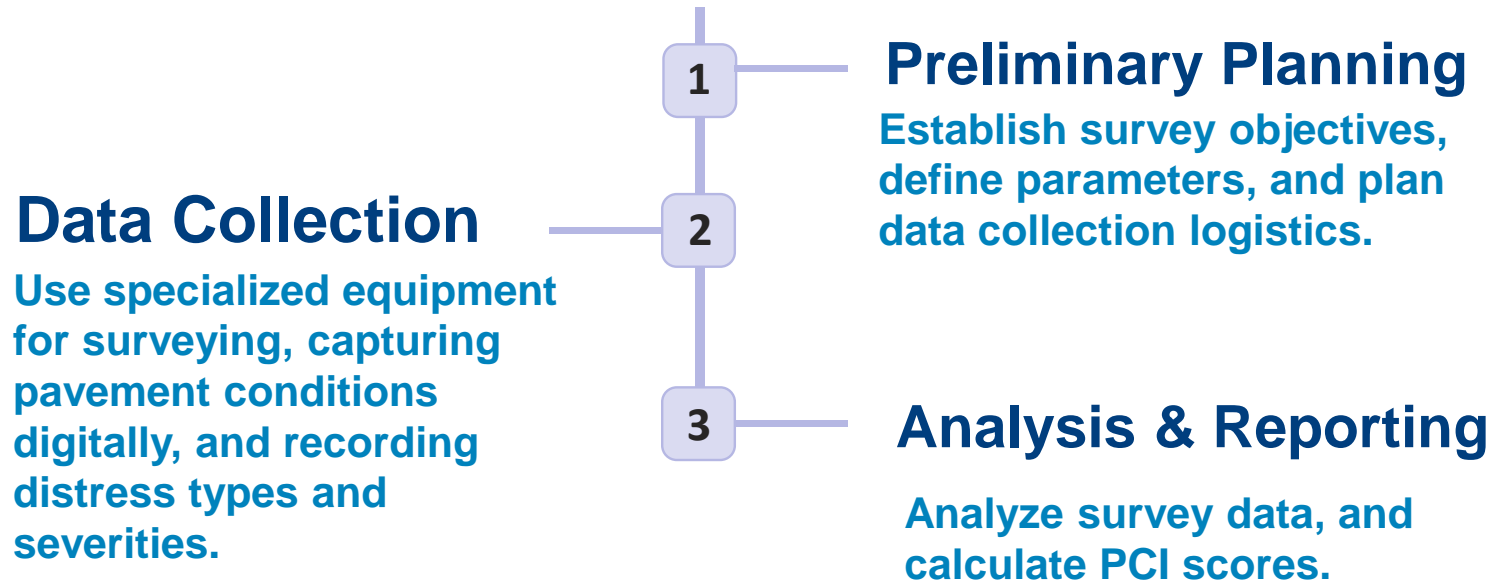
Pavement Condition Index Surveys

A Pavement Condition Index (PCI) survey is a comprehensive evaluation of the condition of a road or pavement, providing crucial data for effective pavement management.



