MISCELLANEOUS PAPER S-69-37

CONDITION SURVEY, HUNTER ARMY AIRFIELD SAVANNAH, GEORGIA

by

A. H. Joseph
P. J. Vedros
W. B. Abbott, Jr.

August 1969

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Office, Chief of Engineers
U. S. Army

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U. S. Army Engineer Waterways Experiment Station
CORPS OF ENGINEERS
Vicksburg, Mississippi

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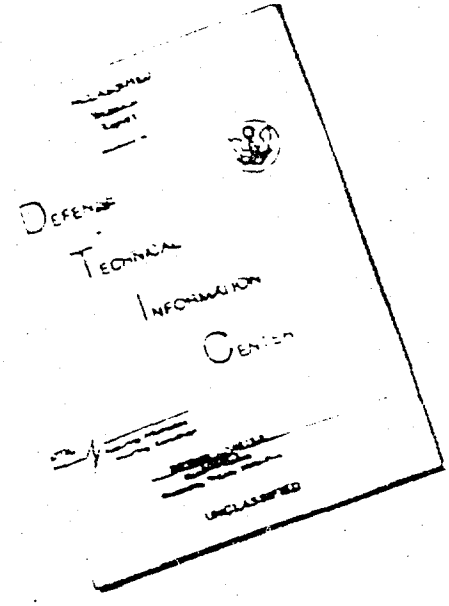

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FOREWORD

Authority for performance of condition surveys at selected airfields is contained in Long Range Program—O&M,A; FY 1969, Project Q6-1: "Engineering Criteria for Design and Construction—WES," dated April 1968.

The facilities at Hunter Army Airfield were inspected in February 1969 by Messrs. P. J. Vedros and W. B. Abbott, Jr., of the Flexible Pavement Branch, U. S. Army Engineer Waterways Experiment Station (WES). This report was prepared by Messrs. Vedros, Abbott, and A. H. Joseph under the general supervision of Messrs. A. A. Maxwell and R. G. Ahlvin of the Soils Division, WES.

COL Levi A. Brown, CE, was Director of the WES during the conduct of the study and preparation of this report. Mr. F. R. Brown was Technical Director.

CONTENTS

CONVERSION FACTORS, BRITISH TO METRIC UNITS OF MEASUREMENT

British units of measurement used in this report can be converted to metric units as follows:

Multiply	By	To Obtain
inches	2.54	centimeters
feet	0.3048	meters
square inches	6.4516	square centimeters
square yards	0.836127	square meters
gallons (U.S.)	3.78543	cubic decimeters
pounds	0.45359237	kilograms
pounds per square inch	0.070307	kilograms per square centimeter

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CONDITION SURVEY, HUNTER ARMY AIRFIELD, SAVANNAH, GEORGIA

PURPOSE

1. The purpose of this report is to present the results of an investigation conducted at Hunter Army Airfield (HAAF) in February 1969. The inspection was limited to visual observations, and no tests were conducted on the existing runways and taxiways. A layout of the airfield is shown in plate 1.

PERTINENT BACKGROUND DATA

General Description of Airfield

2. HAAF, formerly Hunter Air Force Base, is located in the southwest corner of Savannah, Georgia.

3. The airfield is located physiographically in the Sea Island section of the coastal plain province in an area of gently rolling topography. In the general area, scattered deposits of fine sand, silt, and lean clay soils are found, with occasional pockets of fat clays at lower depths.

4. In February 1969, the airfield facilities consisted of an east-west runway 11,375 ft* long and 200 ft wide, connecting taxiways, parking aprons, two warm-up aprons, alert aprons and taxiway, and a compass swing base (see plate 1). The taxiways and aprons are of various lengths and widths. Huey-type helicopters were utilizing the large parking apron and the alert facilities for parking. Army fixed-wing aircraft were parking on the small parking apron located north of the east-west taxiway.

Previous Report

5. The latest evaluation report pertaining to the load-carrying capabilities of the pavements at HAAF is as follows:

> U. S. Army Engineer Waterways Experiment Station, CE, "Airfield Pavement Evaluation, Hunter Air Force Base, Savannah, Georgia," Miscellaneous Paper No. 4-379, February 1960, Vicksburg, Miss.

Pertinent data have been extracted from this report and used herein.

History of Airfield Pavements and Drainage

6. Major pavement facilities have been constructed over the period of years from 1941 to 1959. A compilation of the construction history (from report referenced in paragraph 5) is shown in table 1. The pavements constructed and strengthened after 1955 were designed to support a landing gear load of 100,000 lb carried on dual wheels spaced 37.5 in. c-c, each wheel having a tire contact area of 267 sq in. Typical sections of the primary runway and taxiway are shown in plates 2 and 3. Pavement thickness and other details for all pavement features are shown in the summary of physical property data in table 2.

7. This installation was one of the earliest known locations where, due to fine sands, extensive infiltration occurred in storm drain lines. Research was conducted here using many types

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* A table of factors for converting British units of measurement to metric units is presented on page vii.

of jointing materials and gaskets in concrete and corrugated metal pipelines to develop design requirements for flexible watertight joints.* The improved design practice was employed to avert further undermining of pavements.

