Forecasting Structural Deterioration

"Use of FWD in PMS"

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Presentation Outline

- Introduction
- Data Collection
- Methods of Evaluation
- Take Aways
- Questions

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Acknowledgements

Virginia Department of Transportation, District 5

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Introduction

- VDOT District 5 – Hampton Roads (includes Norfolk)
- Objective to improve pavement management practices on interstate pavements
- Identify roadways that are structurally deficient before they begin deterioration

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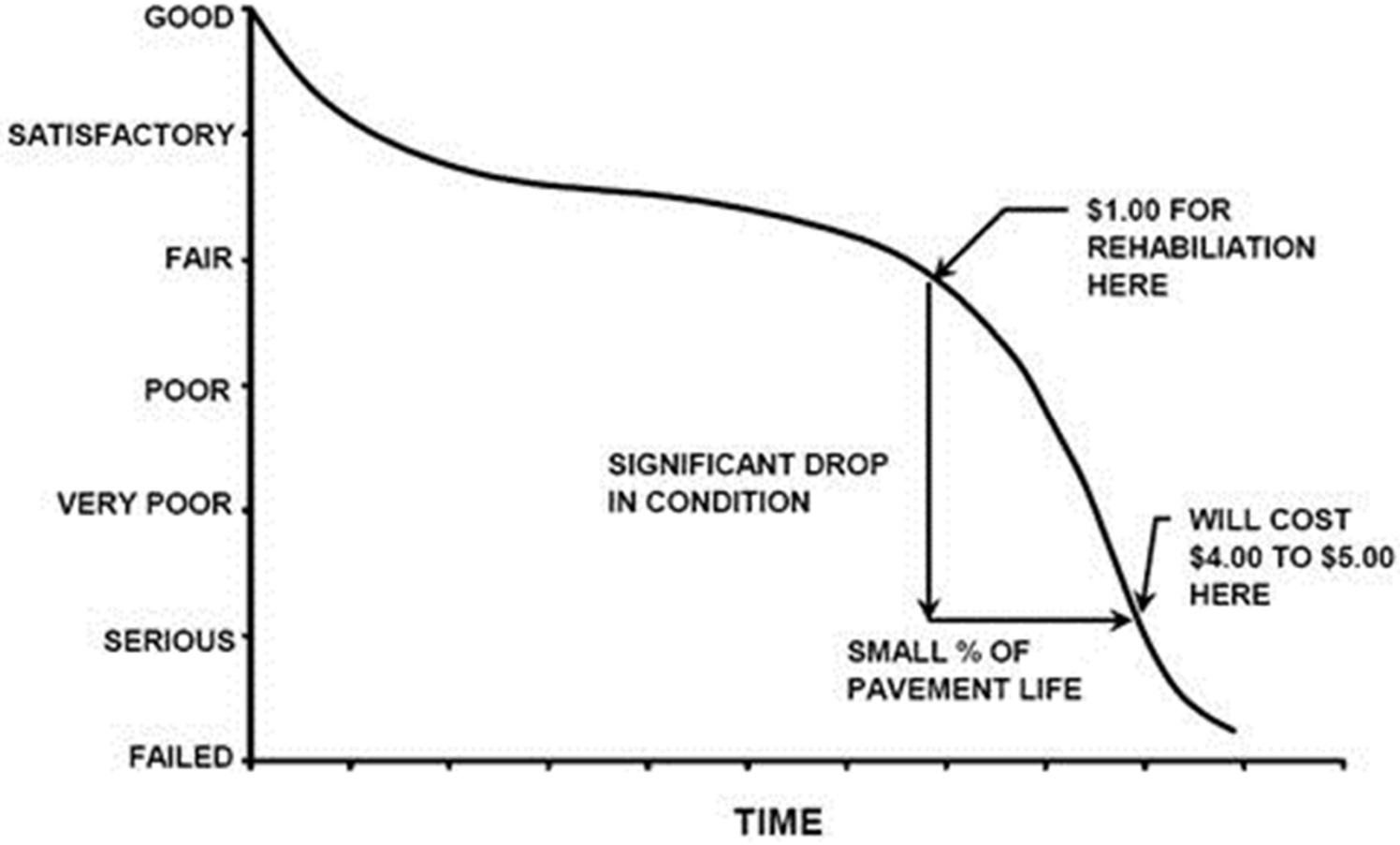
Condition "Forecasting"



