BY ORDER OF THE
SECRETARY OF THE AIR FORCE

AIR FORCE INSTRUCTION 32-1041

25 APRIL 1994

Civil Engineering

AIRFIELD PAVEMENT EVALUATION PROGRAM

COMPLIANCE WITH THIS PUBLICATION IS MANDATORY

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This instruction implements AFPD 32-10, *Installations and Facilities*. It outlines responsibilities, requirements, and procedures for requesting, conducting, and reporting results of pavement structural evaluations; friction characteristics evaluations; pavement condition index (PCI) surveys; and roughness surveys.

SUMMARY OF CHANGES

This is the initial publication of AFI 32-1041, substantially revising AFR 93-13. This instruction contains updated information on procedures used by HQ AFCESA to plan and conduct airfield pavement evaluations and runway friction characteristics evaluations.

Chapter 1

PURPOSE AND ELEMENTS

1.1. How This Program Works:

1.1.1. The Air Force Airfield Pavement Evaluation Program consists of:

- •Airfield pavement structural evaluations.
- •Runway friction characteristics evaluations.
- •Pavement condition index (PCI) surveys.
- •Runway roughness evaluations.

1.1.2. The Air Force Airfield Pavement Evaluation Program obtains, compiles, and reports pavement strength, condition, and performance data on all airfields with present or potential Air Force missions. Pavement evaluations give operators and civil engineers the airfield pavement information they need to manage and control an airfield. These personnel use the results of pavement evaluation studies to:

- •Determine the size, type, gear configuration, and weight of aircraft that can safely operate from an airfield without damaging the pavement or the aircraft.
- •Develop operations usage patterns for a particular aircraft pavement system (for example, parking, apron use patterns, and taxiway routing).
- •Project or identify major maintenance or repair requirements for an airfield pavement system to support present or proposed aircraft missions. Evaluations provide engineering data to help in designing projects.
- •Help airbase mission and contingency planning functions by developing airfield layout and physical property data.
- •Develop and confirm design criteria.
- •Help justify major pavement projects.
- •Ensure flying safety by providing pavement surface data which quantify traction and roughness characteristics.

1.1.3. Air Force Civil Engineer Support Agency (AFCESA) teams provide engineering expertise, field test equipment, and laboratory capability to perform the tasks outlined below. AFCESA personnel perform required airfield pavement studies ranging from basic field investigations to complex and detailed airfield pavement evaluations.

1.2. Types of Evaluations:

1.2.1. **Airfield Pavement Structural Evaluation.** Determines a pavement's load-carrying capacity for various aircraft by testing the physical properties of the pavement in its current condition.

1.2.2. **Runway Friction Characteristics Evaluation.** Determines the hydroplaning potential of a runway surface under standardized wet conditions.

1.2.3. **Airfield Pavement Condition Index (PCI) Surveys.** Identifies and documents pavement distresses caused by aircraft loadings and environmental conditions. Base and command personnel use these data to:

- Determine the operational condition of pavements.
- Prioritize repair and construction projects.
- Determine whether an airfield structural pavement evaluation is needed.

Chapter 2

RESPONSIBILITIES

2.1. HQ AFCESA:

2.1.1. **Overall Responsibilities. AFCESA:**

- •Manages the airfield pavement structural evaluation and runway friction characteristics evaluation programs.
- •Develops and performs the annual schedules for pavement structural evaluations and runway friction characteristics evaluations based on MAJCOM priorities.
- •Monitors the airfield pavement condition index survey program and assists MAJCOMs to ensure the surveys are done on time.
- •Maintains a central file on airfield PCI surveys, pavement evaluations, and runway friction characteristics evaluations.
- •Consults on pavement evaluations, including runway roughness, and performs special pavement and soil studies as the MAJCOMs require.

2.1.2. **For Pavement Features. AFCESA:**

- •Identifies and numbers pavement features, generally to correspond to feature numbering in AFCESA's most current airfield pavement evaluation report.
- •Outlines in the PCI report where a feature differs from the feature numbering system used in the latest pavement evaluation report.
- •Coordinates with the BCE on the feature numbering system.

