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TESTS ON SOILS SAMPLES FROM OVERSEAS
AIR BASES

Army Engineer Waterways Experiment Station
Vicksburg, Mississippi

April 1949

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CORPS OF ENGINEERS
U. S. ARMY

TESTS ON SOILS SAMPLES FROM
OVERSEAS AIR BASES

TECHNICAL MEMORANDUM NO. 1-274

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WATERWAYS EXPERIMENT STATION

VICKSBURG, MISSISSIPPI

FOR

OFFICE OF THE CHIEF OF ENGINEERS

AIRFIELDS BRANCH

ENGINEERING DIVISION

MILITARY CONSTRUCTION

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TESTS ON SOIL SAMPLES FROM OVERSEAS AIR BASES

Introduction

1. Collection and shipment of 50-lb soil samples, representative of soils at overseas airfields, was directed by letter from Headquarters, Army Air Forces, Washington, D. C., to all Theatre Commanders, subject: "Soil Samples," and dated 26 September 1945. The procedure to be followed in selecting and shipping the samples was outlined in a subsequent letter, same subject, dated 31 October 1945. In this letter layout maps showing sample location were requested, together with any available soil test data. A third letter, dated 31 October 1945, from Headquarters, Army Air Forces, to Theatre Commanders, subject: "Soil Samples," requested data on runways (descriptions of pavements, base courses, types of using planes, frequency of operation) and evaluation of performance of the airfield.

2. It was directed in these letters that the soil samples and all pertinent correspondence be sent to the Commanding General, 463rd AAF Base Unit, Geiger Field, Washington, where it was intended that the testing of the samples should be done by the soils laboratory operated by the Aviation Engineer Training School. However, due to the reduction of personnel and facilities at Geiger Field resulting from demobilization processes, arrangements were made by the Office of the Air Engineer, Army Air Forces, Washington, D. C., through the Office, Chief of Engineers, to have the samples and data transferred to the Waterways Experiment Station for necessary testing, analyzing, documenting and storing.

3. Direct authorization for the work by the Waterways Experiment

Station was contained in the 5th indorsement, dated 19 March 1946, from the Office, Chief of Engineers, to the President, Mississippi River Commission, to basic letter dated 4 February 1946, subject: "Analysis of Soil Samples," from the Office, Air Engineer, Army Air Forces, Washington, D. C., to the Chief of Engineers, U. S. Army.

4. The Instructions and Outlines for Testing Soil Samples from Overseas Air Bases, Office, Chief of Engineers, dated October 1946, defined the scope and objectives of the project as follows:

"Scope: 3. This project consists of the performance of mechanical analyses, Atterberg limits, specific gravity, Proctor compaction, and California Bearing Ratio tests on each sample received from overseas air bases.

"Objectives: 4. The purpose of this project is to accumulate information and data concerning soil conditions in overseas theatres."

Soil Samples

5. A total of 551 samples from 222 overseas air bases were received, identified, and tested by the Waterways Experiment Station. Correspondence indicated that samples were shipped from 20 additional air bases, but these samples were either lost en route, or had insufficient markings to be identified when received at the Waterways Experiment Station.

6. The airfields from which samples were received are listed geographically in five main groups as shown in table 1; this grouping and the order within each group have been retained in reporting the soils test data.

7. Table 2 shows the breakdown of the soil samples according to sample sizes by weight. It will be noted that the instructions to ship 50-lb samples must have been misconstrued in many instances, because one-half of the samples were less than 30 lb, and one-quarter less than 15 lb. Of the samples larger than 40 lb, those from Italy and the Philippines comprised 70%, the remaining 30% being scattered among the other reporting theatres.

8. It is therefore apparent that limitations were set by the sizes of the samples on the number of compaction and CBR tests which could be performed, and also on the methods of performing such tests without excessive reuse of the materials.

9. In many cases little or no data were furnished with the soil samples concerning their location and depth at the airfield, whether representative of paving aggregate, base course, subgrade or fill. A similar lack of information existed concerning the air fields: type and thickness of pavement and base course, preparation of subgrade; types of using planes; extent of use; performance of the airfield, et cetera.

10. It should be noted that in many cases it appeared that the soils were sampled by non-engineering types of army units, who were not familiar with details of the construction of the fields represented, nor had acquired the techniques and experience necessary to secure representative soil samples.

11. Particular mention is made of the very comprehensive and well-planned survey in connection with the soil sampling carried out by the Investigations Branch of the General Engineer District, APO 75, covering fields in the Philippines and several other Pacific islands. It is

4

unfortunate that similar surveys of the other overseas air bases reported were not made.

Furnished Data on Theatre Soils Tests and Surveys,
and other Pertinent Subjects

12. Supplementary data consisting of soils tests, soil surveys, geological reports, etc., were furnished in various amounts by the following theatres only:

Group B	- - - - -	Italy
Group C	- - - - -	Africa
Group D	- - - - -	India and Burma
Group D	- - - - -	China
Group E	- - - - -	Philippines
Group F	- - - - -	Alaska

13. Such data, other than those pertaining to airfield description, have not been incorporated in this report, as they are beyond the scope of the project directive. These memoranda, letters, and reports are forwarded as inclosures, as listed on the sheets following the text of this report.

