

Federal Aviation Administration

Non-nuclear Devices & State Specifications for Airport Pavements

Presented to: REDAC By: Navneet Garg, Ph.D. Date: March 4, 2020

Research Request from AAS-100

- Specification for Use of Non-nuclear Technology in Measuring Properties of Unbound Pavement Materials April 30, 2018
- In-Service Performance of Airport Pavements Constructed Following State Specifications for Highway Materials August 8, 2018



Specification for Use of Non-nuclear Technology in Measuring Properties of Unbound Pavement Materials

 Center for Transportation Infrastructure Systems (CTIS) University of Texas at El Paso (UTEP), Texas Research Grant
Principal Investigator: Dr. Soheil Nazarian
Duration: 18 months
Budget: \$155,000
Awarded: September 26, 2019



Challenges with Current Density-Based Practice



Quality Control (Density-Based) is not tied with Design (Modulus-Based) Moisture Content is not strictly controlled Condition (Stiffness) of underlying layers are undefined



Specification for Use of Non-nuclear Technology in Measuring Properties of Unbound Pavement Materials

Scope of Work

- Investigate alternative ways of acceptance of unbound pavement materials (subgrade, subbase and base) based on modulus, density or other material properties.
- Develop draft specifications for acceptance of constructed layers based on alternate methods/devices.



In-Place Measurement of Unbound Material Properties

Modulus-based Devices



Light Weight Deflectometer (LWD)



Portable Seismic Pavement Analyzer (PSPA)

Alternative Density-based Devices





Project Schedule

Task Identifications		Phase I							Phase II									
		2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Phase I – Review of State of Art/Practice																		
Task 1.1 – Kick-off Meeting																		
Task 1.2 – Comprehensive Information Search																		
Task 1.3 – Review of Existing Data																		
Task 1.4 – Finalizing Work Plan																		
Phase II – Data Analysis																		
Task 2.1 – Develop Prototype																		
Task 2.3 – Analysis of Available Data in Support of Specification																		
Task 2.3 – Collect Missing Data *																		
Phase III – Development of Deliverables																		
Deliverables																		
Technical Memorandum																		
Final Report																		
Meetings																		
Potential Meetings																		



In-Service Performance of Airport Pavements Constructed Following State Specifications for Highway Materials

 National Center for Asphalt Technology (NCAT) Auburn University, Auburn, Alabama Other Transaction Agreement (OTA) Principal Investigator: Dr. Randy West Duration: 24 months Budget: \$250,000 Awarded: September 11, 2019



Need for this research

- The FAA Reauthorization Act of 2018 Sec 136 requires the FAA to use specifications for highway materials for pavements at non-primary airports serving aircraft less than 60,000 pounds when requested by the state.
- Since this legislation requires the use of specifications that were not developed considering aircraft loads, tire pressures, and loading patterns, this study will provide the FAA with actual in-service performance data to evaluate if state highway materials can perform satisfactorily at non-primary public use airports serving aircraft less than 60,000 pounds gross weight. This study will evaluate all types of pavement materials, asphalt, concrete, and aggregate base materials.



Need for this research





Project Scope

- Field studies to follow the in-service performance of airport pavements constructed with materials meeting State Highway Specifications.
- Comparison of State Highway Specifications to FAA specifications.
- If significant differences in performance are observed in Phase-I, then Phase-II study will be required to identify minimum performance standards for materials used for pavement construction for airports serving aircraft less than 60,000 pounds. This phase would include laboratory and full scale testing.



<u>PHASE-I:</u>

TASK 1: Monitor In-Service Performance of Airport Pavements Constructed Using State Highway Specifications

TASK 2: Conduct Literature Review

TASK 3: Conduct Numerical Analysis

TASK 4: Technical Report



<u>PHASE-II:</u>

TASK 5: Laboratory Study

TASK 6: Conduct Full-Scale Test

TASK 7: Technical Report



Task	Description		20	19			2020												2021		
		S	0	Ν	D	J	F	Μ	Α	Μ	J	J	Α	S	0	N	D	J	F	М	
1	Prepare Project Plan																				
2	Conduct Literature Review																				
3	Monitor In-Service Performance of Airports									44 14											
4	Prepare Final Report																				
les	Project Plan		X																		
verab	Quarterly Reports					х			X			Х			x			X			
Deli	Final Report																			х	

Table 2. Schedule and Deliverables