NOTE: In the PCI program, "branch" is synonymous with "feature"; however, the term "feature" is preferred on airfield pavement evaluation reports.

2.2. MAJCOM Civil Engineer:

- •Makes sure all MAJCOM operational bases conduct airfield PCI surveys on a 5-year recurring cycle, using technical guidance from the MAJCOM as required.
- •Makes sure that bases prepare and distribute airfield PCI survey reports.
- •Formally requests services from airfield pavement evaluation teams and pavement surface effects teams when needed, justified, properly supported, and prioritized.
- •Makes sure the base provides adequate transportation to ship pavement cores and soil samples from the base where an evaluation is conducted.

2.3. The Base Civil Engineer (BCE). The BCE accumulates and maintains background information for condition surveys, pavement evaluations, and friction characteristics evaluations.

NOTE: Base the feature boundaries on the airfield layout plan in the most recent airfield pavement evaluation report (see paragraph 2.1.2).

2.3.1. For supporting pavement evaluations, the BCE:

•Helps provide local transportation, clearances, runway closure times, billeting, field maintenance, airfield equipment, and other required support for AFCESA teams.

•Provides the labor force and equipment to excavate and backfill test sites and repair core holes.

•Arranges for both aerial (when the evaluation engineer approves) and surface photographic assistance, when required.

•Provides a qualified project officer and representative to support AFCESA evaluations and surveys.

•Conducts, writes, and distributes airfield PCI survey reports, changing feature designation (if necessary) as described in paragraph 2.1.2.

•Provides or arranges for shipping of pavement and soil samples.

Chapter 3

UPDATING PHYSICAL PROPERTY DATA

3.1. Required Information. To ensure that physical property data remain current, construction agencies must furnish the BCE the construction data on all airfield pavement projects. The BCE in turn provides a copy of the following information to HQ AFCESA:

- •Type of surface and texture (Portland cement concrete, asphaltic concrete, aggregate surface seal and burlap drag, wire combed, grooved, porous, rough, medium, smooth, and so on).
- •Type and source of fine and coarse aggregates (for example, basalt, dolomite, gabbro, granite, limestone, quartzite, scoria, silica, slag and manufactured, and pit).
- •Shape and hardness of aggregate (rounded, irregular, sharp, percentage with fractured faces and Los Angeles abrasion, scratch hardness, abrasion coefficient, and so on).
- •Gradation of aggregates and the amount and type of binder.
- •Thickness of the pavement and each layer in the pavement structure.
- •Subgrade and base course moisture contents and densities.
- •Asphaltic concrete test results.
- •Portland cement concrete flexural strength test results.

3.2. Updating Information. The BCE updates the physical property data for all airfield pavement projects that are under BCE control.

3.3. Changes in Physical Property Data. If the structural capacity of the airfield pavement undergoes major changes and previous pavement evaluations become obsolete, HQ AFCESA may use construction control data to reevaluate the pavement without cost to the base.

3.4. Missing or Inadequate Data. If an airfield pavement system undergoes significant structural changes but the BCE finds that construction data are either inadequate or unavailable, the BCE can request a new pavement evaluation (see paragraph 2.2).

Chapter 4

EVALUATION PARAMETERS

4.1. How Pavement Evaluation Procedures and Design Procedures Differ. In theory, the pavement evaluation procedure is the reverse of the design procedure. The design procedure employs a known design aircraft loading and foundation strength to determine the physical characteristics of the required pavement structure. The evaluation procedure employs known physical characteristics to determine allowable gross loads for specific aircraft. This section outlines some basic principles and factors that affect pavements and explains how to systematically obtain physical property data.

4.2. Size of Load. To compute loads on the pavement structure, the Air Force uses:

- •Aircraft gross weights.
- •Gear configurations.
- •Tire spacing (for multiple wheel assemblies).
- •Tire pressure or contact area.

