Update on Pavement Related Advisory Circulars: Changes in the ACs

2015 AIRPORTS CONFERENCE

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Hershey, Pennsylvania

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Presentation Objectives

Summarize work in Airports Safety & Standards, Airport Engineering Division (AAS-100)

Overview and Highlight Principle Changes in:

Advisory Circular 150/5370-10G
Standards for Specifying Construction of Airports

&

Advisory Circular 150/5380-7B
Airport Pavement Management Program (PMP)

~

Advisory Circular 150/5380-6C
Guidelines and Procedures for Maintenance of Airport Pavements
Airport Engineering Division AAS-100

- Division Manager
- Assistant Manager (primarily for Airports GIS)
- Administrative Assistant / Secretary
- National Resource Expert on Air Space
- 8 Civil Engineers (2 Pavements Engineers)
- 4 Electrical/Electronics Engineers
- 2 ACRP (1 Research Engineer; 1 Program Analyst)
- 2 Airports GIS (1 Computer Scientist; 1 Data Analyst)
- Airport Safety Data Program Manager
- Technical Support Contractor (ISI)

FAA Guidance

- FAA guidance is part of the authorizing legislation for airport development using Federal funds.
- FAA airport design, construction, and maintenance guidance are contained in Advisory Circulars, the 150’s series.
- Interim FAA airports engineering guidance is provided in Engineering Briefs.
- FAA airport guidance is available from FAA web sites: http://www.faa.gov/arp/
Establishing or Changing Guidance

• HQ Office Initiates and Prepares Draft.
• Review by HQ Airports Offices (*and Regions*)
• Revised Draft Sent for Concurrent Review to FAA Regions and Industry.
  • The Boeing Company and the Airports Consultants Council (ACC) Receive Copies of Draft Changes and Reviews.
  • Tri-Service Airfield Pavement Working Group Team and ASCE T&D APC Reviews Draft Changes.
• Comments Accepted for 30 - 60 days (General).
• Change Finalized.
• FAA Legal Review, Office Director Signs.

What Delays a Change

• Non-Concurrence from HQ Offices.
• Non-Concurrence from FAA Regions.
• Inability to Reconcile Comments from Boeing, ACC, Peer Review Associations, or Industry.
• Substantive Alterations to a Proposed Change May Require New Draft.
Airports Web Site

http://www.faa.gov/airports/engineering/
http://www.faa.gov/
http://www.faa.gov/airports/
http://www.faa.gov/airports/engineering/
http://www.faa.gov/airports/resources/advisory_circulars/
FY13 – FY14+ Updates & Changes
‘Pavement’ Advisory Circulars

5320-17A AIRFIELD PAVEMENT SURFACE EVALUATION AND RATING MANUALS [9/10/2014]
5335-5C STANDARD METHOD FOR REPORTING AIRPORT PAVEMENT STRENGTH (PCN) [8/14/2014]
5370-10G STANDARD FOR SPECIFYING CONSTRUCTION OF AIRPORTS [7/21/2014]
5370-14B HOT MIX ASPHALT PAVING HANDBOOK [9/27/2013]
5380-6C GUIDELINES AND PROCEDURES FOR MAINTENANCE OF AIRPORT PAVEMENTS [10/10/2014]
5380-7B AIRPORT PAVEMENT MANAGEMENT PROGRAM (PMP) [10/10/2014]
5000-15B ANNOUNCEMENT OF AVAILABILITY OF AIRPORT-RELATED RESEARCH AND DEVELOPMENT PRODUCTS [7/23/2013]
5320-5D AIRPORT DRAINAGE DESIGN [8/15/2013]

FAA AC 150/5370-10G
STANDARD FOR SPECIFYING CONSTRUCTION OF AIRPORTS
FAA AC 150/5370-10G

OVERVIEW

- Extensive technical and editorial edits throughout document
- Updated references to Advisory Circulars and industry standards
- Intent is for Airports/Consultants to start with 5370-10G, not a modified version of 10F

Deleted “Notice to Users” - moved information to the title page under “Developing Project Specifications” & “Changes, additions and deletions to the FAA Standard Specifications”

“How-To” use this AC

Brackets designate where a choice must be made

AC Engineer Notes
(shown between lines of asterisks)

Modifications per Order 5300.1
Update in 2015
**FAA AC 150/5370-10G**
**PRINCIPAL CHANGES**