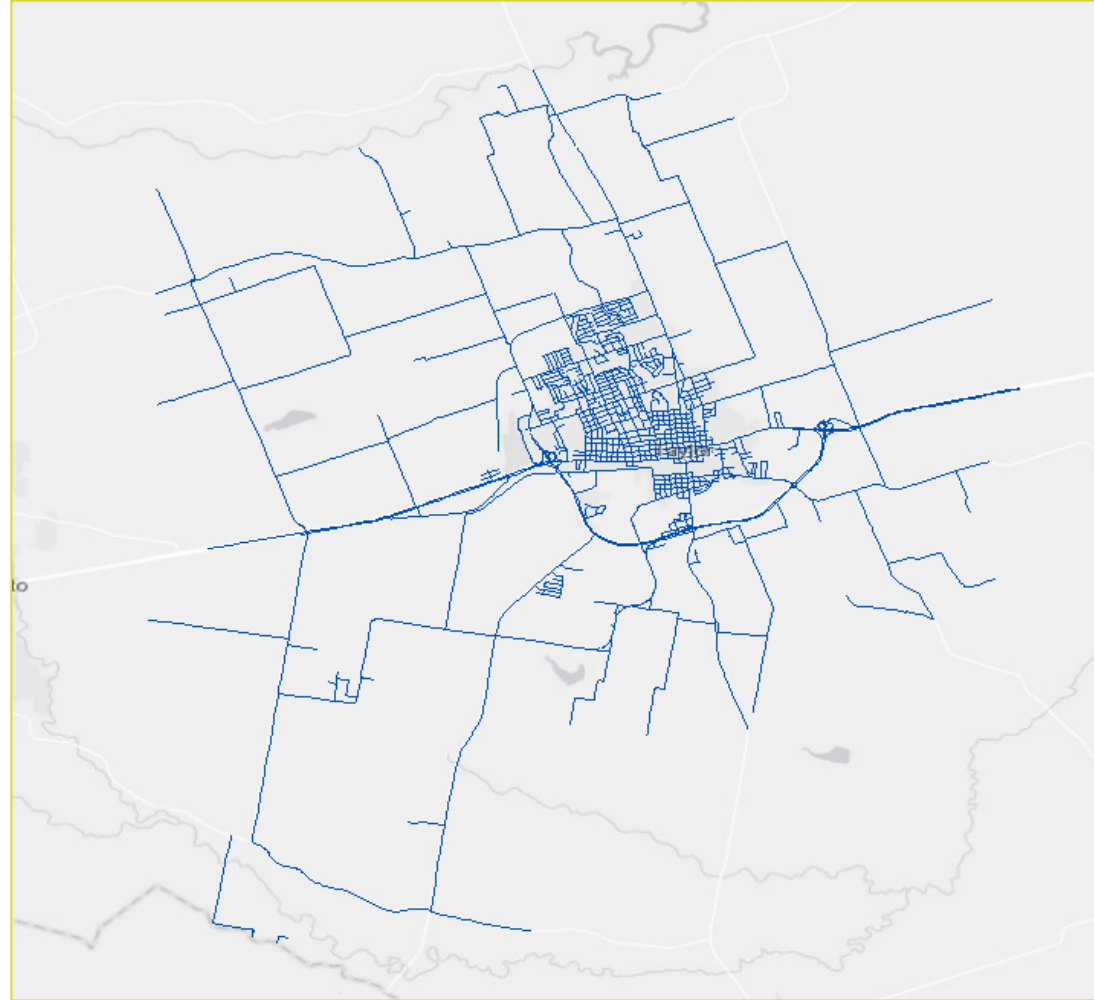


How are PCI Surveys Conducted?



