

## Pavement Preservation and the MTC StreetSaver Pavement Management Program



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## 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



## 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

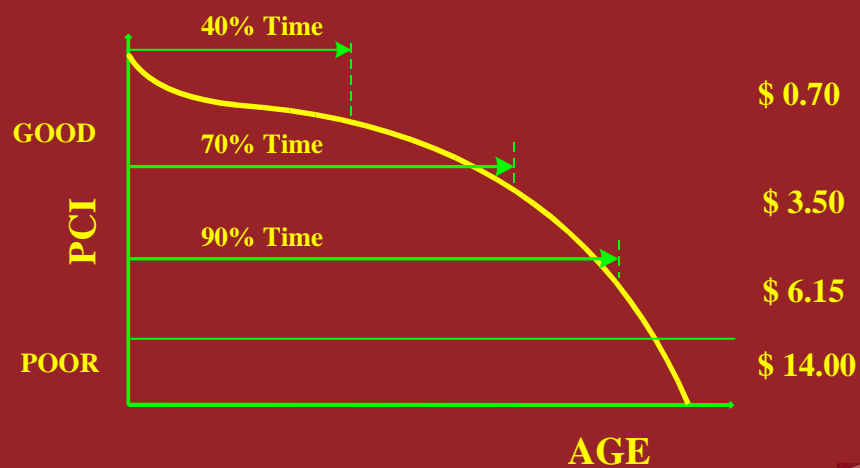


## MTC StreetSaver PMP

- 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



## 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?



## 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



## Inventory

- What Agency Is Responsible for
- Where It Is Located
- Basic Information



## 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



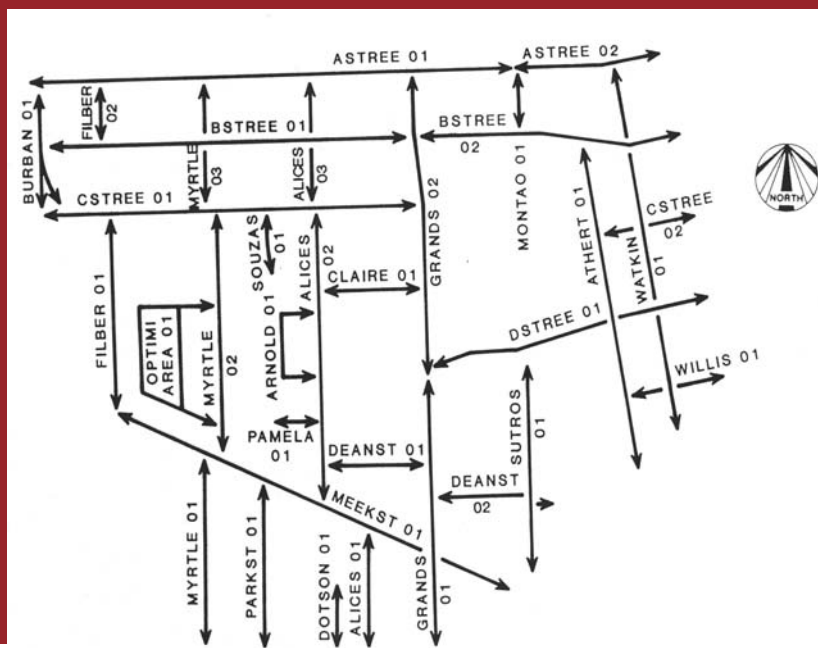
## City/County

- Network of Roads And/or Streets
- They Are Not Uniform In:
  - Structure
  - Age
  - Traffic
  - Condition
- Divide Into Management Sections



## Management Section

- Subdivision of Network
- Area Considered a Unit for Planning:
  - Maintenance
  - Rehabilitation
- Relatively Uniform In:
  - Structure, Age, Traffic, Usage, Etc.



## Breaking Network

- Important First Step
- MTC Training on That Topic Available

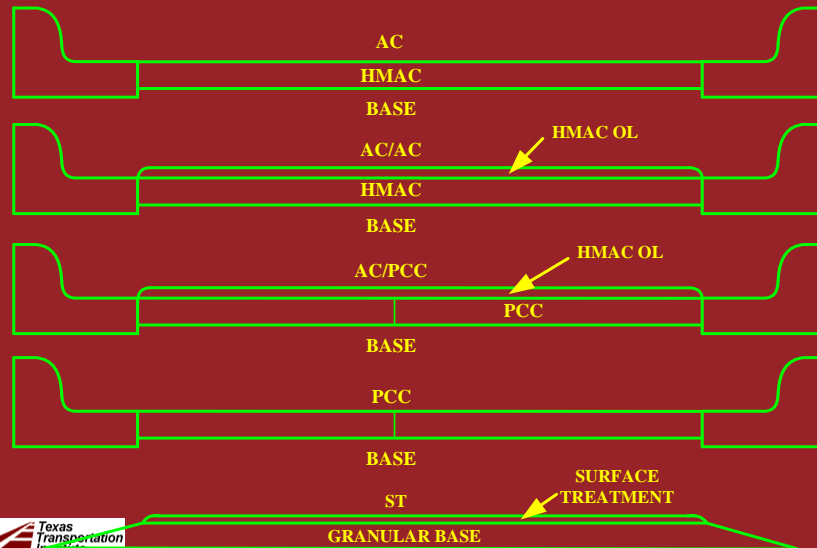


## Basic Information for Each Section

- Name
- Begin - End
- Surface Type
- Date Construction (Last Surface)
- Functional Class
- Area (Length & Width)



