

All About Pavements

Maintaining our Essential Pavement Infrastructure

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providing engineering solutions to improve pavement performance



Presentation Approach

- APMS Process Review
 - PCI Changes
 - Analysis Approach
- Preventive/Routine Maintenance
 - Preventive Actions
 - Reactive Actions
- Pavement Rehabilitation and Reconstruction
 - Rehabilitation Projects
 - Reconstruction or New Construction
 - PCN/ACN Review
- Discussion

APMS Process Review - Background

- Assess pavement conditions through visual inspection using the pavement condition index (PCI) procedure.
- Distress data are used to calculate an index, which ranges from 0 (failed) to 100 (new).
- Analyze data to determine current and forecast future pavement needs (maintenance, rehabilitation or reconstruction).
- Fulfills a majority of the G.A. #11 and Public Law 103-305 requirements for a PMP.

APMS Process Review – PCI Changes

- Recently (2010 & 2012) the PCI procedure was revised.
- Divided Raveling and Weathering into 2 distress types.
- Created an additional PCC distress, Alkali-Silica Reactivity (ASR).
- Impact of these changes was not as noticeable at the ‘entire system’ level.
- Significant impacts observed at the individual pavement level in some cases.

PCI Changes – Raveling & Weathering

- Weathering occurs with the loss of fine matrix material (binder & fine aggregate).
- Raveling occurs with the loss of coarse matrix material (larger sized aggregate).
- There have been noticeable increases in the amount of weathering and raveling observed during recent PCI inspections, causing decreases in PCI values.

PCI Changes – Raveling & Weathering



PCI Changes – ASR

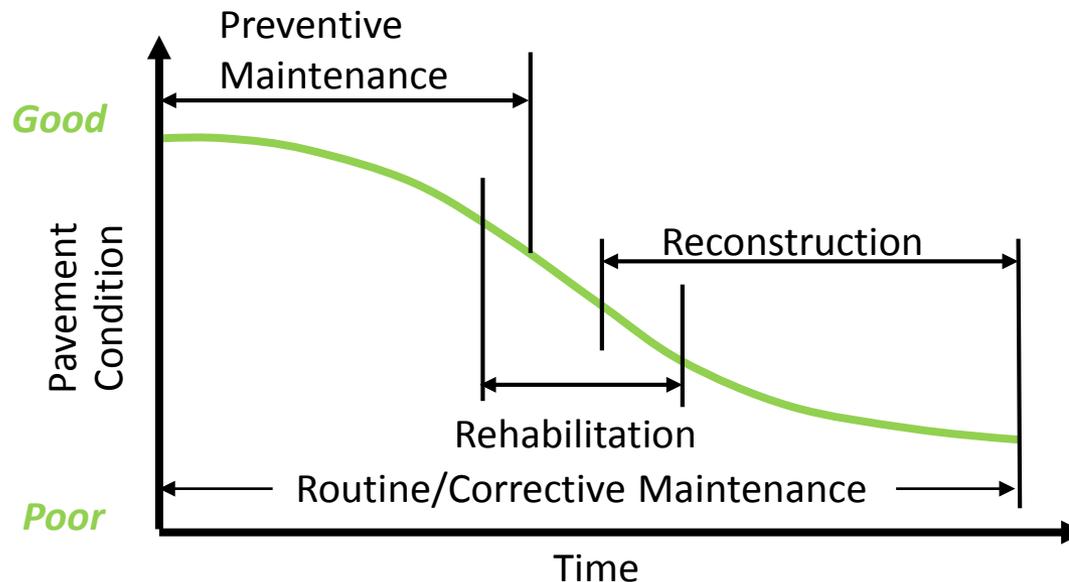
- Reaction that occurs between the alkali and silica in a PCC pavement.
- Produces a gel byproduct that expands when it comes into contact with water.
- Prior to PCI change, suspected ASR was recorded as part of the previous Map Cracking, Scaling and Crazeing distress.
- Petrographic examination is the only way to determine whether it is actually present.

APMS Process Review – ASR



APMS Process – Analysis Approach

- Assess current and project future pavement condition throughout an airport or system of airports.
- Develop plan to address immediate “reactionary” needs, preservation needs, and long term rehabilitation needs.



