Strategy for Treatment Selection

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CP2C Background

- Caltrans start
  - Jan 2007
- Functions (Tasks)
  - Define and quantify benefits of preservation
  - Training and education
  - Improve PP performance
  - Innovation and tech transfer
  - Technical assistance
  - Promote effective PP

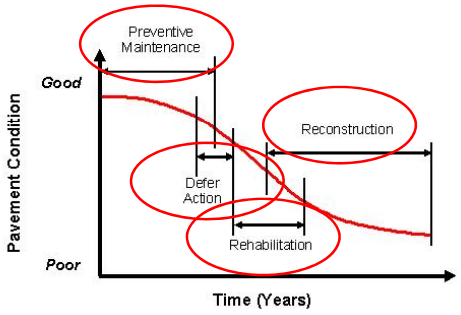
What is Treatment Selection?

A guide to assist maintenance personnel in making better and more informed decisions in selecting and applying maintenance treatments

In other words…

What do we do with this?

Treatment Selection Based on Pavement Condition



Why Pavement Preservation?

- Sustain the built environment
- Conserve natural resources
  - Aggregates
  - Asphalt
  - Cement
- Reduce dependency on petroleum products
- Reduce carbon footprint

Issues Treatment Selection Addresses

- Will the treatment address the distresses present? (i.e., Will it work?)
- Can the required preparation for the treatment be carried out?
- Is the treatment cost effective?
- Will the treatment be performed before the situation being addressed changes?

Selecting Treatments

- Assess Existing Pavement Conditions
- Determine the Feasible Treatment Options
- Analyze and Compare the Feasible Options

Assess Current Conditions

- Assess Existing Pavement Conditions
  - Conduct visual site inspection and/or review project information
  - Perform testing on the existing pavement, as conditions require
  - Define the performance requirements for the treatment

Fatigue (Alligator) Cracking

LOW MODERATE HIGH

Load Related, HMA Thickness

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Potholes

Environmental + Load

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Rutting and Depressions

Ruts in Wheel Paths

Load + Environmental
Typically Upper 4 in.

Depression

Support Issue
Typically Full Depth

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Transverse and Block Cracking

Thermal Cracking

Environmental
Early in Pave. Life

Block Cracking

Environmental + Age

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Polishing and Raveling

Polished Aggregate

Raveling

Traffic + Age

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Bleeding/Flushing

Materials + Environmental + Traffic

Pumping

Moisture + Traffic Materials?

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Patching

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Construction Issues

Bump

Crack Sealant?

Shoving

Delamination

Loss of Bond (Tack Coat) Material Issue?

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What are Preservation Treatments?

- Crack sealing
- Fog/Rejuvenating Seals
- Chip seals
- Slurry seals
- Scrub seals
- Microsurfacing
- Open graded friction course
- RHMA-O, RHMA-HB
- PBA-G
- BWC
- BWC-Rubber
- Thin Overlays

Non-Structural Activities

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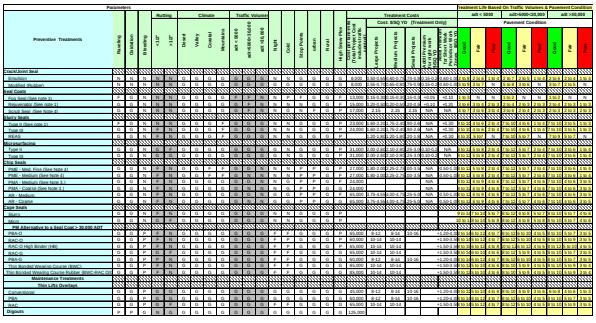
Factors Affecting Treatment Selection

- Pavement age, condition
- Climate
- Traffic levels, expected future plans
- Available funding
- Agency policy

Treatment Selection Matrix

- Covers all the major treatment types currently used by Caltrans for flexible pavements and allows for inclusion of future strategies
- Treatment selection is a complex, yet important procedure to ensure a optimum pavement treatment

GENERAL GUIDELINES FOR EFFECTIVE MAINTENANCE TREATMENT SELECTION



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Maintenance Selection – Detailed Example

Preventive Treatments	Raveling	Oxidation	Bleeding	Rutting <1/2"	Rutting >1/2"
Crack/Joint Seal					
Emulsion	N	N	N	N	N
Modified (Rubber)	N	N	N	N	N
Seal Coats					
Fog Seal (See note 1)	F	G	N	N	N
Rejuvenator (See note 1)	G	G	N	N	N
Scrub Seal (See Note 4)	G	G	N	N	N
Slurry Seals					
Type II (See note 1)	F	G	N	N	N
Type III	G	G	N	F	N
REAS	G	G	N	F	N
Microsurfacing					
Type II	G	G	N	G	F
Type III	G	G	N	G	G