Waterways Experiment Station Soils Tests

14. Summaries of all test results are presented in table 3 together with pertinent airfield data and sample descriptions. The following paragraphs are explanations of terms of data shown in this table, and descriptions of testing methods used.

Field classification

15. The source of information for this column was the AAF Installations Directory, 15 March 1946, Headquarters AAF, Washington,

D. C. (Confidential). The following abbreviations are used:

F = fighter
FB = fighter bomber
MB = medium bomber
HB = heavy bomber
VHB = very heavy bomber
T = transport
HT = heavy transport
M = classified by AAF as minor airfield because either used only a short time by tactical units, or constructed or improved at over-all cost to the U. S. of less than \$25,000.

Airfield description

16. This column includes data on type of surface, base course, subgrade, and pertinent information on operation, use, and general condition of the field. The following abbreviations are used in this column:

FSP = pierced steel plank
PAP = pierced aluminum plank
PBS = prefabricated bituminous surfacing.

Location

17. As previously mentioned, the information obtained identifying the location of samples was, in many instances, incomplete. However, this column indicates the location at the airfields from which the samples were taken insofar as data were available.

Material

18. This column includes data, where available, on the type of material sampled, such as base course, subgrade, etc. In some instances the depth of sample or thickness of layer are also shown in this column.

Description

19. The sample description includes the color and an appropriate name classification derived from the soil triangle of the Department of the Army Uniform Soil Classification System. The name of a soil is based on both gradation and plasticity characteristics. A copy of the soil triangle is shown on figure 1, together with notes explaining its use. Distinctive soil types such as tuff, volcanic ash, coral, etc., where so identified, are described as such.

Classification symbol

20. The soils were also classified using group symbols of the Department of the Army Uniform Soil Classification System. This system is based upon the one developed by A. Casagrande which was used extensively during World War II as the "Airfield Classification." Pertinent features of the presently used system are shown on figure 2.

Grain sizes

21. The division of grain sizes into major soil types is in accordance with the Department of the Army Uniform Soil Classification. Pertinent size ranges for each group are shown in the column headings; sieve sizes are U. S. Standard. The sand sizes have been broken down into "coarse" and "fine" fractions as an aid in evaluating the gradation of the various soils. Where an appreciable percentage of gravel sizes is present in a sample, the maximum size in inches is also shown.

Atterberg limits

22. Values reported are liquid limit (LL) and plasticity index

(PI). The limits tests were performed on that portion of the soil sample passing the No. 40 U. S. Standard sieve.

Specific gravity

23. The specific gravity tests were performed on that portion of a soil sample passing the No. 4 U. S. Standard sieve. The test was performed in a volumetric flask and air was evacuated by subjecting the soil and water to a vacuum.

Modified AASHTO compaction tests

24. Because of the small quantity of material available for testing, all compaction tests were performed using the standard Proctor mold. The soil sample ($< 1/4$ in.) was compacted in five layers with 25 blows on each layer produced by free fall of 18 in. of a 10-lb hammer with a 2-in.-diameter striking face. The optimum water content (w in per cent of dry weight) and the maximum dry density (γ_d) under the above conditions are shown in the table.

CBR tests

25. Because of the small quantity of each sample available (rarely more than 50 lb) the standard procedures for conducting the CBR tests* could not be followed entirely; however, the values reported are believed reasonable as discussed below. All specimens were soaked four days top

* TB5-253-1, "Soil Testing Set No. 1 and Expedient Tests," War Department, June 1945, and T.M. 213-1, "The California Bearing Ratio Test as Applied to the Design of Flexible Pavements for Airports," Waterways Experiment Station, 1 July 1947.

and bottom. The penetration test was performed using a Baldwin-Southwark constant strain testing machine. A uniform surcharge load of 10 lb was applied to each specimen during the soaking and penetration testing.

26. The values reported in the CBR column of table 3 represent the CBR of coarse-grained soils compacted to 100% of modified AASHTO maximum density and the CBR of fine-grained soils compacted to 95% of modified AASHTO maximum density, and at the optimum moisture content for modified AASHTO compaction. These densities are in accordance with design procedures for airfields currently used by the Corps of Engineers as shown in Chapter XII, Part 2 of the Engineering Manual. The CBR values are based on test data, but have in some cases been adjusted to compensate for variations in density and moisture content in the test from the standards listed above. Adjustment has also been made to compensate for variations from the standard procedure for conducting the CBR test. The adjustments are believed reasonable since they are based upon a considerable number of CBR tests on a variety of materials performed previously by the Waterways Experiment Station in which the effect of the above-mentioned variables was investigated.

Swell

27. Values of swell were obtained for the CBR samples after 4 days soaking. In table 3 swell is reported as "low" or "high." Swell values of 3 per cent or less were classed as "low," whereas values over 3 per cent were classed as "high."

