

Pavement Preservation and the MTC StreetSaver Pavement Management Program



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Pavement Preservation Definition

- AASHTO/FHWA
- A program employing a network level, long-term strategy that enhances functional pavement performance by using an integrated, cost-effective set of practices that extend pavement life, improve safety, and meet motorist expectations.



Pavement Preservation Concepts

- Apply:
 - the right treatment
 - to the right pavement
 - at the right time
- Focuses on preventive maintenance
 - Dedicate funds to preventive maintenance
- Gain long-term benefits



Pavement Preservation Principles

- Preserve investment in pavements
- Enhance performance
- Extend pavement life
- Meet customer needs



Preventive Maintenance Definition

- AASHTO
- A planned strategy of cost-effective treatments applied to an existing roadway system and its appurtenances that preserves the system, retards future deterioration, and maintains or improves the functional condition of the system (without increasing the structural capacity).



Preventive Maintenance Treatment

- Any individual maintenance treatment that is used in a preventive manner (i.e., applied to a pavement in relatively good condition), while not adding any structural capacity to the pavement.



Preventive Maintenance Treatment

- Treatments applied to:
 - Preserve the existing structure
 - Retard deterioration
- Primarily prevent environmental caused deterioration
- PM Treatments
 - Applied before major structural damage
 - Relatively inexpensive
 - Results are long term



Pavement Management Is a Decision Making Process

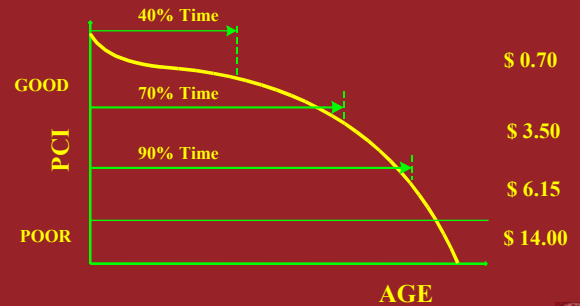
- ◆ To Find Cost-effective Treatments
- ◆ At Designated Times
- ◆ To Provide a Desired Level of Service



MTC StreetSaver PMP

- Network-level with some project selection components
- Help agencies planning & programming pavement work - M&R
- Show the impact of different funding
 - levels
 - approaches (PavPres vs Worst First)
- PM has always been a focus of MTC PMS

Pay Me Now or Pay Me Later



Pay Me Now

- 3 Seal Coats at \$ 0.70 /sy - 24 yrs
- 1 Overlay at \$ 3.50 /sy - 8 yrs
- 2 Seal Coats at \$ 0.70 /sy - 16 yrs
- Total \$7.00 /sy for 56 yrs

Pay Me Later

- 2 Remove & Replace at \$ 14.00 /sy
 - 54 yrs
- Total \$28.00 /sy for 54 yrs

Compare

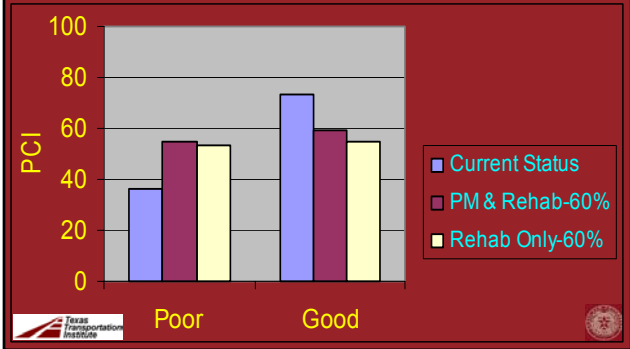
- Pay Me Now
 - Total \$7.00 /sy for 56 yrs

- Pay Me Later
 - Total \$28.00 /sy for 54 yrs

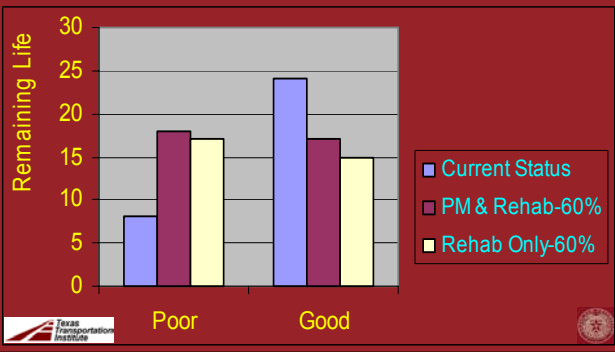
- Which Gave Better Service?



