

RPA - P2 NAPMRC

(National Airport Pavement & Materials
Research Center)

Presented to: REDAC

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Federal Aviation
Administration



RPA P2 Overview - NAPMRC

Need

NAPMRC provides the ability to test the surface layers, pavement materials, and alternative pavement materials. Improved paving materials characterization will conserve airport development funds and reduce the downtime of runways from construction and maintenance activities. Test results will help in developing standards/specification for new asphalt technologies such as WMA, SMA, RAP, etc.

Research Goals

- Research Goals
More durable, long-lived airport pavements, reduced lifecycle costs, better prediction of pavement service life, and accurate assessment of aircraft-pavement compatibility

Standards/specification for new asphalt technologies such as WMA, SMA, RAP, etc.
- Deliverables
Technical Reports, technical papers.

FY 2017 Accomplishments

- Milestones
 - TC1 Posttraffic tests ✓
 - Completed fatigue tests on HMA (PG76-22) at 214-psi tire pressure (unplanned) ✓
 - Completed fatigue tests on HMA (PG76-22) at 254-psi tire pressure (unplanned) ✓
 - Complete fatigue tests on WMA (PG76-22) at 254-psi tire pressure (unplanned) ✓
 - Complete fatigue tests on WMA (PG76-22) at 214-psi tire pressure (unplanned) ✓
 - Complete construction of TC2 test sections.
 - Start tests on TC2 test sections.

RPA P2 - NAPMRC Budget Chart

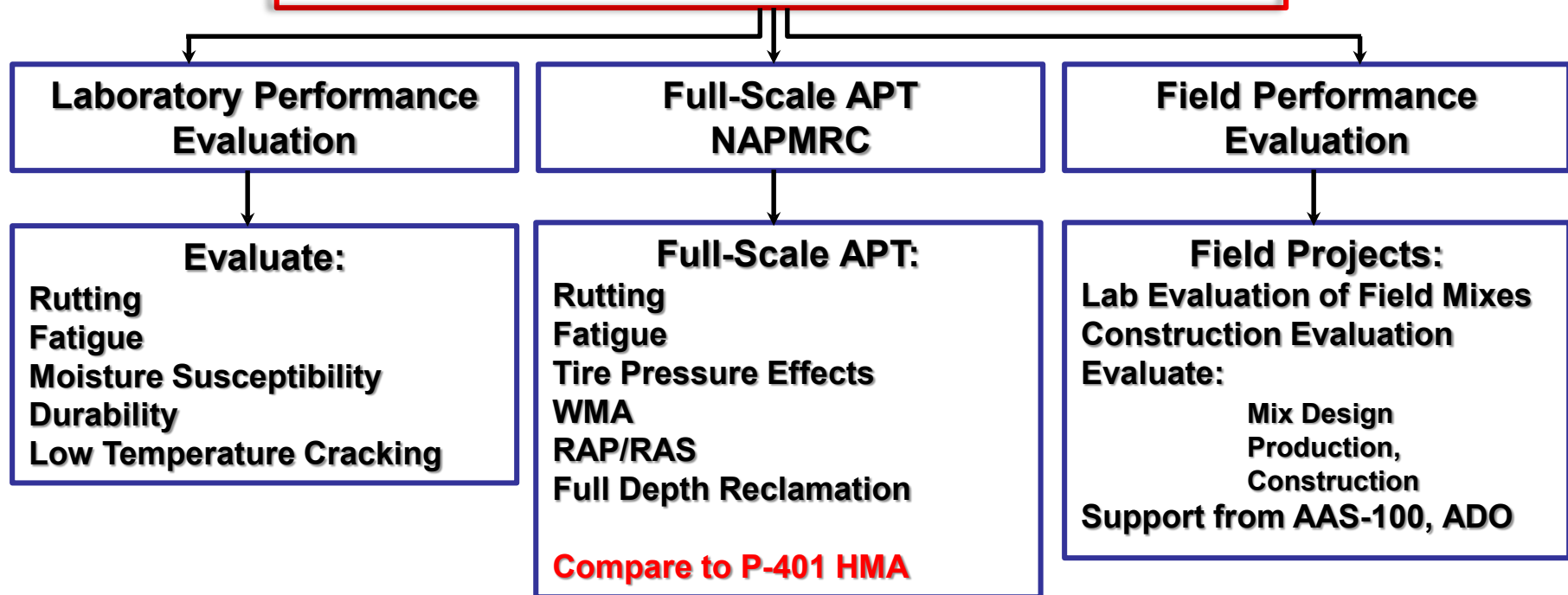
RPA P3 - Field Instrumentation & Testing [\$1,000]		FY17	FY18	FY19
P2.1	Pavement Construction			
	Demolition			
	Sensor Installation			
	Pavement Construction			
P2.2	Facility Operation			
	Construction Specifications & Drawings			
	Response Tests & Traffic Tests TC1			
	Posttraffic Tests - TC1			
	Response Tests & Traffic Tests TC2			
	Posttraffic Tests - TC2			
	Data Analysis			
	Laboratory Tests on HMA/WMA/RAP			
P2.3	HVS-A Operation & Maintenance			
	Operation & Maintenance			