Traffic History

8. HAAF was converted from an Air Force to an Army installation during 1967. Prior to 1967, the pavements were utilized by heavy bomber and cargo-type aircraft. The Army is using the facilities for rotary-wing aircraft used for pilot training. Considerable traffic is recorded for Huey-type helicopters; however, these aircraft have little adverse effect on the pavements, which were designed for heavy loads. Occasional use is made of the runway and taxiway pavements by transient Air Force heavy-type aircraft.

Condition of Pavement Surfaces

9. A visual inspection in February 1969 indicated the airfield pavement to be generally in good condition. The surface of the 11,375-ft-long east-west runway (photograph 1) was in good condition although the asphalt showed signs of weathering and aging; however, no extensive cracks or other signs of imminent problems were observed. Most of the asphaltic-concrete taxiways and apron areas were recently treated with a maintenance-type bituminous pavement coating material. This coating was applied between May 1967 and May 1968. A more detailed discussion of this material is presented in paragraphs 11-14.

10. A brief inspection was made of the concrete portions of the airfield. The concrete slabs appeared to be in good condition with only a minimum of cracking. The joints seemed to be adequately sealed and performing well.

AIRFIELD MAINTENANCE

Bituminous Pavement Coating Material

11. A bituminous pavement coating material (Product A) was used extensively on HAAF's existing asphaltic-concrete taxiways, aprons, and shoulder areas for adhering loose pavement particles and sealing the aging surfaces. The airfield pavements that were coated during the period between May 1967 and May 1968 are shown in plate 4. This proprietary material is primarily a combination of a fast-drying solvent and a hard-base asphalt.

12. Prior to placing the material, the existing asphaltic-concrete surfaces were scaling and cracking, with some cracks as wide as 1/2 in. These surfaces had been sealed 8 to 10 years ago with a tar seal, and the latter material was scaling from the surface. Photographs 2 and 3 show the condition of the pavement surface in an area that was not treated and indicate the general condition of the surface prior to application of the bituminous pavement coating.

13. Product A was sprayed on the asphaltic-concrete surface at a rate of 0.2 gal/sq yd. There was one exception to this. A portion of the warm-up apron on the west end of taxiway 5 was treated at a rate of 0.3 gal/sq yd (plate 4). This small section was reported to contain more cracking in the surface, and this was the reason for the heavier application.

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* U. S. Army Engineer District, Savannah, CE, "Study of Watertight Drainage Pipe Joints," Final Report, 1955, Savannah, Ga.

14. The coated surfaces were visually inspected in February 1969. The inspection included evaluation of such performance factors as ability to adhere loose particles, slipperiness, crack sealing, general pavement rejuvenation, and product durability. Photograph 4 shows a typical surface treated with the bituminous pavement coating. The product did a good job of binding loose or nearly loose pavement fragments and provided a hard, tough, protective coat over the old surface. Very little stripping or loss of the bituminous pavement was noticed on any of the treated areas. Product A flowed well into the bottom of most cracks and appeared to form a complete initial seal. However, the product seemed rigid and incapable of working or flexing with the crack during expansion and contraction. The cracks observed were usually reduced in size (up to 90 percent) after a full year's cycle of expansion and contraction. Very little evidence of pavement rejuvenation was noticed in comparing the treated and untreated asphaltic concrete. The treated pavement had a blacker color to depths of 1/4 to 1/2 in. but did not appear to be more pliable. Rapid braking by an automobile on the dry coated surface was used to obtain estimates of skid resistance (photograph 5). The dry surface seemed to provide fair resistance to skidding; however, it was reported that the coated surface was extremely slippery when wet.

Dust Palliative and Soil Binder

15. A problem of erosion and dust had occurred in the unsurfaced hover lanes used by helicopters. An asphaltic penetrative soil binder (APSB) was used to solve this problem. The material was obtained under Federal Stock No. 5610-999-3034. The soil binder material was applied on hover lanes adjacent to taxiway 2 and an area surrounding a helicopter landing pad at the rate of 0.75 to 1.0 gal/sq yd (photograph 6). The material penetrated the loose sandy silty soil (in excess of 1 in. in some cases) and appeared to do a good job in binding the surface soils and preventing erosion from the downwash of the helicopter blades. Any traffic applied to these treated areas would break up the material, but the areas were not affected by the downwash.