Compare Results - Future PCI



Compare Projected Remaining Life



MTC StreetSaver PMP Principle

- It Costs the Maintaining Agencies Less to Have Good Roads Than Bad Roads

- Providing:
 - Reasonable Level of Service Provided
 - Pavements Will Respond to Preventive Maintenance, e.g. they must be Structurally Adequate



Network-Level Elements

- Inventory
- Condition Assessment
- Determination of Needed Work & Funds
- Identification of Candidate Projects
- Determination of Impacts of Funding Alternatives
- Feedback



To Incorporate PPP into PMP

- Each of the element elements were designed to address PPP & PMP



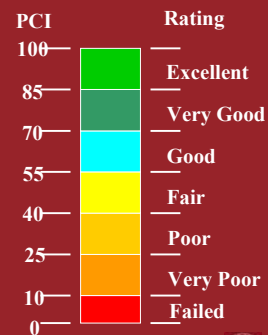
Network-Level Inventory (Data)

- Absolute Minimum Data
 - Collect Only the Data Needed
 - When It Is Needed
- Critical Data for PPP & PM
 - Surface Type
 - Date of construction
 - Date & Type of Subsequent Treatments



Condition Assessment

- Health of Individual Segments
 - Engineering
 - Functional
 - Safety
- Collectively Define Health of Network

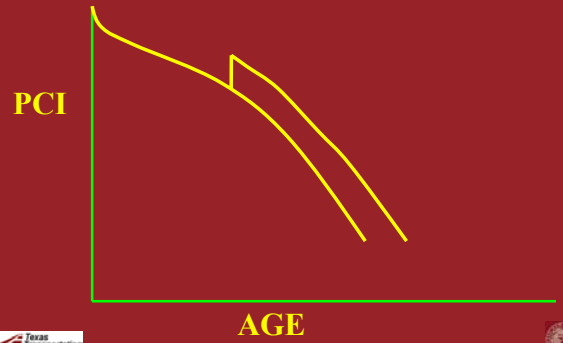


Needs Analysis

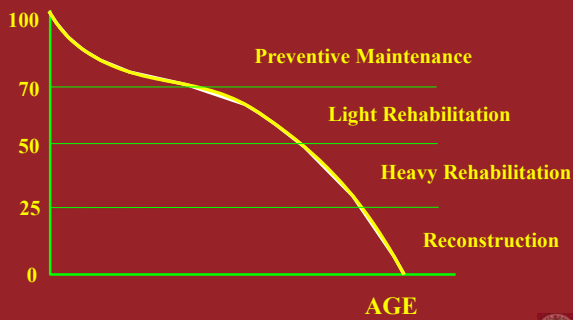
- Identify Sections Needing Work
- Estimate Funds Needed
- Rehabilitation - Condition Driven
- Preventive Maintenance
 - Minimum Condition &
 - Time Interval



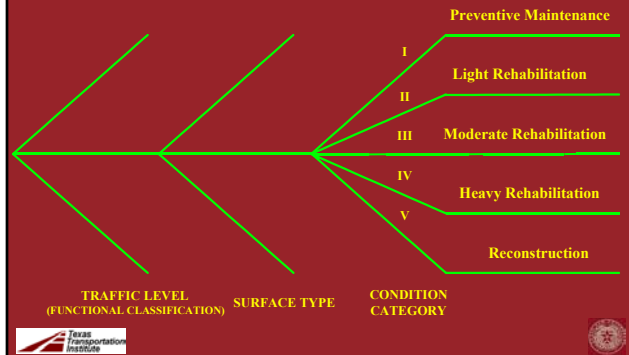
Ability to Project PCI with & without PM Treatments