Maintenance Selection on Cracks - Overview

GENERAL GUIDELINES FOR EFFECTIVE MAINTENANCE TREATMENTS ON CRACKS

	Type of Cracking														
	Alligator "A"			Alligator "B"			Alligator "C"			Longitudinal/Transverse			Edge		
Criteria	Low	Medium	High	Low	Medium	High	Low	Medium	High	Low	Medium	High	Low	Medium	High
Width	<1/4"	>1/4", <1/2"	>1/2"	<1/4"	>1/4", <1/2"	>1/2"	<1/4"	>1/4", <1/2"	>1/2"	<1/4"	>1/4", <1/2"	>1/2"	No	>0%, <10%	>10%
	or	or	or	or	or	or	or	or	or				Material	Material	Material
Area	<10%	>10%, <20%	>20%, <30%	<10%	>10%, <20%	>20%, <30%	<10%	>10%, <20%	>20%, <30%				Loss	Loss	Loss
Preventive Treatment															
Crack/Joint Seal (See Note 5)															
Emulsion	N	F	N	N	P	N	N	N	N	G	F	N	G	P	P
Modified (Rubber)	N	G	P	N	P	N	N	P	N	P	G	F	P	P	P
Fog Seal (See note 1)	G	P	N	G	N	N	F	N	N	F	N	N	F	P	P
Rejuvenator (See note 1)	G	N	N	G	N	N	F	N	N	F	N	N	F	P	P
Scrub Seals	G	F	N	G	F (See Note 4)	N	G	P (See Note 4)	N	F	P	P	F	P	P
Slurry Seals															
Type II (See note 1)	G	N	N	F	N	N	F	N	N	F	N	N	F	P	P
Type III	F	P	N	F	P	N	F	P	N	F	P	N	F	P	P
Microsurfacing															
Type II (See note 2)	G	N	N	F	P	N	F	P	N	F	N	N	P	P	P
Type III	G	P	N	F	P	N	F	P	N	F	N	N	P	P	P
Chip Seal															
PME - Med. Fine	G	F	N	G	F (See Note 4)	N	G	P (See Note 4)	N	P	P	N	P	P	P
PME - Medium	G	P	N	G	F (See Note 4)	N	G	P (See Note 4)	N	P	P	N	P	P	P
PMA - Medium (See Note 3.)	G	P	P	G	P	P	G	P (See Note 4)	P	P	P	N	P	P	P
PMA - Coarse (See Note 3.)	G	P	P	G	F (See Note 4)	P	G	P (See Note 4)	P	P	P	N	P	P	P
AR - Medium	G	G	F	G	G	F	G	F (See Note 4)	F	P	F	F	P	P	P
AR - Coarse	G	G	F	G	G	F	G	F (See Note 4)	F	P	F	F	P	P	P
PM Alternative > 30,000 ADT															
PBA OGAC	G	F	N	G	F (See Note 4)	N	G	F (See Note 4)	N	G	F	P	P	P	P
RAC-O	G	G	F	G	G	F (See Note 4)	G	G	F	G	F	P	P	P	P
RAC-O High Binder (HB)	G	G	F	G	G	F (See Note 4)	G	G	F	G	F	P	F	F	F
RAC-G	G	G	G	G	G	F (See Note 4)	G	G	G	G	F	P	G	G	G
Thin Bonded Wearing Course Rubber (BWCR)	G	G	G	G	F (See Note 4)	F (See Note 4)	G	F (See Note 4)	F	F	F	P	P	P	P
Maintenance Treatments															
Conventional	F	F	F	G	E (See Note 4)	F (See Note 4)	G	E	F	P	F	F	N	F	F
PBA	G	G	G	G	G (See Note 4)	P (See Note 4)	G	G	G	P	F	F	N	F	F
RAC	G	F	P	F	P (See Note 4)	P	G	F	P	P	P	F	N	F	F
BWC															
Groups	N	N	F	N	N	G	N	N	G	N	F	F	N	F	F

Guidelines for Effective Treatments on Cracks – Detailed Example

	Alligator "C"			Longitudinal/Transverse		
Criteria	Low	Medium	High	Low	Medium	High
Width	<1/4"	>1/4", <1/2"	>1/2"	<1/4"	>1/4", <1/2"	>1/2"
	or	or	or			
Area	<10%	>10%, <20%	>20%, <30%			
Treatment						
Microsurfacing						
Type II (See note 2)	F	P	N	F	N	N
Type III	F	P	N	F	N	N
PM Alternative >30,000 ADT						
PBA OGAC	G	F (Note 4)	N	G	F	P
RAC-O	G	G	F	G	F	P
RAC-O High Binder (HB)	G	G	F	G	F	P
RAC-G	G	G	G	G	F	P
Thin Bonded Wearing Course Rubber (BWCR)	G	F (Note 4)	F	F	F	P