To simplify the mechanics of the evaluation, HQ AFCESA assigns Air Force and selected commercial aircraft to thirteen aircraft groups (see figure 4.1). It then selects a controlling aircraft for those aircraft groups containing more than one aircraft. The controlling aircraft is the aircraft in a particular group that causes the maximum load on a pavement system.

4.3. Frequency of Load. Load repetitions (aircraft passes) greatly affect pavement life.

4.3.1. On runways and overruns, passes are the number of aircraft movements, by aircraft group, across an imaginary transverse line placed within 1,000 feet of the runway end. Since touch-and-go operations do not usually involve this area, they do not count as passes.

Figure 4.1. Aircraft Group Index and Pass Intensity Levels.

AIRCRAFT GROUP INDEX												
LIGHT LOAD			MEDIUM LOAD							HEAVY LOAD		
1	2	3	4	5	6	7	8	9	10	11	12	13
A-37	A-7	F-111*	C-130	C-7	737	727*	707	C-141	C-5	KC-10*	747	B-52
C-12	A-10	FB-111		C-9*	T-43*	C-22	E-3*	B-1*		DC-10	E-4*	
C-21	F-4			DC-9			C-135	B-757		L-1011	VC-25	
C-23*	F-5			C-140			KC-135*			C-17		
T-37	F-15*						VC-137					
	F-16						DC-8					
	F-10X						EC-18					
	T-33						A-300					
	T-38						B-767					
	T-39											
	OV-10						* CONTROLLING AIRCRAFT					
	C-20											

	GROSS WEIGHT LIMITS FOR AIRCRAFT GROUPS												
	1	2	3	4	5	6	7	8	9	10	11	12	13
	PAVEMENT CAPACITY IN KLBS												
Lowest Possible Gross Weight	5	7	49	69	22	61	92	60	150	325	240	334	180
Highest Possible Gross Weight	25	81	114	175	121	125	210	400	477	840	590	850	488
	PAVEMENT CAPACITY IN KILOGRAMS X 1000												
Lowest Possible Gross Weight	2	3	22	31	10	28	42	27	68	147	109	151	82
Highest Possible Gross Weight	11	37	52	79	55	57	95	181	216	381	267	385	221

	PASS INTENSITY LEVEL												
LEVEL	1	2	3	4	5	6	7	8	9	10	11	12	13
I	300,000 PASSES			50,000 PASSES							15,000 PASSES		
II	50,000 PASSES			15,000 PASSES							3,000 PASSES		
III	15,000 PASSES			3,000 PASSES							500 PASSES		
IV	3,000 PASSES			500 PASSES							100 PASSES		
V	300,000 PASSES			50,000 PASSES							15,000 PASSES		
VI	50,000 PASSES			15,000 PASSES							3,000 PASSES		

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Tyndall Air Force Base, Florida

RELATED DATA

4.3.2. On taxiways and aprons, passes are the number of aircraft movements, by aircraft group, across a line on the primary taxiway connecting the runway and parking apron.

4.4. Distribution of Loads. Distribution of loads also affects pavement life. Traffic tends to be more concentrated (channelized) on taxiways and runway ends and more evenly distributed (nonchannelized) in the interior portions of runways and on aprons.

4.5. Airfield Pavements System Features. Engineers cannot evaluate an airfield pavement system as a single entity because pavements vary greatly in:

•Type.

•Use.

•Thickness.

•Construction history.

•Traffic area.

•Condition.

Engineers therefore divide the pavement system into basic units, designating common characteristics as features. Table 4.1 shows a scheme for numbering features.

4.5.1. **Pavement Type.** Pavement types are:

•Flexible.

•Rigid.

•Rigid and flexible overlay on rigid.

•Flexible overlay on flexible.

•Composite.

•Reinforced rigid pavements.

A specific feature contains only one pavement type.

4.5.2. **Pavement Use.** Airfield pavements consist of runways, taxiways, aprons, and overruns. A feature is confined to a single pavement use. For example, a taxiway that passes through an apron is a feature, separate and distinct from apron pavements.