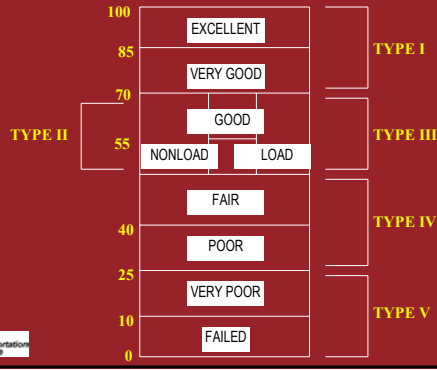
Rehab – Condition Driven



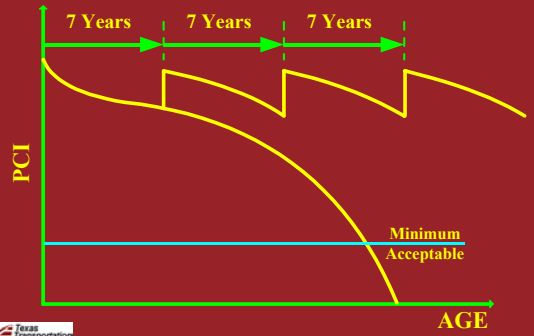
MTC PMS Uses Decision Tree Approach



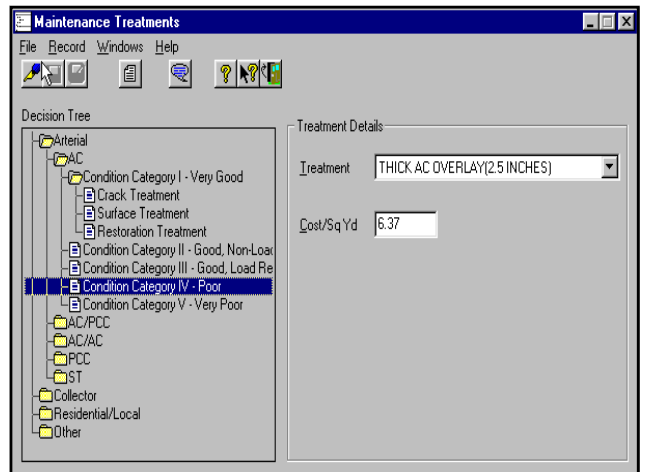
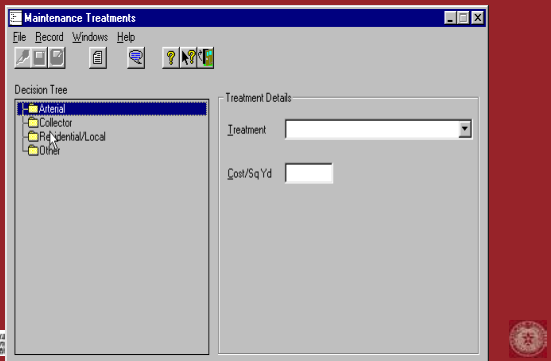
Condition Categories