## Surface Types



## Functional Class

- Arterial
- Collector
- Residential/Local
- Other
  
- More Detailed Functional Class Still Use These in Analysis



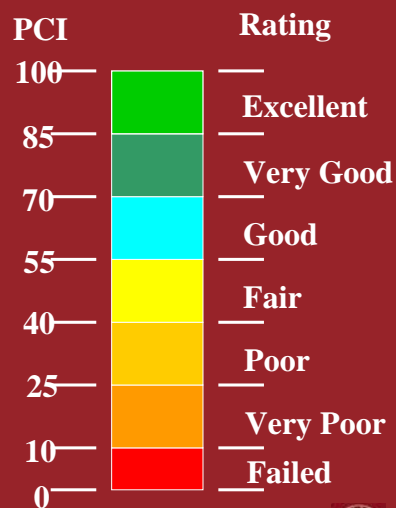
## Other Information and Sort Codes

- ADT
- TI
- Area ID
- Funding Code
- General Code
- More



## Condition Assessment

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



## MTC PMS Uses PCI

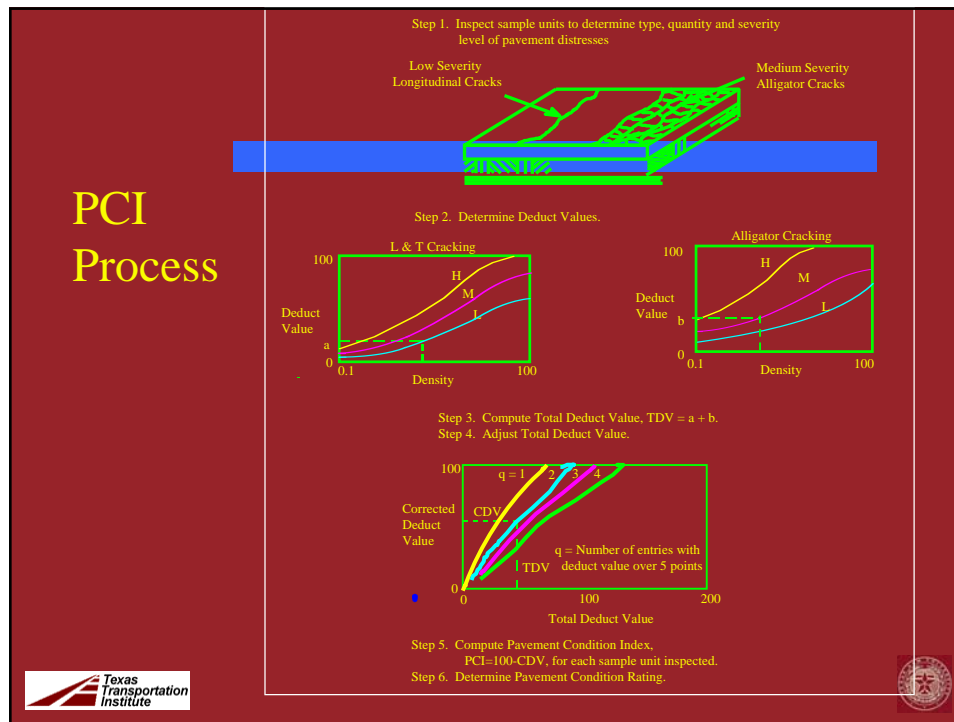
- Pavement Condition Index Basic Measure of Condition
  
- Method to Uniformly Characterize Condition of Paved Surface
  - Along Road/street
  - Over Time
  - Among Raters



## PCI Values

- Based on Distress Surveys
  - Type - What Is Wrong?
  - Severity - How Bad Is It?
  - Density - How Much Present?





## Distress Definitions

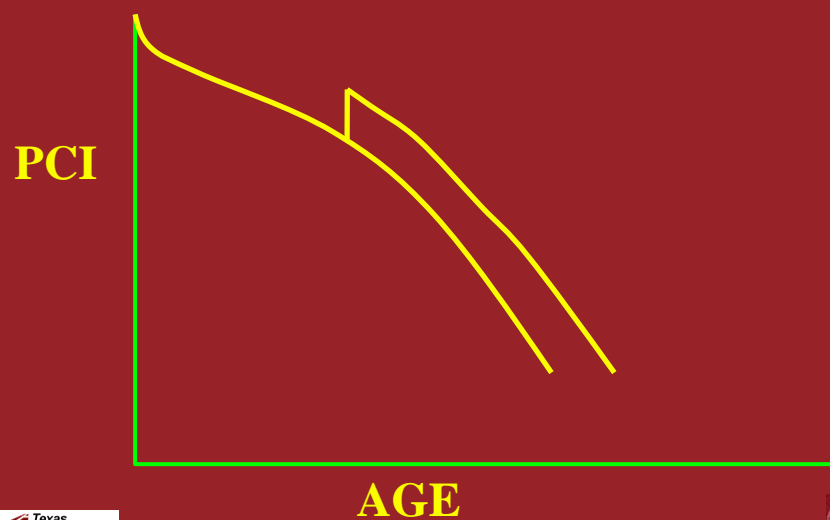
- 7 Types Each for Asphalt Surfaced & PCC
  - Alig Crk, Blk Crk, Dist, L&T Crk, Patch, Rut, W&R
  - Cor Brk, Div Slab, Fault, L&T Crk, Patch, Scale, Spall
- Three Severities - L, M, & H
- Quantity