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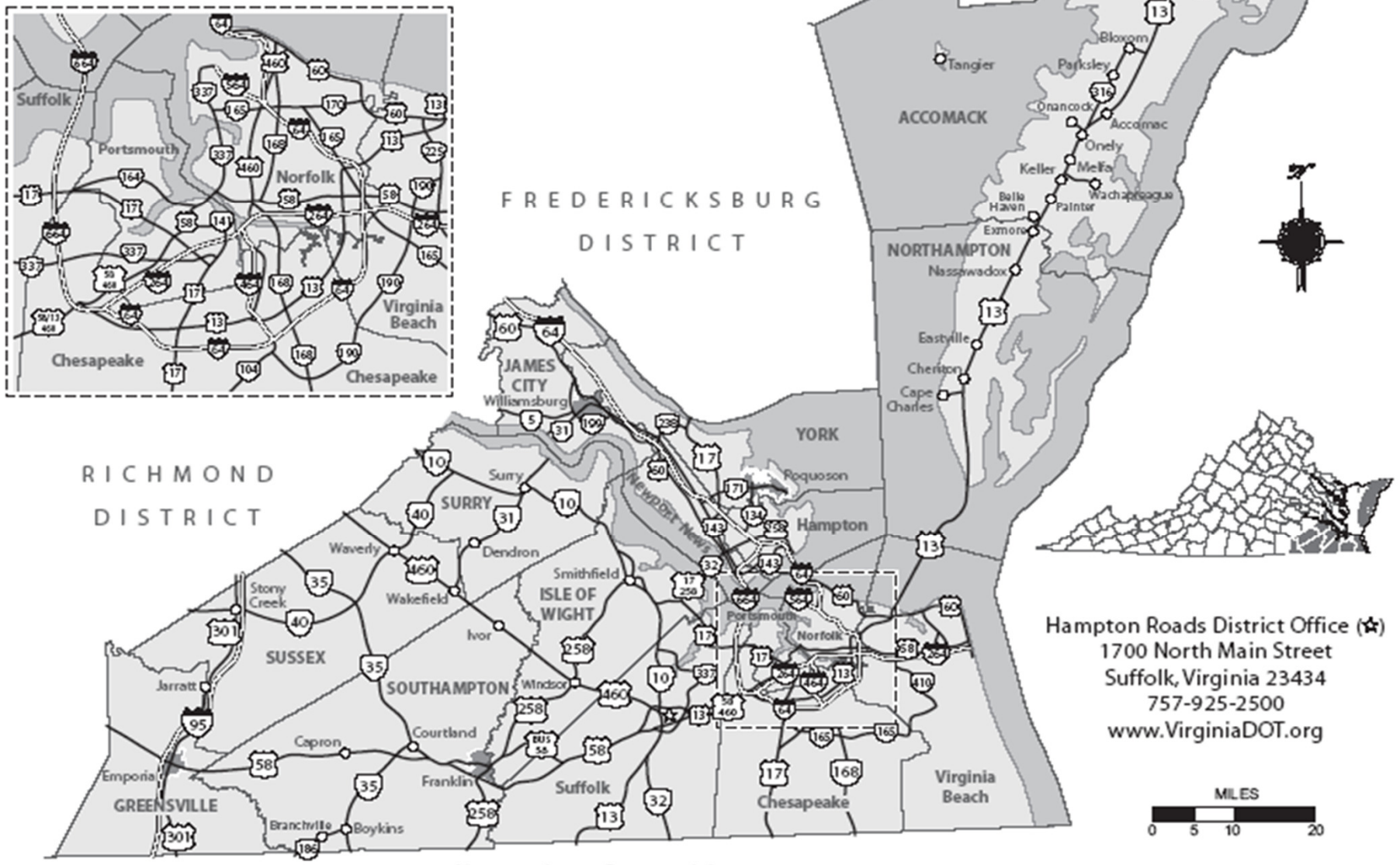
Virginia Department of Transportation
HAMPTON ROADS DISTRICT