REPORTS AND OTHER DATA FURNISHED IN CONNECTION WITH
SOIL SAMPLES FROM OVERSEAS AIR BASES

Group B: Italy:

- Incl. 1. Airfield Status Report 15 July 1945, Hq AAF Engr. Command,
MFO

Group C: Africa: (French Airfield Survey Reports)

(a) Algeria

- Incl 1. Blida
- Incl 2. La Reghaia
- Incl 3. Bougie
- Incl 4. Djidjelli
- Incl 5. Taher
- Incl 6. Philippoville
- Incl 7. Bone
- Incl 8. Biskra
- Incl 9. Navarin
- Incl 10. St. Donat
- Incl 11. Chateaudun du Rhumel
- Incl 12. Timeslet
- Incl 13. Telergha
- Incl 14. Bertaux No. 1
- Incl 15. Bertaux No. 2
- Incl 16. Ain M'Lila
- Incl 17. Le Kroub
- Incl 18. Canrobert
- Incl 19. Montesquieu
- Incl 20. Tebessa

(b) Laghouat

- Incl 21. Laghouat

Group D: India and Burma; China:

Part 1. Furnished by theatre:

- Incl. 1 - Ltr, Hq AAF-IBT, dated 22 October 1945, subject:
"Soil Samples."
- Incl. 2 - Booklet, "USAAF Airfields, 'ia-Burma," Office
of the Air Engineer CBI- (in dupl.).
- Incl. 3 - "Airfield Status Map," IB-AS, Office of the Air
Engineer, 15 April 1945.
- Incl. 4 - Geological Report, Midnapore District, 15
November 1944.

- Incl. 5 - Ltr, Hq SOS, USF, CBI, dated 24 February 1944, subject: "Design of VLR Fields."
- Incl. 6 - Memo to District Engr, Engr Dist #10, 1 April 1944, subject: "Test Section using Moorun Base."
- Incl. 7 - Ltr, Engr Dist #10, dated 4 May 1944, subject: "Subgrade Tests."
- Incl. 8 - Memo to Chief Engineer, L of C Command, dated 4 January 1945, subject: "Tests - Elephant (Maugdaw) and Teknaf Airfield Sites."
- Incl. 9 - Memo to Chief Engineer, 14th Army, dated 25 October 1944, subject: "Tests - Cox's Bazaar Airfield."
- Incl. 10 - Memo to Chief Engineer, L of C Command, dated 12 December 1944, subject: "Tests on Soil Cement, Chir'nga Airfield."
- Incl. 11 - Ltr, Hq IB-ACS, dated 5 February 1945, subject: "Soil Reconnaissance Proposed Kyaukpyu Airfield."
- Incl. 12 - Memo, Hq IB-ACS, 10 April 1945, subject: "Soil Reconnaissance - Airfield Sites on Akyab Island."
- Incl. 13 - Memo, Hq IB-ACS, 10 April 1945, subject: "Hathazari Airfield."
- Incl. 14 - Memo, Hq IB-ACS, 24 June 1945, subject: "Airfields in the Rangoon Area."
- Incl. 15 - Memo, Hq IB-ACS, 15 August 1945, subject: "Soils Tests-Myingyan Airfield, Burma."
- Incl. 16 - Memo, Hq IB-ACS, 31 May 1945, subject: "Soils Tests-Shwobo and Onbauk Airfields."
- Incl. 17 - Ltr, Engr Dist #10, 6 March 1944, subject: "Tests on Concrete Aggregates."

Part 2. Furnished by Office of Air Engineer, AAF, Washington, D.C.:

- Incl. A - "Final Report, B-29 Air Bases - India," Construction Service SOS USAF, CBI, November 1944 (Restricted).
- Incl. B - "Construction of Airfields in North Burma," Air Engineer, ASF, IB 15 July 1945 (Restricted).
- Incl. C - "Survey of Burma (Extract)," Command and General Staff School, Fort Leavenworth, Kansas (Restricted).

Part 3.

- Incl. 1 - Soil Tests - Linan Airfield.
- Incl. 2 - Soil Tests - Mengtze Airfield.
- Incl. 3 - Soil Tests - Tatum #1 Airfield.
- Incl. 4 - Soil Tests - Tatum (Chacopa) Airfield.

Part 4.

- Incl. A - List of soil samples sent.
- Incl. B - Map showing location of airfields.
- Incl. C - Soils Survey - Chanyi Airfield.
- Incl. D - Soils Tests - Hsinching Area.
- Incl. E - Soils Survey - Luliang Airfield.
- Incl. F - Supplementary Airfield Data.

Group E: Philippine and Other Pacific Islands:Part 1. Airfield and Sample Data on Fields from Which Samples Were Forwarded:

- Incl. 1 - Luzon Island (in dupl).
- Incl. 2 - Mindoro Island.
- Incl. 3 - Leyte, Samar, Cebu, Negros, and Mactan Islands (in dupl).
- Incl. 4 - Mindanao, Palawan, Palau, Batak, and Los Negros Islands (in dupl).