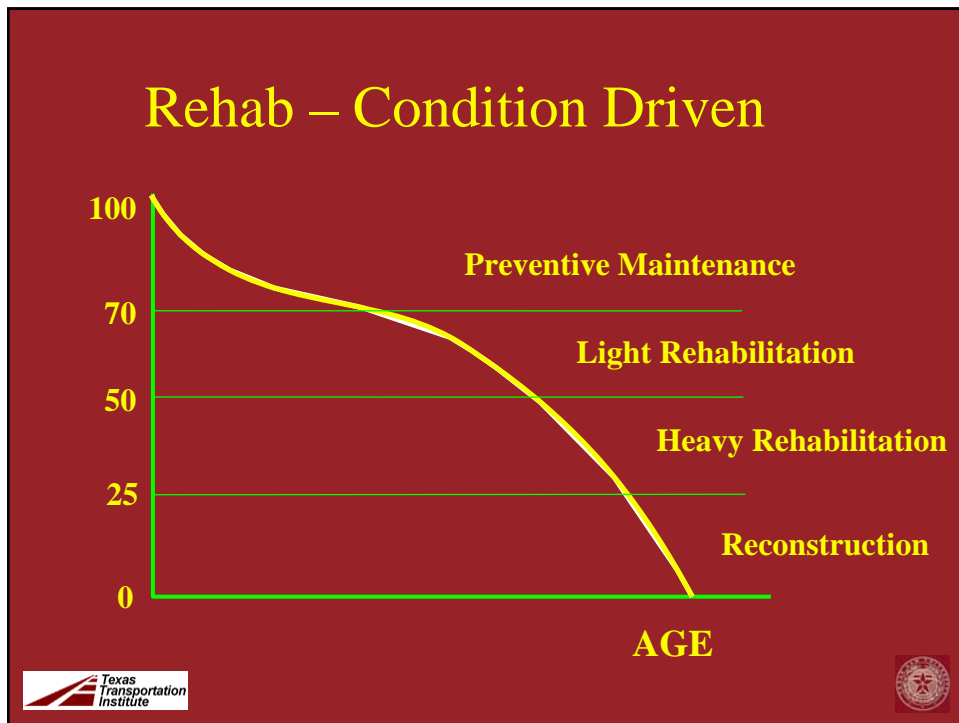
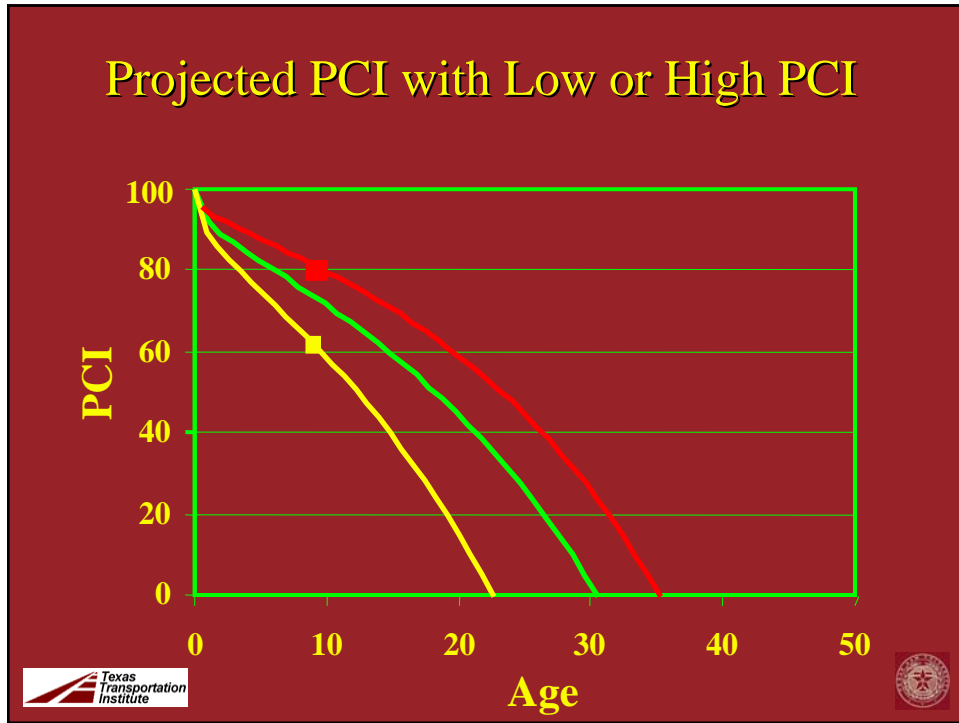
## Needs Analysis

