Strategic Highway Research Program 2 Project R26

Pavement Preservation on High-Traffic Volume Roadways

2009 Midwestern Pavement Preservation Partnership Conference

October 28, 2009

Schaumburg, Illinois

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Presentation Overview

- Project overview
- Accomplishments
- Remaining work
- Anticipated products
- Discussion

Project Overview

- Use of pavement preservation is growing
- Use on high-traffic roads is not widely accepted and is poorly documented
- Formal guidelines being developed by many agencies do not include higher ADTs

Project Objectives

- Develop preventive maintenance guidelines for high-traffic volume roads
- Identify promising preventive maintenance strategies for high-traffic volume roads
- Recommend further research opportunities

Project Team

- Principal Investigator: David Peshkin, APTech, Inc.
- Angie Wolters/Kelly Smith/James Krstulovich, APTech, Inc.
- Jim Moulthrop/Cesar Alvarado, Fugro Consultants, Inc.
- Consultants: Gerry Eller, Gary Hicks, and Dean Testa

James Bryant, Ph.D., P.E., SHRP2 Program Director

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Research Approach: Tasks

- Phase I
  - Task 1: Research, survey state of practice
  - Task 2: Develop criteria to identify best practices
  - Task 3: Submit Interim Report
- Phase II
  - Identify factors affecting treatment use
  - Develop draft and final guidelines
  - Prepare draft and final report

Research Approach: Activities

- Literature review
- Comprehensive survey of practice
- Direct contacts with industry, other agencies

Accomplishments

- Completed literature review
- Summarized state of practice through use of survey
- Developed criteria for preservation best practices
- Completed draft guidelines
- Completed draft final report

Literature Review

- Most preservation occurs on low volume roads (with varying definitions of “low”)
- Concerns on high volume roads include durability, performance, negative public perception
- Risk is also likely a concern

Survey Results

- Sought information on
  - Defining "high"
  - Successful and potential successful treatments
  - Challenges and solutions
- Distributed to 50 SHAs, Canadian Provinces, cities, international practitioners, and industry reps
- Responses from 40 SHAs, 7 Provinces, and 3 cities, as well as industry

High-Traffic Categories

Green — Low (<10,000)

Yellow — Medium (10,000-19,999)

Red — High (≥20,000)

