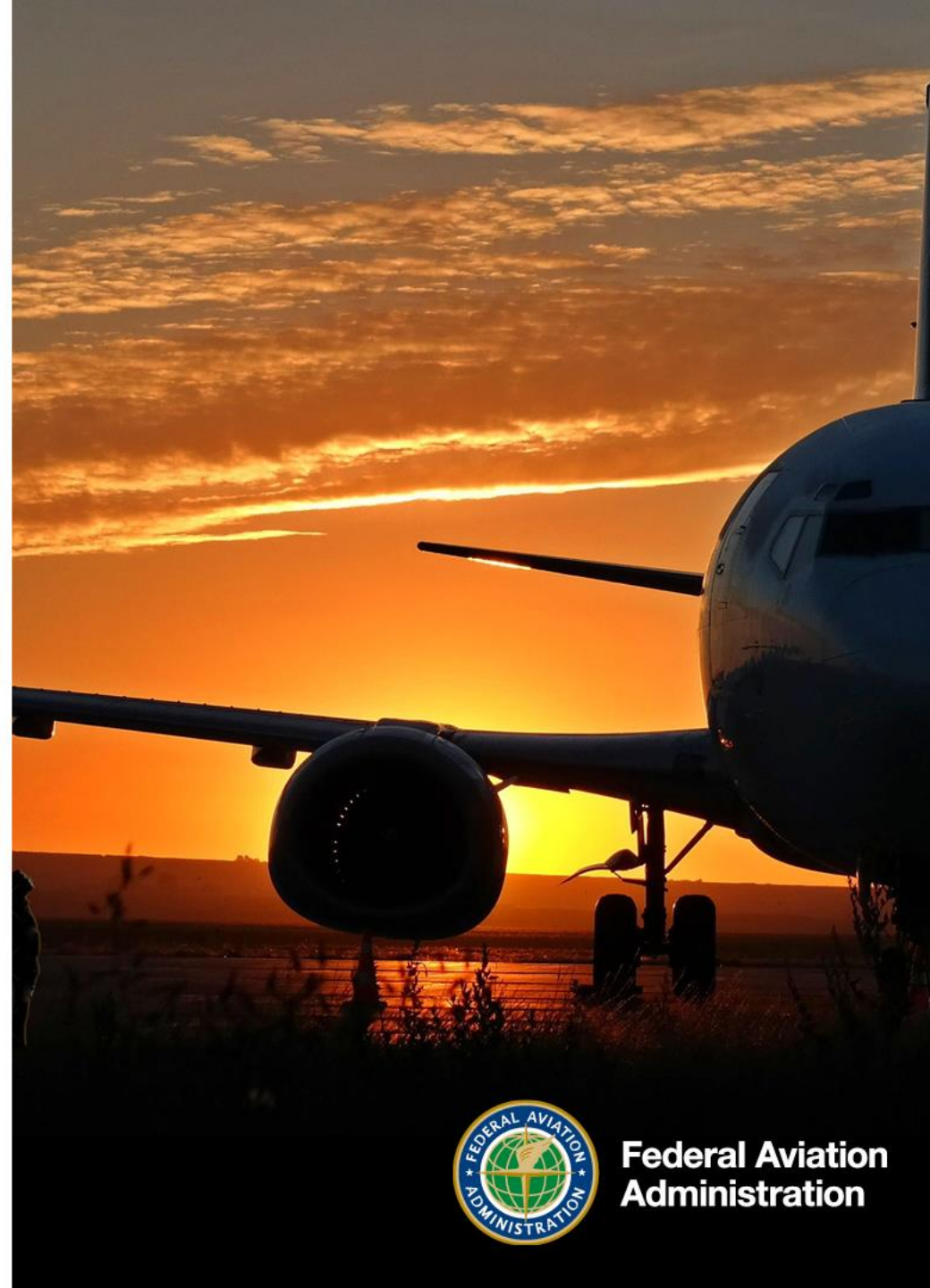


Pavement Issues – Best Practices for Design and Construction

Presented to: ARP National Consultant Workshop (AAS)
Fort Worth, TX

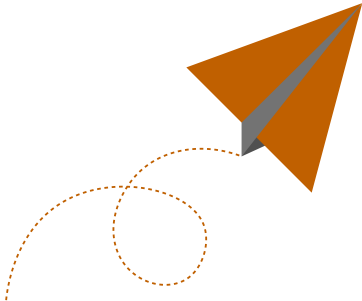
By: Harold Honey, P.E., PMP

Date: August 27, 2024



**Federal Aviation
Administration**

When can I open my runway?



