Investment Planning for ITS Assets

Prashant Ram and Katie Zimmerman

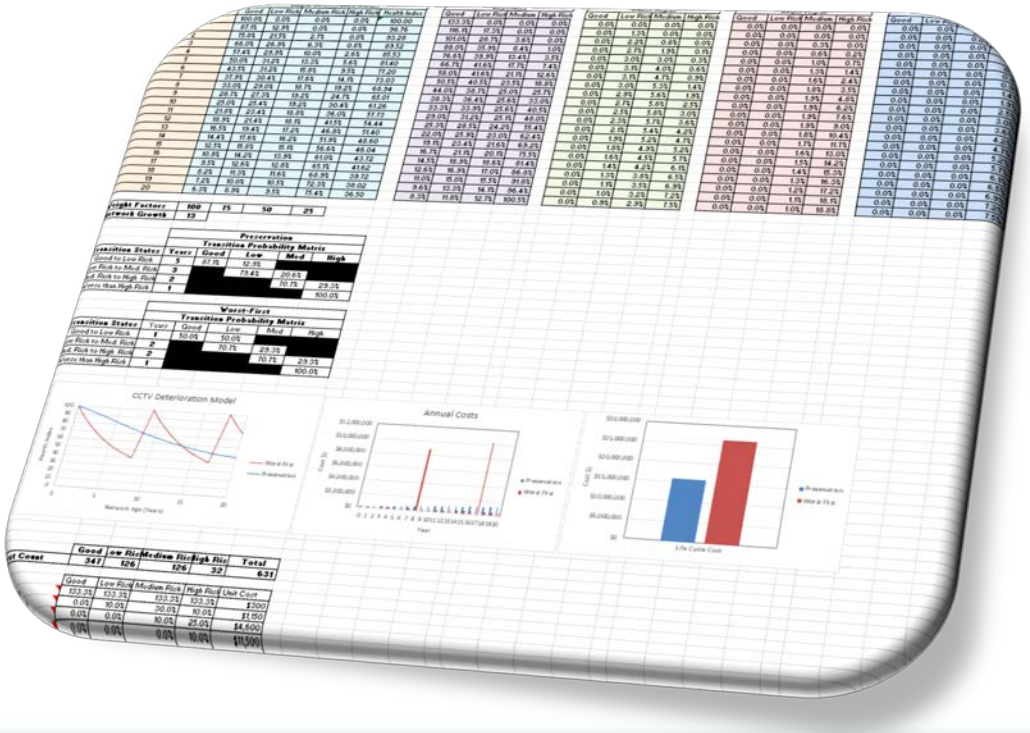
11th National Conference on Transportation Asset Management
July 11, 2016

applied pavement TECHNOLOGY

providing engineering solutions to improve pavement performance

Objective

- Develop a simple spreadsheet-based investment planning tool for Intelligent Transportation System (ITS) assets



ITS Assets Included in Analysis

- Closed-Circuit Television Cameras (CCTV)
- Dynamic Message Signs (DMS)
- Flow Detectors
- Highway Advisory Radio (HAR)
- Ramp Meters
- Road Weather Information System (RWIS)

ITS Investment Approach

Determine initial device conditions

- Good, Low Risk, Medium Risk, and High Risk

(based on expert opinion)

Define general procedures and protocols

- Inspections, minor repairs, and replacement activities
- Unit costs for each activity

Identify appropriate activities

- Best practices for device management
- How activities impact the condition of each device
- Indicate percentage of devices that require annual activities

Determine maintenance and repair activities

- Simple, expert-judgement based deterioration models
- Indicate level of investment needed to maintain current level-of-service over the next 10-year period

Condition Rating

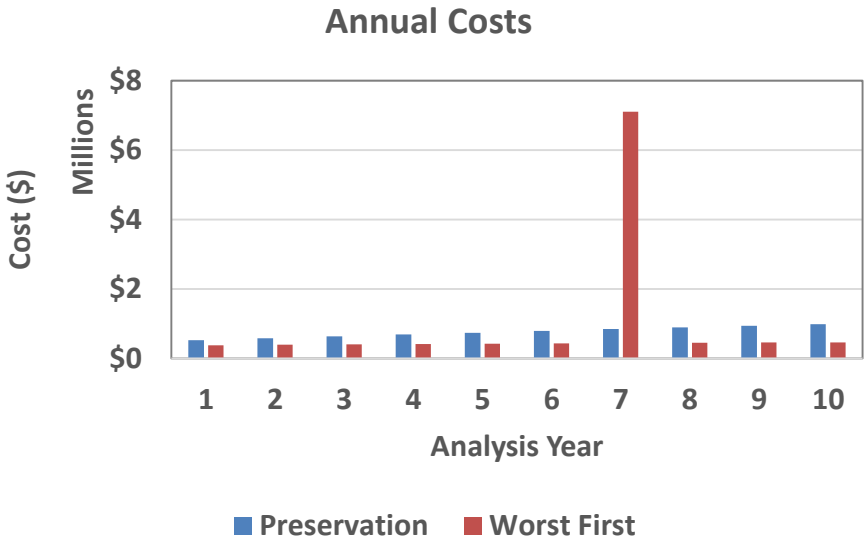
Condition Category	Condition Description
Good	Age of the device is less than 80 percent of the manufacturers' recommended service life.
Low Risk	Age of the device is between 80 and 100 percent of the manufacturers' recommended service life.
Medium Risk	Age of the device is between 100 and 125 percent of the manufacturers' recommended service life.
High Risk	Age of the device is greater than 125 percent of the manufacturers' recommended service life.