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

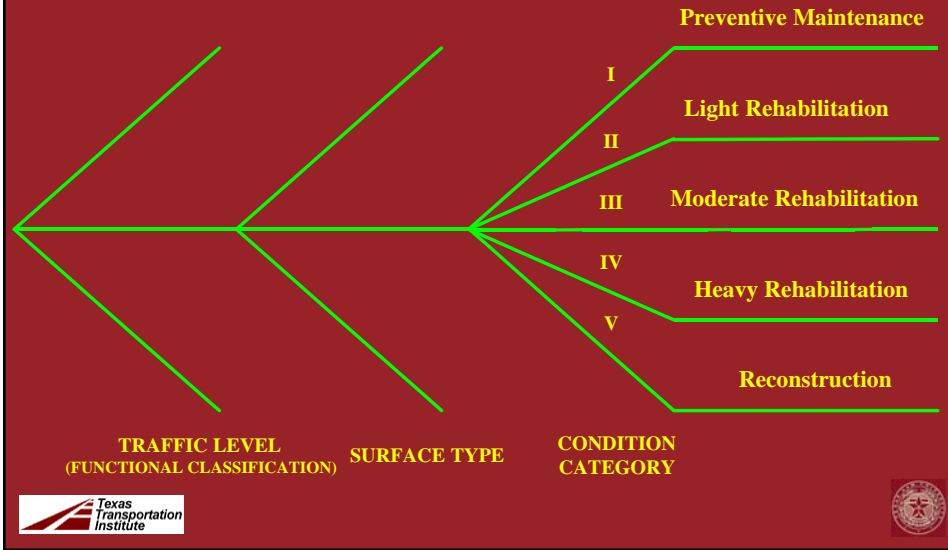


## Ability to Project PCI with & without PM Treatments

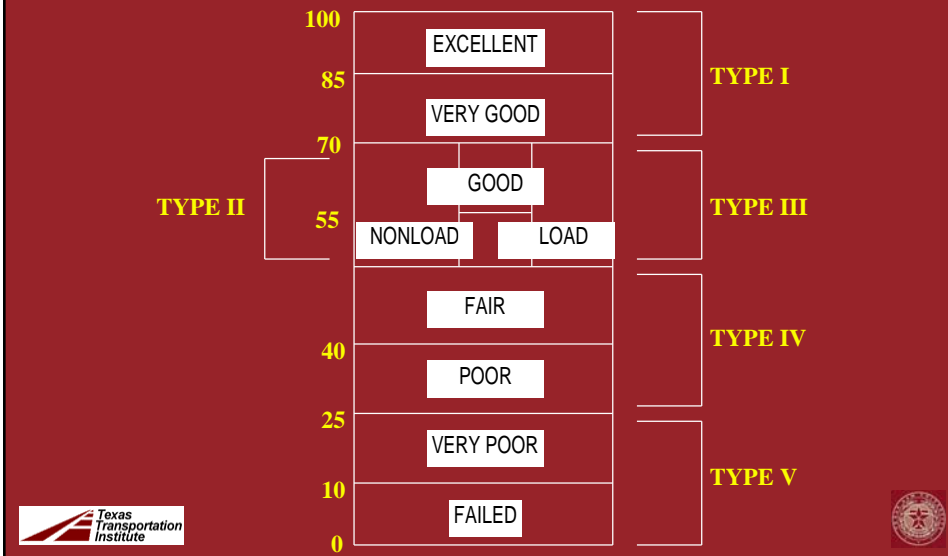