Pavement Drainage Layers

- Drainage Layer Guidance provided in AC 150/5320-6G paragraph 3.7
 - Drainage layers are recommended for use on pavement serving aircraft over 60,000 lbs.
 - May replace the stabilized base under rigid pavement
 - Recommended to be place on top of subgrade with flexible pavement
- Drainage layer design guidance is in AC 150/5320-5D Appendix A
 - Typically constructed with edge drains, but interior drains may be used
 - FAA recommends 6-inch drainage layer. But drainage layer can be designed for specific local conditions with DoD PCASE program



Drainage Layer Specifications

- P-307 Cement Treated Permeable Base
 - First issued in 2018 with AC 150/5370-10H
 - Current version can be difficult to achieve acceptance even when constructed properly
- P-407 Asphalt Treated Permeable Base
 - First issued in 2021 as EB-102
 - Asphalt stabilized drainage layers not as common as cement



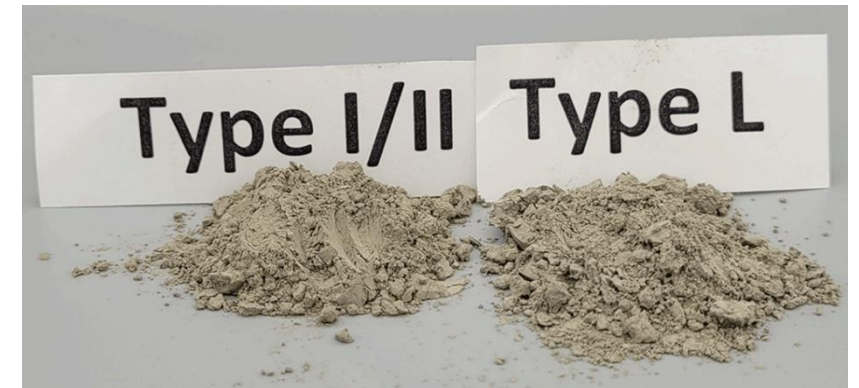
Why use a drainage layer?

- Provides drainage path to rapidly remove moisture from pavement system
 - A saturated pavement system can significantly reduce structural performance
 - Goal is to drain 85% of moisture from runway and taxiway pavement in 24 hours
- Drainage layer provides reservoir to collect water during surge events while maintaining pavement strength
 - The thicker the drainage layer, the more the capacity. Think of a sponge.
- Provides area to hold water during post-freeze thaws while the underlying materials and drainage structures are still frozen reducing thaw weakening of pavement



Portland Limestone Cement (PLC)

- Industry started transition from Original Portland Cement (OPC) to Portland Limestone Cement (PLC) in 2022
 - Reduces carbon emissions as first step in industry drive to net zero
 - Industry expected to be fully transitioned to PLC as primary cement on market by end of 2023
- FAA Issued EB-106 in 2023 providing guidance
 - FAA has included PLC in standard specifications since 2014



PLC Implementation Challenges

- PLC requires higher water demand than OPC. Mixes need to be adjusted appropriately with admixtures, or adjustments to w/c ratio
 - Shrinkage cracks can form if water demand is not accounted for
- Limestone in PLC is non-reactive and becomes a fine aggregate in the final concrete matrix
 - Can create too much mortar if not adjusted for properly in mix design
- Suppliers are having a higher variability in cement as they dial in PLC production
- Most issues seem to be going away as suppliers and contractors adjust



Pavement Strength Reporting Update

- AC 150/5335-5D *Standardized Method of Reporting Airport Pavement Strength* – PCR issue 4/29/2023
 - Adopts ICAO ACR/PCR method as new FAA standard method of reporting pavement strength replacing ICAO ACN/PCN system
- September 30, 2024 deadline for 14 CFR Part 139 certificated airports to assign PCRs to paved runways
 - ICAO implementation date for ACR/PCR is November 28, 2024
- As of August 15, 2024: 99 of ~935 Part 139 runways are reporting PCR



AC 150/5370-10 Update

- AC 150/5370-10J (Draft) *Standards for Specifying Construction of Airports*
 - 1st Draft is currently out for FAA Internal Review
 - Industry Review should be out in spring of 2025
 - Targeting publication in 2026
- Most comprehensive update since -10B was released in 2005