Data Collection

- ~314 directional miles of Interstate Freeway
- Includes AC, ACP, CRC, and JCP
- FWD collected at 0.2-mile intervals
- 2 drops at 3 load levels
- Condition data
- Ride quality data

Data Analysis Approaches

- Remaining Life (AASHTO ’93 Guide)
- Structural Strength Index (TTI)
- Effective Structural Number versus As-built Structural Number (AASHTO ’93 Guide)
- Area Method (Everseries Users Guide)

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Structural Number Comparison

- Effective Structural Number from FWD data (SN_{eff})
- As-built Structural Number based on in-place pavement structure (SN_o)
- SN_{eff} / SN_o < 90% recommended for structural improvement
- HMA pavements only

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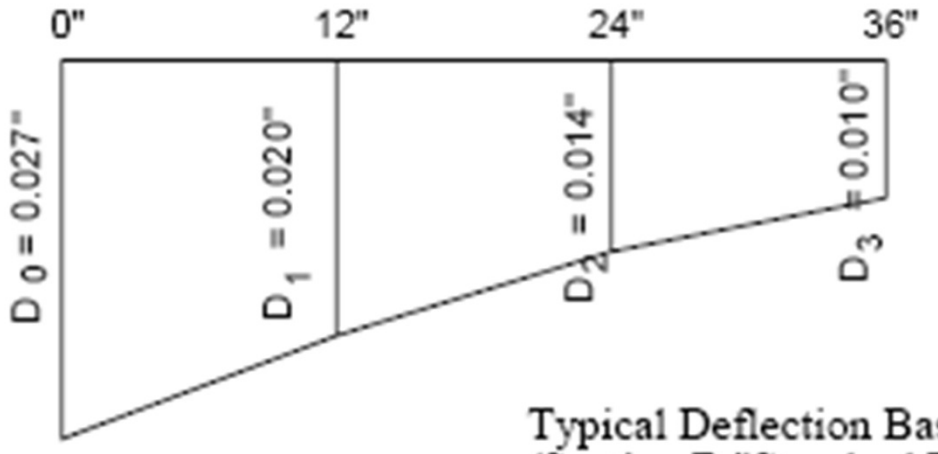
Area Method

- Concrete pavements (including ACP)
- Area under deflection basin



Typical Deflection Basin
(Section B "Standard Pavement")

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Evaluation Using Area

FWD Based Parameter		Generalized Conclusions
Area	**Deflection Under Load Plate**	
Low	Low	Weak structure, strong subgrade
Low	High	Weak structure, weak subgrade
High	Low	Strong structure, strong subgrade
High	High	Strong structure, weak subgrade

