


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



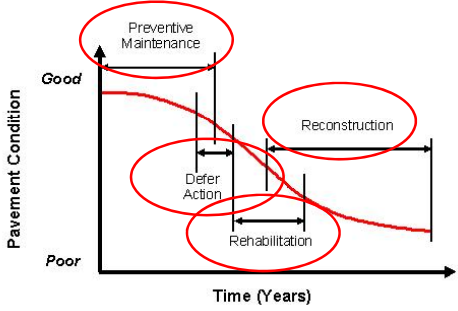
What is Treatment Selection?

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

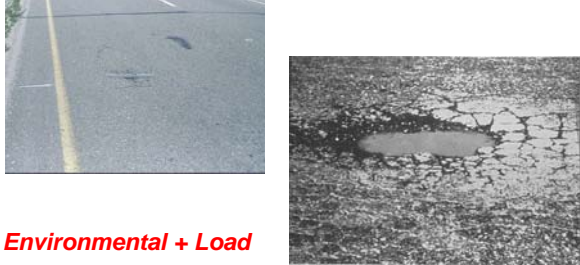


LOW MODERATE HIGH

Load Related, HMA Thickness

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Potholes



Environmental + Load

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Rutting and Depressions



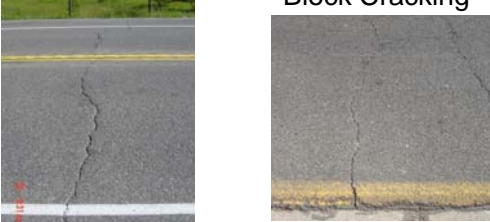
Ruts in Wheel Paths Depression

Load + Environmental
Typically Upper 4 in.

Support Issue
Typically Full Depth

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Transverse and Block Cracking



Thermal Cracking Block Cracking


Environmental
Early in Pav. Life

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



Loss of Bond (Tack Coat) Material Issue?

Delamination



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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

Preservation Treatment	Sealing	Cracking	Distressing	Rutting	Skidding	Water	Noise	Air Quality	Safety	Life Cycle Cost	Construction	Traffic	Weather	Availability	Performance			
															1	2	3	4
Crack Sealing	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Open Graded Friction Course	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
RHMA-O	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
RHMA-HB	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
PBA-G	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
BWC	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
BWC-Rubber	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Thin Overlays	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y

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Maintenance Selection – Detailed Example

Preventive Treatments	Raveling	Oxidation	Bleeding	Rutting	
				<1/2"	>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

Criteria	Alligator "A"						Alligator "B"						Alligator "C"						Longitudinal/Transverse		Edge	
	Low	Medium	High	Low	Medium	High	Low	Medium	High	Low	Medium	High	Low	Medium	High	Low	Medium	High	Low	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"	<1/4"	>1/4", <1/2"	>1/2"							
Area	<10%	>10%, <20%	>20%, <30%	<10%	>10%, <20%	>20%, <30%	<10%	>10%, <20%	>20%, <30%	<10%	>10%, <20%	>20%, <30%	<10%	>10%, <20%	>20%, <30%							
Preventive Treatment																						
Crack/Joint Seal																						
Emulsion	N	F	N	N	P	N	N	N	N	N	N	N	N	G	F	N	G	P	F			
Modified (Rubber)	N	G	P	N	F	N	N	N	N	N	N	N	N	G	F	N	G	P	F			
Fog Seal (See note 1)	G	P	N	G	N	N	F	N	N	F	N	N	F	N	N	F	N	N	F	P		
Rejuvenator (See note 1)	G	N	N	G	N	N	F	N	N	F	N	N	F	N	N	F	N	N	F	P		
Scrub Seal	G	F	N	G	F	N	N	G	F	N	N	N	G	F	N	N	F	N	F	P		
Slurry Seals																						
Type II (See note 1)	F	N	N	F	N	N	F	N	N	F	N	N	F	N	N	F	N	N	F	P		
Type III	F	P	N	F	P	N	F	P	N	F	P	N	F	P	N	F	P	N	F	P		
REAS	G	N	N	F	P	N	F	P	N	F	P	N	F	P	N	F	P	N	F	P		
Microsurfacing																						
Type II (See note 2)	G	P	N	G	P	N	G	P	N	G	P	N	G	P	N	G	P	N	G	P		
Type III	G	P	N	G	P	N	G	P	N	G	P	N	G	P	N	G	P	N	G	P		
PM Alternative >30,000 ADT																						
PBA OGAC	G	P	N	G	P	N	G	P	N	G	P	N	G	P	N	G	P	N	G	P		
RAC-O	G	P	N	G	P	N	G	P	N	G	P	N	G	P	N	G	P	N	G	P		
RAC-O High Binder (HB)	G	P	N	G	P	N	G	P	N	G	P	N	G	P	N	G	P	N	G	P		
RAC-G	G	P	N	G	P	N	G	P	N	G	P	N	G	P	N	G	P	N	G	P		
Thin Bonded Wearing Course Rubber (BWCR)	G	P	N	G	P	N	G	P	N	G	P	N	G	P	N	G	P	N	G	P		

Guidelines for Effective Treatments on Cracks – Detailed Example

Criteria	Alligator "C"			Longitudinal/Transverse		
	Low	Medium	High	Low	Medium	High
Width	<1/4"	>1/4", <1/2"	>1/2"	<1/4"	>1/4", <1/2"	>1/2"
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

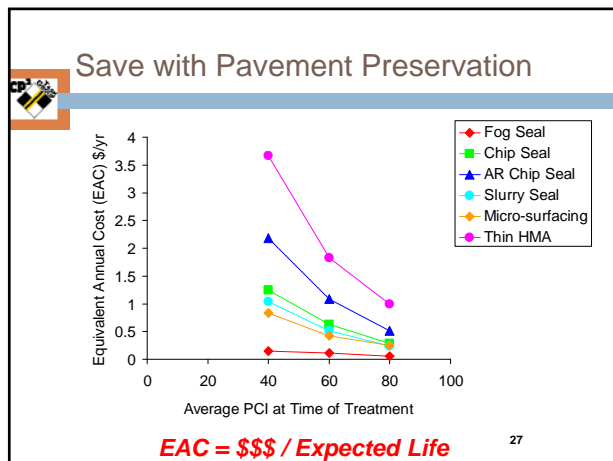
Analyze and Compare

- 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




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



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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