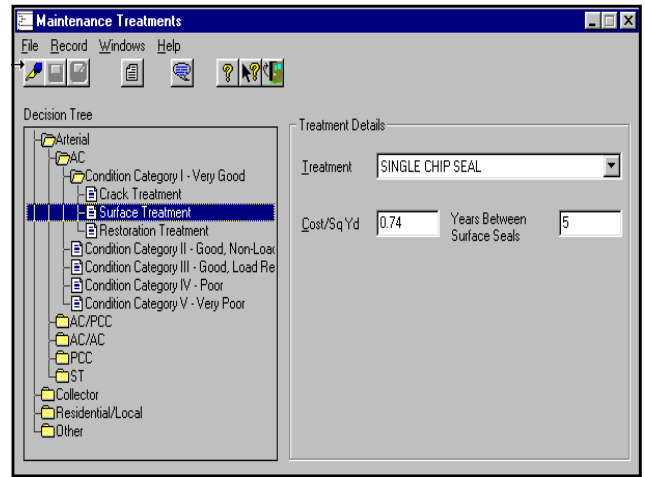
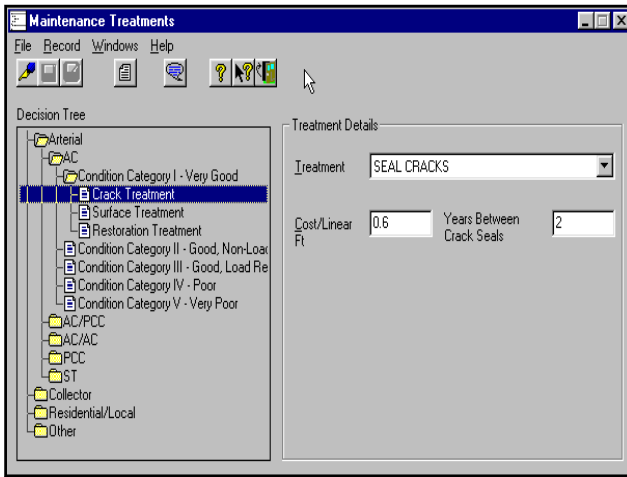


PM – Time Sequenced



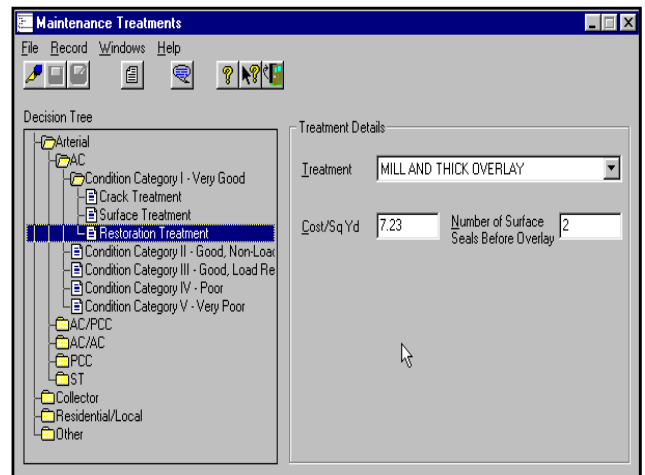
Each Agency Establishes Decision Tree





Maximum Number of Surface Seals

- Can Set Maximum Number of Surface Seals (AC, AC/AC, AC/PCC)
- Once Maximum Reached, No Additional Surface Seals Applied
 - PM - Restoration Treatment Applied When PCI Reaches 70
 - Rehab - Next Rehab Treatment That Is Not a Surface Seal

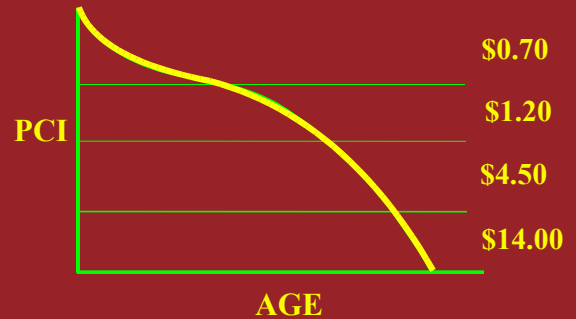


Prioritizing Candidate Projects

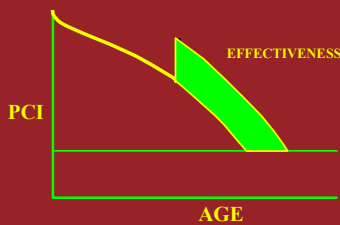
- Consider Effect of Available Funds
- Prioritized Listings of Projects Needing Work
- Goal - Best Pavement Network Over Time for Available Funds



Best Return on \$'s Spent



Weighted Cost-Effectiveness Ratio



$$\text{Weighted Cost-Effectiveness Ratio} = \frac{\text{AREA / YR}}{\text{EUAC / SY}} \times \text{WF}$$



Analysis Process

- Weighted Effectiveness Ratio (WER) Calculated for Each Section Needing Work in First Year
- Rehab Separated Into One Group, **PM Into Another**
- All Those Needing Rehab Ranked From Highest to Lowest
- Sections Selected Until Funds Exhausted



