

***Subsurface Drainage System Benefits in Airport Pavement Performance***

Click here to see problem statement in IdeaHub: <http://ideascale.com/t/UKsrZBPxQ> (Note: you must be a registered user in myACRP/IdeaHub.)

**TAGS:** Construction, Design, Environment, Maintenance, Sustainability, Water Quality

**STAFF COMMENTS**

The proposed research should consider the results of ACRP Research Report 178: Guidance for Usage of Permeable Pavement at Airports, which touches on draining.

**AVERAGE INDUSTRY RATING SUMMARY**

|                | <b>Committees<sup>1</sup></b> | <b>Airport Community<sup>2</sup></b> |
|----------------|-------------------------------|--------------------------------------|
| Achievable     | 3.00                          | 3.88                                 |
| Applicable     | 4.00                          | 4.25                                 |
| Implementable  | 4.00                          | 3.57                                 |
| Understandable | 4.00                          | 4.38                                 |
| <b>OVERALL</b> | <b>3.75</b>                   | <b>4.05</b>                          |

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Notes: 1. Includes TRB aviation committees and committees from ACI-NA and AAAE.

2. Includes airport employees serving on active ACRP project panels.

[USE THIS LINK TO SEE DETAILED INDUSTRY RATINGS.](#) Click on the arrow in the Problem Statements dropdown menu in the upper right and select the problem statement number.

[USE THIS LINK TO SEE DETAILED INDUSTRY COMMENTS.](#) Click on the arrow in the Problem Statements dropdown menu in the upper right and select the problem statement number.

**ACRP OVERSIGHT COMMITTEE (AOC) DISPOSITION**

The average AOC rating among its voting members was 2.5 on a scale of 1 to 5. There was no discussion. The problem statement was not selected for ACRP funding and will be returned to the idea collection phase of ACRP's IdeaHub.

## **ACRP Problem Statement: 20**

### **Subsurface Drainage System Benefits in Airport Pavement Performance**

**TAGS:** Construction, Design, Environment, Maintenance, Sustainability, Water Quality

#### **OBJECTIVE**

This research would summarize the best of practices through survey of airports and consultants; evaluate the effectiveness of subsurface drainage configurations by investigating field performance of airport pavements with and without drainage features; quantify the cost and benefits of including subsurface drainage by comparing any potential extension in service-life with increased construction and maintenance costs; and formulate recommendations of subsurface material properties and the FAARFIELD implementation.

#### **BACKGROUND**

It is a common practice to incorporate positive subsurface drainage features into airport pavements to address surface infiltration water. The use of such features usually increase the cost of construction and raise the question whether the increased construction cost is offset by a proportional increase in pavement performance. Although the Federal Aviation Administration specification (AC 150/5320-5, G-3.3.1) and Department of Defense specification (Unified Facilities Criteria 3-260-02) outline the criteria for requiring a subsurface drainage system, there has been no study dedicated to summarize the best of practices and to verify the benefits of using such systems. In addition, although the specification states that certain subsurface drainage layers could be considered as base layers in pavement design, the FAARFIELD design software does not consider any factors of drainage in the calculation, which may result in under- or over-estimate of the design thickness.

#### **APPROACH TO RESEARCH**

##### Proposed Tasks

- 1) Perform literature search and review
- 2) Conduct agency industry survey
- 3) Conduct site visits of agency and industry representatives
- 4) Develop guide document for best practices
- 5) Review and identify model for unbound layer and subgrade
- 6) Develop a plan for treated and untreated permeable pavement models that can be incorporated in FAARFIELD

#### **COST AND JUSTIFICATION**

##### Estimated Funding

The funding for developing a guidebook for standards on best practices in the use of pervious pavement is estimated at \$400,000

##### Estimated Research Duration

The estimated duration for the proposed tasks outlined above is 15 months, which includes an estimated 3 months for the ACRP approval process.

## **RELATED RESEARCH**

- 1) FAA Advisory Circulars, 150/5320-5D - Airport Drainage Design, Federal Aviation Administration, Washington D.C., 2013
- 2) Unified Facilities Criteria, UFC 3-260-02, Pavement Design for Airfields, Department of Defense, Washington D.C., 2001
- 3) Kathleen Hall, and Carlos Correa, Effects of Subsurface Drainage on Performance of Asphalt and Concrete Pavements, National Cooperative Highway Research Program (NCHRP) Report 499, Transportation Research Board, 2003
- 4) Vincent C. Janoo, Robert Eaton, and Lynette Barna, Evaluation of Airport Subsurface Materials, US Army Corps of Engineers Cole Regions Research and Engineering Laboratory, 1997
- 5) Harry Cedergren, Ken O'Brien, and Jorge Arman, Guidelines for the Design of Subsurface Drainage Systems for Highway Structural Sections, FHWA-RD-72-30, FHWA, 1972

## **IDEA CREATOR**

*Person who first shared the idea with the IdeaHub community.*

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## **OWNER/SUBMITTER**

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