**New Sections/Items**
- 90-10 Construction Warranty and 90-11 Project Closeout
- Section 105, Mobilization

**Section 90**
**Measurement and Payment**

**Project Warranty**
- AIP participation in cost of extended warranties generally not eligible….check with APP-400
- LED lights may require longer warranties need to call those items out separately

**Project Closeout**
- Jobs Not done till all the paperwork is complete
Section 105
Mobilization

Recommended that pay in increments

Consider retaining portion until project closeout documents submitted

Section 100
Contractor Quality Control Program

Contractor Quality Control

- Program not same as Construction Management Program required by Grant Special Conditions
- Major Projects require on site QC Manager

Paving projects Preconstruction Workshop

- >$250K Threshold may need to change to match AIP Handbook which kicks in a CMP at $500K
- Engineer, Contractor, Subs, Testing laboratories, Owner & FAA
- QC/QA Requirements of Specification
- Acceptance Testing By Engineer
FAA AC 150/5370-10G
PRINCIPAL CHANGES

New Sections/Items
- 90-10 Construction Warranty and
- 90-11 Project Closeout
- Section 105, Mobilization
- Item P601, Fuel Resistant Hot Mix Asphalt (HMA) Pavement
- Item P608, Emulsified Asphalt Seal Coat
- Item P629, Thermoplastic Coal Tar Emulsion Surface Treatment
- Item F 164, Wildlife Exclusion Fence

Deleted Sections/Items:
- Section 120 Nuclear Gauges
- Item P402, Porous Friction Course
- Item T907, Tiling
- Item L-102 Hazard Beacons

Significant Changes in Many ‘P’ Specs
P401 and P403 Gyratory or Marshall Mix
Item P152
Excavation Subgrade and Embankment

Proof Rolling
- After compaction is completed
- In the presence of the Engineer
- Note - The purpose of proof rolling the subgrade is to identify any weak areas in the subgrade and not for compaction of the subgrade

12’ Straight Edge
- Note - for consistency all straight edge testing in specification went to 12’ straight edge….in 10F we had 10’, 12’ and 16’ Now all specifications use 12’

P208 Aggregate Base Course & P209 Crushed Aggregate Base

Clarified “aggregate base” and “crushed aggregate base” & quality requirements for both:

<table>
<thead>
<tr>
<th></th>
<th>P208</th>
<th>P209</th>
</tr>
</thead>
<tbody>
<tr>
<td>ASTM C131</td>
<td>50</td>
<td>45</td>
</tr>
<tr>
<td>Sulfate Soundness</td>
<td>12% / 18%</td>
<td>12% / 18%</td>
</tr>
<tr>
<td>Fractured Faces</td>
<td>60%/2, 75%/1</td>
<td>90%/2, 100%/1</td>
</tr>
<tr>
<td>Flat and Elongated</td>
<td>15% 1:3</td>
<td>15% 1:3</td>
</tr>
</tbody>
</table>

& Clarified Fractured Faces and Flat and Elongated aggregate
P208 Aggregate Base Course & P209 Crushed Aggregate Base (also in 210, 211, 212, 213, 219)

- Added option for whose laboratory will do QA for density
- 12’ straight edge
- Added Grade check; Want to be checking grade as pavement section is built so no surprises on surface
- Job Control Grading Band relative to Contractor Gradation
- Not a change - but remember we only pay for ‘accepted’ material (gradation, thickness, grade, density (moisture & density))

P304 Cement Treated Base Course  
P306 Lean Concrete Base Course

Now Similar strength requirements

- P-304 Lowered 7-day compressive strength requirements to 400 psi min and 800 psi max; added 28-day strength not to exceed 1000 psi.

Use with caution

- Potential for reflective cracking,
- Need to saw control joints, within 6” of joints in PCC if strength > 500 psi
- Bond breaker
P401 Hot Mix Asphalt (HMA)

P401 Surface Course on Airfields

- P403 Stabilized Base, binder course, leveling, roads, shoulders, blast pads and < 12,500 pounds AC
- You can use P401 for these pavements but may consider P403

Option for Marshall & Gyratory Mix Design

- Engineer needs to select one, edit specification paragraphs 3.2
- EB59A is Cancelled and not to be used

Aggregate Requirements

- Note to check for Ferrous Sulfides & Iron Oxides
- NOT a highway / state DOT gradation!