APMS Process – Preventive Maintenance

- Pavements in relatively good condition are candidates for maintenance activities.

Branch ¹	Section ¹	Distress Type	Severity	Estimated Quantity	Unit	Maintenance Action ²	Estimated Cost ³
A01HB	10	L&T Cracking	M	211	ft	Crack Sealing - AC	\$230
RW1028HB	10	L&T Cracking	M	3,436	ft	Crack Sealing - AC	\$3,745
		Weathering	H	122	sf	Partial-Depth AC Patch	\$399
TH02HB	20	Alligator Cracking	M	28	sf	Full-Depth AC Patch	\$247
		L&T Cracking	M	522	ft	Crack Sealing - AC	\$569
		L&T Cracking	H	4	ft	Full-Depth AC Crack Repair	\$110
		Raveling	M	164	sf	Partial-Depth AC Patch	\$539
2016 Total:							\$5,839

APMS Process – Surface Treatments

- Pavements primarily experiencing raveling and/or weathering deterioration are identified as candidates for a surface treatment.

Branch ¹	Section ¹	Section Area, sf	Critical PCI	Projected PCI Before Work	Projected PCI After Work	Work Type	Estimated Cost ²
TH01HB	10	30,736	50	82	93	Minor Surface Treatment	\$10,266
TH02HB	30	55,002	50	80	86	Minor Surface Treatment	\$18,547
TWAHB	10	113,769	50	71	90	Minor Surface Treatment	\$38,795
	20	4,098	50	58	82	Minor Surface Treatment	\$1,385
	30	12,282	50	72	92	Minor Surface Treatment	\$4,118
2016 Total:							\$73,111

Preventive maintenance w/o surface treatment

Branch ¹	Section ¹	Section Area, sf	Projected PCI Before Work	Projected PCI After Work	Estimated Cost ²
A01HC	10	100,380	60	63	\$905
A02HC	20	120,306	35	37	\$730
RW1331HC	10	1,008,629	70	75	\$16,970
TWCHC	10	149,635	66	68	\$949
2016 Total:					\$19,554

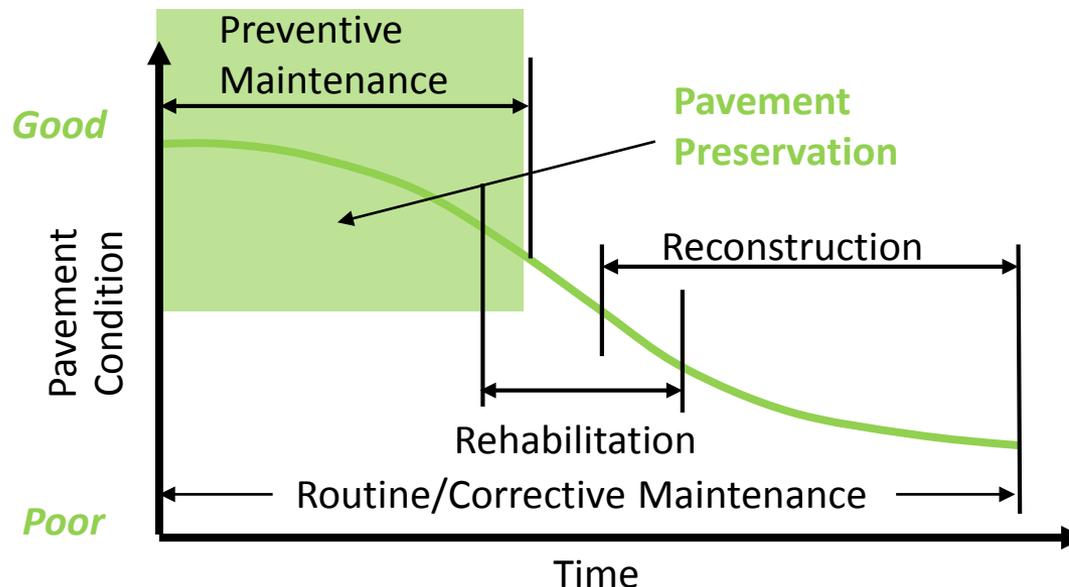
APMS Process – Major M&R

- Major M&R is identified for pavements that have deteriorated to the point that other repair strategies are no longer viable.