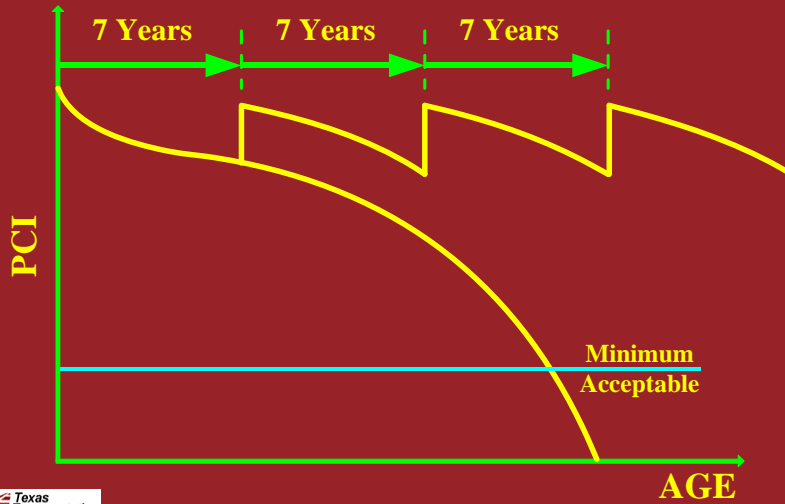
## MTC PMS Uses Decision Tree Approach



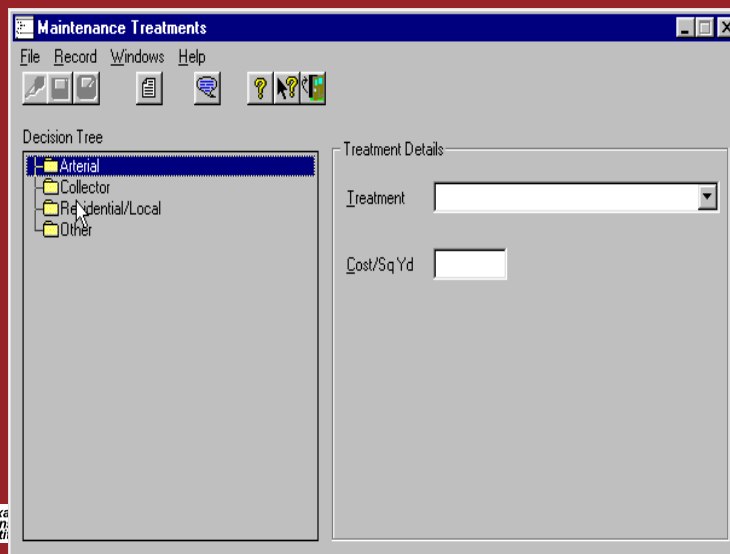
## Condition Categories

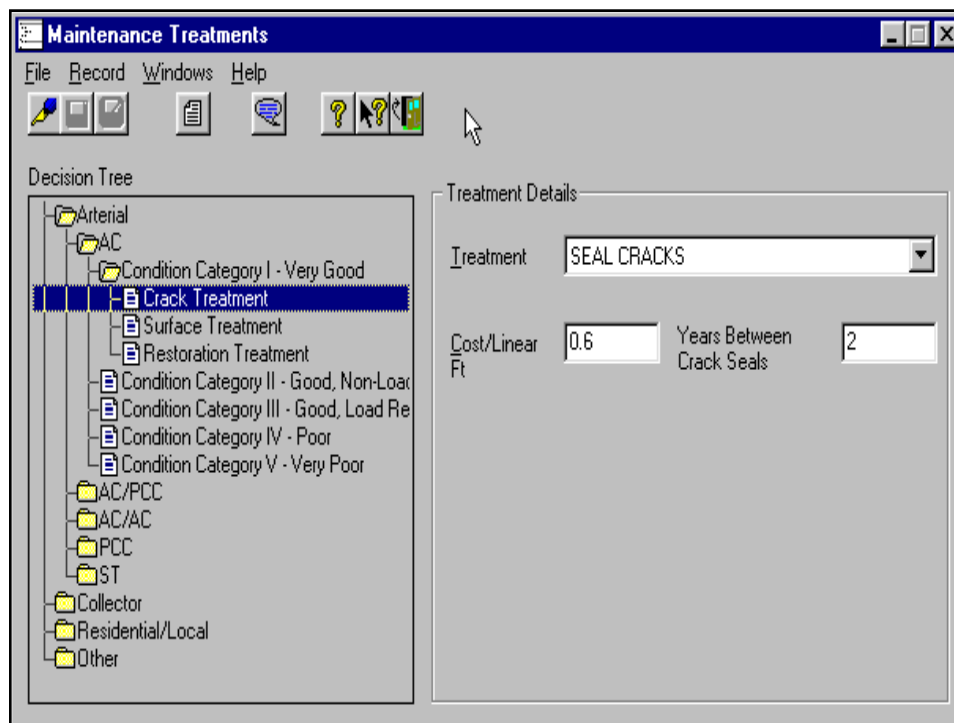
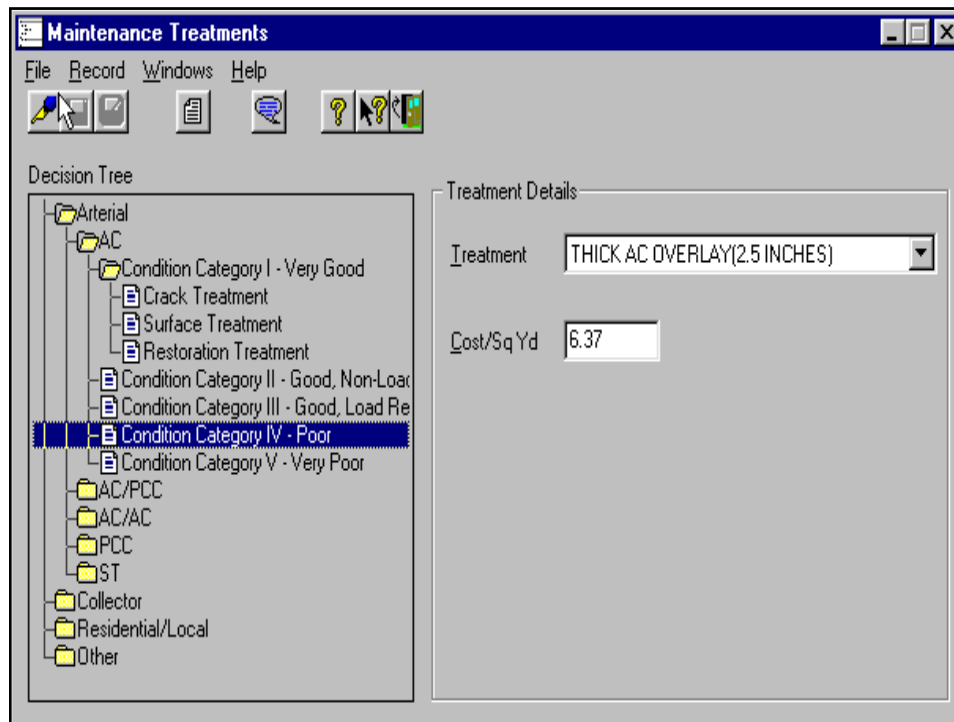