-10J Update Facts

- Reduced entire AC by ~100 pages
- Deleted 7 Items
 - Most were combined with similar specs with options to select materials
- Added 5 Items
- Incorporated 3 EBs
 - EB-66 Rubblization (P-215), EB-102 ATPB (P-407), EB 106 (Cement changes)
- Significant revisions to stabilized bases, asphalt and concrete specs
- Renumbered and re-arranged items to match standard format



AC 150/5370-12 Update

- AC150/5370-12C (Draft) *Quality Management for Federally Funded Airport Construction Projects*
- Major Updates planned
 - Align AC with changes in 5370-10
 - Updated guidance on roles of RPR
 - Additional discussion on relationship between CQC and Owner quality management
 - Expanded discussion on reasonably close conformance for acceptance
 - Guidance on building CMPs for projects of all sizes

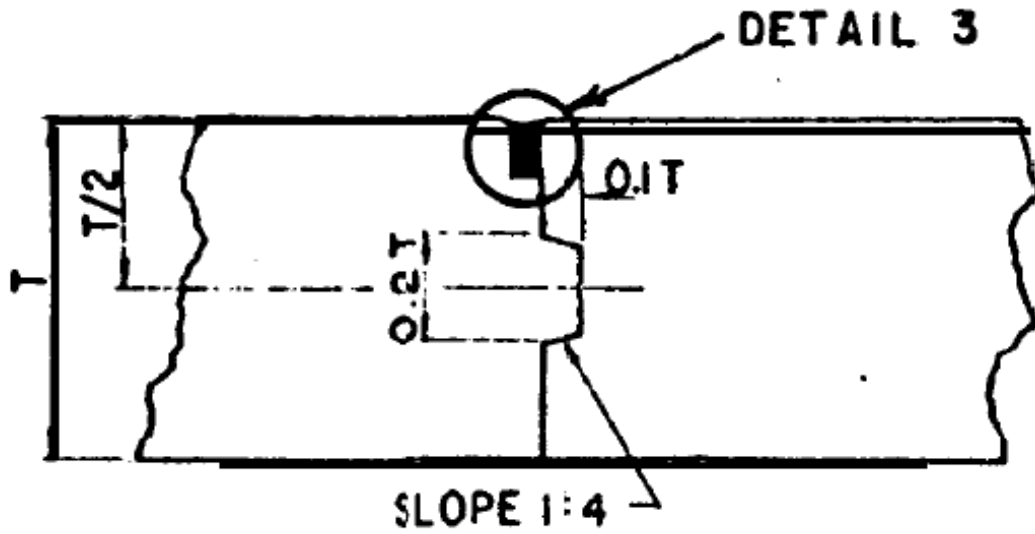


AC 150/5320-6 Update

- AC150/5320-6G Change 1 (maybe -6H?) (Draft) *Airport Pavement Design and Evaluation*
- Major Updates planned
 - Align AC with changes in 5370-10J
 - Revised guidance on selection of pavement section using LCCA
 - Guidance on incorporating sustainability and resilience into pavement design
 - New/improved guidance on use of drainage layers and stabilized base
 - Incorporation of EB-66 (concrete rubblization) design guidance
 - Improved guidance on Full Depth Reclamation



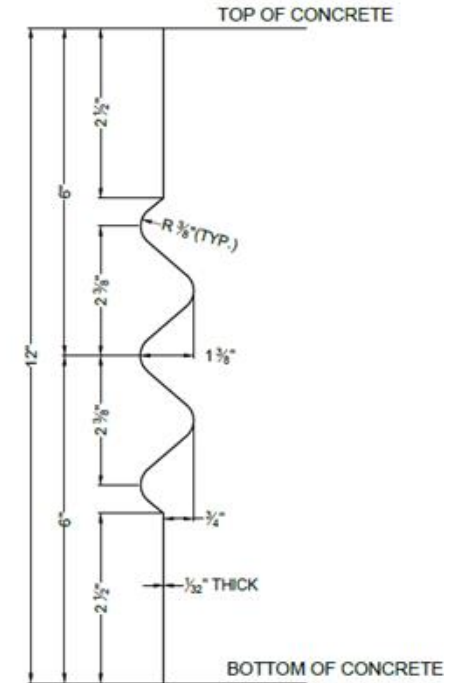
Sinusoidal Longitudinal Construction Joints