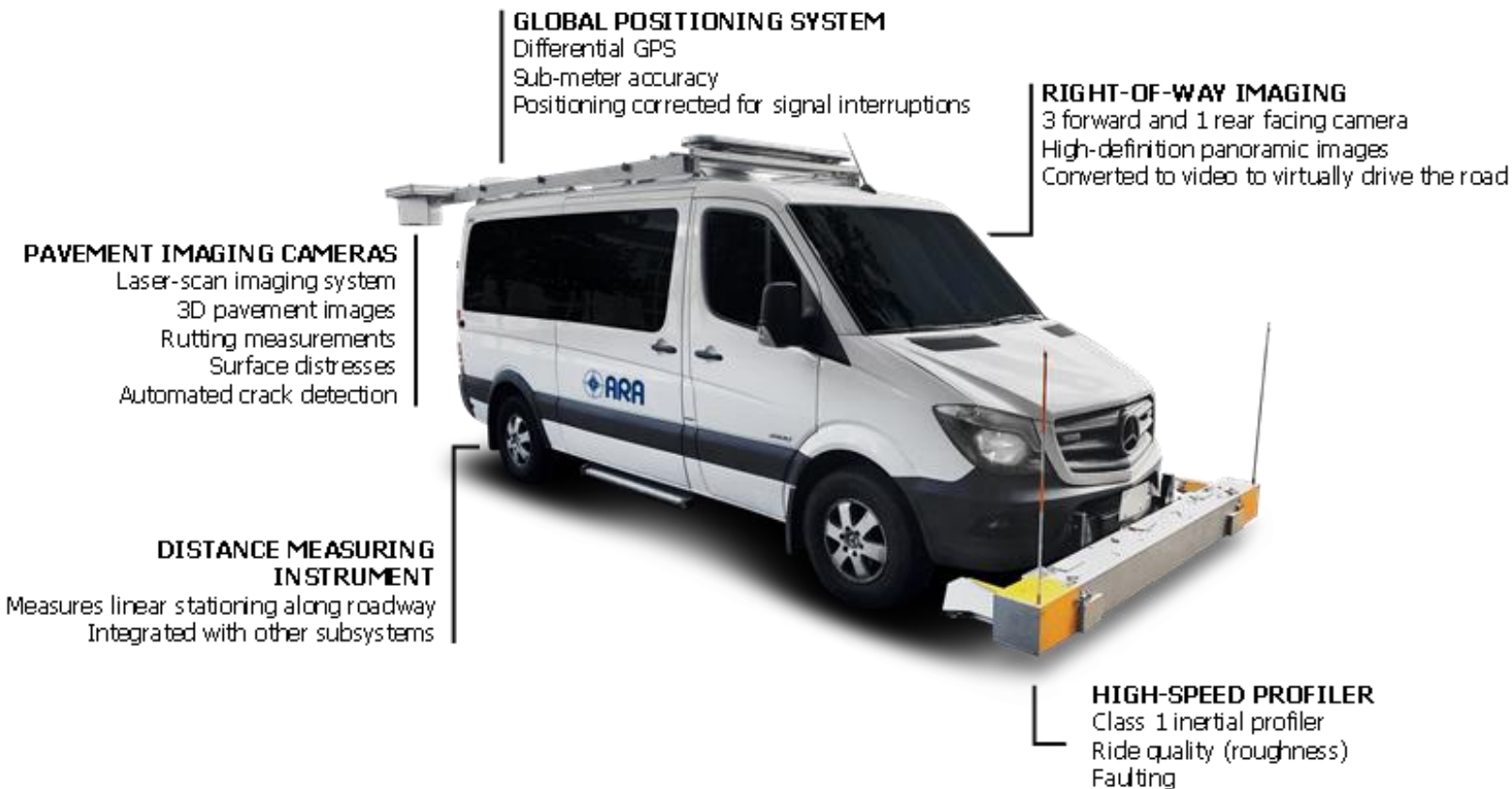


Preliminary Planning



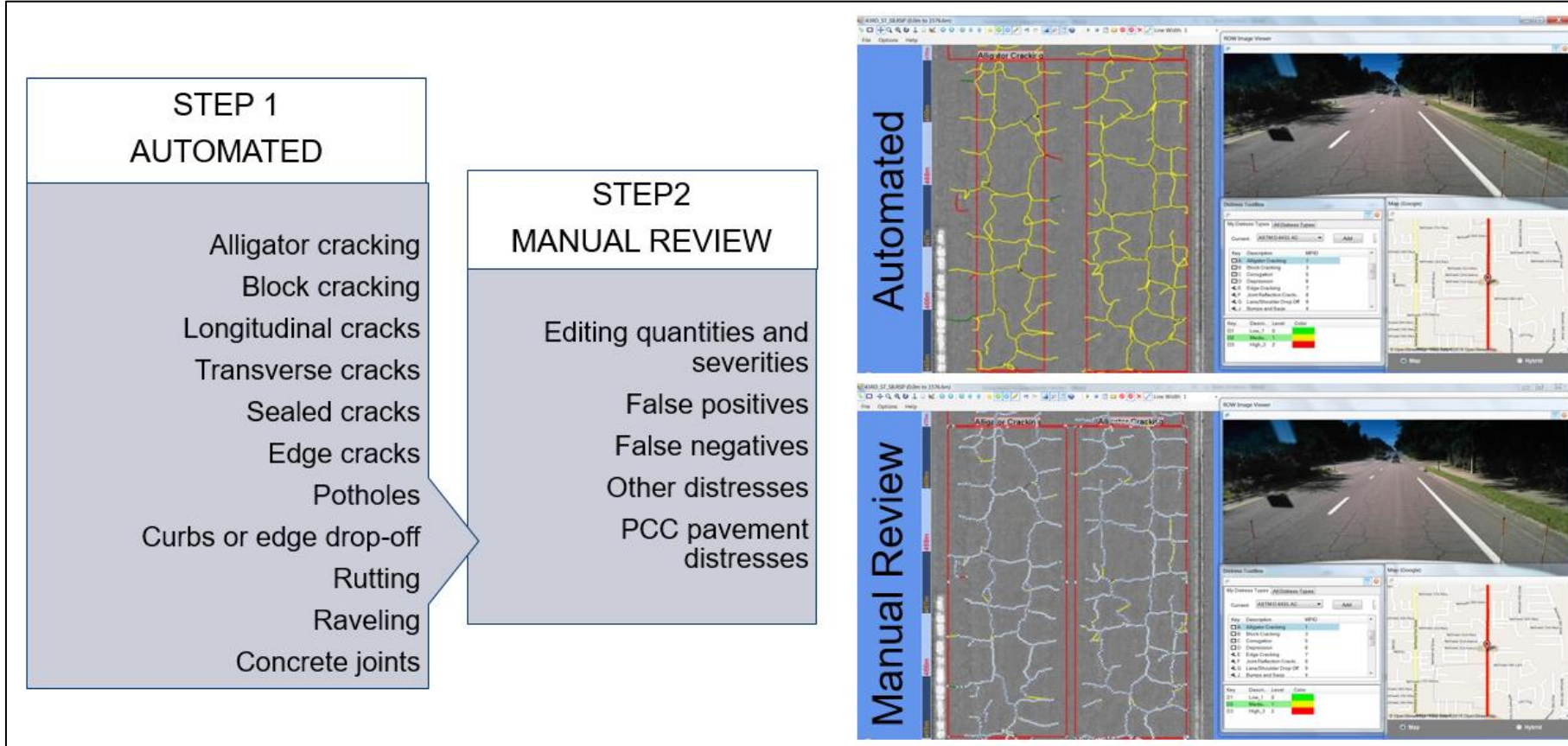


Data Collection



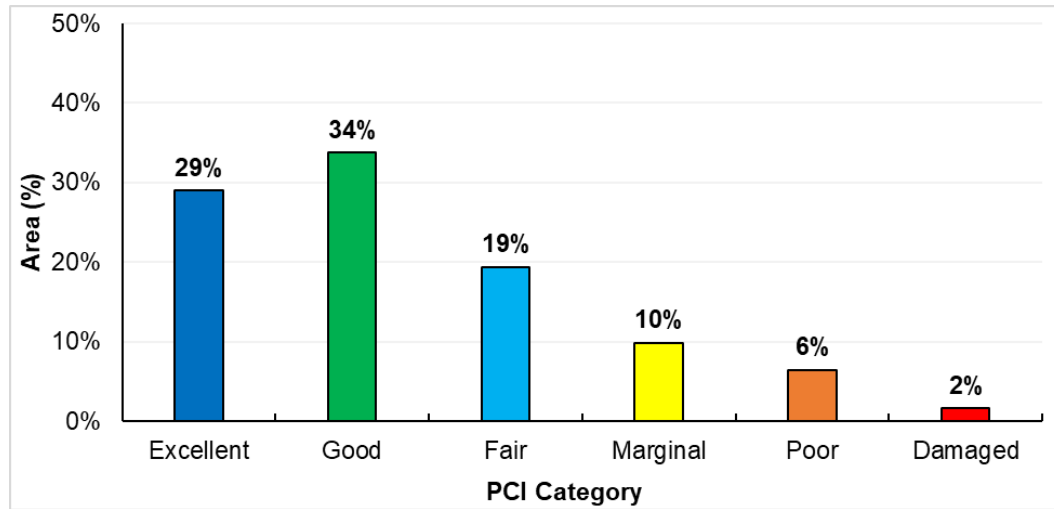


Data Processing and Distress Rating

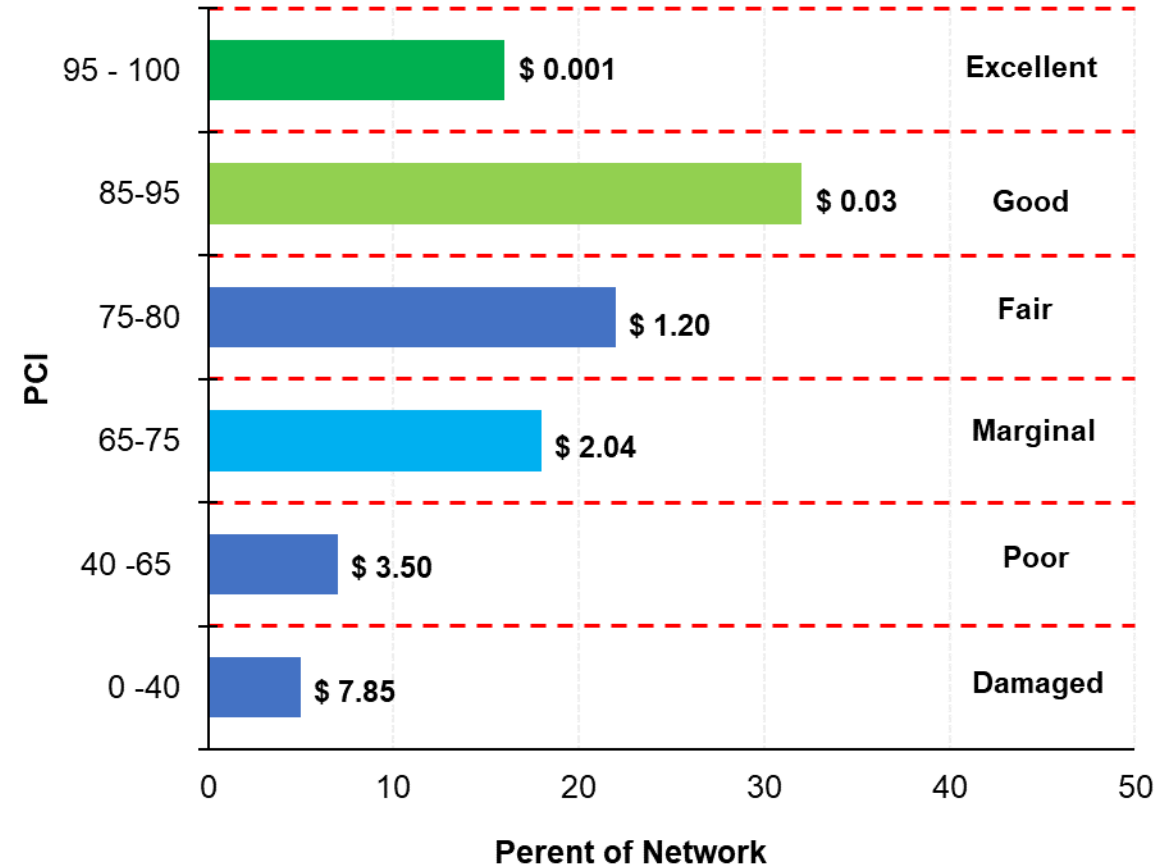




Score Calculation and Treatment Recommendation



PCI Score Distribution Histogram





Areas That Needs More Attention in PMS

- All automatic distress/condition survey results in an average PCI score for the whole section.
- Many entities use a single performance curve for all pavement types, functional classes, ...
- PCI only might lead to ambiguity in treatment selection as the same treatment is assigned to the roadways with similar PCI values regardless of the main reason for pavement condition drop (i.e., rutting, cracking, or weathering).
- Many entities do not apply an appropriate procedure for budget optimization.