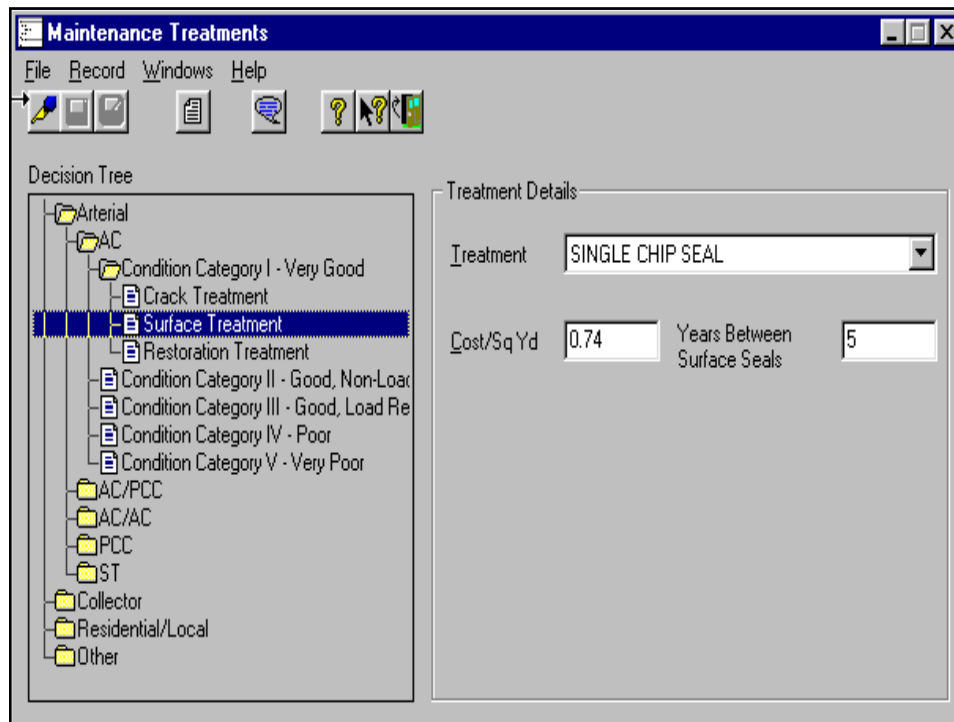
## PM – Time Sequenced



## Each Agency Establishes Decision Tree

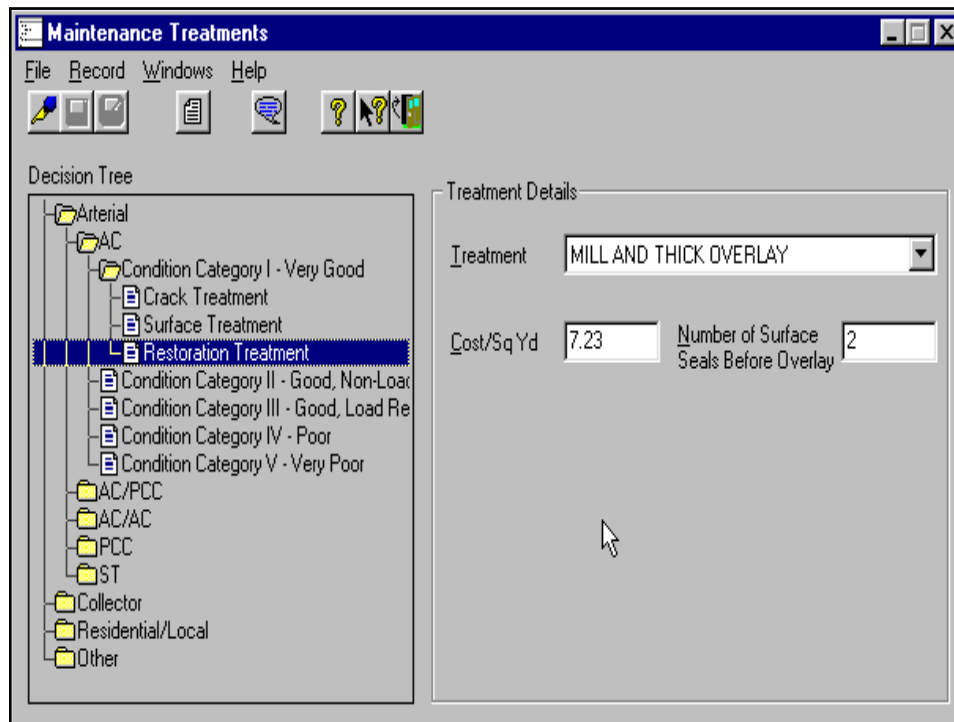






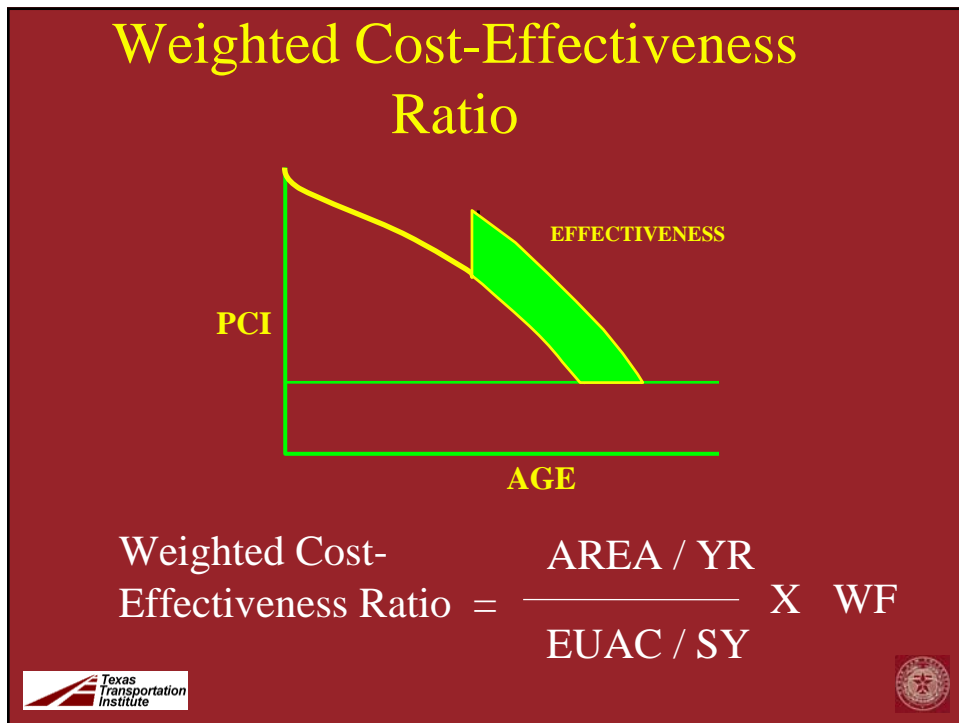
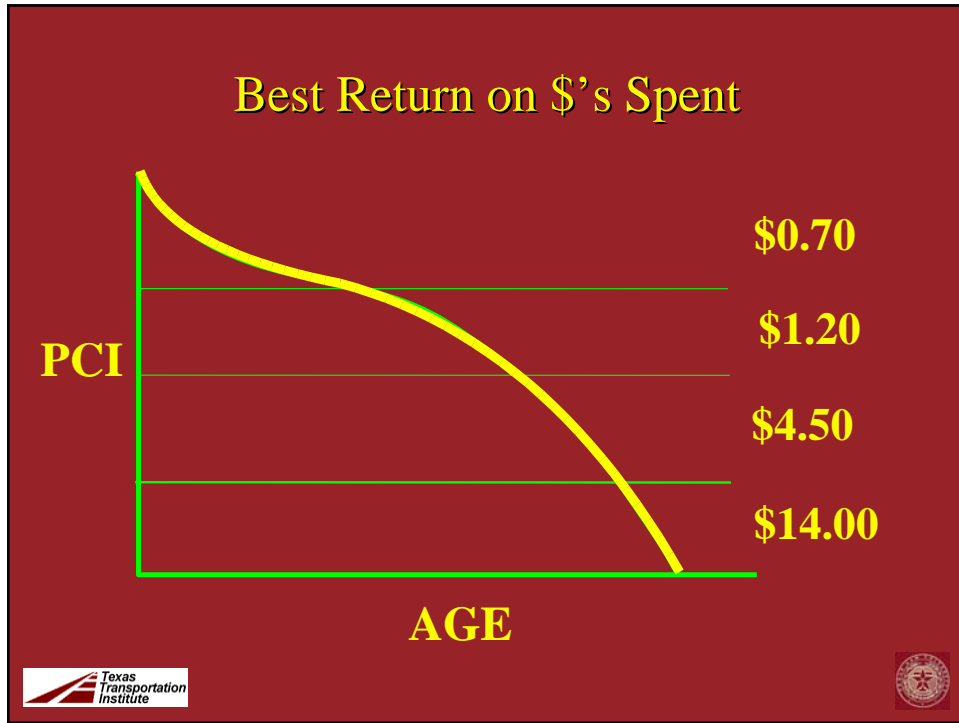
## Maximum Number of Surface Seals