4.5.3. **Pavement Thickness.** The actual pavement thickness usually varies considerably throughout an airfield system. However, each discrete pavement area usually has a constant nominal thickness that evaluators use as a standard. This discrete area of constant thickness contains the feature.

4.5.4. **Construction History.** In most cases, different contractors, using different materials and techniques, construct and maintain various portions of an airfield pavement system at different times. All pavement included in a specific feature must share a consistent construction history.

4.5.5. **Traffic Areas.** Airfield pavements are divided into traffic areas based on the lateral distribution of aircraft traffic and effective gross aircraft load. These areas are designated types A, B, C, and D.

4.5.5.1. Unless the MAJCOM specifically requests, HQ AFCESA doesn't normally evaluate overruns. If they are evaluated, they are designated as type "C" traffic areas.

4.5.5.2. A feature must be located within a single traffic area.

Table 4.1. Feature/Branch Numbering Format.

First Character	Second & Third Character	Fourth Character
Type of Feature	Number of Feature	Feature Traffic Type
(R/O/T/A)	(0-99)	(A/B/C/D)
R = Runway		A = Channelized, full design
		weight of aircraft.
O = Overrun		B = Uniform Traffic Pattern, full design
		weight.
T = Taxiway		C = Low Traffic Volume, less than
		aircraft design weight.
A = Apron		D = Extremely low traffic volume and
		applied design weight.

4.5.6. **Pavement Condition.** A discrete pavement area is usually consistent for each of the above characteristics. Sometimes, however, the condition of the pavement in an area varies considerably. In this unusual situation, AFCESA may subdivide the discrete pavement area into separate pavement features, based on the condition of the pavement.

4.6. Allowable Gross Load (AGL). AFCESA determines an AGL for specific numbers of passes for each of the 13 aircraft groups. To simplify the reporting process, it arranges these passes in six pass-intensity levels as shown in figure 4.1.

4.6.1. The AGLs associated with levels I through IV are based on the reported physical property data for each feature.

4.6.2. AFCESA uses levels V and VI for bases located in frost melt areas: these AGL levels are based on reduced subgrade strength during the frost melt period.

4.7. Pavement Classification Number (PCN). AFCESA determines and reports for each feature the PCN as developed and adopted by the International Civil Aviation Organization (ICAO). The PCN expresses the capacity of a pavement to support aircraft traffic and varies with aircraft group and pass intensity level.

4.8. Evaluation Technique. AFCESA uses the following fundamental steps in all types of pavement evaluations:

4.8.1. Thoroughly study all existing information regarding design, construction, maintenance, and traffic history of pavements. Also review:

•Previous pavement evaluations or condition survey reports.

•Results of physical property tests of pavements.

•Weather records for the vicinity.

4.8.2. Determine the pavement condition by visual inspection.

4.8.3. Determine the scope and validity of available data and what additional information or tests are needed.

4.8.4. Obtain field data and samples.

4.8.5. Send the samples in for laboratory testing and data analysis.

4.8.6. Select the strength and thickness values that seem to be representative for the individual features that comprise the pavement structure.

4.8.7. Determine AGLs and PCNs for each pavement feature using representative physical property data and field test results.

Chapter 5

AIRFIELD PAVEMENT EVALUATION METHODS AND PROCEDURES

5.1. Preliminary Activities:

5.1.1. Before AFCESA schedules an evaluation, BCE personnel conduct the PCI survey.

5.1.2. In April of each year, AFCESA sends a call letter to the MAJCOMs asking what structural and friction characteristics evaluations they need.

5.1.2.1. The MAJCOMs respond with a priority listing of bases requiring evaluation in the following fiscal year, along with proper justification and the PCI rating.

5.1.2.2. Based on this information, AFCESA develops an evaluation schedule usually involving 15 to 20 bases per year.

5.1.2.3. Early in the fourth quarter of each fiscal year, AFCESA informs MAJCOMs which bases it has selected for evaluation.