Research at NAPMRC

EVALUATION OF NEW ASPHALT TECHNOLOGIES FOR AIRFIELD PAVEMENTS

Warm Mix Asphalt, Stone Matrix Asphalt, Polymer Modified Binders,
RAP Mixes, Full-Depth Rehabilitation

PROBLEM: Lack of Guidance/Standards/Specifications
Lack of Performance Data

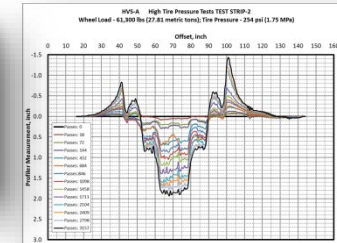




Objectives, Pavement Construction, Sensors

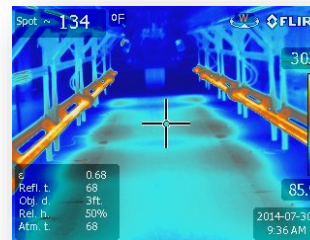
NDT & Pavement Characterization

TEST CYCLE (TC) AT NAPMRC



Posttraffic Testing

Full-Scale APT,
Pavement Evaluation



Test Cycle 1 (TC1) Objectives

- Compare Warm Mix Asphalt (WMA) performance with P401 Hot Mix Asphalt (HMA) performance (rutting);
- Effect of tire pressure on pavement rutting;
- Effect of polymer modified binder (PMA) on pavement rutting;
- Effect of temperature on pavement rutting.
- Effect of tire pressure on pavement cracking (fatigue).

Summary of TC1 Tests

- Compare Warm Mix Asphalt (WMA) performance with P401 Hot Mix Asphalt (HMA) performance (rutting);
Comparable Performance in rutting.
Cracking performance need to be evaluated (TC2)
- Effect of tire pressure on pavement rutting;
Significant effects on mixes with unmodified binders.
Insignificant effects on mixes with PMA.
- Effect of polymer modified binder (PMA) on pavement rutting;
Improves rutting performance significantly.
- Effect of temperature on pavement rutting.
Rutting performance of HMA/WMA is more sensitive to temperature than tire pressure.
- Effect of tire pressure on pavement cracking (fatigue); PG 76-22 HMA/WMA
21,000 passes at 210 psi and 21,000 passes at 254 psi
No signs of any fatigue cracking.

TRB-2018

“Rutting Evaluation of Hot and Warm Mix Asphalt Concrete Under High Aircraft Tire Pressure and Temperature at National Airport Pavement and Materials Research Center (NAPMRC)”