- All Those Needing PM Ranked From Highest to Lowest

- Sections Selected Until Funds Exhausted



- Condition Projected Forward One Year

- With Treatment If Selected
- Without Treatment If Not Selected

- Process Repeated for Each Analysis Year

- Sections Can Have Multiple Treatments (Rehab & PM) in Analysis Period



Calculations

File Windows Help

Calculation Type

PCI From Inspection Units
 PCI From Maintenance Treatments
 Budget Needs
 Budget Scenario

Inflation Rate (5 = 5%)
 Interest Rate (5 = 5%)
 Start Year
 Years to Calculate

Calculations

File Windows Help

Calculation Type

PCI From Inspection Units
 PCI From Maintenance Treatments
 Budget Needs
 Budget Scenario

Scenarios			
Description	Current Reporting	Calculated	Date
Test Case 3B - All	<input type="checkbox"/>	<input type="checkbox"/>	8/1
Trial 2	<input type="checkbox"/>	<input type="checkbox"/>	8/1
▶ Test Case 3D - All	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	11/1
Trial 4	<input type="checkbox"/>	<input type="checkbox"/>	8/1

Scenario Wizard View Scenario

Pavement Preservation & PM

- PM funds can be controlled
 - Increased or decreased



Scenarios Calculation Wizard - Step 2 of 4

Budget Dollars Test 1

Base Budget Base PM Split % Dollar Amount

Base Budget Increase Factor OR

OR

Year	Budget Amount	PM %	PM Amount
Year 1	\$50,000.00	5	\$0.00
Year 2	\$50,000.00	5	\$0.00
Year 3	\$50,000.00	5	\$0.00
Year 4	\$50,000.00	5	\$0.00
Year 5	\$50,000.00	5	\$0.00
Year 6	\$50,000.00	5	\$0.00

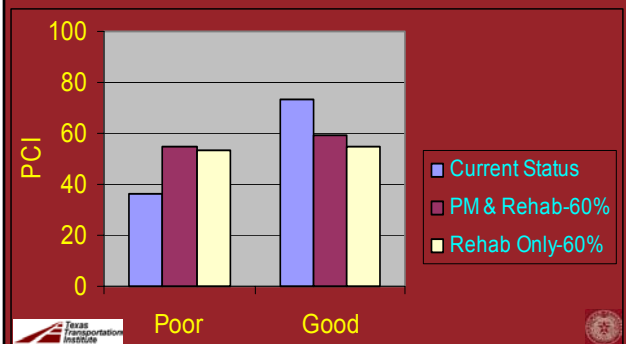
? Exit Back Next Finish

Impact Analysis

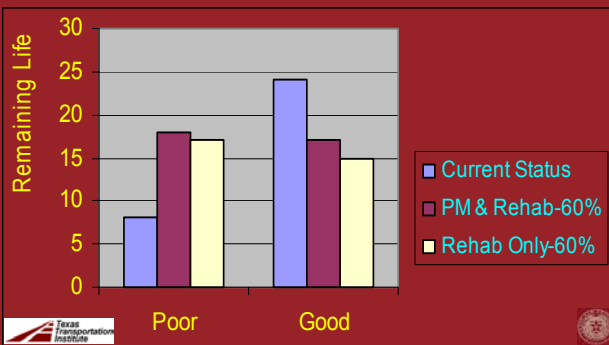
- MUST look long-term for impact of Preventive Maintenance
 - 20+ years (30+ for PCC)



Compare Results - Future PCI



Compare Projected Remaining Life



Results of This Approach

- List of sections to consider for PM as part of PP program
- Prioritized listing
- Impact of applying PM

- Specific treatment (chip seal or slurry) determined in project selection or project design level

Summary

- PP included in MTC StreetSaver PMP
 - Specific treatment incorporated in Project Selection
- PM along with needed rehab provides the best condition for the least money
- Preventive maintenance (when applied correctly) is cost-effective
- Preventive maintenance should be a part of every agencies pavement management practices