TYPE C - KEYED



SINUSOIDAL KEYWAY LONGITUDINAL JOINT



How Joint was Constructed - NAPTF



Where is the FAA going with Sinusoidal Joint

- Evaluated at FAA NAPTF as part of Construction Cycle – 8
 - Currently in post-traffic analysis
 - Initial findings indicate similar performance to traditional doweled construction joints
 - Final report will be published with full analysis of findings
- Joints have been constructed at limited airports
- May become optional joint in update to AC 150/5320-6G
 - Consider savings in dowel bars and construction time vs. modifying paver



Early Completion Incentive

- P.L. 117-186 Expedited Delivery of Airport Infrastructure Act of 2021
 - Signed into law Oct 10, 2022
 - Modifies 49 U.S. Code § 47710 to make allowable incentive payments to a contractor for early completion of a construction project.
 - Allows for incentive payment of up to 5% of the contract, or \$1M, whichever is less
 - If project is phased, FAA may approve incentive payment for each phase
- APP is finalizing a PGL that will be issued with procedures and rules to incorporate incentives into a grant project
 - 5370-10J update will include appropriate language in General Provisions



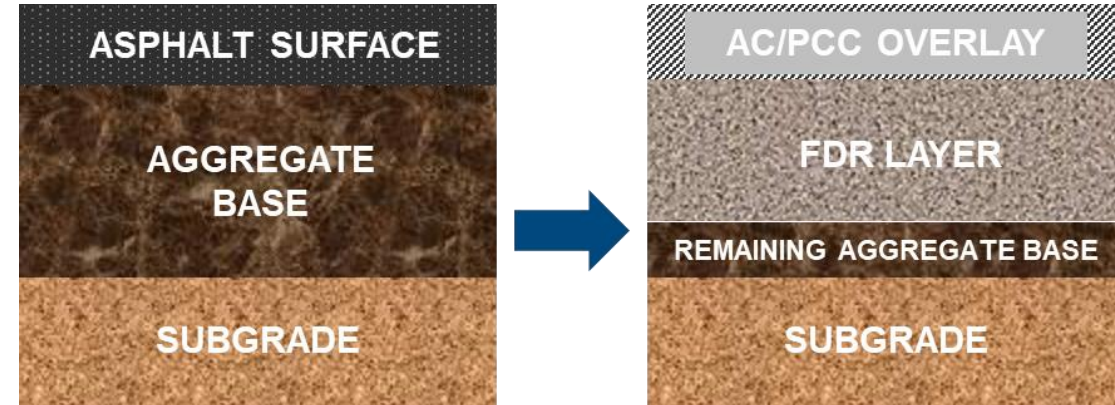
FAA Reauthorization Provisions Related to Construction

- Sec 707 Price Adjustment Provisions. This Section allows the FAA to incorporate price adjustment provisions into an AIP grant to account for labor or material cost inflation
 - APP leading team to develop PGL with guidance
- Sec 723 Alternative Project Delivery. This section authorize the FAA to approve AIP grants for projects that use innovative financing techniques.
 - APP is lead. Any recommended changes to AC 150/5370-10 or 5370-12 will be implemented as needed.



Full Depth Reclamation (FDR)

- Item P-207 in AC 150/5370-10H
- Existing asphalt surface and underlying aggregate layers are pulverized and mixed in-place
 - Stabilization may be used to improve material or create construction platform
 - Virgin aggregate may be blended in to control gradation
- New asphalt or concrete surface paved over FDR base



Full Depth Reclamation (FDR) - Challenges

- Requires extensive geotechnical investigation
 - Existing pavement profile
 - Depth of pulverization/mixing
 - Quality and gradation of FDR material
 - Modulus for design
- Not all pavement is a candidate. Sometimes the Geotech says no!
- Look for further design guidance in update to -6G



Concrete Overlays of Asphalt Pavement

- Concrete overlay is alternative to FDR
- Thin concrete overlays is placed directly on asphalt pavement
 - Can be placed on deteriorated asphalt surfaces
 - Profile milling may be needed
 - Typical overlay is 5-7 inches
 - Smaller joint spacing improves performance
- FAA Southern Region has done almost 2 dozen concrete overlay projects since 1998



Questions?



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