No gradation changes – but . . .

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**P401 Hot Mix Asphalt (HMA)**

**Removed 1 ½” Max Aggregate Gradation**

<table>
<thead>
<tr>
<th>Aggregate – HMA Pavements</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Sieve Size</strong></td>
</tr>
<tr>
<td>1-½ in. (17.5 mm)</td>
</tr>
<tr>
<td>1 in. (25.0 mm)</td>
</tr>
<tr>
<td>¾ in. (19.0 mm)</td>
</tr>
<tr>
<td>½ in. (12.5 mm)</td>
</tr>
<tr>
<td>¾ in. (9.5 mm)</td>
</tr>
<tr>
<td>No. 4 (4.75 mm)</td>
</tr>
<tr>
<td>No. 8 (2.36 mm)</td>
</tr>
<tr>
<td>No. 16 (1.18 mm)</td>
</tr>
<tr>
<td>No. 30 (0.600 mm)</td>
</tr>
<tr>
<td>No. 50 (0.300 mm)</td>
</tr>
<tr>
<td>No. 100 (0.150 mm)</td>
</tr>
<tr>
<td>No. 200 (0.075 mm)</td>
</tr>
<tr>
<td><strong>Asphalt percent:</strong> Stone or gravel</td>
</tr>
</tbody>
</table>

**Federal Aviation Administration**
P401 Hot Mix Asphalt (HMA)

Revised RAP Paragraph

- Binder adjustment based upon % RAP
- The amount of RAP limited to 30%,
  - as long as the resulting recycled mix meets all requirements specified for virgin mixtures
- Not allowed in Surface, except shoulders
- Recycled asphalt shingles (RAS) not allowed
- RAP containing Coal Tar not allowed

- Additional research planned
- Additional guidance in future
P401 Hot Mix Asphalt (HMA)
Revised Asphalt Cement Paragraph

Performance Grade (PG) per ASTM D6373
(Viscosity and Penetration Grades removed)

Selecting the PG (In Engineers Note)

✓ Initial PG binder consistent with applicable State DOT requirements for Interstate pavement - prior to bumping

✓ Using the initial PG selected, apply the applicable grade bump PG Binders Bump based upon Weight

<12.5 & < 100 1 Grade on High End
> 100 2 Grade on High End

If history of rutting may need 2 grade bump

✓ A PG Plus Test required to determine if the asphalt cement binder has been properly modified

FAA AC 150/5370-10G
Item P-401 and P-403

SUPERPAVE ADDED!

401-3.2 Job mix formula (JMF). No hot-mixed asphalt (HMA) for payment shall be produced until a JMF has been approved in writing by the Engineer. The asphalt mix-design and JMF shall be prepared by an accredited laboratory that meets the requirements of paragraph 401-3.4. The HMA shall be designed using procedures contained in [ ].

Specifier Choice
Choose Mix Design Method

For Marshall Method, insert:
Asphalt Institute MS-2 Mix Design Manual, 7th Edition. ASTM D6926 shall be used for preparation of specimens using the manually held and operated hammer for the mix design procedure. ASTM D6927 shall be used for testing for Marshall stability and flow.

For Gyratory Method, insert:
Asphalt Institute MS-2 Mix Design Manual, 7th Edition. Samples shall be prepared at various asphalt contents and compacted using the gyratory compactor in accordance with ASTM D6925.

Gyratory Mix Design

Highway Departments adopted ‘Superpave’ Mix Design System throughout the United States

Asphalt Binder and Mixture Design Guidance

- Performance Graded Asphalt Binder
  - Asphalt Institute Asphalt Binder Handbook (MS-26)
- Gyratory Mix Design
  - Asphalt Institute, Manual Series No.2 (MS-2)  
  *Seventh Edition*
Gyratory Mix Design