5.1.2.4. In prioritizing bases for evaluation, MAJCOMs must consider:

•Time since the last evaluation. (Evaluations normally occur every 5 to 10 years.)

•Operational requirements or mission changes.

•Safety.

5.1.2.5. In prioritizing bases for evaluation, MAJCOMs must consider:

•Time since the last evaluation. (Evaluations normally occur every 5 to 10 years.)

•Operational requirements or mission changes.

•Safety.

•Plans for major reconstruction or rehabilitation projects.

•Recent new construction for which there isn't sufficient physical property data to determine the pavement load bearing capacity.

•US Air Force operational bases generally get top priority, with non-US Air Force bases coming second.

5.1.3. About 90 calendar days before deployment, AFCESA sends a letter to the scheduled base (with a copy to the responsible MAJCOM) telling what support it will need during the evaluation.

5.1.3.1. AFCESA needs construction and traffic history, soils and drainage data, master plans, and other data to plan the test program and to develop the evaluation report.

5.2. Field Testing. The field testing phase of a pavement evaluation, performed by AFCESA, obtains required pavement and soil layer physical property data. This phase usually takes 8 to 10 calendar days for nondestructive testing (NDT) and 10 to 14 days for destructive evaluations.

5.2.1. Base airfield operations personnel should plan on closing the airfield for 72 hours for a destructive evaluation and for at least 10 hours for a nondestructive evaluation of each runway.

5.2.2. The AFCESA pavement evaluation team chief decides which data are required and which specific types of tests to run, depending on pavement type, construction history, and so on.

5.2.3. For rigid pavements, the pavement evaluation team usually obtains:

- •Actual pavement and soil layer thicknesses.
- •Cores to determine the flexural strength of the concrete.
- •Effective modulus of subgrade reaction (destructive evaluation).
- •Modulus of elasticity for each pavement and soil layer (NDT).
- •In situ moisture content and density of subgrade soils and base course materials (destructive evaluation).
- •Visual assessment of pavement condition.
- •Soil samples for features where no previous data exist.

5.2.4. For flexible pavements, the team usually obtains:

- •Total pavement thickness above the natural subgrade and the thickness of each layer in the pavement structure.
- •Strength of the subgrade, subbase, and base courses using the California Bearing Ratio (CBR) for destructive evaluations or the modulus of elasticity for NDT evaluations.
- •In situ moisture content and density of all subgrade soils, subbase, and base course materials (destructive evaluations).
- •Visual assessment of pavement condition.
- •Soil samples for features where no previous data exist.
- •Quality of subgrade, subbase, and granular base courses (tested in situ). NOTE: Laboratory tests on samples of materials and construction control data supplement the field tests. The team determines these properties by visual observations, laboratory tests on pavement core samples, or from construction data.

5.3. Laboratory Tests. MIL-STD-620A and MIL-STD-621A outline the procedures for laboratory and field testing. American Society for Testing and Materials (ASTM) standards supplement these procedures. As with the field tests, the data and types of tests required in the laboratory vary with the situation.

5.4. Evaluation Procedure. The team chief thoroughly analyzes all physical property and laboratory data and selects representative thickness and strength data. He or she uses the representative physical property data with the appropriate evaluation computer codes to determine the AGL and PCN for each feature.

Chapter 6

AIRFIELD PAVEMENT EVALUATION REPORTS

6.1. The Preliminary Report. The preliminary report summarizes results of the field evaluation and makes recommendations for immediate actions to correct or alleviate problem areas. AFCESA prepares this report before leaving the base and gives it to the BCE, who distributes it to appropriate base and MAJCOM personnel.

6.2. Pavement Evaluation Report. AFCESA prepares, publishes, and distributes a final pavement evaluation report after it has completed all laboratory and field testing and analyzed the results. The report includes:

6.2.1. **Executive Summary.** A brief synopsis of the evaluation and the results and recommendations.

6.2.2. **Introduction.** Statement of the purpose and scope of the evaluation, telling which pavements the team evaluated.

6.2.3. **Background.** A general description of the airfield, aircraft traffic, construction history, climatic conditions, and drainage.