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Table 1

Construction History

Facility	Length ft	Width ft	Pavement Thickness in.	Type	Construction Period	Agency
E-W runway						
Sta 0+00-105+00	10,500	200	4	AC	1951-1952	CE
Sta 95+00-105+00 (strengthened)	1,000	200	2	AC	1955-1956	CE
Sta 105+00-113+75	875	200	15	PCC	1955-1956	CE
Sta 0+00-3+00	300	200	19-22	PCC	1957	IE
Sta 3+00-105+00 (strengthened)	10,200	200	1	AC	1959	IE
Alert aprons and twy			20	PCC	1959	CE
Taxiway 6	1,300±	75	18	PCC	1957	CE
Taxiway 5						
Original	5,400±	100	4	AC	1951-1952	CE
Sta 62+50-83+00 (strengthened)	2,050	80	1-1/2	AC	1959	IE
Taxiway 1	1,670±	75	4	AC	1951-1952	CE
Taxiway 4	670±	75	4	AC	1951-1952	CE
Taxiway 3						
Southwest end	630±	75	4	AC	1951-1952	CE
Northeast end	2,200±	150	6	PCC	1941	CE
Strengthened	2,200±	150	4	AC	1952-1953	CE
Taxiway 2						
Southeast end	970±	75	4	AC	1951-1952	CE
Northwest end	900±	150	6	PCC	1941	CE
Strengthened	900±	150	4	AC	1952-1953	CE
E-W taxiway						
Original	5,300	150	6	PCC	1941	CE
Strengthened	5,300	150	4	AC	1952-1953	CE
Hangar aprons			13	PCC	1953-1954	CE
Compass swing base			15	PCC	1953-1954	CE
West apron			15	PCC	1953-1954	CE
East apron						
Original			6	PCC	1942	CE
Strengthened			11	PCC	1955-1956	CE
North apron			15	PCC	1955-1956	CE
South apron			15	PCC	1953-1954	CE

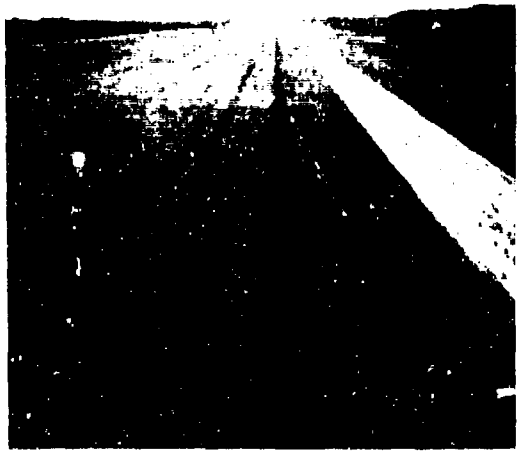
Table 2

Summary of Physical Property Data

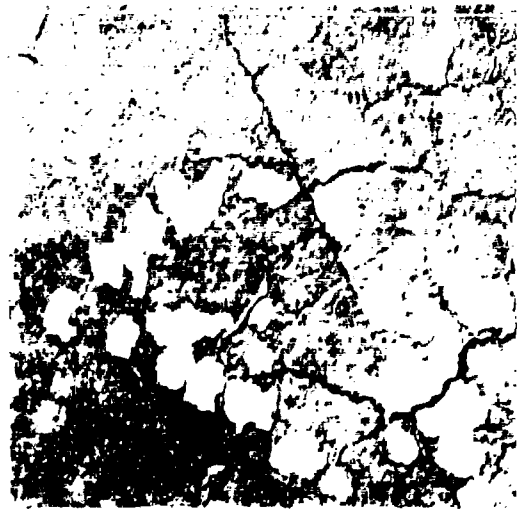
FACILITY			OVERLAY PAVEMENT			PAVEMENT			BASE			SUBGRADE		GENERAL CONDITION OF AREA CONSIDERED
FACILITY NUMBER AND IDENTIFICATION	LENGTH FT	WIDTH FT	THICK. IN.	DESCRIPTION	FLEX. STR PSI	THICK. IN.	DESCRIPTION	FLEX. STR PSI	THICK. IN.	CLASSIFICATION	CBR OR K	CLASSIFICATION	CBR OR K	
E-W runway														
Sta 0+00 to 3+00	300	200				19 to 22	Portland-cement concrete	750				Sand	300	
Sta 3+00 to 11+00	800	200	1	Asphaltic concrete		4	Asphaltic concrete		8 8	Limerock base Subbase	80 40	Sand	25	
Sta 11+00 to 95+00	8400	200	1	Asphaltic concrete		4	Asphaltic concrete		6 8	Limerock base Subbase	80 40	Sand	25	
Sta 95+00 to 105+00	1000	200	3	Asphaltic concrete		4	Asphaltic concrete		8 8	Limerock base Subbase	80 40	Sand	25	
Sta 105+00 to 113+75	875	200				15	Portland-cement concrete	730				Sand	300	
Taxiway 6	1300±	75				18	Portland-cement concrete	735				Sand	300	
Taxiway 1	1670±	75				4	Asphaltic concrete		8 8	Limerock base Subbase	80 40	Sand	25	
Taxiway 4	670±	75				4	Asphaltic concrete		8 8	Limerock base Subbase	80 40	Sand	25	
Taxiway 5														
Sta 62+50 to 83+00	2050	80	1-1/2	Asphaltic concrete		4	Asphaltic concrete		8 8	Limerock base Subbase	80 40	Sand	25	
Original	5400±	100				4	Asphaltic concrete		8 8	Limerock base Subbase	80 40	Sand	25	
Taxiway 2														
Southeast end	970±	75				4	Asphaltic concrete		8 8	Limerock base Subbase	80 40	Sand	25	
Northwest end	900±	150	7	Asphaltic concrete		6	Portland-cement concrete	650				Sand	350	
Taxiway 3														
Southwest end	630±	75				4	Asphaltic concrete		8 8	Limerock base Subbase	80 40	Sand	25	
Northeast end	2200±	150	7	Asphaltic concrete		6	Portland-cement concrete	650				Sand	350	
E-W taxiway	5300	150	7	Asphaltic concrete		6	Portland-cement concrete	650				Sand	350	
Hangar aprons						13	Portland-cement concrete	730				Sand	300	
Alert aprons and taxiway						20	Portland-cement concrete	800				Sand	225	
North apron						15	Portland-cement concrete	730				Sand	300	
South apron						15	Portland-cement concrete	730				Sand	300	