Plan Year	Branch ¹	Section ¹	Section Area, sf	Projected PCI Before Work	Critical PCI	Localized Maintenance Cost	Surface Treatment Cost	Major Rehabilitation Cost	Estimated Cost ²
2016	A01HB	10	175,471	94	50	\$230	\$0	\$0	\$230
	RW1028HB	10	319,260	67	60	\$4,144	\$0	\$0	\$4,144
	TH01HB	10	30,736	82	50	\$123	\$10,143	\$0	\$10,266
	TH02HB	10	44,995	47	50	\$0	\$0	\$266,093	\$266,093
		20	37,548	59	50	\$1,465	\$0	\$0	\$1,465
		30	55,002	80	50	\$397	\$18,150	\$0	\$18,547
	TWAHB	10	113,769	71	50	\$1,251	\$37,544	\$0	\$38,795
		20	4,098	58	50	\$33	\$1,352	\$0	\$1,385
		30	12,282	72	50	\$65	\$4,053	\$0	\$4,118
2016 Total:						\$7,708	\$71,242	\$266,093	\$345,043
2017	No work identified for 2017								
2017 Total:						\$0	\$0	\$0	\$0
2018	No work identified for 2018								
2018 Total:						\$0	\$0	\$0	\$0
2019	A01HB	10	175,471	94	50	\$2,592	\$0	\$0	\$2,592
		20	15,876	99	50	\$4,503	\$0	\$0	\$4,503
	TH02HB	20	37,548	50	50	\$0	\$0	\$202,673	\$202,673
2019 Total:						\$7,095	\$0	\$202,673	\$209,768
2020	RW1028HB	10	319,260	60	60	\$0	\$0	\$1,767,902	\$1,767,902
2020 Total:						\$0	\$0	\$1,767,902	\$1,767,902
5-Year Plan Total:						\$14,803	\$71,242	\$2,236,668	\$2,322,713

Preventative/Routine Maintenance

- Assess current and project future pavement condition throughout an airport or system of airports.
- Develop plan to address **immediate “reactionary” needs, preservation needs,** and long term rehabilitation needs.



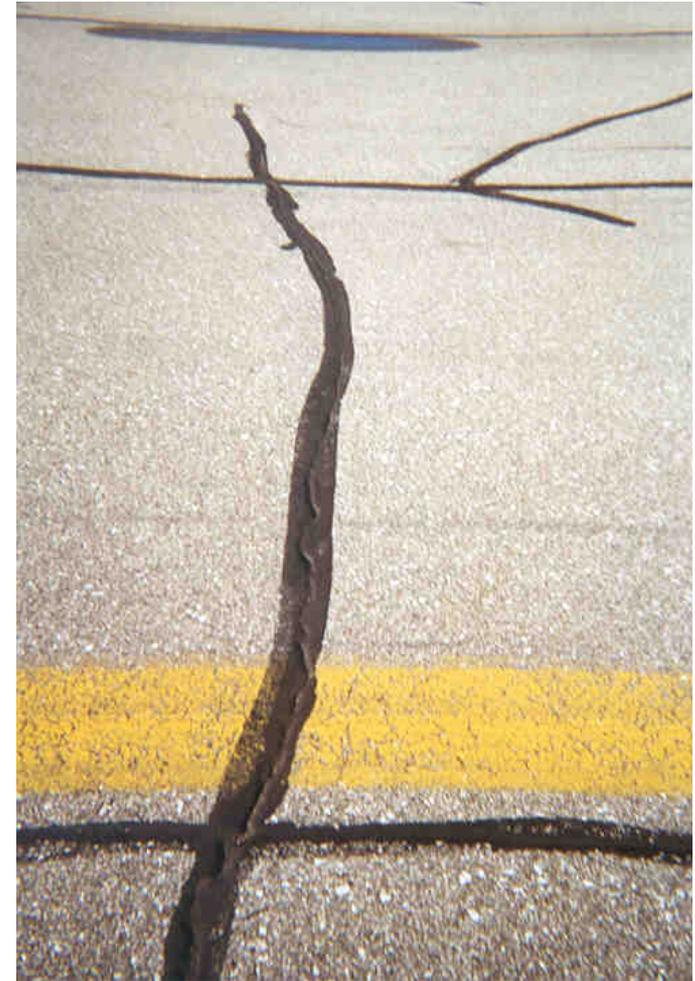
Identifying Pavement Concerns

- Field Inspections
 - Daily Inspections
 - Monthly Inspections
- Things to look for
 - Immediate concerns and corrective action
 - ‘Watch’ list