- 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



## 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

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

Scenarios Calculation Wizard - Step 2 of 4



**Budget Dollars**

%      Dollar Amount

Base Budget       Base PM Split       OR     

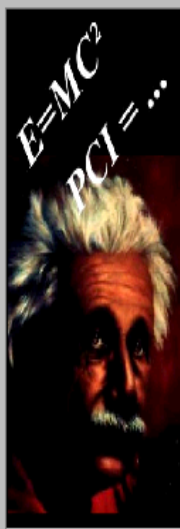
Base Budget Increase Factor      

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

Scenarios Calculation Wizard - Step 2 of 4



**Budget Dollars**

%      Dollar Amount

Base Budget       Base PM Split       OR     

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OR

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?    Exit    Back    **Next**    Finish

## Pavement Preservation & PM

- PM funds can be controlled
  - Increased or decreased



Scenarios Calculation Wizard - Step 2 of 4

**Budget Dollars**

Base Budget  Base PM Split  %  Dollar Amount   
OR  
Base Budget Increase Factor

OR

Year	Budget Amount	PM %	PM Amount
▶ Year 1	\$50,000.00	5	\$0.00
Year 2	\$50,000.00	5	\$0.00
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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 of Funding Alternatives

- Connect PMS to Funding Decisions
- Justify Fund Requests
- Support of Allocation Decisions
  - Fix Worst First
  - Apply PM

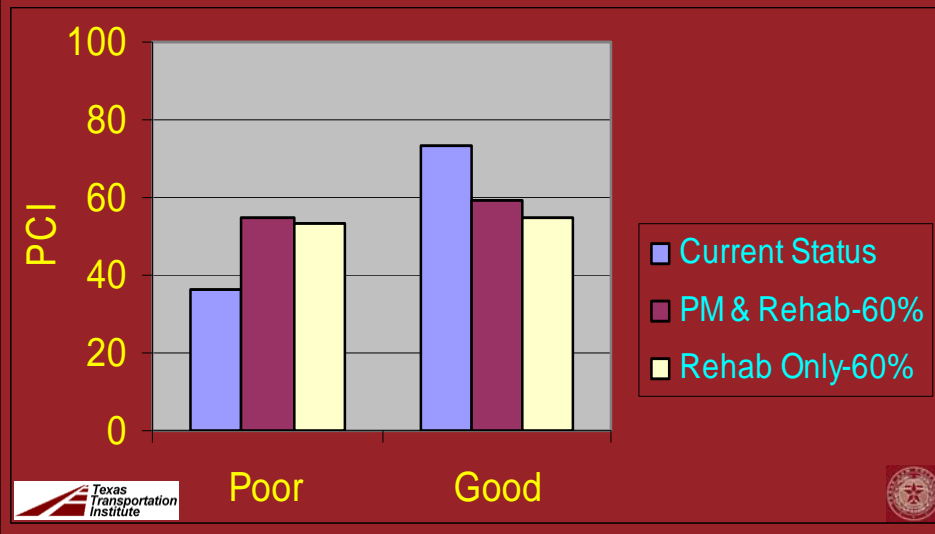


## Impact Analysis

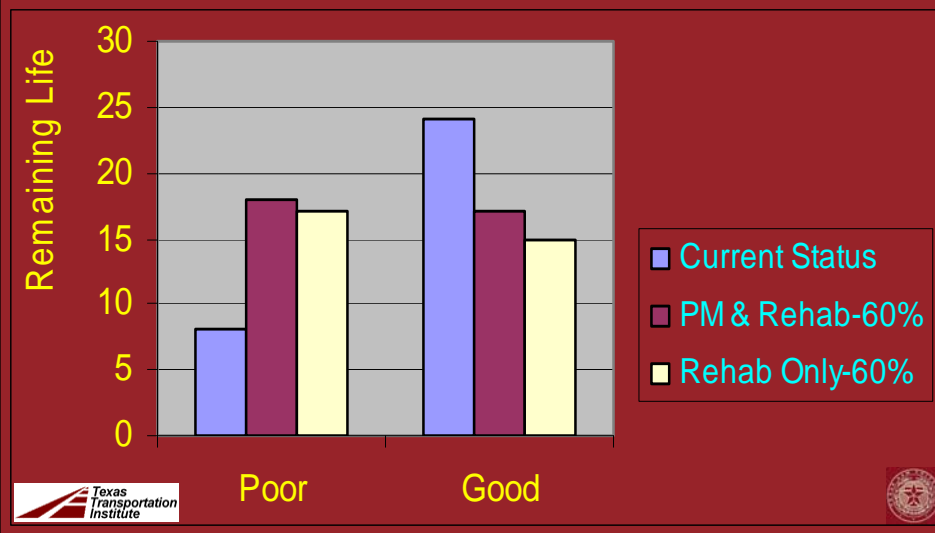
- MUST look long-term for impact of Preventive Maintenance
  - 20+ years (30+ for PCC)