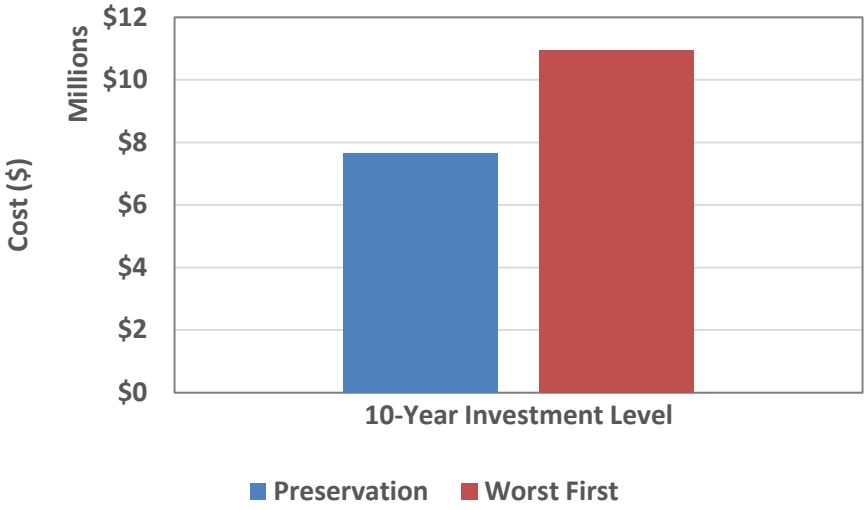
Life-Cycle Performance Modeling

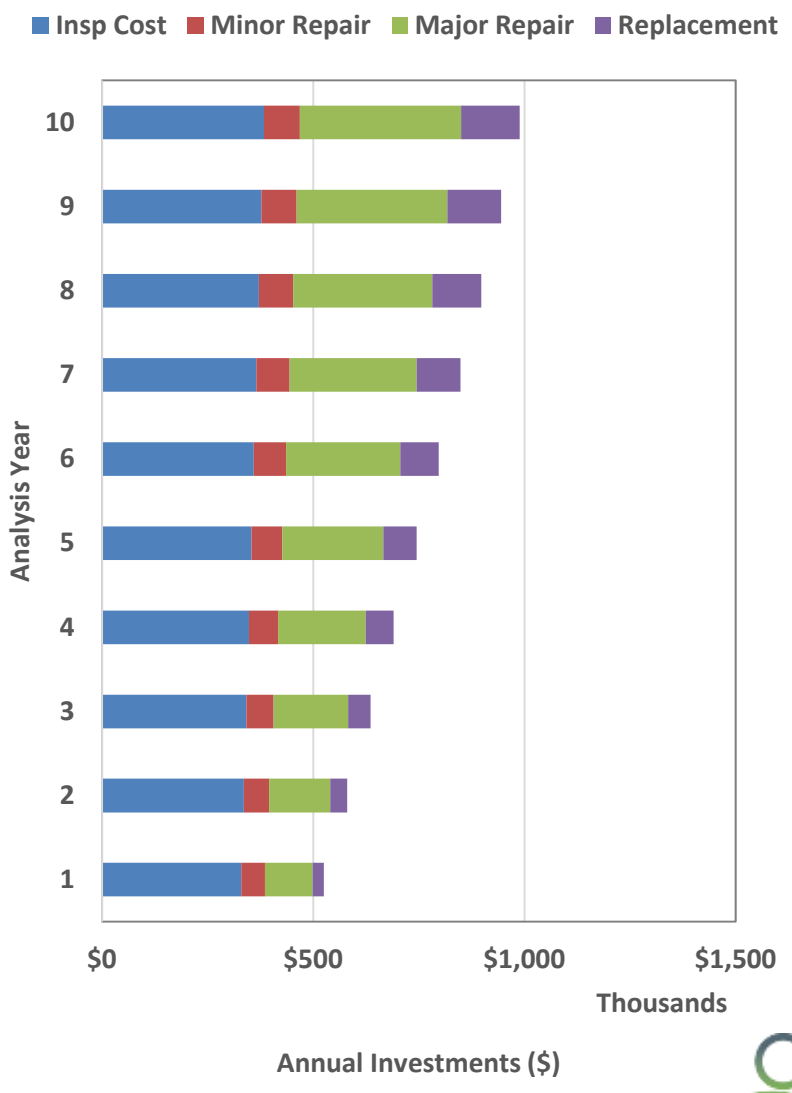
- Based on Markov Models using input from experts
  - Time required for device to deteriorate from one condition state to another
- Maintenance activity impact matrix:

Current Condition	Resulting Condition After:			
	Inspection	Minor Repair	Major Repair	Replacement
Good	Good			
Low Risk	Low Risk	Good		
Medium Risk	Medium Risk	Medium Risk	Low Risk	
High Risk	High Risk	High Risk	Medium Risk	Good

Tool Outputs







Concluding Remarks

- A simple network-level budget planning tool to help agencies determine future investment needs
- Inputs can be customized based on agency preferences
  - Performance models
  - Growth rate
  - Cost
  - Amount and type of maintenance
- Impact of different maintenance strategies can be compared

Thank You!