Rural High-Volume Limits

Urban High-Volume Limits

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Did not answer

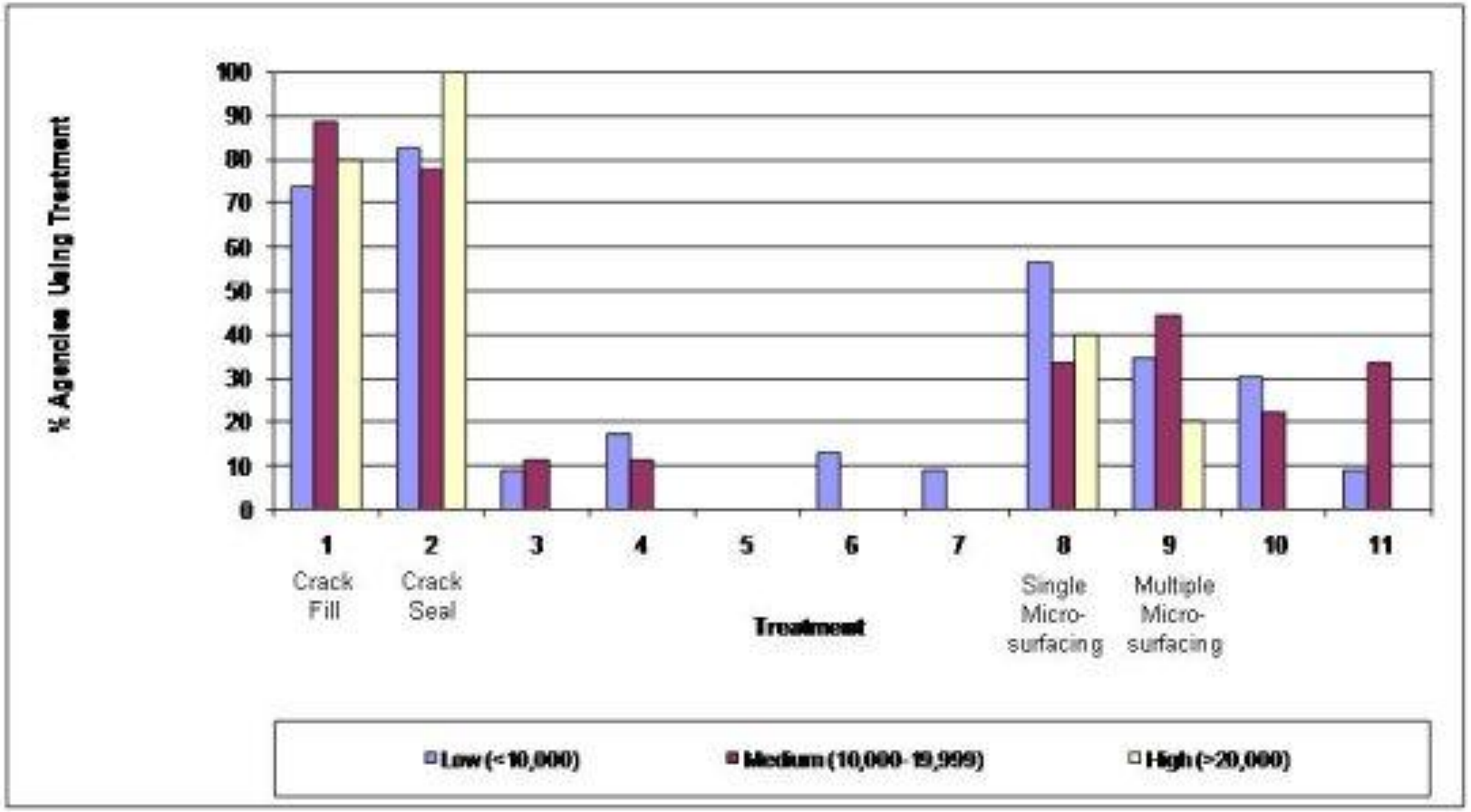
Did not return survey

HMA Treatments

1	Crack Fill
2	Crack Seal
3	Cape Seal
4	Fog Seal
5	Scrub Seal
6	Slurry Seal
7	Rejuvenators
8	Single Course Microsurfacing
9	Multi. Course Microsurfacing
10	Single Course Chip Seal
11	Multi. Course Chip Seal

12	Chip Seal w/ Modified Binder
13	Thin Bonded Wearing Course
14	Thin HMA Overlay
15	Cold Milling and HMA Overlay
16	Ultrathin HMA Overlay
17	Hot In-Place Recycling
18	Cold In-Place Recycling
19	Profile Milling
20	Ultrathin Whitetopping
21	Drainage Preservation
22	Other