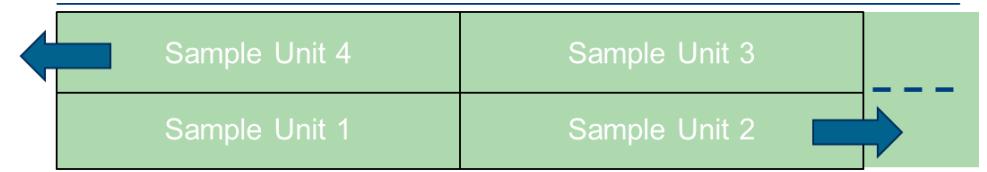
Section Level Vs Sample Level



Importance of Calculate the PCI Score on the Sample Level

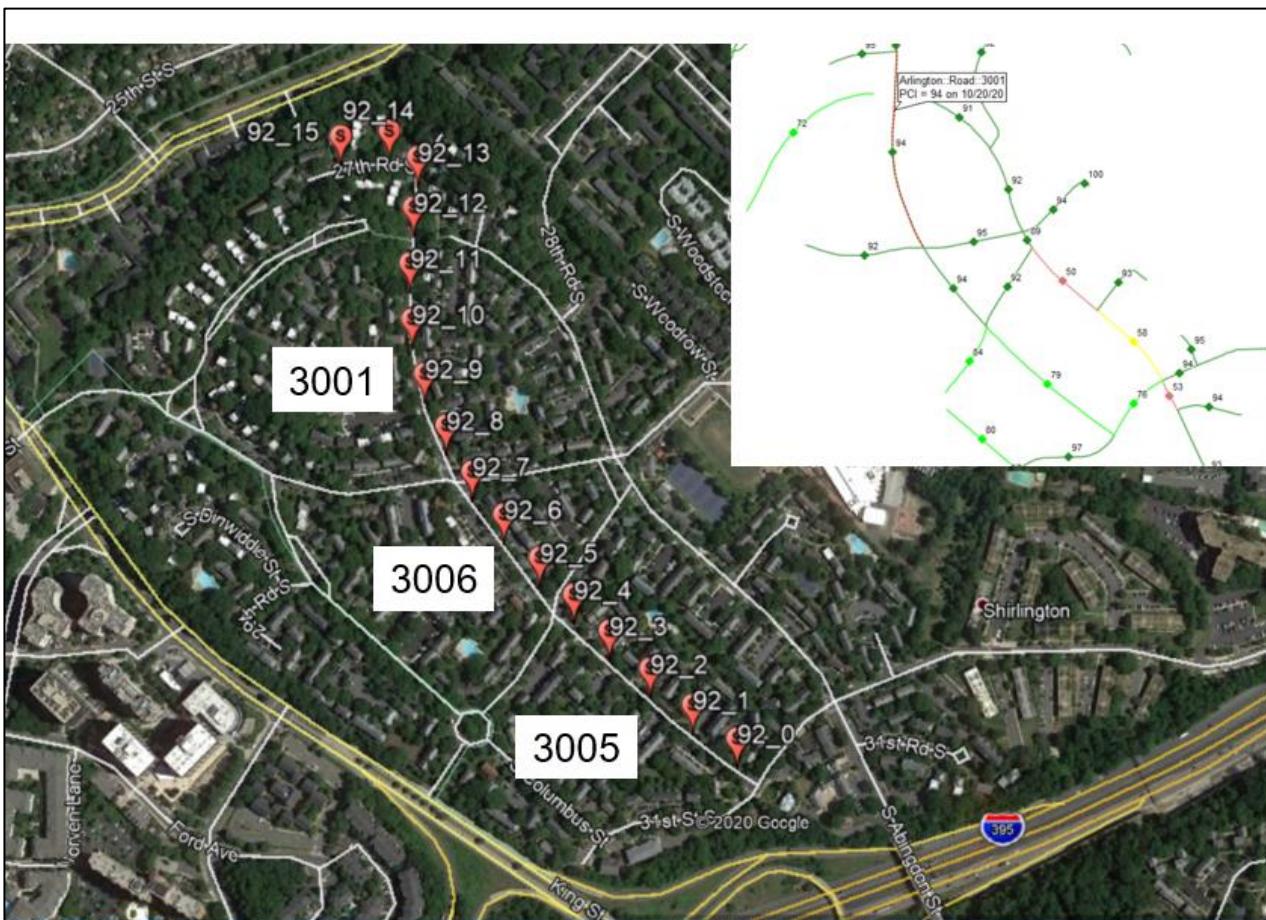
Data collected with the LCMS is continuous along the length of the roadway surveyed.

Converting the collected data in to 'Sample Units', which are 200 ft. in length x 13 ft. in width (or lane width), thereby creating a Sample Unit of approximately 2,600 square feet in area will provide more details about the roadway section under study.





Importance of Calculate the PCI Score on the Sample Level



SEGMENT	SU #	SU PCI
3006 PCI = 79	92_0	95
	92_1	79
	92_2	72
	92_3	82
	92_4	68
3005 PCI = 94	92_5	94
	92_6	94
	92_7	95
3001 PCI = 94	92_8	95
	92_9	94
	92_10	92
	92_11	94
	92_12	95