Table 3 (Continued)

FACILITY			OVERLAY PAVEMENT			PAVEMENT			BASE			SUBGRADE		GENERAL CONDITION OF AREA CONSIDERED
FACILITY NUMBER AND IDENTIFICATION	LENGTH FT	WIDTH FT	THICK. IN.	DESCRIPTION	FLEX. STR PSI	THICK IN.	DESCRIPTION	FLEX STR PSI	THICK. IN.	CLASSIFICATION	CBR OR K	CLASSIFICATION	CBR OR K	
West apron						15	Portland-cement concrete	730				Sand	300	
Compass-swing base						15	Portland-cement concrete	730				Sand	300	
East apron	1400	Var	11	Portland-cement concrete	730	6	Portland-cement concrete	650				Sand	350	
Apron area Apron extensions						4	Asphaltic concrete		6 6	Waterbound macadam Subbase	80 40	Sand	25	
Portion of old NW-SE runway	2200	150	4	Asphaltic concrete		6	Asphaltic concrete					Sand	24	
Portion of old NE-SW runway	700	150	4	Asphaltic concrete		6	Portland-cement concrete	650				Sand	350	

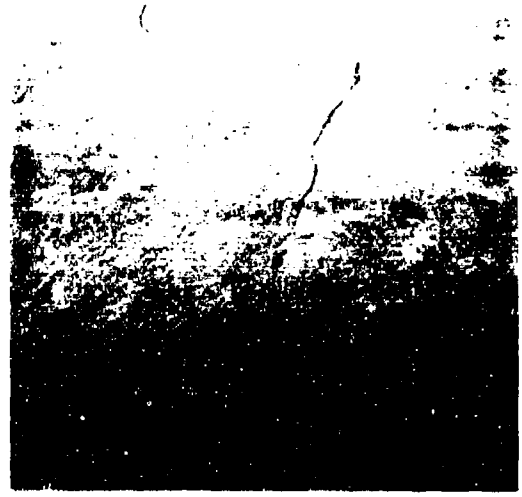


Photograph 1. View looking westward along the runway

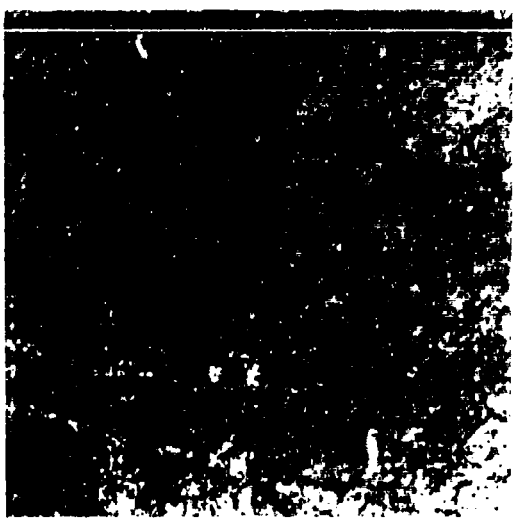


Photograph 2. Scaling of the old tar surface seal

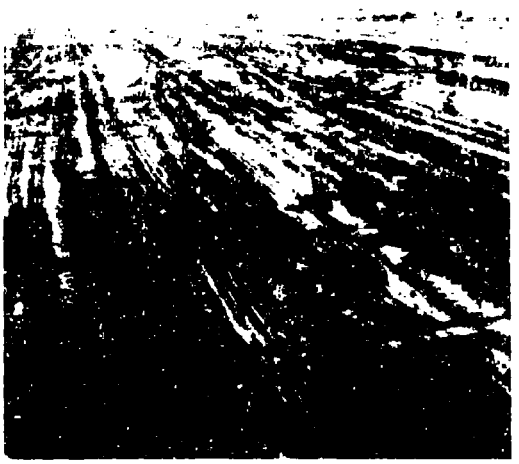
Photograph 3. Typical cracks in untreated pavement