Treatment Use – HMA Rural



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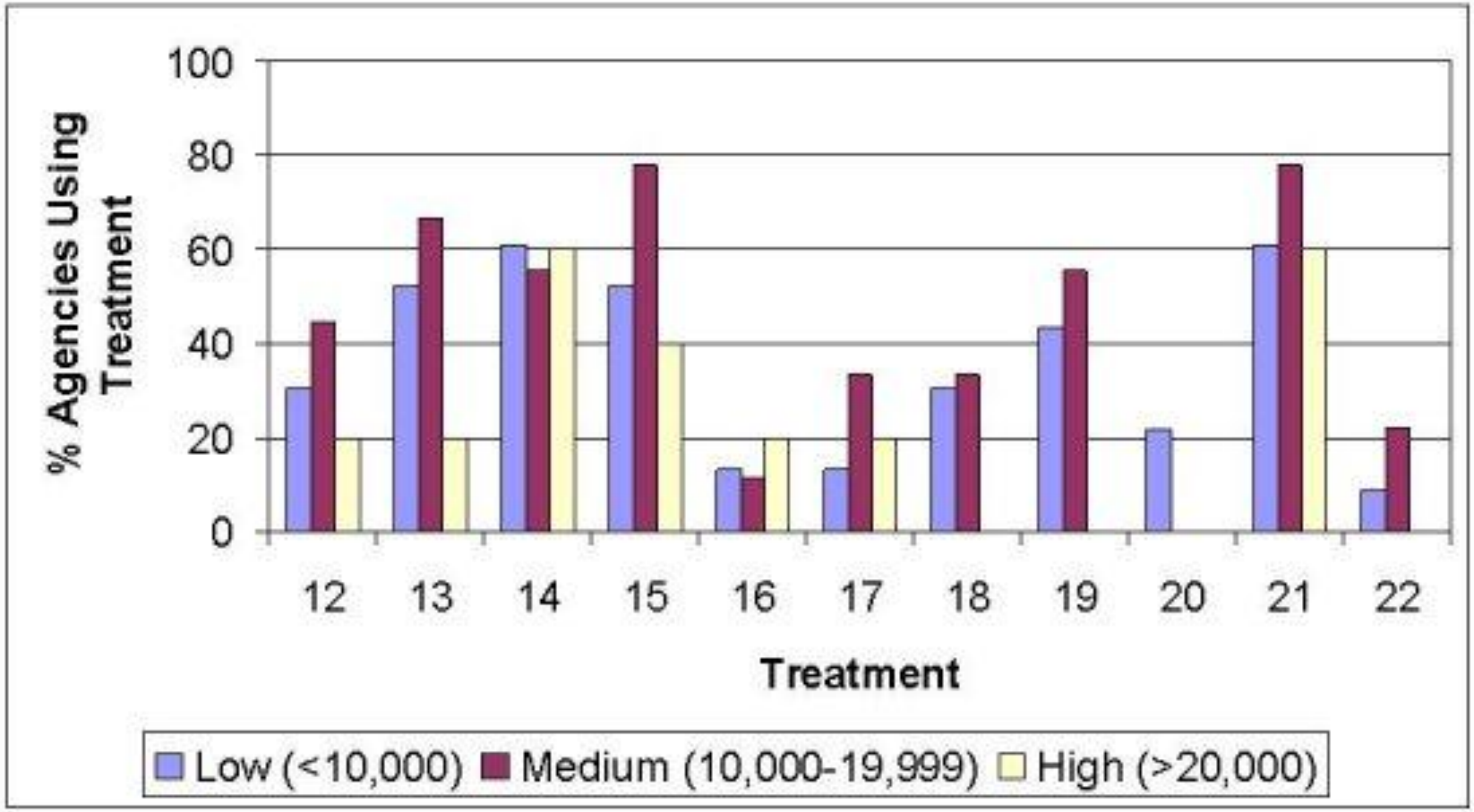
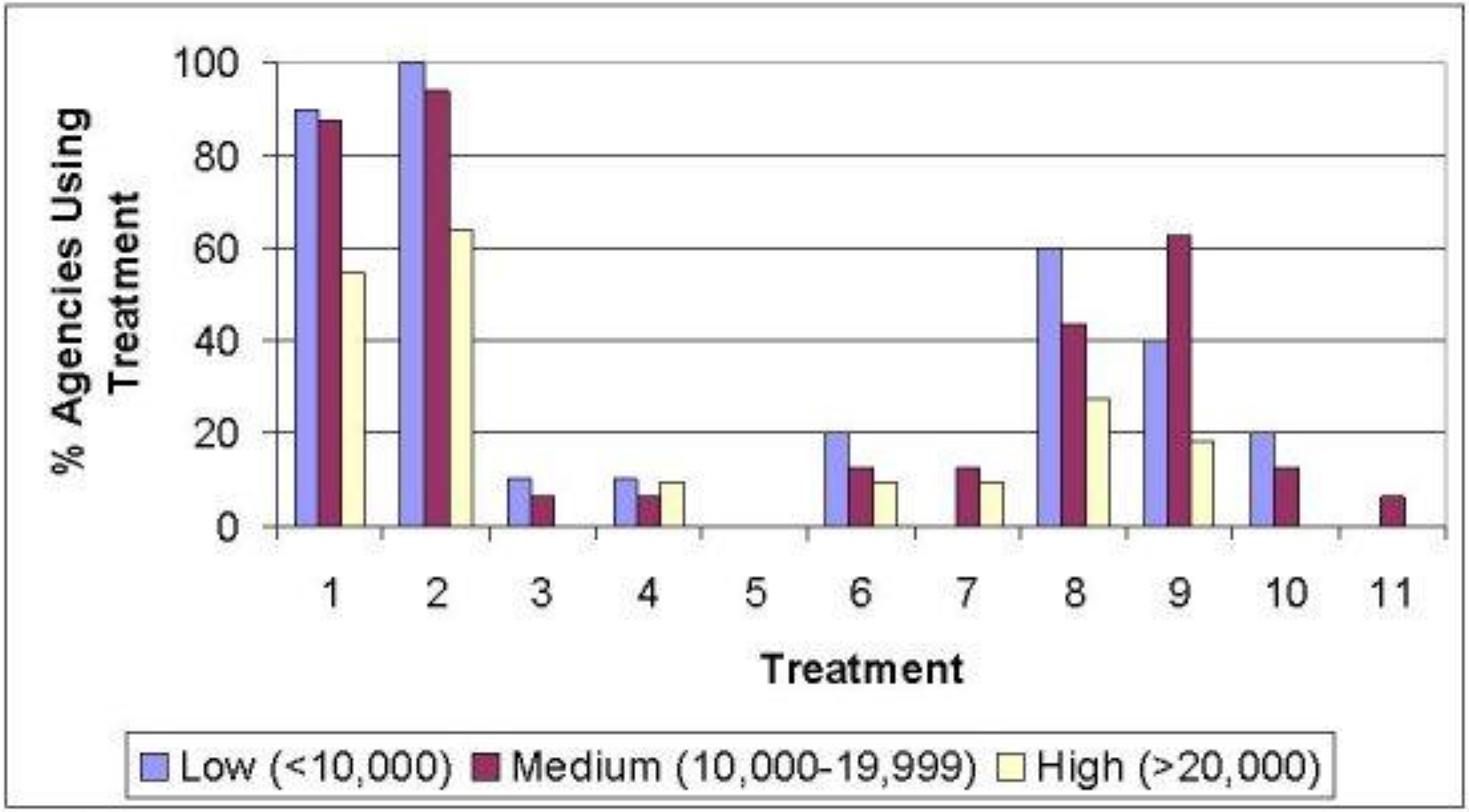
Treatment Use – HMA Rural