Customized Performance Curve

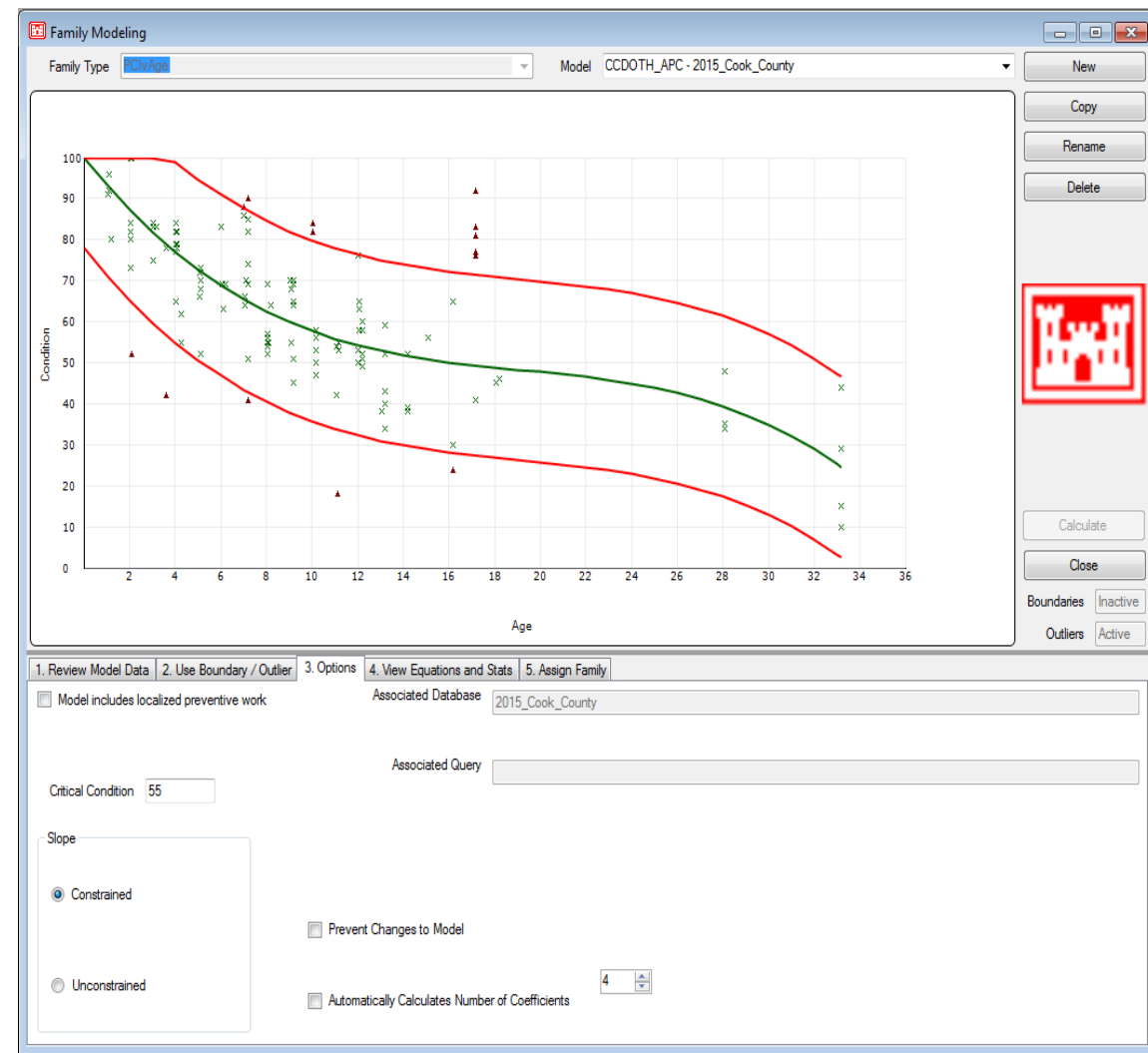


Pavement Performance Models

Performance models are mathematical tools used to evaluate the remaining service life (or age) of a pavement segment given its current condition.