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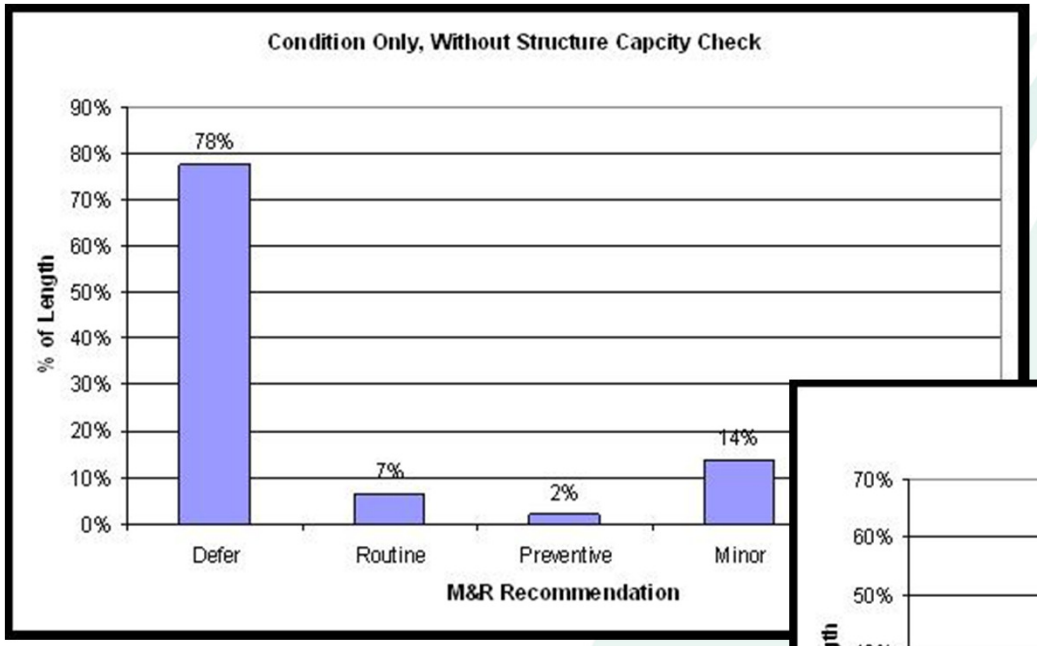
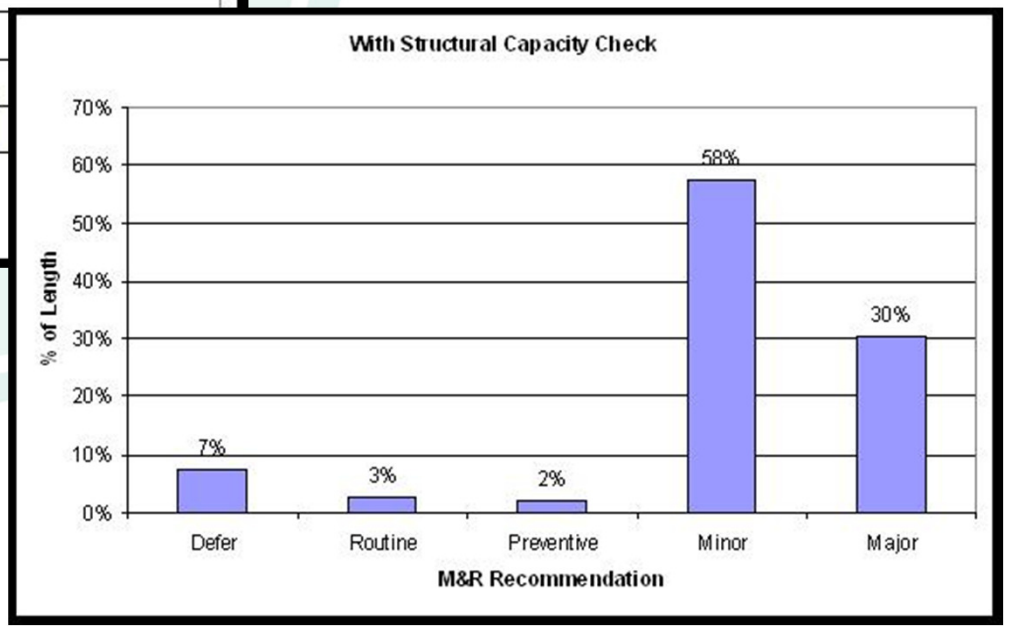
AC Segments