Treatment Use – HMA Urban



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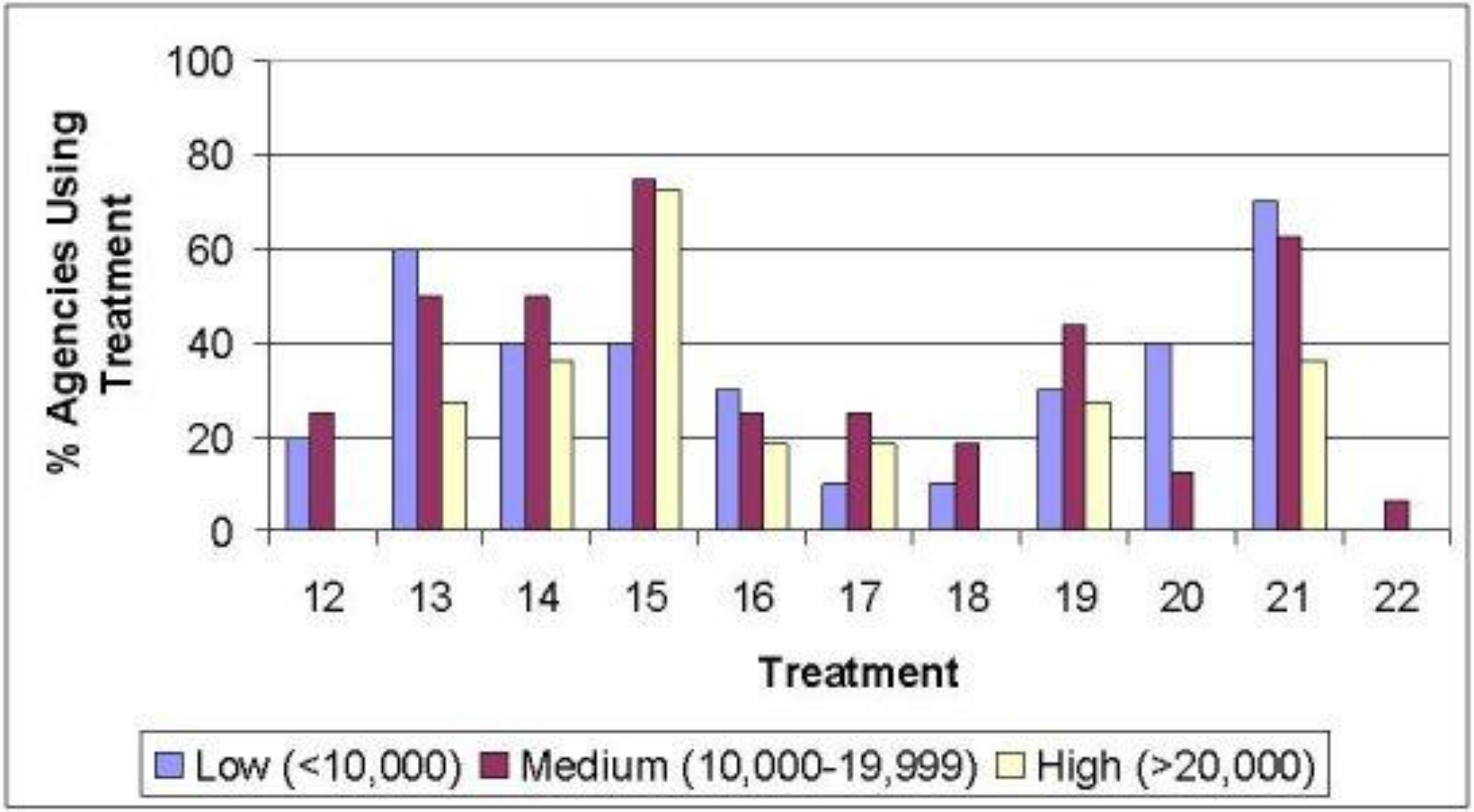
Treatment Use – HMA Urban