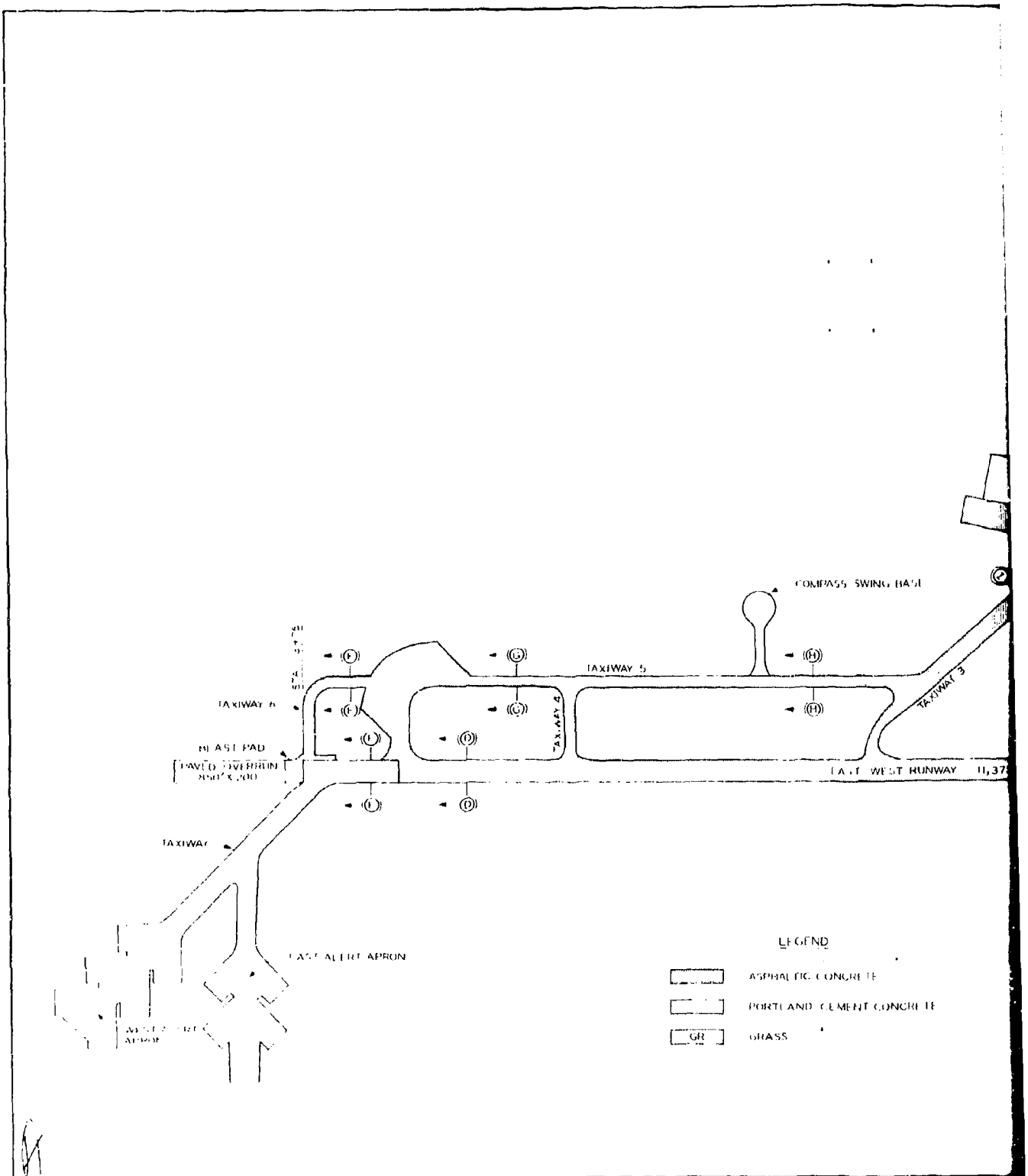
Photograph 4. Typical condition of surface treated with Product A