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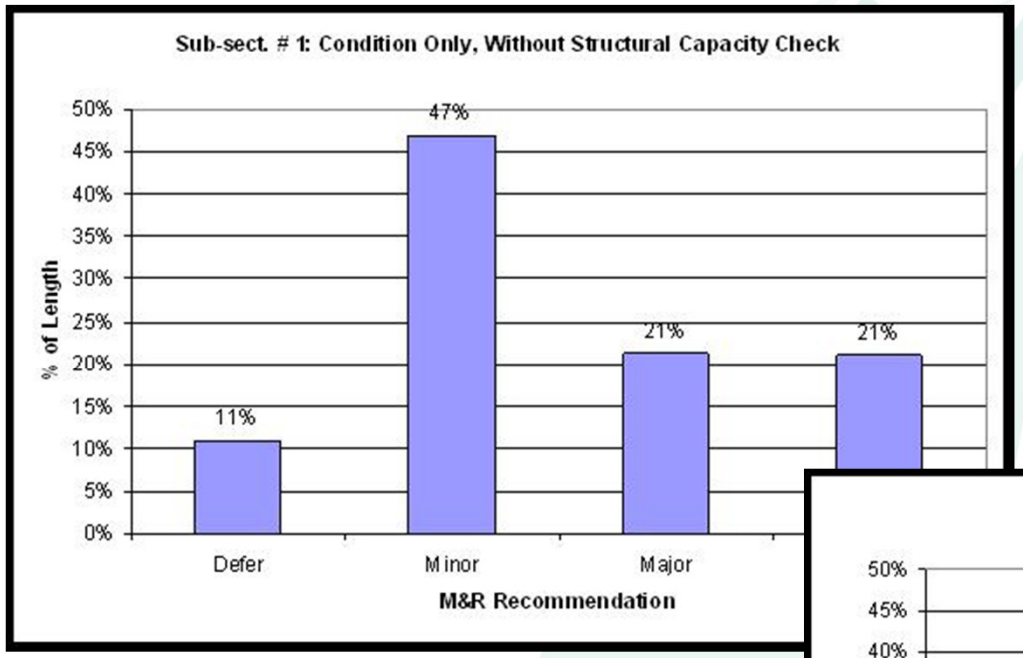
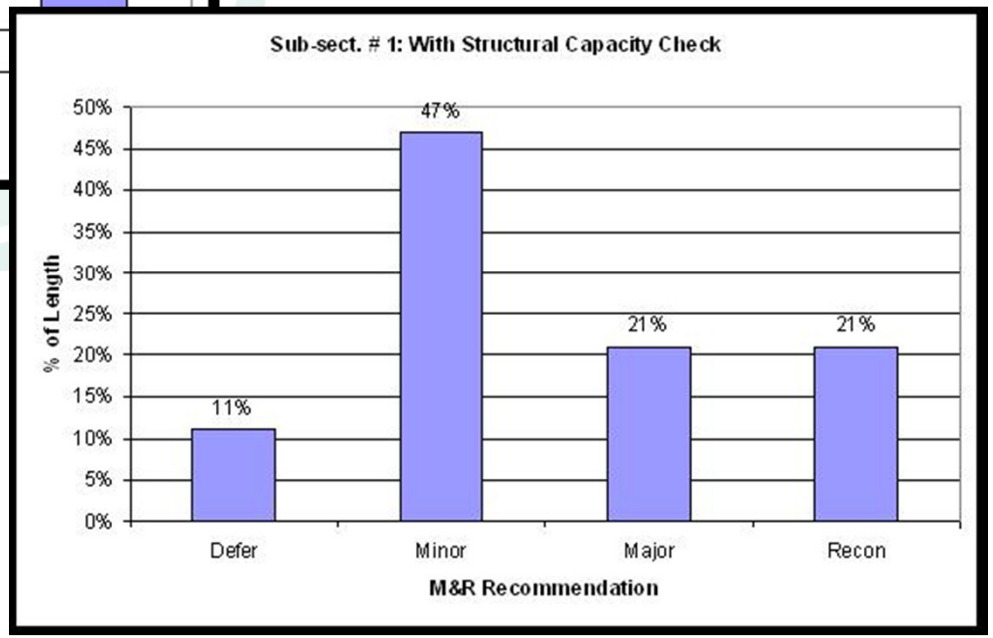