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"High" Traffic (≥ 20,000 ADT)

Widely used HMA treatments

- Crack Seal
- Crack Fill
- Drainage Preservation

HMA treatments with limited use

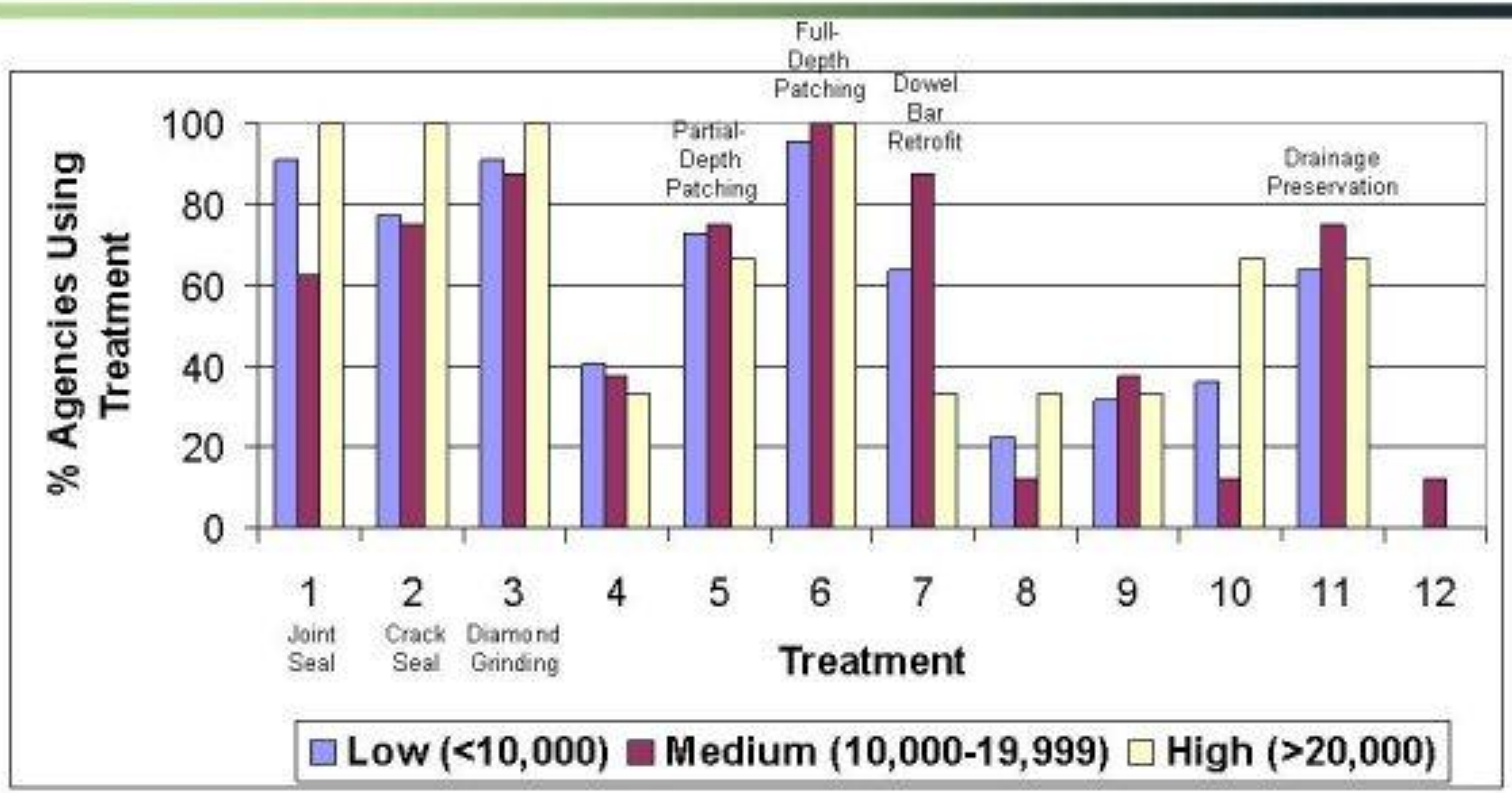
- Cape seal, scrub seal, chip seals, CIR, ultra-thin whitetopping