Better Simulates Loading

Gyratory Compactor
- 600 Kpa Pressure
- 30 RPM
- 1.25° Gyration Angle

Compact to Number Gyration
- ≥ 60k lbs, N = 75
- < 60k lbs, N = 50

Interpretation of Gyratory Test Data

Plot averages vs. asphalt content
FAA AC 150/5370-10G
Item P-401 and P-403

<table>
<thead>
<tr>
<th>Test Property</th>
<th>Pavements Designed for Aircraft Gross Weights of 60,000 Lb or More or Tire Pressures of ≥ 100 PSI</th>
<th>Pavements Designed for Aircraft Gross Weights Less Than 60,000 Lb or Tire Pressures &lt; 100 PSI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of compactor gyrations</td>
<td>75</td>
<td>50</td>
</tr>
<tr>
<td>Number of Blows</td>
<td>75</td>
<td>50</td>
</tr>
<tr>
<td>Stability, pounds (minimum)</td>
<td>2150</td>
<td>1350</td>
</tr>
<tr>
<td>Flow, 0.01 inch. (0.25 mm)</td>
<td>10 - 16</td>
<td>10 - 18</td>
</tr>
<tr>
<td>Air Voids (percent)</td>
<td>3.5</td>
<td>3.5</td>
</tr>
</tbody>
</table>

Percent VMA (minimum):

<table>
<thead>
<tr>
<th>Gradation 3</th>
<th>16</th>
<th>16</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gradation 2</td>
<td>15</td>
<td>15</td>
</tr>
<tr>
<td>Gradation 1</td>
<td>14</td>
<td>14</td>
</tr>
</tbody>
</table>

P401 Hot Mix Asphalt (HMA)
Acceptance Criteria

(1) Air voids
(2) Mat density
(3) Joint density
(4) Thickness
(5) Smoothness
(6) Grade

(7) Stability (for Marshall only)
(8) Flow (for Marshall only)

and

Implementation of the Contractor Quality Control Program and test results
P401 Hot Mix Asphalt (HMA)

Smoothness

- Clarified how to measure…measure within 24 hours
- Longitudinal: Intent is to minimize bumps / Dips that could cause operational issues with AC
- Transverse: Intent is to prevent areas that could pond water > ¼”
- 12’ straightedge move forward ½ length starting with ½ off
- Profilograph intended for RW & TW
  - Not necessarily appropriate for all projects, e.g. RW widening, not appropriate on apron. Need MOS to change PI limits

P501 Portland Cement Concrete

Reactivity Tests

- Expansion < 0.10% @ 28 days @ ASTM C1260
- Combined < 0.10% @ 28 days @ ASTM C1567
  - If Lithium nitrate follow Corps of Engineers CRD 662

Aggregate Requirements

- Free of ferrous sulfides, such as pyrite
- Deleterious Limits Tighter but still may not be tight enough if in an area with know problems
P501 Portland Cement Concrete

Combined Aggregate Gradation
- Define what must be submitted for 'optimized' mix
- Coarseness Factor: cumulative % retained on 3/8 / cumulative % retained on sieve no 8
- Workability Factor: % passing No 8

Mix Design by Accredited lab
Min cementitious material reduced to 470 lbs

Acceptance Strength
- May be different than design strength
- Acceptance Strength 28 day (or some other period)
- Compressive Strength vs. Flexural Strength
  Engineer/Airport can now select Compressive Strength
  Remains a Flexural Strength Design
  Acceptance testing can be Compressive – following laboratory testing requirements in Engineer Note.
P501 Portland Cement Concrete

Clarification on Smoothness
Remember purpose is primarily related to prevention of ponds (in transverse direction)
• Test within 48 Hours !
• Center of paving lane < 20’
• Third point of paving lane > 20’
• Profilograph not appropriate for all projects
  - May not be appropriate on aprons
  - Not appropriate on widening projects
  - May not be appropriate on keel section replacements
• MOS required to change Profilograph limits

FAA AC 150/5370-10G

Item P-601, Fuel Resistant Hot Mix Asphalt (HMA) Pavement

ADDED

This mix is to be used only as a surface course.

The minimum coarse thickness shall be 1 inch (25mm) and the maximum coarse thickness shall not exceed 2 inches (50 mm).
Item P-609, Emulsified Asphalt Seal Coat

ADDED

The asphalt material base residue shall contain not less than 20% gilsonite (natural asphalt).

Shall not contain any tall oil pitch or coal tar material.

An emulsified asphalt seal coat / sealer binder without aggregate, more commonly called a “fog seal”, can be considered for use on pavements with low to moderate weathered surfaces as defined by ASTM D5340.