Routine Asphalt Maintenance

- Crack Sealing
- Surface Treatments



Routine Asphalt Maintenance

- Crack Sealing



Illustration of Crack Routing, Cleaning, and Sealing



Routine Asphalt Maintenance



A properly sealed, “flat” joint or crack can last for many years without additional maintenance

YES!

*Choose the
right crack!*

NO!



Crack Sealing



Surface Treatment

Routine Asphalt Maintenance

- Surface Treatment

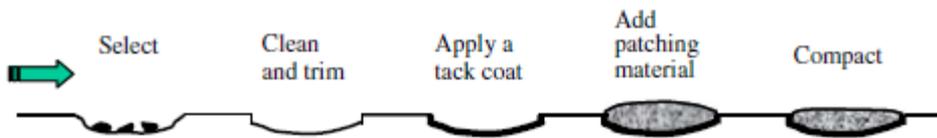


A photograph of a wide, deep crack in asphalt pavement. A red and white marker is placed inside the crack to indicate its width. The crack is filled with a dark, viscous material, likely sealant. The surrounding pavement is made of small, light-colored aggregate stones.

*Too wide
to seal!*

Reactive Asphalt Maintenance

- Crack Repair
- Partial/Full depth Repair



The Sequence of Operations for Small Patching Repairs



Routine Concrete Maintenance

- **Joint sealing**
- Crack sealing



Routine Concrete Maintenance

- Joint sealing
- **Crack sealing**



Reactive Concrete Maintenance

- Partial Depth Repair
- Full Depth Repair



Reactive Concrete Maintenance

- Partial Depth Repair
- Full Depth Repair



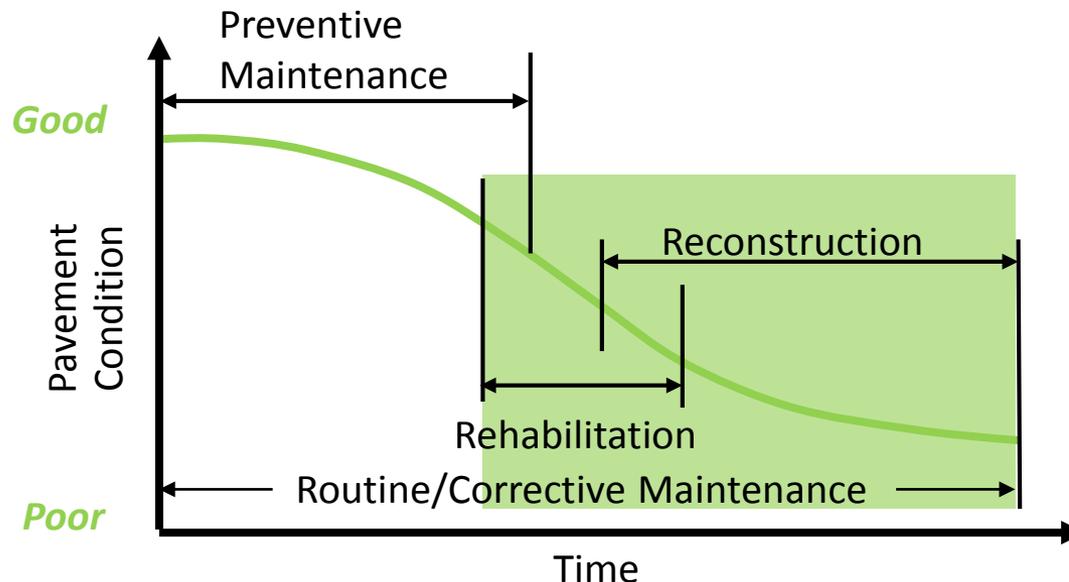
Reactive Concrete Maintenance - ASR

- Alkali-Silica Reaction



Pavement Rehab and Reconstruction

- Assess current and project future pavement condition throughout an airport or system of airports.
- Develop plan to address immediate “reactionary” needs, preservation needs, and **long term rehabilitation needs.**