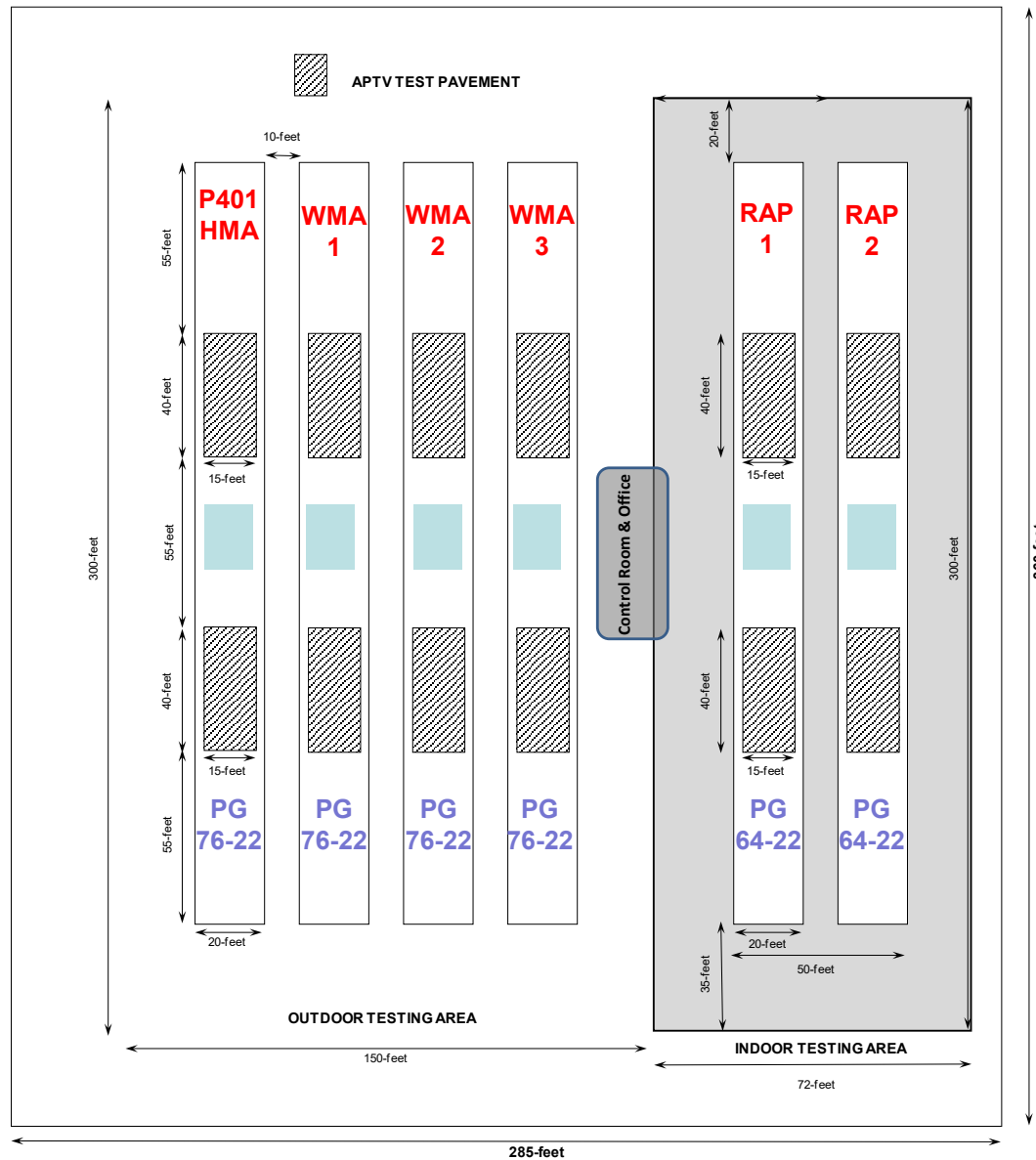
- *Presented at TRB 2018 Annual Meeting.*
- *Accepted for publication in the Transportation Research Record: Journal of the Transportation Research Board.*
- *Selected as “Practice Ready Paper”.*

MATERIAL

RUTTING
(test at high temperature)

CRACKING
(test during winter)

Tire Pressure
254 psi



TOTAL AREA = 102,600 sq. feet (2.36 acres)

NAPMRC
Test Cycle-2
(TC-2)