PCC Treatments

1	Joint Seal
2	Crack Seal
3	Diamond Grinding
4	Diamond Grooving
5	Partial-Depth Patching
6	Full-Depth Patching

7	Dowel Bar Retrofit
8	Thin PCC Overlay
9	Thin Bonded Wearing Course
10	Thin HMA Overlay
11	Drainage Preservation
12	Other

Treatment Use – PCC Rural



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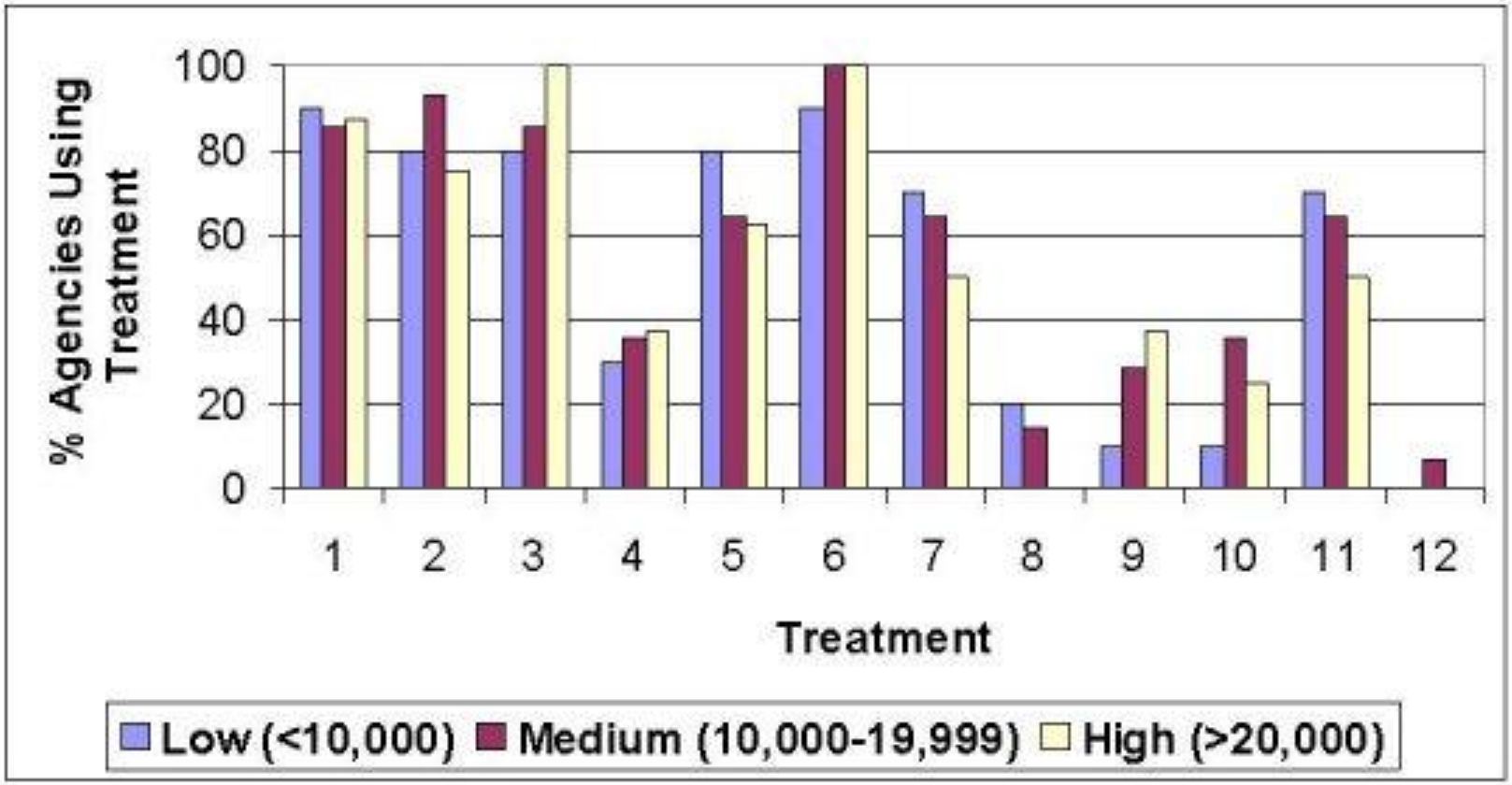
Treatment Use – PCC Urban



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"High" Traffic (≥ 20,000 ADT)