Emulsified Asphalt surface treatments for:

- Taxiways and Runways w/application of a suitable aggregate to maintain adequate surface friction
- Airfield Secondary and Tertiary Pavements including low-speed taxiways, shoulders, overruns, roads, parking areas, and other general applications with or without aggregate applied
- New Asphalt Pavement and pavements in fair or better condition as defined in ASTM D 5340 or AC 150/5320-17
**Item P-608, Emulsified Asphalt Seal Coat**

W/application of a suitable aggregate

**Item P-629, Thermoplastic Coal Tar Emulsion Surface Treatments**

ADDED

Item P-629 is based on and replaces EB35A (1994)

The purpose of this thermoplastic resin coal-tar emulsion product is to provide a fuel resistant surface where pavements are subjected to fuel spills

**Composition and Application**

- Thermoplastic Coal Tar Emulsion Micro-Surfacing
- Thermoplastic Coal Tar Emulsion Sand Slurry Seal
- Spray Seal with [ without ] Sand Aggregate
FAA AC 150/5370-10G
Item P-629 Thermoplastic Coal Tar Emulsion Surface Treatments

Approved for use on general aviation airports serving small airplanes 12,500 lb or less (Note: The Engineer, with FAA approval, may specify this item for airports serving airplanes 60,000 lbs. or less)

Thermoplastic coal tar spray seal treatments may be used on Airfield Secondary and Tertiary Pavements

Thermoplastic coal tar spray seal treatments may be used for Taxiways and Runways w/application of a suitable aggregate to maintain adequate surface friction

FAA AC 150/5370-10G
‘P’ Items related to asphalt pavement surface treatments:

P-608 Emulsified Asphalt Seal Coats / Natural Asphalt Sealer Binders
P-609 Seal Coat and Bituminous Surface Treatments
P-626 Emulsified Asphalt Slurry Seal Surface Treatment
P-629 Thermoplastic Coal-Tar Emulsion Surface Treatments
P-630 Refined Coal Tar Emulsion Without Additives, Slurry Seal Surface Treatment
P-631 Refined Coal Tar Emulsion With Additives, Slurry Seal Surface Treatment
P-632 Bituminous Pavement Rejuvenation

Including Engineering Briefs:
DRAFT EB7X Rejuvenation Product Qualification Procedure and Requirements Draft
DRAFT EB 68 Four Component Coal-Tar Sealer Rejuvenator
EB 62 Polymer Composite Micro-Overlay for Fuel-Resistant Wearing Surfaces
EB 60 Semi-Flexible Wearing Course for Apron Pavement
EB 41 Coal Tar Sealer Rejuvenator
EB 44B Revised Coal Tar Sealer Rejuvenator Specification
EB 35A Thermoplastic Coal-Tar Emulsion Slurry Seal

Federal Aviation Administration
"620-2.1 - Materials Acceptance"
All material shall arrive in sealed containers 55 gallons or smaller for inspection by the Engineer. Material shall not be loaded into the equipment until inspected by the Engineer.

"620-2.2 – Marking Materials"
Federal Standard Color for Green, 34108
Thermoplastic airport markings will be subject to an Engineering life-cycle cost analysis prior to inclusion in specifications

"620-2.3 Reflective Media"
The Engineer should consult with the paint and bead manufacturer on the use of adhesion, flow promoting, and/or flotation additives.

Reflective performance must be measured in accordance with ASTM E1710 and with the practices in ASTM D7585 shall be followed for taking retroreflectivity readings with a portable retro-reflectometer and computing measurement averages.
"620-3.1 Weather Limitations"
Markings shall not be applied when the wind speed exceeds 10 mph unless windscreens are used to shroud the material guns.

"620-3.3 Surface Preparation“
New section may not have it 100% right but headed in correct direction. Stay tuned may be some changes.

"620-3.6 Test Strip“
Prior to the full application of airfield markings
In the presence of the Engineer
To establish thickness/darkness standard for all markings

• Temporary Markings 30-50% rate serve as primer

• Wait for surface (both HMA & PCC) to cure prior to full application

• Need to apply full thickness to get beads to hold
Overview
AC 150/5380-7B
Airport Pavement Management Program (PMP)

Airport Pavement Management

- 1988: Advisory Circular (AC) 150/5380-7, Pavement Management System was published.

- 1995: Public Law 103-305 was passed requiring that for an airport agency to be eligible for federal funding it must be able to show that it has an effective pavement maintenance management system in place.