Analyze and Compare

- Analyze and Compare the Feasible Options
  - Several treatments may be feasible
  - Cost and life of the treatments vary
  - Effect of the treatment on the life extension of the existing pavement
  - Other factors to consider: cost effectiveness, treatment timing, traffic level, and constructability

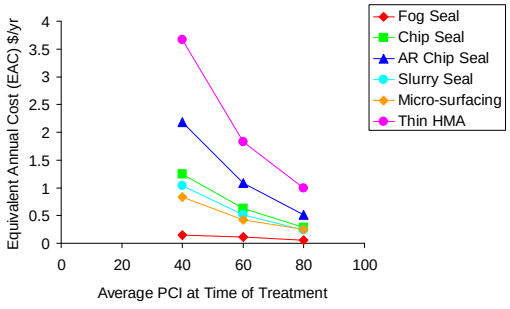
Estimated Life of Treatments

Treatment	Good Condition (PCI=80)	Fair Condition (PCI=60)	Poor Condition (PCI=40)
Fog Seal	3 - 5	1 - 3	1 - 2
Chip Seal	7 - 10	3 - 5	1 - 3
Slurry Seal	7 - 10	3 - 5	1 - 3
Micro-surfacing	8 - 12	5 - 7	2 - 4
Thin HMA	10 - 12	5 - 7	2 - 4

Select Best Treatment

- Cost Effectiveness
  - Equivalent Annual Cost
  - Life Cycle Cost Analysis
- Selection of Maintenance Treatments
  - Performance and constructability
  - Customer satisfaction
  - Ranking of selected treatments by rating overall importance

Save with Pavement Preservation



EAC = $$$ / Expected Life

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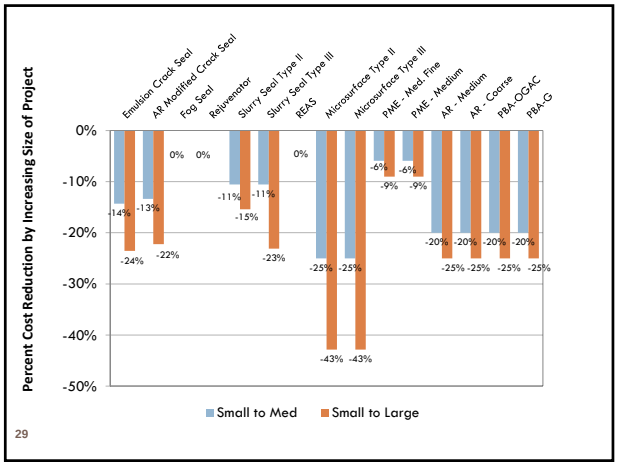
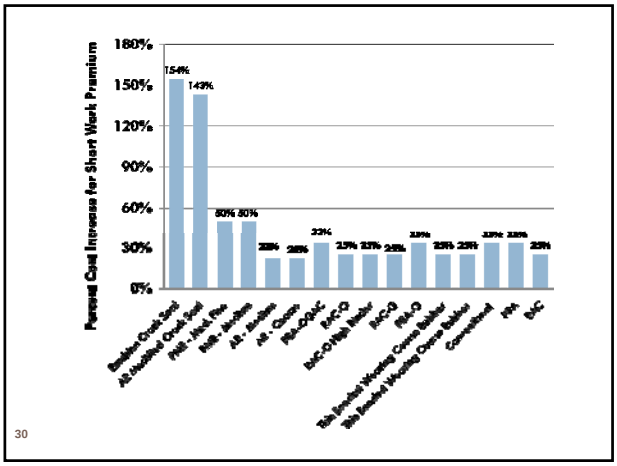
Economics of Preservation

- Project Size
  - Small
    - 1 to 2 days of work
  - Medium
    - 3 to 5 days of work
  - Large
    - + 1 week





Other Options

- Other preservation treatments
  - Recycling
    - Cold in-place
    - Hot in-place
    - Full depth recycling

Interlayers

- Interlayers
  - Overlays
  - Chip over fabric

Summary

- Right treatment at the right time on the right pavement
- Treatments have different service lives
  - Better life when used earlier
- Cost savings with increasing size of project

Questions?

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