Test Cycle 2 (TC2) Objectives

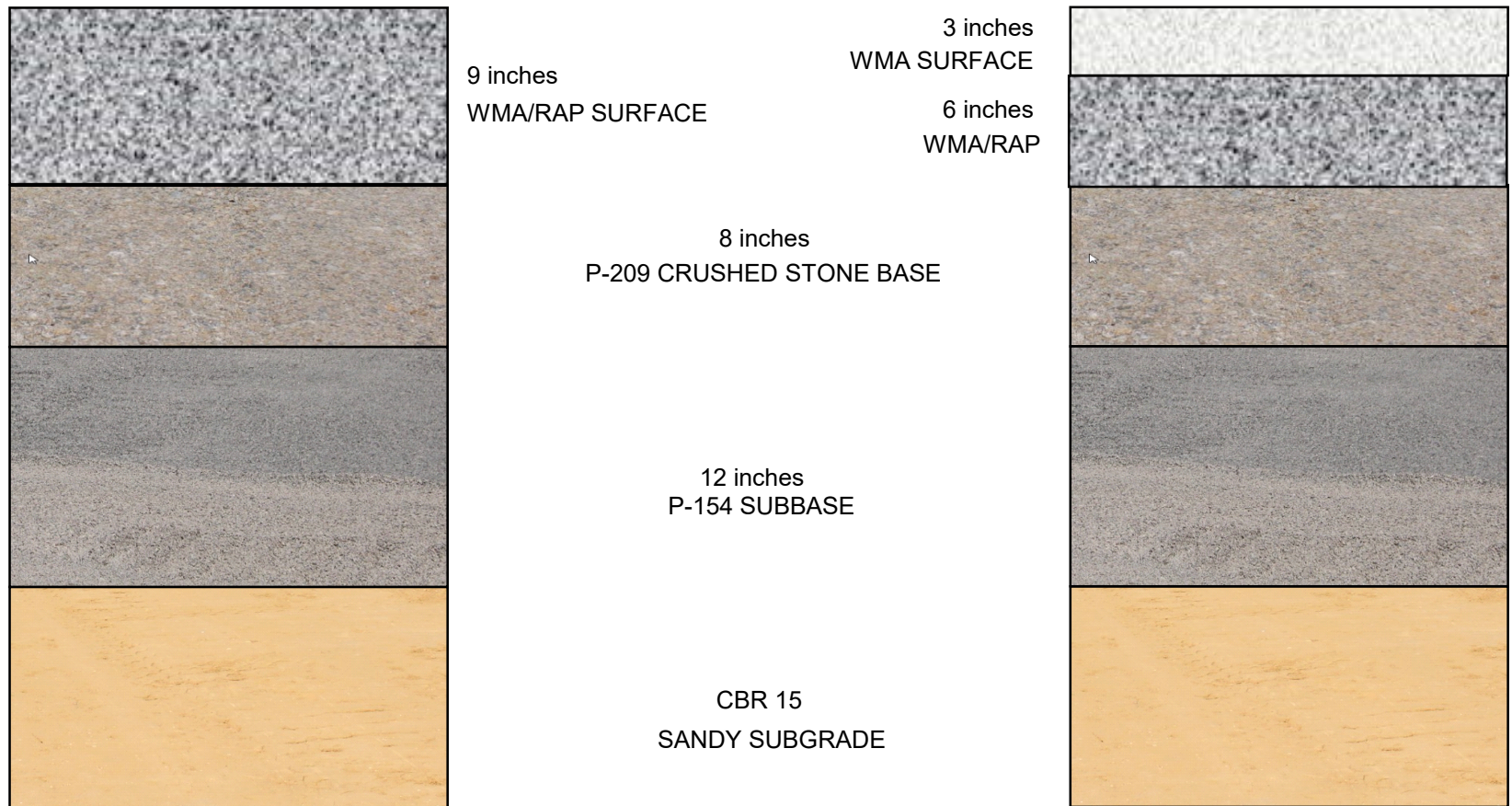
- Compare Warm Mix Asphalt (WMA) performance with P401 Hot Mix Asphalt (HMA) performance
 - Rutting (at high temperature)
 - Fatigue
- Evaluate different WMA technologies
 - Waxy additive
 - Chemical additive
 - Hybrid
- Compare WMA/RAP performance with P401 Hot Mix Asphalt (HMA) performance
 - Rutting (at high temperature)
 - Fatigue

Pavement Cross Sections



NAPMRC TC-2 PAVEMENT CROSS SECTION – OUTDOOR LANES

Pavement Cross Sections



NAPMRC TC-2 PAVEMENT CROSS SECTION – INDOOR LANES

TC2 Status

- Demolition Plans Complete
- Construction Specifications Complete
- Construction Drawings Complete
- Bid Package Complete
- Contract Award
- Construction