Part 2. Various Reports on Airfields in the Philippine Islands:

- Incl. P-2-a-(1): Soils Report on Nichols Field, NW-SE Runway and Taxiway, 8 April 1945.
- Incl. P-2-b-(1): Specifications for Construction of Neilson Airdrome, 15 April 1945.
- Incl. P-2-c-(1): Report on Evaluation of Clark Field, Florida Blanca and Porac Airdromes, 5 August 1945 (Inclosure missing).
- Incl. P-2-c-(2): Photographic Report for March 1945. Clark Field Engr Area.
- Incl. P-2-d-(1): Soil Profile, Proposed Taxiway, Florida Blanca Airdrome, June 1945.
- Incl. P-2-d-(2): Operational Photos, Florida Blanca Airfield, 1 July 1945.
- Incl. P-2-d-(3): Operational Photos, Florida Blanca Airfield, 1 September 1945.
- Incl. P-2-d-(4): Specification for Double Asphalt Surface Treatment, Florida Blanca and Porac Airfields, 21 April 1945.
- Incl. P-2-e-(1): Soils Investigation of C-47 Strip at San Fernando, La Union, 8 November 1945 (Inclosure missing).
- Incl. P-2-e-(3): Photographic Report, Lingayen Area, February 1945.
- Incl. P-2-e-(4): Photographic Report, Lingayen Area, March 1945.

Group F: Alaska:

Incl. 1 - Stabilization of Beach Gravel for Runway Construction at Point Spencer, Alaska, 31 August 1945 (Restricted).

TABLE 1

GEOGRAPHICAL BREAKDOWN OF FIELDS AT WHICH SOIL SAMPLES WERE TAKEN

Group	Subgroup		Total Fields in Group
	Country or Island	No. Fields	
A. Germany, Austria and France	(1) Germany	19	21
	(2) Austria	1	
	(3) France	1	
B. Italy			43 (2)
C. Africa	(1) Rio de Oro	1	(1) 77 (4)
	(2) French Morocco	3	
	(3) Algeria:		
	(a) Oran area	6 (1)	
	(b) Algiers area	2 (1)	
	(c) Constantine area	20	
	(d) Ghardaia area	1	
	(e) Tougourt area	1	
	(4) Tunisia	28 (2)	
	(5) Libya	1	
	(6) French West Africa	1	
	(7) Gold Coast	2	
	(8) French Equatorial Africa	1	
D. Near East, India, Burma, and China	(9) Belgian Congo	2	
	(10) Nigeria	3	
	(11) Anglo-Egyptian Sudan	3	
	(12) Eritrea	2	
	(13) Egypt		
	(1) Near East:		
	(a) Turkey	2	
	(b) Syria (Lebanon)	1	
	(c) Palestine	1	
	(d) Iraq	1	
	(e) Iran	1	
	(f) Saudi Arabia	4	
	(2) India:		
	(a) United Provinces	1	
	(b) Bombay	1	
	(c) Bengal	9 (1)	
	(d) Assam	1 (1)	
	(e) Mysore	1 (1)	
	(3) Burma:	4	
	(4) China:		
	(a) Shensi Province	3	

() = Samples from fields either lost enroute or unidentified.

TABLE 1 (Cont.)

GEOGRAPHICAL BREAKDOWN OF FIELDS AT WHICH SOIL SAMPLES WERE TAKEN

Group	Subgroup		Total Fields in Group
	Country or Island	No. Fields	
	(b) Szechwan Province	4 (1)	
	(c) Hunan Province	2	
	(d) Kweichow Province	3	
	(e) Yunnan Province	2	
	(f) Kwangsi Province	2	16 (1) 42 (4)
<u>Pacific Islands:</u>			
E. Philippine, Palau and Admiralty Islands; and New Guinea Area	(1) Philippine Islands:		
	(a) Luzon	9	
	(b) Mindoro	4	
	(c) Palawan	1	
	(d) Negros	1	
	(e) Cebu	2	
	(f) Loyte	4	
	(g) Samar	1	
	(h) Mindanao	2	24
	(2) Palau Group - Peleliu	1	
	(3) Admiralty Islands - Los Negros	1	
	(4) New Guinea Area - Biak	1	27
F. Hawaiian Islands, Alaska, and Aleutian Islands	(1) Hawaiian Islands (Oahu)	3	
	(2) Alaska	6 (9)	
	(3) Aleutian Islands:		
	(a) Umnak	1	
	(b) Atka	1	
	(c) Adak	1	
	(d) Shemya	(1) 3 (1)	12 (10)
TOTALS			222 (20)

() = Samples from fields either lost enroute or unidentified.