6.2.4. **Test Procedures.** An overview of the pavement testing procedures employed in the field and in the laboratory, along with a discussion of material properties.

6.2.5. **Methodology of Analysis.** Procedures used to evaluate data and calculate AGLs and PCNs.

6.2.6. **Pavement Condition Assessment.** A description of the overall condition of various airfield pavement features with recommendations for appropriate maintenance, repair, and construction efforts. Recommendations are nondirective in nature. Management uses them to initiate in-house or contract corrective action.

6.2.7. **Conclusions and Recommendations.** The engineer's conclusions and recommendations based on data analysis. Topics typically include:

- The capability of various airfield pavement features to support current and projected aircraft traffic.
- Observations on the overall condition of the airfield pavements.
- General recommendations for main-tenance, repair, and construction.

6.2.8. **Appendices.** Information, data, and test results that bear directly on the evaluation. Significant appendices are:

6.2.8.1. **Maps:**

- Airfield layout plan.
- Airfield designations plan.
- Primary pavements plan.
- Pavement condition plan.
- Photo locations plan.

•Other applicable information.

6.2.8.2. **Summary of Physical Property Data.** Documents all data used in the evaluation for each pavement feature. A typical summary includes:

•Feature number.

•Pavement identification.

•Dimensions (length and width) of the feature.

•General condition of the pavement.

•Type and thickness of overlay pavement, pavement base, subbase, and subgrade.

•Representative flexural strength, CBR, "k," and elastic modulus values.

•Soil layer classifications.

6.2.8.3. **Summary of Allowable Gross Loads.** An essential table listing allowable gross loads for each pavement feature for all pass intensity levels and the 13 aircraft groups (figure 4.1). With this information, the pavement engineer can advise base operations about pavement capacity for operational loadings. AGLs are computed and reported within a range from the minimum weight of the lightest aircraft to the maximum weight of the largest aircraft in a particular aircraft group:

•When the AGLs are less than the minimum weight, an "A" appears beside the AGL, meaning that the allowable gross load for the feature is less than the minimum weight of any aircraft in that group.

•When an AGL is greater than the maximum weight, a "+" sign appears next to that AGL.

6.2.8.4. **Pavement Classification Numbers.** PCN values are presented for each feature. Along with the PCN value, the pavement type, subgrade strength level, tire pressure level, and evaluation method are given. A code system, implemented to allow an abbreviated presentation of the necessary information, is used as follows:

•The pavement type is abbreviated "R" for rigid (PCC) and "F" for flexible (AC) pavements.

•There are four subgrade categories: A, B, C, and D, for high, medium, low, and ultralow subgrade strengths, respectively.

•The four tire pressure categories are W, X, Y, and Z, for high, medium, low, and very low tire pressures.

•The evaluation methods are "T", for technical, or "U", based on the type aircraft that commonly use the airfield.

The PCN number 31/R/C/W/T, for example, indicates a PCN of 31, a rigid pavement, a low strength subgrade, high pressure tires are allowed, and a technical evaluation was performed to determine the PCN. Table 6.1 is an example of a typical PCN.

Table 6.1. Sample Pavement Classification Number (PCN).