Pavement Construction Categories

(Airport Improvement Program Handbook)

- **Rehabilitation**

- Provides a pavement with a useful life of at least 10 years

- **Reconstruction and New Construction**

- Results in a virtually new piece of pavement with a useful life of at least 20 years
 - Work must meet current FAA standards

Pavement Construction Methods

Concrete & Asphalt

- Traffic
- Location on Airport
- Time Constraints
- Cost
- Longevity
- Other



Asphalt Rehabilitation - Milling



Asphalt Rehabilitation - Milling & Fabric



Asphalt Rehabilitation - Pulverizing



Concrete Rehabilitation - Milling



Concrete Rehabilitation - Overlays



Pavement Reconstruction/Construction



Reporting Airport Pavement Strength AC 150/5335-5C

PCN- Pavement Classification Number

ACN- Aircraft Classification Number

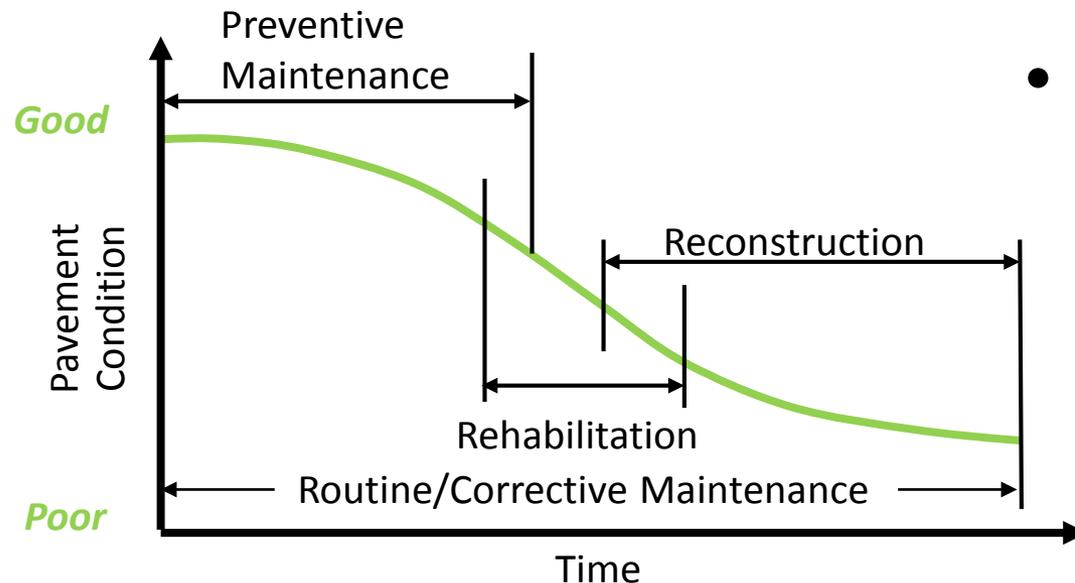
- PCN's are required upon completion of paving projects on pavement over 12,500#
- User Defined Method VS Technical Method
- ACN **should** be less than or equal to PCN, some overloading is allowed

PCN Value

- 80/R/B/W/T
- **80**- PCN Value
- **R**- Pavement Type (Flexible or Rigid)
- **B**- Subgrade Strength (High to Low)(A-D)
- **W**- Tire Pressure (Unlimited to Low)(W-Z)
- **T**-Method Used (Technical or User Defined)

Long Term Pavement Solutions

- Airfield pavements are essential to the operation of our air transportation system and represent a tremendous investment
- Routine airfield inspections identify problem conditions to drive maintenance efforts
- Airports have an array of preventative and rehabilitation techniques available to keep air transportation moving



- Open discussion

Thank You!

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