TABLE 2
BREAKDOWN OF SAMPLES ACCORDING TO SAMPLE SIZE

<u>Geographical Group</u>	<u>10-15</u> <u>Lb</u>	<u>20-30</u> <u>Lb</u>	<u>40-50</u> <u>Lb</u>	<u>Over 50</u> <u>Lb</u>	<u>Total</u> <u>Number</u>
Group A: Germany	5	31	12	2	50
Austria	1	-	-	-	1
France	-	3	6	-	9
Group B: Italy	-	-	124	-	124
Group C: Africa: Algeria	73	15	-	-	88
Tunisia	21	8	19	1	49
Others	27	5	10	5	47
Group D: Near East	-	6	6	5	17
India	-	20	6	-	26
Burma	-	12	-	-	12
China	5	9	2	-	16
Group E: Philippine Islands	-	-	49	18	67
Other Pacific Islands	-	-	2	1	3
Group F: Hawaiian Islands (Oahu)	-	10	-	-	10
Alaska and Aleutian Islands	-	27	5	-	32
TOTALS	132	146	241	32	551

CAMPBELL

The subgrade is a coarse to medium sand about 1000 feet from the west end of the runway. It extends about 35 per cent and a subgrade modulus, "K", of about 30.

TABLE 1: SUMMARY OF AIRFIELD TEST DATA (Cont.)