- 2003: AC 150/5380-6A, Guidelines and Procedures for Maintenance of Airport Pavements [ASTM D5340 for pavement condition surveys replaced written procedure; Appendix A outlines effective pavement maintenance management program]

- 2006: AC 150/5380-7A, Airport Pavement Management Program published. [references Appendix A in 5380-6A]

- 2007: AC 150/5380-6B, [added ASTM Distress Types and Tables associating Distress Types with Maintenance/Repair]

- 2014: AC 150/5380-7B and 150/5380-6C
FAA AC 150/5380-7B
Airport Pavement Management Program (PMP)

What is the purpose of this advisory circular (AC)?

Discusses
• The Airport Pavement Management Program (PMP) concept,
• its basic essential components, and
• how it is used to make cost-effective decisions about pavement maintenance and rehabilitation (M&R).

The terms “pavement management program (PMP),” “pavement maintenance-management program (PMMP),” and “pavement management system (PMS)” are interchangeable.

FAA AC 150/5380-7B and FAA AC 150/5380-6C

Why and what is the purpose of both ACs now?

To clarify and separate maintenance and management

• To be eligible for federal funding - an effective pavement maintenance management system must be in place

• Maintenance is responsibility of Airport/Owner
• Maintenance AC is for maintenance and minor repairs of airport pavements by airport maintenance staff
FAA AC 150/5380-7B
PRINCIPAL CHANGES

Included airfield inspection frequency requirement in Cover Letter and Appendix A.

Added new Appendix A, Pavement Management Program (PMP), which addresses minimum PMP requirements (previously Appendix A in AC 150/5380-6)

Federally obligated airports must perform a detailed inspection of airfield pavements at least once a year for the PMP. If a pavement condition index (PCI) survey is performed, as set forth in ASTM D5340, Standard Test Method for Airport Pavement Condition Index Surveys, the frequency of the detailed inspections by PCI surveys may be extended to three years.

The PMP inspections are in addition to routine maintenance inspections for operations.
PRINCIPAL CHANGES

Added new Appendix B, Pavement Condition Index (PCI) Method

Added new Appendix C, PaverTM Distress Identification Manuals, with link to manuals.

Updated Appendix D, Related Reading Material

Added information on requirements to implement a PMP, i.e., AIP Grant Assurance 11

Added discussion on pavement preservation concept and new Figure.

Airport Pavement Management Program (PMP)

Typical Pavement Condition Life Cycle
When implementing a PMP, note the distinction between rehabilitation and routine maintenance activities.

Routine maintenance is required to preserve the pavement to achieve the design life of the pavement.

Routine maintenance consists of work planned and performed on a routine basis to maintain and preserve the condition of the airport pavements and is an integral part of the overall pavement preservation concept.

This includes items such as yearly crack sealing and daily inspections of the airport pavement system.
Benefits of a PMP

• Increased pavement useful life.
• An objective and consistent evaluation of the condition of a network of pavements.
• A systematic and documentable engineering basis for determining M&R needs.
• Identifying budget requirements necessary to maintain pavement functionality.
• Documentation on the present and future condition of the pavements.
• Life Cycle Cost Analysis for various M&R alternatives.
• Identifying the impact on the pavement if no major repairs are performed.

Components of a PMP

Database There are several elements critical to making good pavement M&R decisions

Pavement inventory
Pavement structure
M&R history, including costs
Pavement condition data
Traffic data
Components of a PMP

System Capabilities

Predicting current and future pavement condition

Determining optimum M&R plans for a given budget

Determining budget requirements to meet management objectives

Facilitating the formulation and prioritization of M&R projects

PMP Management Levels

Network-level management. In network-level management, questions are answered about short-term and long-term budget needs, the overall condition of the network (current and future), and pavements to be considered at the project level.

A network level evaluation can be utilized to optimize funding and prioritize M&R techniques so decisions are made for the management of an entire pavement network.

For example, local consideration, might comprise all the pavements on an airport and, for state consideration, all the pavements in the state airport system.
PMP Management Levels

Project-level management. In project-level management, decisions are made about the most cost-effective M&R alternative for the pavements identified in the network analysis.

- At this level, each specified pavement should have a new detailed condition survey.
- A project normally consists of multiple pavement sections and may include different M&R actions for different sections.
- Roughness and friction measurements may be useful for project development. Nondestructive and/or destructive tests may be necessary to determine the pavement's load-carrying capacity.