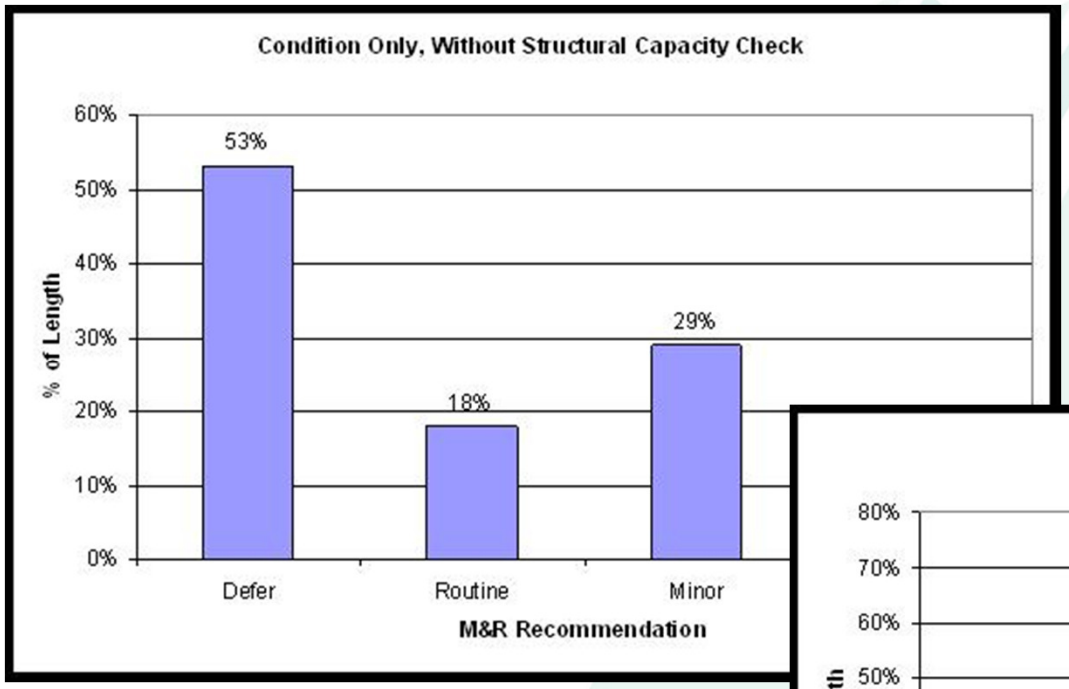
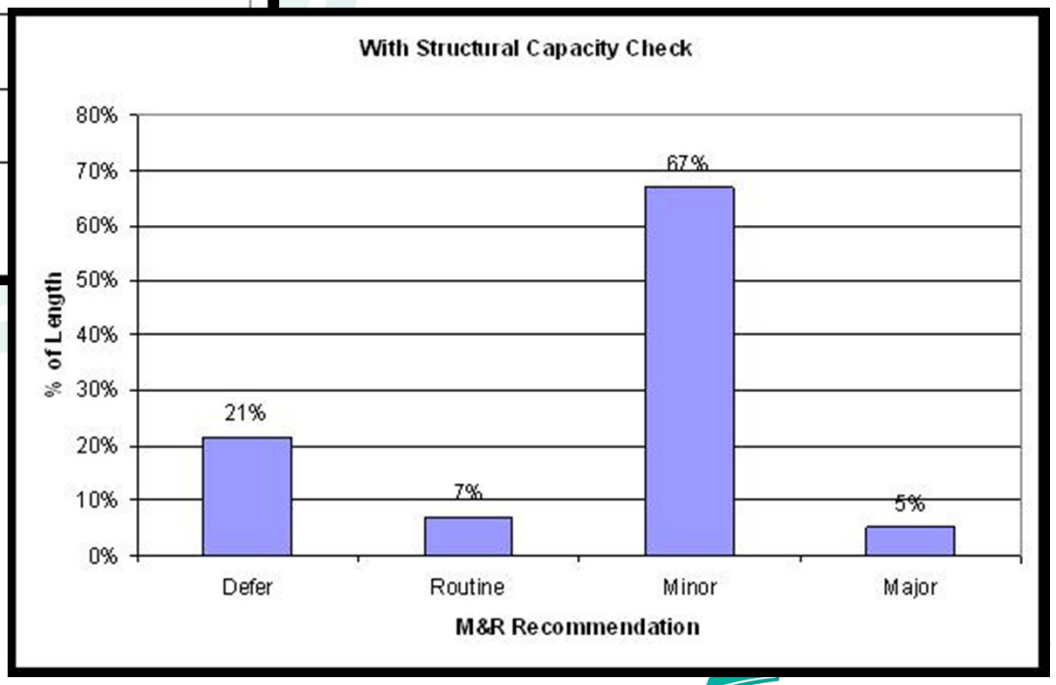
CRCP Segments