### Compare Results - Future PCI

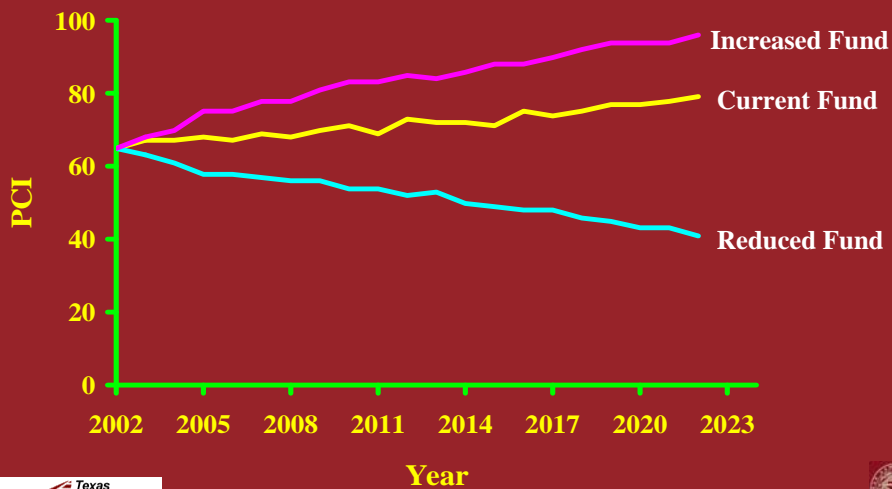


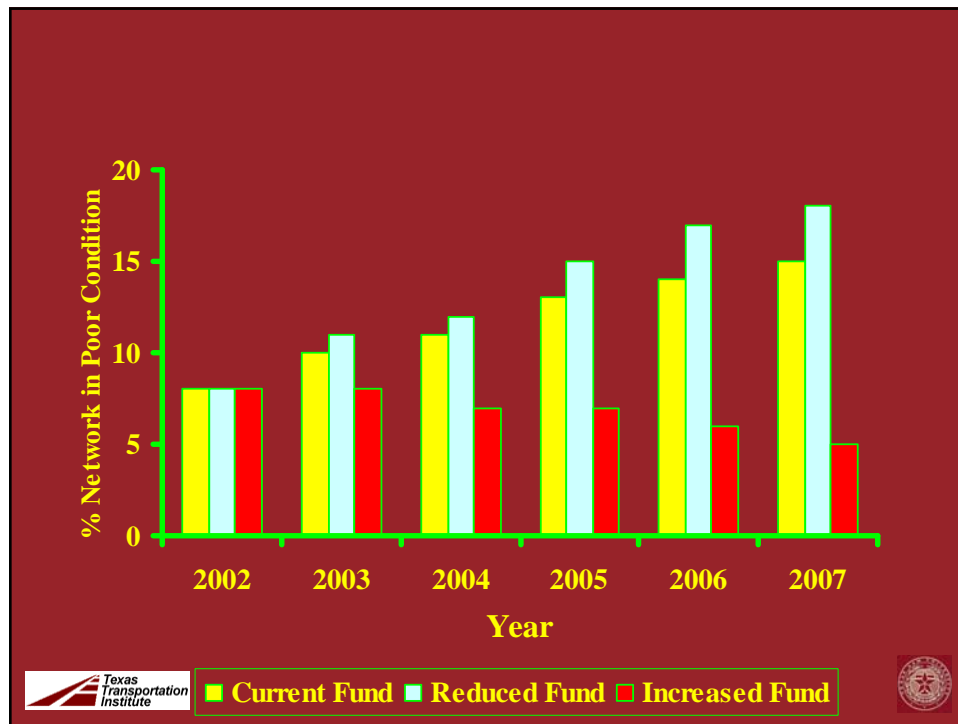
### Compare Projected Remaining Life



## Projected Condition

- How Condition Changes With Alternatives
- May Wish to Use Condition Categories
- Don't Rely Only on Changes in Average PCI





## Other Impacts Calculated

- Funds deferred
- Sections (area) backlogged
- Stop gap fund needs generated
- Remaining life

## Results of Impact Analysis

- Ability to Look at Different Funding Scenarios
  - Different Funding Levels
  - Different Allocation Approaches
  - Different Approaches to Treatment
  
- Answer “What If?”



## Caution

- PMS Does Not Make Decisions
  
- People Make Decisions
  
- User Must Manipulate Data to Produce Graphs



## 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



## Project-Selection Level

- Software used to evaluate results
  - Most work requires staff input
  - Finalize candidate project list
    - » Add & Remove projects
    - » Combine projects
  - Consider constraints - other work
  - Change dates
  - Adjust limits of projects
  - Revise cost estimates



## Upkeep

- Enter Work Completed
- Periodically Re-inspect Sections



## Update For Work Completed

- Computer Does Not Know Work Completed Until Data Entered
- Will Recommend Work on Wrong Projects Unless Data Updated



## Update Inspection Information

- State or GASB Requirements
- Inspect Once Every 2 Years?



## 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



- MTC StreetSaver PMP developed to assist with pavement preservation planning
- Requires agency input
- Requires resources
  - Staff
  - Expertise
  - Funds
  - Data
- StreetSaver minimizes resources required