PAVEMENT CLASSIFICATION NUMBERS (PCNs)					
FEATURE	**PCN**	**FEATURE**	**PCN**	**FEATURE**	**PCN**

R01A	80/R/C/W/T	T20A	96/R/C/W/T	A23B	29/F/A/W/T
R02A	76/R/B/W/T	T21A	26/F/C/W/T	A24B	25/F/A/W/T
R03C	81/R/C/W/T	T22A	25/F/B/W/T	A25B	24/F/A/W/T
R04C	98/R/B/W/T	T23A	31/F/A/W/T	A26B	24/F/A/W/T
R05A	85/F/C/W/T			A27B	108/R/B/W/T
R06C	72/F/B/W/T	A01B	85/R/A/W/T	A28B	17/F/B/W/T
		A02B	100/R/A/W/T	A29B	15/F/C/W/T
T01A	29/F/A/W/T	A03B	126/R/A/W/T	A30B	19/F/B/W/T
T02A	55/F/A/W/T	A04B	24/F/B/W/T	A33B	17/F/C/W/T
T05A	24/F/B/W/T	A07B	18/F/B/W/T	A34B	16/F/C/W/T
T06A	27/F/A/W/T	A08B	24/F/A/W/T	A35B	7/F/D/W/T
T07A	113/F/A/W/T	A09B	24/F/A/W/T	A36B	18/F/B/W/T
T08A	24/F/B/W/T	A10B	21/F/B/W/T	A37B	20/F/B/W/T
T09A	35/F/A/W/T	A11B	24/F/B/W/T	A38B	18/F/B/W/T
T10A	29/F/A/W/T	A12B	14/F/C/W/T	A39B	15/F/C/W/T
T11A	25/F/A/W/T	A13B	28/F/A/W/T	A40B	24/F/A/W/T
T12A	57/F/A/W/T	A14B	84/F/A/W/T	A41B	24/F/B/W/T
T13A	109/R/B/W/T	A15B	17/F/C/W/T	A42B	26/F/A/W/T
T14A	98/R/B/W/T	A16B	21/F/B/W/T	A43B	18/F/C/W/T
T15A	113/R/B/W/T	A17B	22/F/B/W/T	A44B	62/R/B/W/T
T16A	105/F/B/W/T	A18B	24/F/B/W/T	A45B	68/R/B/W/T
T17A	128/F/A/W/T	A19B	23/F/A/W/T	A46B	72/R/C/W/T
T18A	109/R/B/W/T	A20B	31/F/A/W/T	A48B	45/R/D/W/T
T19A	86/R/C/W/T	A21B	31/F/A/W/T	A50B	39/R/D/W/T
		A22B	15/F/C/W/T	A51B	87/R/B/W/T

6.3. Distribution of Pavement Evaluation Reports. Distribution for US Air Force airfields:

Location	**Number of Copies**
Evaluated Base Civil Engineer	4
Evaluated Airfield Manager	2
MAJCOM CEO	4
CETSO/ESOF 11817 Cannon Boulevard	1

Crestar Bank Building, Suite 208
Newport News VA 23606-2558

HQ AMC/CES 2
507 A Street
Scott AFB IL 62225-5022

AFIT/CEE 1
2950 P Street
Wright Patterson AFB OH 45433-7765

DMA Aerospace Center 2
Attn: Air Information Library
3200 South Second Street
St. Louis AFS MO 63118-3399

ANGRC/CEEC 1
3430 2nd Street NE
Minot ND 58701-5027

Naval Facilities Engineering Command 1
Office of the Chief Engineer (OOCE)
901 M Street SE, Building 212
Washington DC 20374-5018

USACE 4
Mandatory Transportation Systems Center of Expertise
PO Box 103, Downtown Station
Omaha NE 68101-0103

USA-WES-GP 2
3909 Halls Ferry Road
Vicksburg MS 39180-6199

USA-CRRL-EG 2
72 Lyme Road
Hanover NH 03755-1290

USA-CERL-FOM PO Box 4005 Champaign IL 61820-1305	2
HQ AFCESA/TIC 139 Barnes Drive, Suite 1 Tyndall AFB FL 32403-5319	1
Defense Technical Information Center Attn: DTIC-FDAC Cameron Station Alexandria VA 22304-6145	2
HQ AFCESA/DMP 139 Barnes Drive, Suite 1 Tyndall AFB FL 32403-5319	15

6.4. Disposition of Related Program Documentation. Dispose of documentation created by this instruction according to AFMAN 37-139, *Records Disposition--Standards* (formerly AFR 4-20, volume 2).

Chapter 7

RUNWAY SURFACE EFFECTS EVALUATIONS

7.1. Runway Friction Characteristics Evaluation. A runway friction characteristics evaluation assesses a runway's tractive qualities and hydroplaning potential as they contribute to aircraft braking response. Since these properties are subject to change with time and traffic, an evaluation must determine what, if any, maintenance may be required.