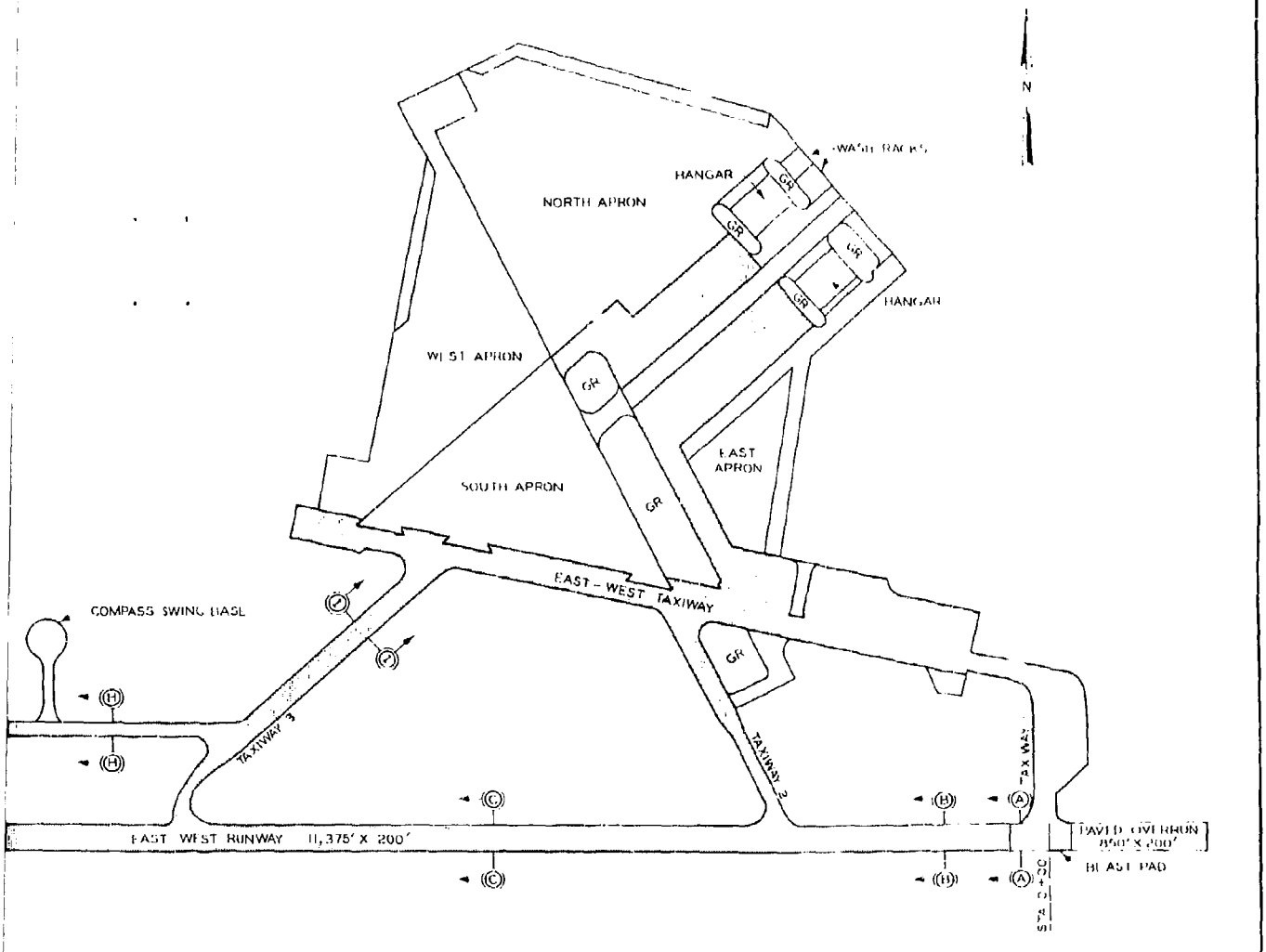


Photograph 5. Skid mark left on dry coated surface



Photograph 6. Area adjacent to helicopter pad treated with a dust palliative


COMPASS SWING BASE
TAXIWAY 5
TAXIWAY 3
TAXIWAY 6
TAXIWAY 4
NJ AST PAD
PAVED OVERRUN
TAXIWAY
EAST WEST RUNWAY
EAST ALERT APRON
LEGEND
ASPHALTIC CONCRETE
PORTLAND CEMENT CONCRETE
GR
GRASS



LEGEND

ASPHALTIC CONCRETE

PORTLAND CEMENT CONCRETE

GRASS

PAVEMENT LAYOUT

SCALE IN FEET

B

PLATE 1

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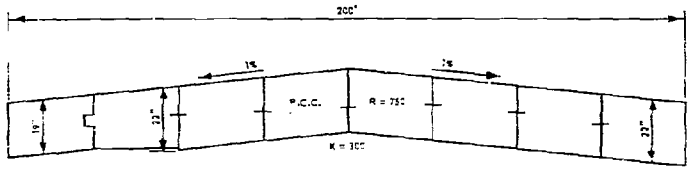
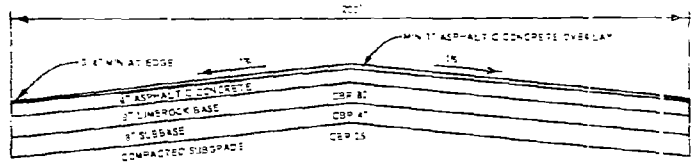