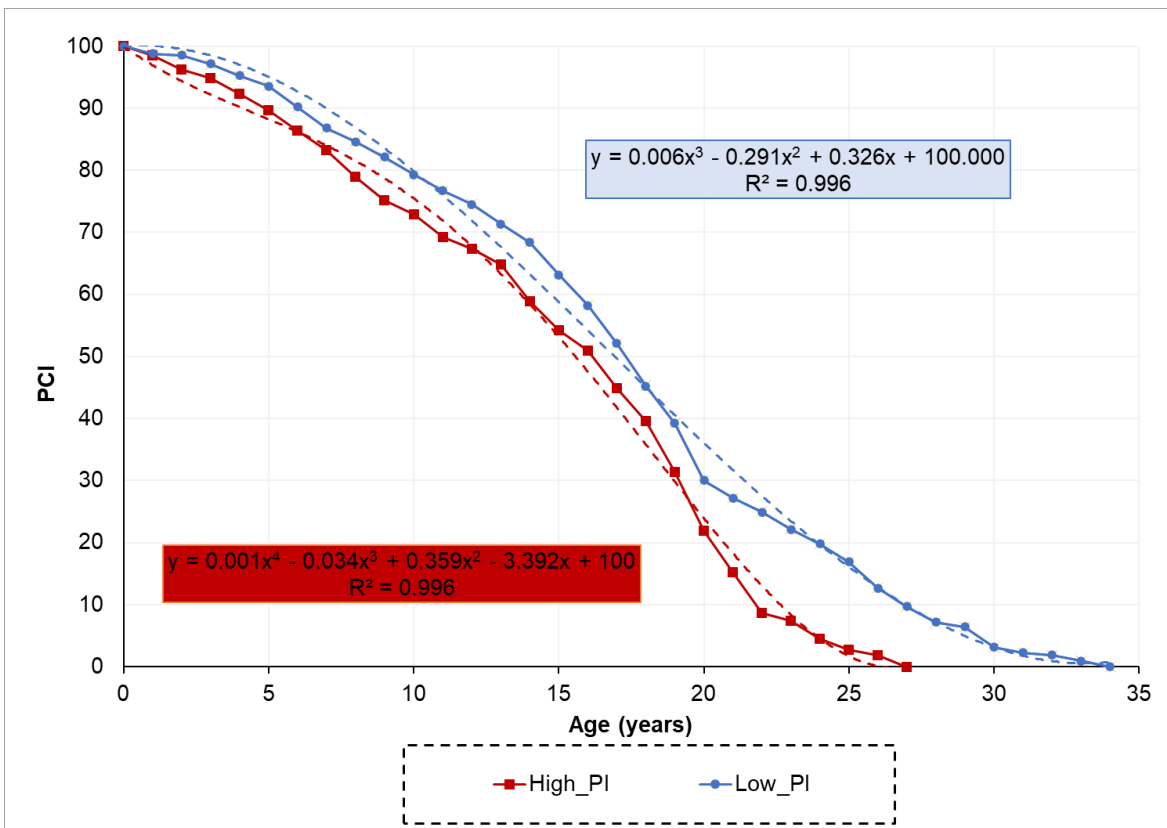
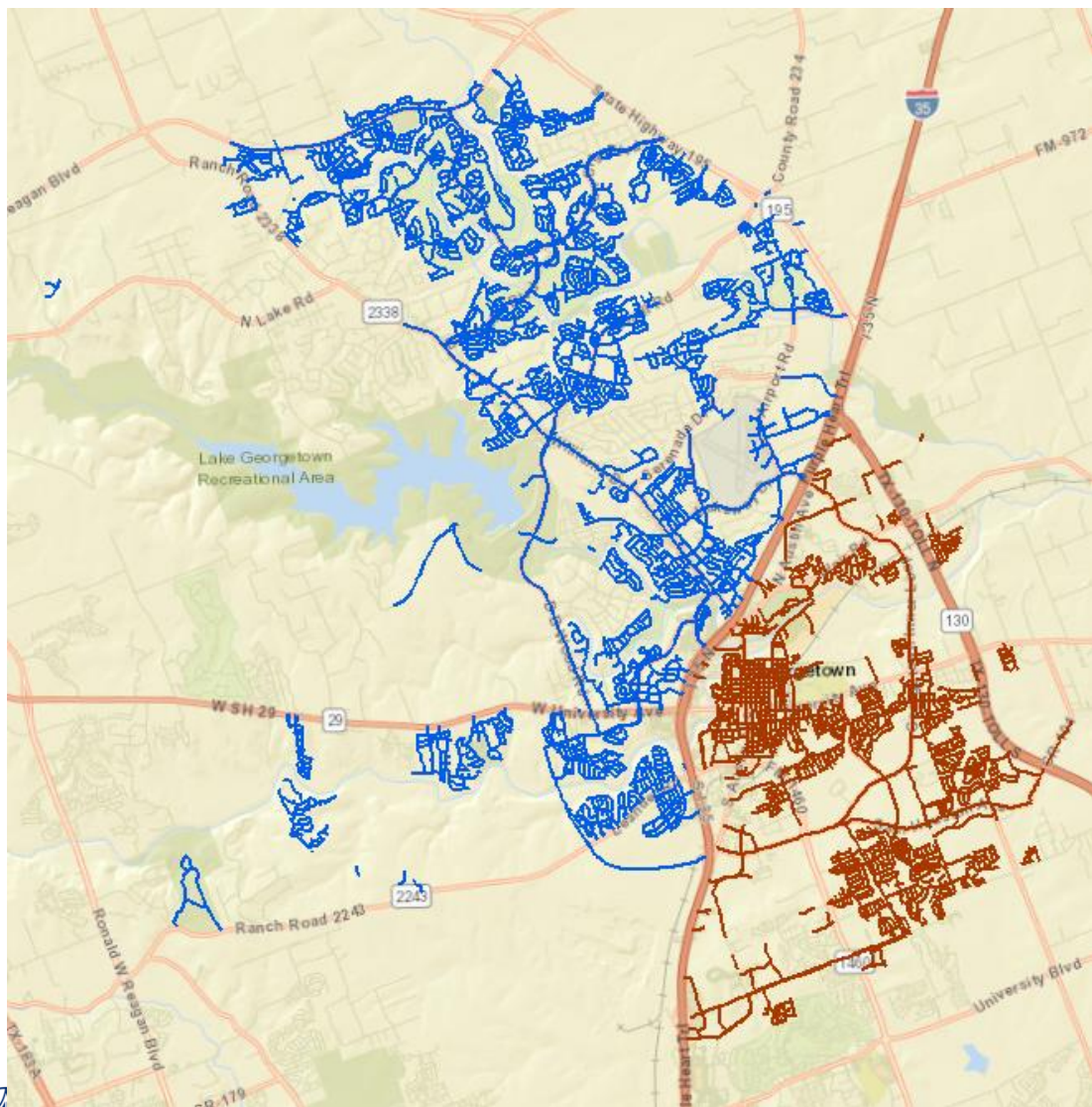
Many entities use one performance model for the prediction of future network condition regardless of pavement type, functional class, and/or soil type.