Name and Location	Latitude and Longitude	Field No.	Airfield Description	Location	Category	Description	Material	Gravel Size (mm)	Gravel Content (%)	Gravel Content (No. 20)	Gravel Content (No. 40)	Gravel Content (No. 60)	Gravel Content (No. 100)	Gravel Content (No. 200)	Gravel Content (No. 425)	Gravel Content (No. 75)	Gravel Content (No. 150)	Gravel Content (No. 300)	Gravel Content (No. 600)	Gravel Content (No. 1200)	Gravel Content (No. 2500)	Gravel Content (No. 5000)	Gravel Content (No. 10000)	Gravel Content (No. 20000)	Gravel Content (No. 40000)	Gravel Content (No. 80000)	Gravel Content (No. 160000)	Gravel Content (No. 320000)	Gravel Content (No. 640000)	Gravel Content (No. 1280000)	Gravel Content (No. 2560000)	Gravel Content (No. 5120000)	Gravel Content (No. 10240000)	Gravel Content (No. 20480000)	Gravel Content (No. 40960000)	Gravel Content (No. 81920000)	Gravel Content (No. 163840000)	Gravel Content (No. 327680000)	Gravel Content (No. 655360000)	Gravel Content (No. 1310720000)	Gravel Content (No. 2621440000)	Gravel Content (No. 5242880000)	Gravel Content (No. 10485760000)	Gravel Content (No. 20971520000)	Gravel Content (No. 41943040000)	Gravel Content (No. 83886080000)	Gravel Content (No. 167772160000)	Gravel Content (No. 335544320000)	Gravel Content (No. 671088640000)	Gravel Content (No. 1342177280000)	Gravel Content (No. 2684354560000)	Gravel Content (No. 5368709120000)	Gravel Content (No. 10737418240000)	Gravel Content (No. 21474836480000)	Gravel Content (No. 42949672960000)	Gravel Content (No. 85899345920000)	Gravel Content (No. 171798691840000)	Gravel Content (No. 343597383680000)	Gravel Content (No. 687194767360000)	Gravel Content (No. 1374389534720000)	Gravel Content (No. 2748779069440000)	Gravel Content (No. 5497558138880000)	Gravel Content (No. 10995116277760000)	Gravel Content (No. 21990232555520000)	Gravel Content (No. 43980465111040000)	Gravel Content (No. 87960930222080000)	Gravel Content (No. 175921860444160000)	Gravel Content (No. 351843720888320000)	Gravel Content (No. 703687441776640000)	Gravel Content (No. 1407374883553280000)	Gravel Content (No. 2814749767106560000)	Gravel Content (No. 5629499534213120000)	Gravel Content (No. 11258999068426240000)	Gravel Content (No. 22517998136852480000)	Gravel Content (No. 45035996273704960000)	Gravel Content (No. 90071992547409920000)	Gravel Content (No. 180143985094819840000)	Gravel Content (No. 360287970189639680000)	Gravel Content (No. 720575940379279360000)	Gravel Content (No. 1441151880758558720000)	Gravel Content (No. 2882303761517117440000)	Gravel Content (No. 5764607523034234880000)	Gravel Content (No. 11529215046068469760000)	Gravel Content (No. 23058430092136939520000)	Gravel Content (No. 46116860184273879040000)	Gravel Content (No. 92233720368547758080000)	Gravel Content (No. 184467440737095516160000)	Gravel Content (No. 368934881474191032320000)	Gravel Content (No. 737869762948382064640000)	Gravel Content (No. 1475739525896764129280000)	Gravel Content (No. 2951479051793528258560000)	Gravel Content (No. 5902958103587056517120000)	Gravel Content (No. 11805916207174113034240000)	Gravel Content (No. 23611832414348226068480000)	Gravel Content (No. 47223664828696452136960000)	Gravel Content (No. 94447329657392904273920000)	Gravel Content (No. 188894659314785808547840000)	Gravel Content (No. 377789318629571617095680000)	Gravel Content (No. 755578637259143234191360000)	Gravel Content (No. 1511157274518286468382720000)	Gravel Content (No. 3022314549036572936765440000)	Gravel Content (No. 6044629098073145873530880000)	Gravel Content (No. 12089258196146291747061760000)	Gravel Content (No. 24178516392292583494123520000)	Gravel Content (No. 48357032784585166988247040000)	Gravel Content (No. 96714065569170333976494080000)	Gravel Content (No. 193428131138340667952988160000)	Gravel Content (No. 386856262276681335905976320000)	Gravel Content (No. 773712524553362671811952640000)	Gravel Content (No. 1547425049106725343623905280000)	Gravel Content (No. 3094850098213450687247810560000)	Gravel Content (No. 6189700196426901374495621120000)	Gravel Content (No. 12379400392853802748991242240000)	Gravel Content (No. 24758800785707605497982484480000)	Gravel Content (No. 49517601571415210995964968960000)	Gravel Content (No. 99035203142830421991929937920000)	Gravel Content (No. 198070406285660843983859875840000)	Gravel Content (No. 396140812571321687967719751680000)	Gravel Content (No. 792281625142643375935439503360000)	Gravel Content (No. 1584563250285286751870879006720000)	Gravel Content (No. 3169126500570573503741758013440000)	Gravel Content (No. 6338253001141147007483516026880000)	Gravel Content (No. 12676506002282294014967032053760000)	Gravel Content (No. 25353012004564588029934064107520000)	Gravel Content (No. 50706024009129176059868128215040000)	Gravel Content (No. 101412048018258352119736256430080000)	Gravel Content (No. 202824096036516704239472512860160000)	Gravel Content (No. 405648192073033408478945025720320000)	Gravel Content (No. 