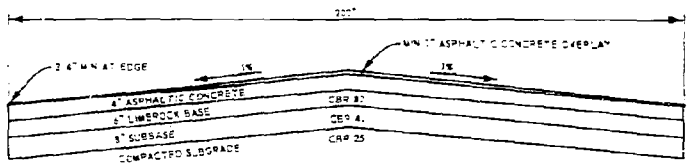
SECTION A-A

STA 0+00 TO 3+00



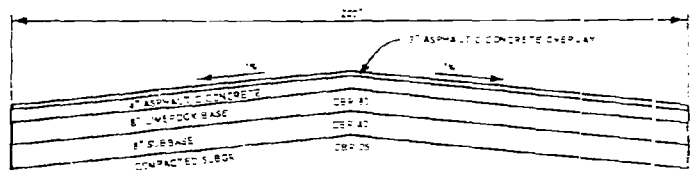
SECTION B-B

STA 3+00 TO 11+00



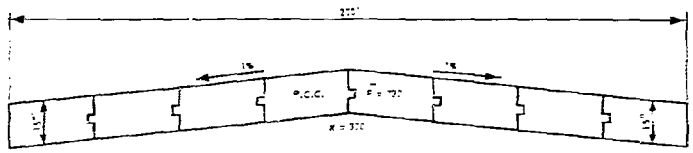
SECTION C-C

STA 11+00 TO 95+00



SECTION D-D

STA 95+00 TO 105+00



SECTION E-E

STA 105+00 TO 112+75

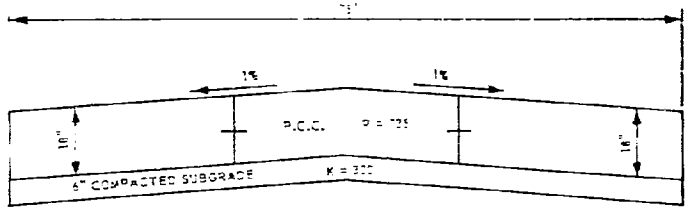
TYPICAL PAVEMENT AND FOUNDATION SECTIONS

EAST-WEST RUNWAY

011160-C

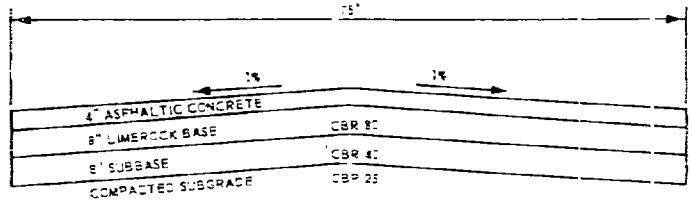
PLATE 2

PLATE 3



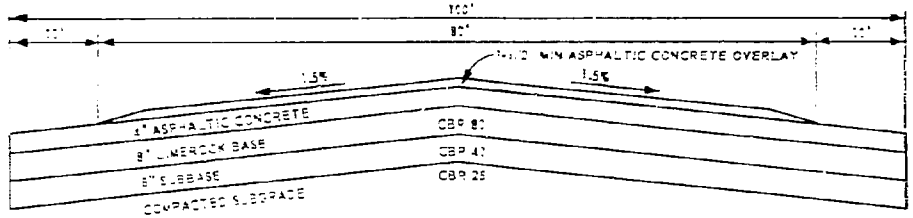
SECTION F-F

TAXIWAY 6



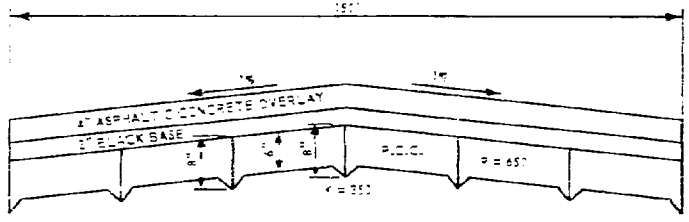