7.1.1. **Frequency.** MAJCOMs should request a runway friction characteristics evaluation when:

- •Recent evaluation reports recommend frequent testing.
- •Surface treatment significantly alters the runway surface characteristics (for example, grooving, overlay, reconstruction).
- •Mission change significantly alters the runway's rate of wear and rubber accumulation.
- •An aircraft skidding accident or incident occurs.

7.1.2. **Evaluation Schedule.** Each April AFCESA asks MAJCOMs for a priority listing of bases requiring friction characteristics evaluations in the following year. Based on these requirements, AFCESA develops a schedule and advises MAJCOMs which bases it has selected for evaluation. About 90 days before a deployment, AFCESA advises the base and the responsible MAJCOM of the team's specific travel and testing itinerary.

7.1.3. **Support Requirements.** Along with the itinerary, AFCESA sends a copy of "Project Officer's Guide and Operations Plan for Runway Friction Characteristics Testing" detailing what support AFCESA needs for the evaluation.

7.1.4. **Evaluation Procedures.** Both the operations plan and the evaluation report describe the procedures for evaluating runway friction characteristics, including equipment descriptions, testing methods, and some theory on their use.

7.1.5. **Evaluation Report.** After conducting the field evaluation, AFCESA reduces the data, analyzes the results, and publishes a formal report.

7.1.5.1. This report includes:

- •A description of the equipment and testing procedures.
- •A summary of the pertinent data and results.
- •The criteria for analysis.
- •Interpretation of the results based on these criteria and the judgment of the engineer.

7.1.5.2. The narrative portion of the report presents the engineer's conclusions and recommendations for improving the runway's friction characteristics.

7.2. Runway Roughness Evaluation. A runway roughness evaluation examines the elevation profile of the runway surface and evaluates aircraft response to this profile.

7.2.1. AFCESA no longer conducts these evaluations but maintains contact with NASA, FAA, and other organizations doing research in this field.

7.2.2. Bases requiring a runway roughness evaluation should contact AFCESA for assistance.

7.3. Distribution of Runway Friction Characteristics Evaluation Reports. Distribution for US Air Force airfields:

7.4. Disposition of Related Program Documentation. Dispose of documentation created by this instruction according to AFMAN 37-139.

Location	Number of Copies
Evaluated Base Civil Engineer	6
Evaluated Airfield Manager	1
MAJCOM CEO	6
AFSA/SEFBF 9700 Avenue G, Suite 220 Kirtland AFB NM 87117-5670	1
AFHRA 600 Chennault Circle Maxwell AFB AL 36112-6424	2
AFIT/CEE 2950 P Street Wright Patterson AFB OH 45433-7765	2
CETSO/ESOF 11817 Cannon Boulevard Crestar Bank Building, Suite 208 Newport News VA 23606-2558	1
NASA Langley Research Center Mail Stop 497 Hampton VA 23681-0001	1
Department of Transportation Federal Aviation Administration Engineering and Specification Division (AAS-200) 800 Independence Avenue SW Washington DC 20591-5000	1
Department of Transportation	1

Federal Aviation Administration
Flight Test Branch (AAS-160)
800 Independence Avenue SW
Washington DC 20591-5000

DMA Aerospace Center 1
Attn: Air Information Library
3200 South Second Street
St Louis AFS MO 63118-3399

Defense Technical Information Center 2
Attn: DTIC-FDAC
Cameron Station
Alexandria VA 22304-6145

HQ AMC/CEEE 1
507 A Street
Scott AFB IL 62225-5022

HQ ACC/DO 1
205 Dodd Boulevard, Suite 101
Langley AFB VA 23665-2789

HQ ACC/SEF 1
130 Andrews Boulevard, Suite 301
Langley AFB VA 23665-2786

HQ AFCESA/TIC 1
139 Barnes Drive, Suite 1
Tyndall AFB FL 32403-5319

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