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53169119831396634916152282411213783040000)	Gravel Content (No. 106338239662793269832304564822427566080000)	Gravel Content (No. 212676479325586539664609129644855132160000)	Gravel Content (No. 425352958651173079329218259289710264320000)	Gravel Content (No. 850705917302346158658436518579420528640000)	Gravel Content (No. 1701411834604692317316873037158841057280000)	Gravel Content (No. 3402823669209384634633746074317682114560000)	Gravel Content (No. 6805647338418769269267492148635364229120000)	Gravel Content (No. 13611294676837538538534984297270728458240000)	Gravel Content (No. 27222589353675077077069968594541456916480000)	Gravel Content (No. 54445178707350154154139937189082913832960000)	Gravel Content (No. 108890357414700308308279874378165827665920000)	Gravel Content (No. 217780714829400616616559748756331655331840000)	Gravel Content (No. 435561429658801233233119497512663310663680000)	Gravel Content (No. 871122859317602466466238995025326621327360000)	Gravel Content (No. 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28544953854119197621165719388989902481894932480000)	Gravel Content (No. 57089907708238395242331438777979804963789864960000)	Gravel Content (No. 114179815416476790484662877555959609927579729920000)	Gravel Content (No. 228359630832953580969325755111919219855159459840000)	Gravel Content (No. 456719261665907161938651510223838439710318919680000)	Gravel Content (No. 913438523331814323877303020447676879420637839360000)	Gravel Content (No. 1826877046663628647754606040895353758841275678720000)	Gravel Content (No. 3653754093327257295509212081790707517682551357440000)	Gravel Content (No. 7307508186654514591018424163581415035365102714880000)	Gravel Content (No. 14615016373309029182036848327162830070730205429760000)	Gravel Content (No. 29230032746618058364073696654325660141460410859520000)	Gravel Content (No. 58460065493236116728147393308651320282920821719040000)	Gravel Content (No. 116920130986472233456294786617302640565841643438080000)	Gravel Content (No. 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Content (No. 1915619426082361072947933783937886463030749486089502720000)	Gravel Content (No. 3831238852164722145895867567875772926061498972179005440000)	Gravel Content (No. 7662477704329444291791735135751545852122997944358010880000)	Gravel Content (No. 15324955408658888583583470271503091704245995888716021760000)	Gravel Content (No. 30649910817317777167166940543006183408491991777432043520000)	Gravel Content (No. 61299821634635554334333881086012366816983983554864087040000)	Gravel Content (No. 122599643269271108668667762172024733633967967109728174080000)	Gravel Content (No. 245199286538542217337335524344049467267935934219456348160000)	Gravel Content (No. 490398573077084434674671048688098934535871868438912696320000)	Gravel Content (No. 980797146154168869349342097376197869071743736877825392640000)	Gravel Content (No. 1961594292288337738698684194752395738143487473755650785280000)	Gravel Content (No. 3923188584576675477397368389504791476286974947511301570560000)	Gravel Content (No. 7846377169153350954794736779009582952573949895022603141120000)	Gravel Content (No. 15692754338306701909589473558019165905147899790045206282240000)	Gravel Content (No. 31385508676613403819178947116038331810295799580090412544480000)	Gravel Content (No. 62771017353226807638357894232076663620591599160180825088960000)	Gravel Content (No. 125542034706453615276715788464153327241183198320361650177920000)	Gravel Content (No. 251084069412907230553431576928306654482366396640723300355840000)	Gravel Content (No. 502168138825814461106863153856613308964732793281446600711680000)	Gravel Content (No. 1004336277651628922213726307713226617929465586562893201423360000)	Gravel Content (No. 2008672555303257844427452615426453235858931173125786402846720000)	Gravel Content (No. 4017345110606515688854905230852906471717862346251572805693440000)	Gravel Content (No. 8034690221213031377709810461705812943435724692503145611386880000)	Gravel Content (No. 16069380442426062755419620923411625886871449385006291222773760000)	Gravel Content (No. 32138760884852125510839241846823251773742898770012582445547520000)	Gravel Content (No. 64277521769704251021678483693646503547485797540025164891095040000)	Gravel Content (No. 128555043539408502043356967387293007094971595080050329782190080000)	Gravel Content (No. 257110087078817004086713934774586014189943190160100659564380160000)	Gravel Content (No. 51422017415
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TABLE 3: SUMMARY OF APT-TEL DATA (Cont.)