The use of a single performance model may lead to inaccurate predictions and subsequently not the optimum treatment.





Pavement Performance Models





Multi Condition Index Approach



Multi Condition Index (MCI) Approach

Relying solely on the Pavement Condition Index (PCI) can create uncertainty in treatment selection because it assigns the same treatment to roads with similar PCI values, irrespective of the specific issues.

MCI is a comprehensive technique in pavement engineering that offers a holistic evaluation of road surface condition and performance by incorporating diverse indicators.

By using distress data, it becomes possible to compute multiple indices that provide a more comprehensive assessment of pavement condition from various perspectives.



Multi Condition Index (MCI) Approach

Example 1

Section	PCI	Distresses
A	60	<ol style="list-style-type: none"> 1. L&T cracks (low density) 2. Utility Cuts 3. weathering
B	60	<ol style="list-style-type: none"> 1. L&T cracks (high density) 2. Rutting 3. weathering

Example 2

Section	PCI	Distresses
A	70	<ol style="list-style-type: none"> 1. L&T cracks (low density) 2. Utility Cuts
B	70	<ol style="list-style-type: none"> 1. Alligator Cracks 2. Block Cracks 3. Weathering 4. Utility Cuts

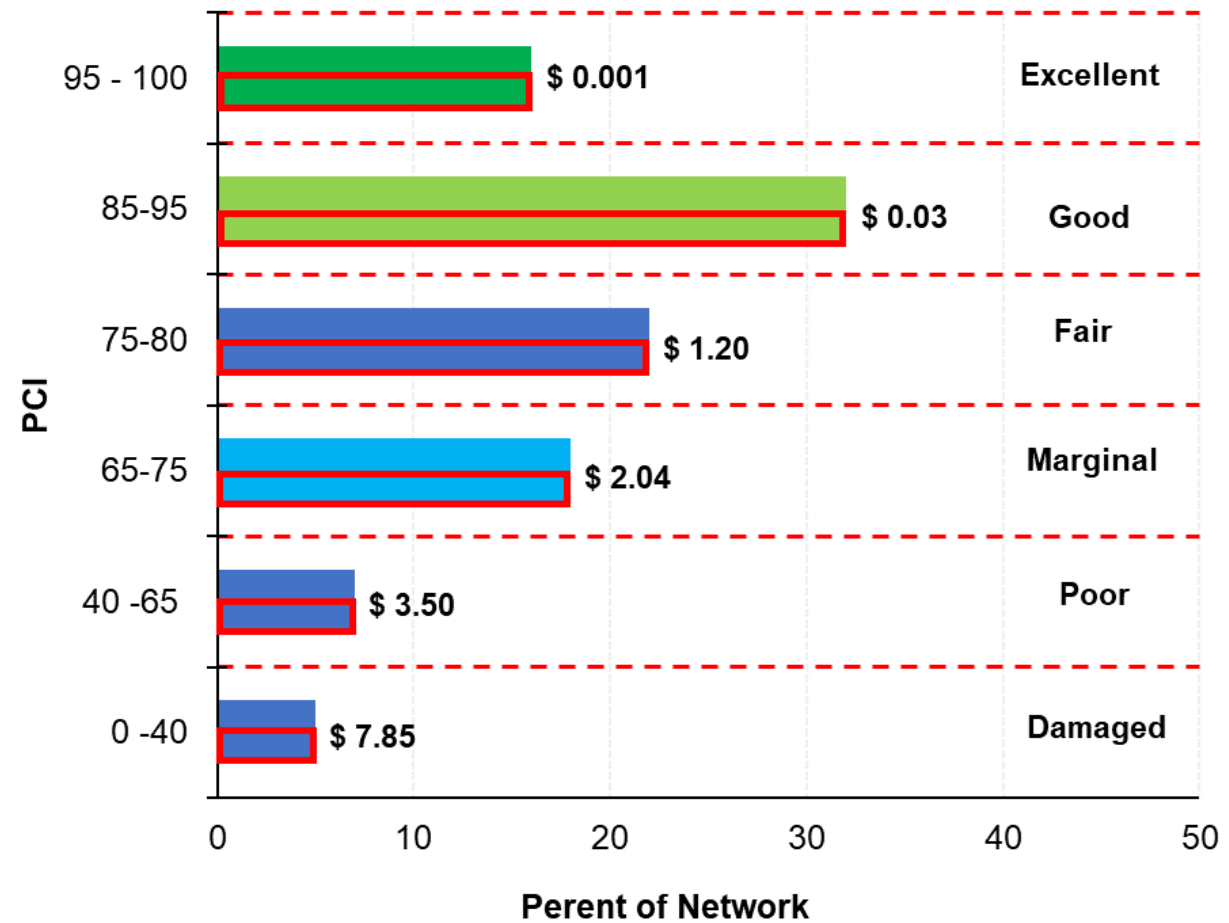


Critical Treatment Analysis



Traditional Section Selection for Treatments

PCI Score Distrubtion Histogram





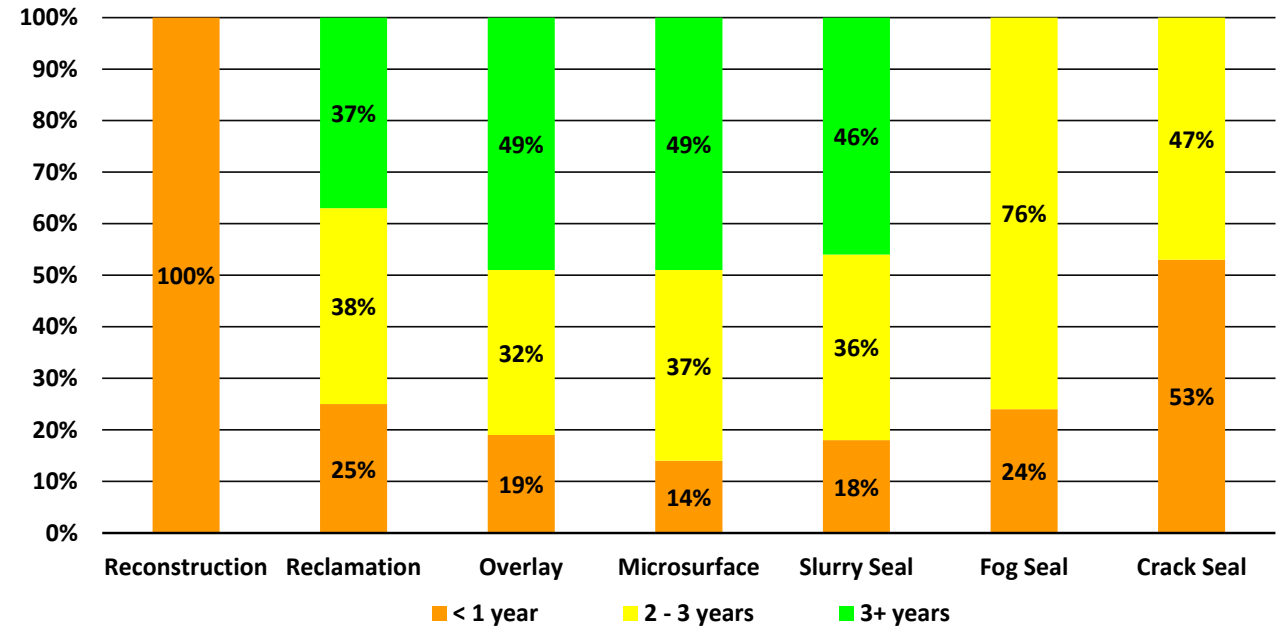
Critical Analysis for Budget Optimization

Critical analysis is crucial to conduct sections' prioritization.

This analysis involves prioritizing roads in each maintenance category by anticipating which ones will move into a more costly maintenance category in the upcoming year (underscoring the need for accurate performance data).

By determining the quantity of "critical" roads within each maintenance category, it becomes possible to accurately plan the budget level for each maintenance task.

Critical Maintenance Analysis – Repair Window





Recap

- PCI Score Calculation on Sample Level
- Significance of customized performance curves.
- Importance of Multi Condition Index procedure.
- Benefits of critical maintenance analysis



Questions

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