Widely used PCC treatments

- Joint Seal
- Diamond Grinding
- Full-Depth Patching

PCC treatments with limited use

- Diamond grooving, thin bonded wearing course, thin HMA or PCC overlay

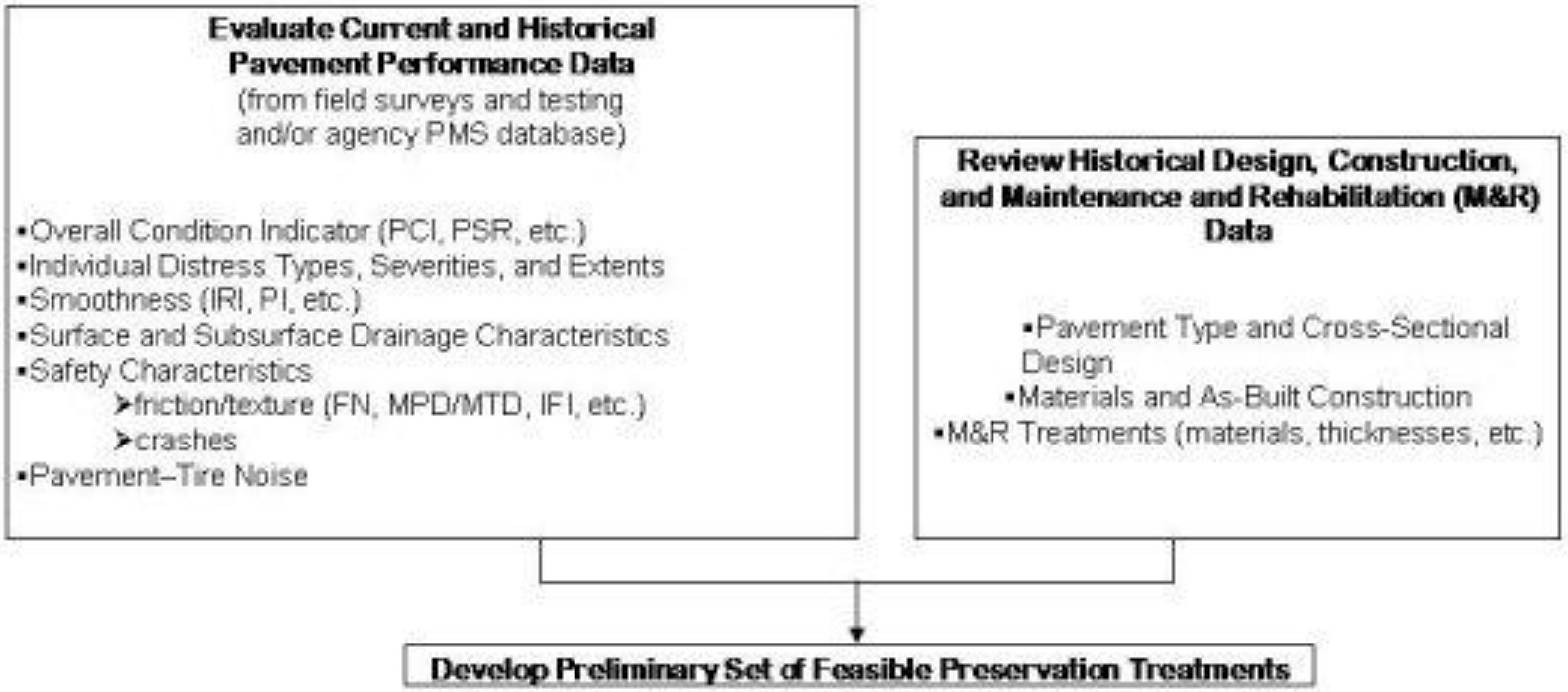
Decision Criteria

- Traffic levels
- Pavement condition
- Climate/environment
- Available work hours
- Expected performance
- Costs

Guidelines

- Discussion of decision criteria
- Detailed information on treatments
- Flow of decision process
- Treatment feasibility matrices