SECTION G-G

TAXIWAYS 1 AND 5



SECTION H-H

TAXIWAY 5-STA 62-50 TO 83-00



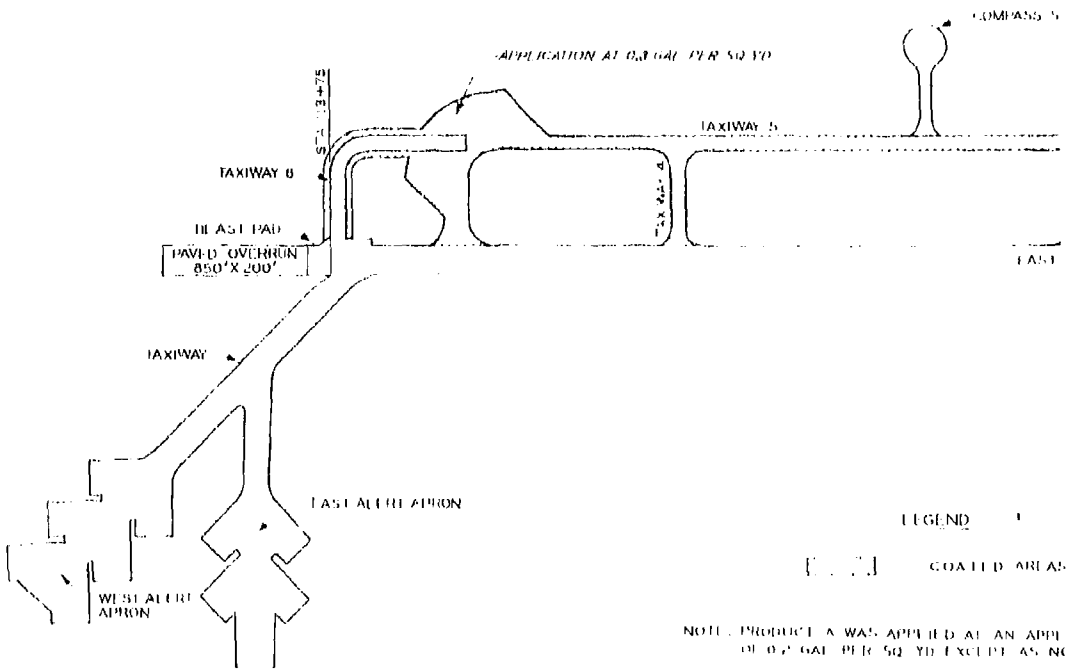
SECTION I-I

TAXIWAY 3 AND EAST-WEST TAXIWAY

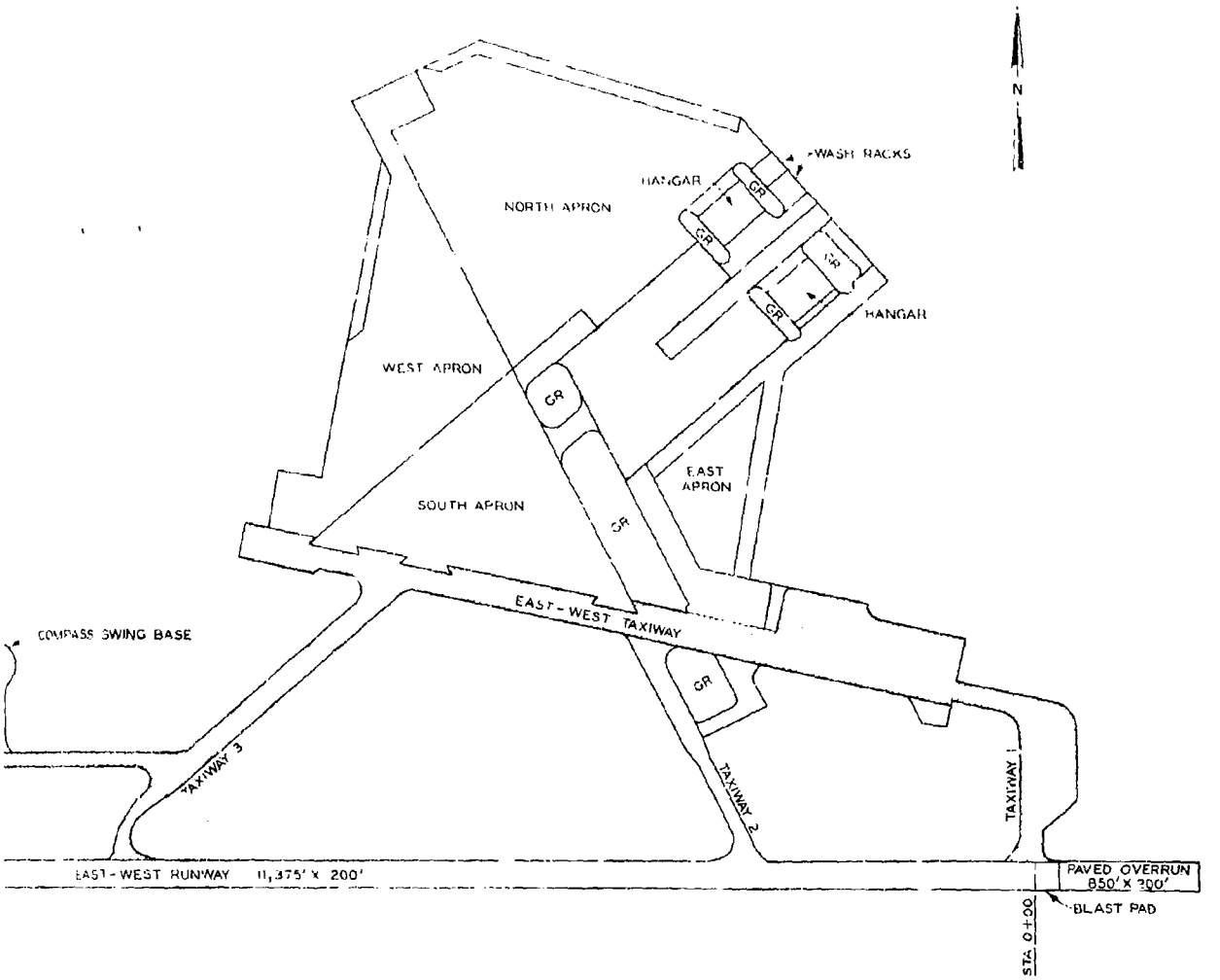
TYPICAL PAVEMENT AND FOUNDATION SECTIONS

TAXIWAYS

0116D-D


APPLICATION AT 0.3 GAL PER SQ YD
TAXIWAY 5
TAXIWAY 6
EAST PAD
PAVED OVERRUN
850'X 200'
TAXIWAY
EAST ALERT APRON
WEST ALERT
APRON
LEGEND
COATED AREAS

a



END

COATED AREAS

ED AT AN APPLICATION RATE
EXCEPT AS NOTED.

AREAS COATED WITH PRODUCT A

SCALE IN FEET

500 0 500 1000

PLATE 4