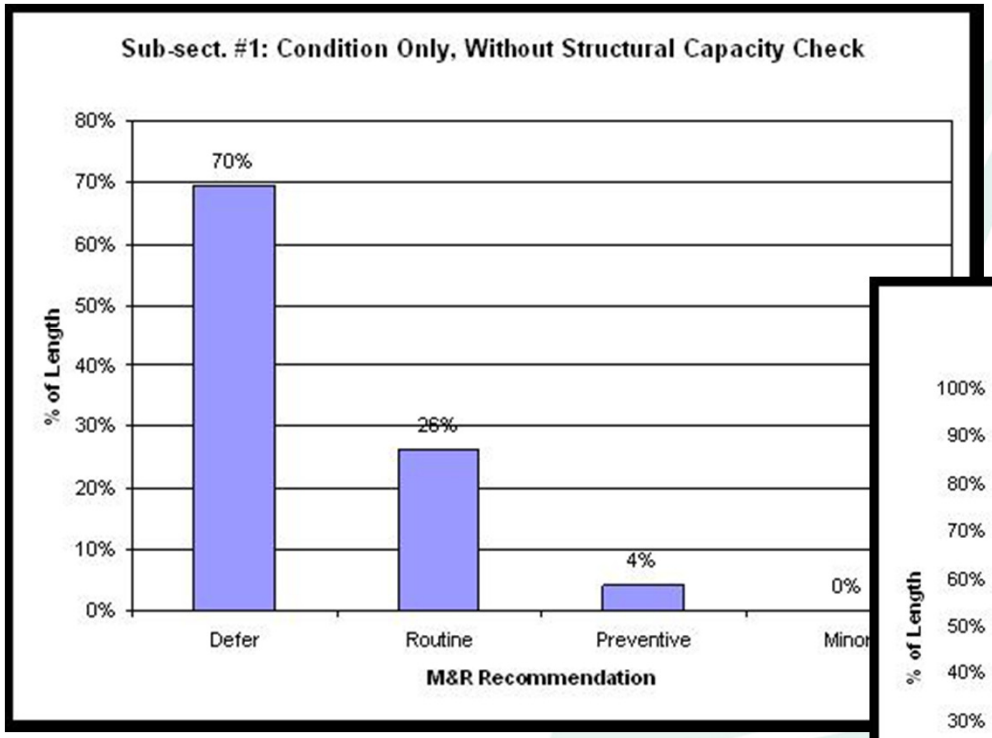


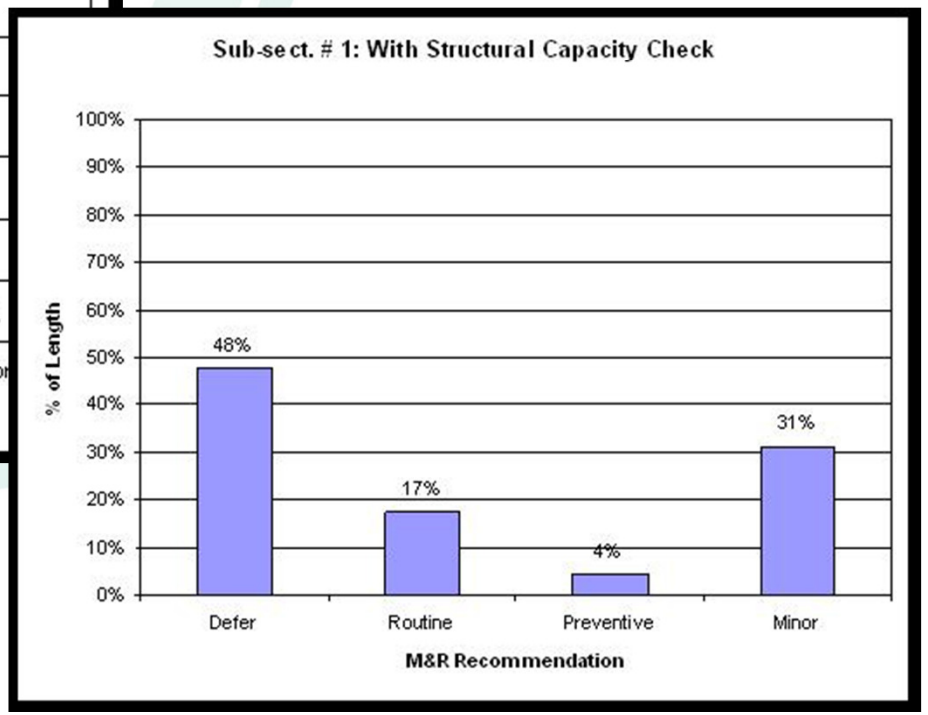
JCP Segments





APC Segments





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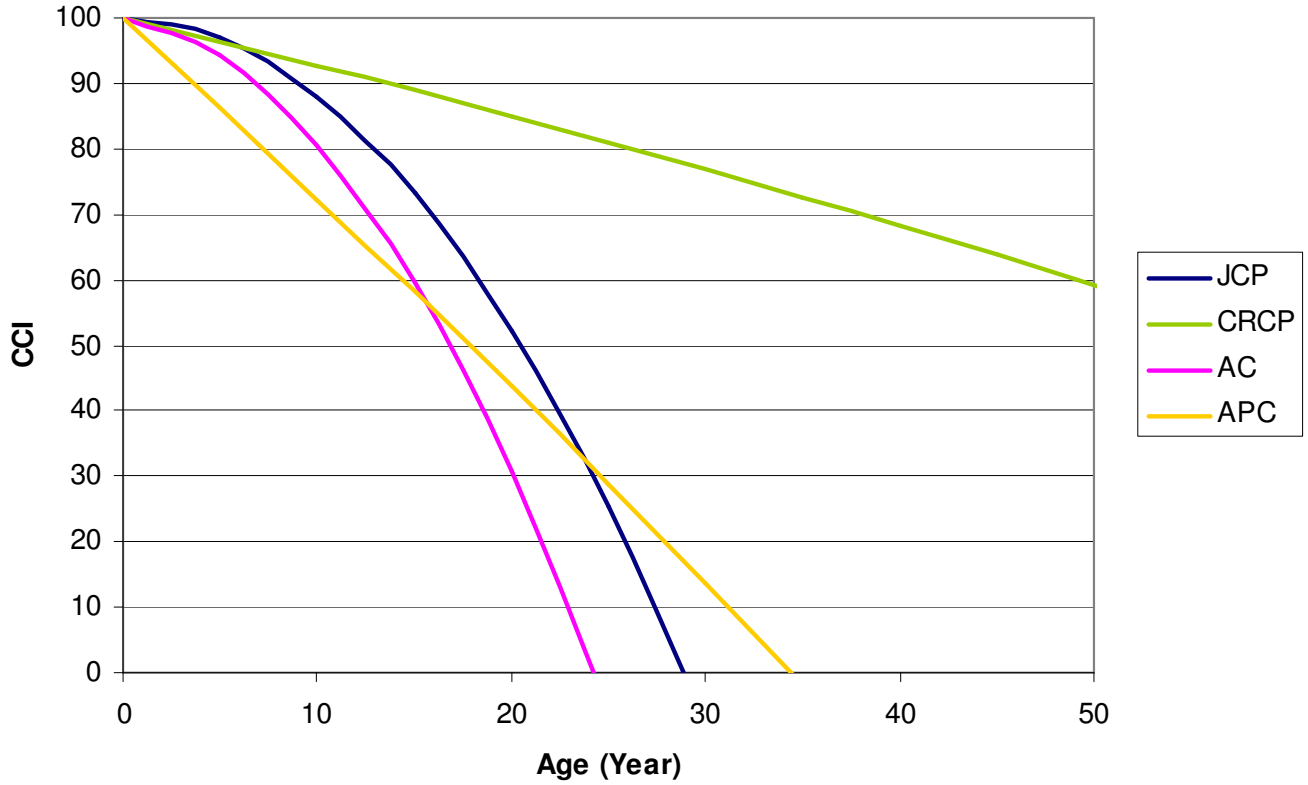
Structural Deterioration Curves



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Take Aways

- Condition and structural analysis check needed for effective PMS
- Structural analysis identified sections in need of strengthening prior to onset of heavy distress
- There is no suitable method for forecasting structural integrity
- Use of structural response in PMS will be limited unless solved

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- Questions??
- Discussion??

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