Reports for a PMP

Inventory Report
Inspection Scheduling Report
Pavement Condition Report
Budget Planning Report
Network Maintenance Report
Economic Analysis Report
Other Reports
Appendix B  Pavement Condition Index (PCI) Method

Example PCI Rating Scales for Airfield Pavements

PAVEMENT PRESERVATION
Applying the right treatment to the right pavement at the right time
Timing for Pavement Seal Treatment

Pennies Saving Dollars
Preservation = ¢ SY
Corrective = $ SY
Rehabilitation = $$ SY
Reconstruction = $$$$ SY

Preventative Maintenance
Life Expectancy of Treatments

<table>
<thead>
<tr>
<th>Estimated Life Extensions (years)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Surface Treatment</td>
</tr>
<tr>
<td>Fog Seal/Rejuvenator</td>
</tr>
<tr>
<td>Spray Applied Seal</td>
</tr>
<tr>
<td>Chip Seal</td>
</tr>
<tr>
<td>Slurry Seal</td>
</tr>
<tr>
<td>Microsurfacing</td>
</tr>
</tbody>
</table>

Table is based on AAPTP Report
Not FAA Policy to date
Discussion on Seal Coats/Modified Seal Coats and FY14 AC Updates

SEAL COAT/ MODIFIED SEAL COAT

Asphalt seal coats are composed of a thin layer of an asphalt material, generally emulsions. Modifiers are often added to the asphaltic liquid mixture which include:

- Polymer-Modified Emulsions
- Gilsonite -Modified Emulsions
- High-Float Asphalt Emulsions
- Rejuvenating Emulsions
New Update Advisory Circular & Standard

150/5370-10G  Standards for Specifying Construction of Airports

P-608 Emulsified Asphalt Seal Coat

This specification covers the requirements for emulsified asphalt surface treatments (not coal tars products) for taxiways and runways with the application of a suitable aggregate to maintain adequate surface friction; airfield secondary and tertiary pavements including low-speed taxiways, shoulders, overruns, roads, parking areas, and other general applications with or without aggregate applied.

The emulsified asphalt seal coat and sealer binder may be applied to new asphalt pavement and pavements in fair or better condition as defined in ASTM D5340 or advisory circular (AC) 150/5320-17, Airfield Pavement Surface Evaluation and Rating (PASER) Manuals.

New Update Advisory Circular & Standard

P-608 Emulsified Asphalt Seal Coat

Emulsified asphalt surface treatment composed of:
- An emulsion of natural* and refined asphalt materials,
- Water, and if specified,
- A polymer additive.

For taxiways and runways, aggregate shall be:
- Dry, clean, dust and dirt free,
- Sound, durable, angular shaped manufactured specialty sand (such as that used as an abrasive),
- A Mohs hardness of 6 to 8,
- A specified percent retained gradation

*The asphalt material base residue shall contain not less than 20% gilsonite, or uintaite and shall not contain any tall oil pitch or coal tar material.
Overview
AC 150/5380-6C
Guidelines and Procedures for Maintenance of Airport Pavements

Overview
Principal Changes
Highlights of Advisory Circular
Not intended to be used on AIP funded maintenance projects
Principal Changes

Complete Revision

- Revised and reformatted entire AC, updated references
- Added Section on Safety
- Simplified Chapter on background of Airport Pavements
- Focus of who main audience of AC clarified
- Deleted Generic Specifications and Developed Simplified Quick Repair Guide
- Deleted Appendix on Pavement Maintenance Management Program now in AC 150/5380-7

Focus of who the main audience is for this Advisory Circular

- Recommended for the maintenance and minor repairs of airport pavements
- Offers general guidance for maintenance and is neither binding nor regulatory
- Use of this AC is not mandatory
- For major maintenance projects, the airport should utilize plans and specifications developed under the direction of a pavement design engineer

Focus Audience? Airport Owners/Staff
Chapter 1. Introduction to Airport Pavement Maintenance

• General
  • Introduction provides basics
  • Stresses importance of timely preventative and regular recurring maintenance

• Operational Safety
  • Construction Safety and Phasing Plan CSPP should be used for all maintenance activities
  • Regardless of whether Contractor or others are used for repair