Flow of Decision Process, part 1



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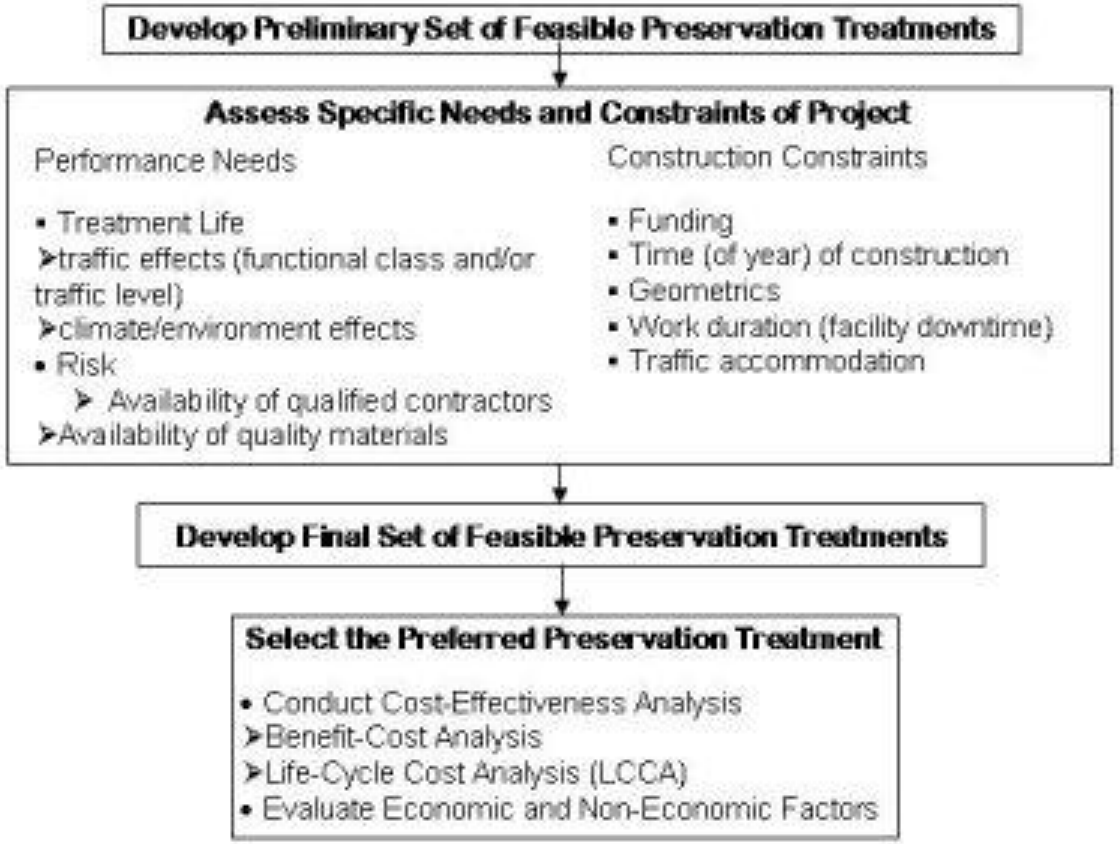
Flow of Decision Process, part 2



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Example Treatment Matrix

Preservation Treatment	Window of Opportunity		Distress Types and Severities									Surface Characteristics Issues		
			Surface Distress			Joint Distress		Cracking Distress		Deformation Distress				
			Polish	Map Crack/ Scale	D-Crack	Joint Seal Damage	Joint Spall	Corner	Long/ Trans	Faulting	Patches	Ride Quality	Friction	Noise
	PCI	Age, yrs	—	—	L/M/H	L/M/H	L/M/H	L/M/H	L/M/H	L/M/H	L/M/H	—	—	—
Concrete Joint Resealing	75-90	5-10				○◉●	○××							
Concrete Crack Sealing	70-90	5-12						●◉○	●◉○					
Diamond Grinding	70-90	5-12	●	◉	×××	×××	×××	×××	××○	◉●◉	◉●◉	●	◉	●
Diamond Grooving	70-90	5-12	○	×	×××	×××	×××	×××	×××	×××	×××	×	○	●
Partial-depth Concrete Patching	65-85	6-15	×	○	×××	×××	◉●●	×××	×○◉	×××	○◉○	×	×	×
Full-depth Concrete Patching	65-85	6-15	×	○	○◉●	×××	×○◉	◉●●	××○	×○◉	○◉●	◉	×	×
Load Transfer Restoration	65-85	6-15	×	×	×××	×××	×××	×○○	×××	○◉●	×××	×	×	×
Thin Bonded Wearing Course	70-90	5-12	◉	●	◉○×	×××	×××	○××	○◉○	○◉○	◉●◉	●	●	◉
Thin HMA Overlay	70-90	5-12	◉	●	◉○×	×××	×××	○××	○◉○	○◉○	◉●◉	●	●	●

● Highly Recommended ◉ Generally Recommended ○ Provisionally Recommended × Not Recommended

[a] May be appropriate in conjunction with partial- and/or full-depth repairs to ensure smooth profile.

[b] Likely needed in conjunction with diamond grinding.

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Current Status and Remaining Work

- Submitted Draft Guidelines and Draft Report to SHRP 2
- Awaiting feedback on Drafts
- Complete Final Report and Guidelines

Questions?

Thank You!

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