Chapter 2. Airport Pavements

• Types of pavements
  • Flexible pavement composition and structure
  • Rigid pavement composition and structure
Chapter 2. Airport Pavements

- Drainage of airport pavements
  - General overview of Surface and Subsurface
  - Maintenance of subsurface drainage systems
  - Drainage inspection
  - Wildlife hazard attractants and mitigation
- Pavement Management Program (PMP)
- Friction
- Nondestructive Testing (NDT)

Chapter 3. Pavement Distress

- Generally follow:
  - ASTM D5350 Standard Test Method for Airport Pavement Condition Index Surveys
  - ASTM D 6433 Standard Practice for Roads and Parking Lots Pavement Condition Index Surveys
Flexible Pavement Distress

- Flexible Distresses
  - **Cracking** (L&T, Block, Reflection, Alligator, slippage)
  - **Disintegration** (raveling, weathering, potholes, stripping, jet blast, patching)
  - **Distortion** (Rutting, corrugation, shoving, depressions, swelling)
  - **Loss of Skid Resistance** (Polished aggregate, contaminant’s, bleeding, fuel spillage)

Rigid Pavement Distress

- Rigid Distresses
  - **Cracking** (longitudinal, transverse, diagonal, corner breaks, Durability, Shrinkage, Shattered)
  - **Joint Seal Damage**
  - **Disintegration** (Scaling, map cracking, ASR, Joint spall, corner spall, blowups, popouts, patching, utility cuts)
  - **Distortion** (Pumping, settlement)
  - **Loss of Skid Resistance**
Chapter 4. Guidelines for Inspection of Pavements

- Introduction to pavement inspection
  - Inspection procedures
  - Inspection schedules
  - Recordkeeping

Repair Procedures

- Intended for airport maintenance personnel
- Quick guide for maintenance and repair
  - First ID distress
  - Next review Quick Guide Table (Chapter 6)
- Repair Guides in Appendix intended to be for local airport maintenance personnel to follow
- One page guides that could be laminated and used as training for personnel
Flexible Pavement Repair

• Regardless of cause of distress, repairs fall into one of following categories:
  • Crack Repair
  • Partial Depth Repair
  • Full Depth Repair
Rigid Pavement Repair

- Crack Repair / Joint Sealing & Resealing
- Full Depth Repair
  - Corner Break
  - Partial Slab
  - Full Slab
- Partial Depth Repair
- Temporary Patching
A. FULL DEPTH REPAIR IN RIGID PAVEMENT - CORNER BREAK

Figure 6.5. Full Depth Repair in Rigid Pavement - Corner Break

REPAIR PROCEDURE

1. Remove the concrete saddle and placing block (CSPB). Ensure all permanent closures have been removed, and inspect the pavement for any indication of distress. Clear the area around the saddle and place the saddle and joint into position, and then compact. See Figure 6.5.

2. If the saddle is to be replaced, remove the old saddle by cutting through the concrete underneath the saddle and breaking the edge of the concrete. Install a new saddle and compact. See Figure 6.5.

3. If the concrete saddle and placing block (CSPB) is to be replaced, remove the old saddle by cutting through the concrete underneath the saddle and breaking the edge of the concrete. Install a new saddle and compact. See Figure 6.5.

MATERIAL REQUIREMENTS

- ASTM A770 Standard Specification for Epoxy Powder Coating for Concrete
- ASTM A183 Standard Specification for Deformed and Plain Carbon Steel Bars for Concrete Rebars
- ASTM C33 Standard Specification for Concrete Cushion
- E-1200 Portland Cements (PCU) Permanent, AC 150/940-85, ASTM Standards for Specifying Concretes of Spalling
- Spalling of Concrete of Spalling

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A. FULL DEPTH REPAIR IN RIGID PAVEMENT - PARTIAL SLAB REPLACEMENT

Figure 6.6. Full Depth Repair in Rigid Pavement - Partial Slab Replacement

REPAIR PROCEDURE

1. Remove the concrete saddle and placing block (CSPB). Ensure all permanent closures have been removed, and inspect the pavement for any indication of distress. Clear the area around the saddle and place the saddle and joint into position, and then compact. See Figure 6.6.

2. If the saddle is to be replaced, remove the old saddle by cutting through the concrete underneath the saddle and breaking the edge of the concrete. Install a new saddle and compact. See Figure 6.6.

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Thank You

Questions / Discussion

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