AIRFIELD			SAMPLE			SOIL TESTS											
Name and Location	Latitude and Longitude	Field Class.	Airfield Description	Location	Material	Description	Classi- fication 1/2 Mo.	Grain Sizes				Moisture					
								No. 10 to 40 microns	No. 40 to 100 microns	No. 100 to 200 microns	No. 200 to 400 microns	Moisture Content %	Moisture Ratio %	Moisture Ratio %	Moisture Ratio %		
Bologna	44 32 N 12 15 E	F	Surface: Turf	-	Subgrade	Brown sandy clay	CL	1-1/2	16	0	1	3	60	35	12	-	-
Bologna	44 41 N 12 15 E	M	Surface: Turf Base: Run	-	Base course	Brown medium gravel	GP	1-1/2	16	0	1	3	60	35	12	-	-
Forli	44 12 N 12 08 E	M	Surface: Runway with PEP extension	-	Base course	Brown sandy gravel	GP	1-1/2	16	0	1	3	60	35	12	-	-
Genoa	44 13 N 12 23 E	M	Surface: PEP Base: Run	-	Subgrade	Brown sandy clay	CL	1-1/2	16	0	1	3	60	35	12	-	-
Genoa	44 01 N 12 37 E	M	Surface: PEP Base: Gravel	-	Subgrade	Clay fine sand	SM	-	0	0	0	0	0	0	0	0	0
Genoa	44 01 N 12 37 E	M	Surface: PEP Base: Gravel	-	Subgrade	Gray sandy clay	CL	1-1/2	16	0	1	3	60	35	12	-	-
Genoa	44 01 N 12 37 E	M	Surface: PEP Base: Gravel	-	Subgrade	Gray sandy clay	CL	1-1/2	16	0	1	3	60	35	12	-	-
Genoa	44 01 N 12 37 E	M	Surface: PEP Base: Gravel	-	Subgrade	Gray sandy clay	CL	1-1/2	16	0	1	3	60	35	12	-	-
Genoa	44 01 N 12 37 E	M	Surface: PEP Base: Gravel	-	Subgrade	Gray sandy clay	CL	1-1/2	16	0	1	3	60	35	12	-	-
Genoa	44 01 N 12 37 E	M	Surface: PEP Base: Gravel	-	Subgrade	Gray sandy clay	CL	1-1/2	16	0	1	3	60	35	12	-	-
Genoa	44 01 N 12 37 E	M	Surface: PEP Base: Gravel	-	Subgrade	Gray sandy clay	CL	1-1/2	16	0	1	3	60	35	12	-	-
Genoa	44 01 N 12 37 E	M	Surface: PEP Base: Gravel	-	Subgrade	Gray sandy clay	CL	1-1/2	16	0	1	3	60	35	12	-	-
Genoa	44 01 N 12 37 E	M	Surface: PEP Base: Gravel	-	Subgrade	Gray sandy clay	CL	1-1/2	16	0	1	3	60	35	12	-	-
Genoa	44 01 N 12 37 E	M	Surface: PEP Base: Gravel	-	Subgrade	Gray sandy clay	CL	1-1/2	16	0	1	3	60	35	12	-	-
Genoa	44 01 N 12 37 E	M	Surface: PEP Base: Gravel	-	Subgrade	Gray sandy clay	CL	1-1/2	16	0	1	3	60	35	12	-	-
Genoa	44 01 N 12 37 E	M	Surface: PEP Base: Gravel	-	Subgrade	Gray sandy clay	CL	1-1/2	16	0	1	3	60	35	12	-	-
Genoa	44 01 N 12 37 E	M	Surface: PEP Base: Gravel	-	Subgrade	Gray sandy clay	CL	1-1/2	16	0	1	3	60	35	12	-	-
Genoa	44 01 N 12 37 E	M	Surface: PEP Base: Gravel	-	Subgrade	Gray sandy clay	CL	1-1/2	16	0	1	3	60	35	12	-	-
Genoa	44 01 N 12 37 E	M	Surface: PEP Base: Gravel	-	Subgrade	Gray sandy clay	CL	1-1/2	16	0	1	3	60	35	12	-	-
Genoa	44 01 N 12 37 E	M	Surface: PEP Base: Gravel	-	Subgrade	Gray sandy clay	CL	1-1/2	16	0	1	3	60	35	12	-	-
Genoa	44 01 N 12 37 E	M	Surface: PEP Base: Gravel	-	Subgrade	Gray sandy clay	CL	1-1/2	16	0	1	3	60	35	12	-	-
Genoa	44 01 N 12 37 E	M	Surface: PEP Base: Gravel	-	Subgrade	Gray sandy clay	CL	1-1/2	16	0	1	3	60	35	12	-	-
Genoa	44 01 N 12 37 E	M	Surface: PEP Base: Gravel	-	Subgrade	Gray sandy clay	CL	1-1/2	16	0	1	3	60	35	12	-	-
Genoa	44 01 N 12 37 E	M	Surface: PEP Base: Gravel	-	Subgrade	Gray sandy clay	CL	1-1/2	16	0	1	3	60	35	12	-	-
Genoa	44 01 N 12 37 E	M	Surface: PEP Base: Gravel	-	Subgrade	Gray sandy clay	CL	1-1/2	16	0	1	3	60	35	12	-	-
Genoa	44 01 N 12 37 E	M	Surface: PEP Base: Gravel	-	Subgrade	Gray sandy clay	CL	1-1/2	16	0	1	3	60	35	12	-	-
Genoa	44 01 N 12 37 E	M	Surface: PEP Base: Gravel	-	Subgrade	Gray sandy clay	CL	1-1/2	16	0	1	3	60	35	12	-	-
Genoa	44 01 N 12 37 E	M	Surface: PEP Base: Gravel	-	Subgrade	Gray sandy clay	CL	1-1/2	16	0	1	3	60	35	12	-	-
Genoa	44 01 N 12 37 E	M	Surface: PEP Base: Gravel	-	Subgrade	Gray sandy clay	CL	1-1/2	16	0	1	3	60	35	12	-	-
Genoa	44 01 N 12 37 E	M	Surface: PEP Base: Gravel	-	Subgrade	Gray sandy clay	CL	1-1/2	16	0	1	3	60	35	12	-	-
Genoa	44 01 N 12 37 E	M	Surface: PEP Base: Gravel	-	Subgrade	Gray sandy clay	CL	1-1/2	16	0	1	3	60	35	12	-	-
Genoa	44 01 N 12 37 E	M	Surface: PEP Base: Gravel	-	Subgrade	Gray sandy clay	CL	1-1/2	16	0	1	3	60	35	12	-	-
Genoa	44 01 N 12 37 E	M	Surface: PEP Base: Gravel	-	Subgrade	Gray sandy clay	CL	1-1/2	16	0	1	3	60	35	12	-	-
Genoa	44 01 N 12 37 E	M	Surface: PEP Base: Gravel	-	Subgrade	Gray sandy clay	CL	1-1/2	16	0	1	3	60	35	12	-	-
Genoa	44 01 N 12 37 E	M	Surface: PEP Base: Gravel	-	Subgrade	Gray sandy clay	CL	1-1/2	16	0	1	3	60	35	12	-	-
Genoa	44 01 N 12 37 E	M	Surface: PEP Base: Gravel	-	Subgrade	Gray sandy clay	CL	1-1/2	16	0	1	3	60	35	12	-	-
Genoa	44 01 N 12 37 E	M	Surface: PEP Base: Gravel	-	Subgrade	Gray sandy clay	CL	1-1/2	16	0	1	3	60	35	12	-	-
Genoa	44 01 N 12 37 E	M	Surface: PEP Base: Gravel	-	Subgrade	Gray sandy clay	CL	1-1/2	16	0	1	3	60	35	12	-	-
Genoa	44 01 N 12 37 E	M	Surface: PEP Base: Gravel	-	Subgrade	Gray sandy clay	CL	1-1/2	16	0	1	3	60	35	12	-	-
Genoa	44 01 N 12 37 E	M	Surface: PEP Base: Gravel	-	Subgrade	Gray sandy clay	CL	1-1/2	16	0	1	3	60	35	12	-	-
Genoa	44 01 N 12 37 E	M	Surface: PEP Base: Gravel	-	Subgrade	Gray sandy clay	CL	1-1/2	16	0	1	3	60	35	12	-	-
Genoa	44 01 N 12 37 E	M	Surface: PEP Base: Gravel	-	Subgrade	Gray sandy clay	CL	1-1/2	16	0	1	3	60	35	12	-	-
Genoa	44 01 N 12 37 E	M	Surface: PEP Base: Gravel	-	Subgrade	Gray sandy clay	CL	1-1/2	16	0	1	3	60	35	12	-	-
Genoa	44 01 N 12 37 E	M	Surface: PEP Base: Gravel	-	Subgrade	Gray sandy clay	CL	1-1/2	16	0	1	3	60	35	12	-	-
Genoa	44 01 N 12 37 E	M	Surface: PEP Base: Gravel	-	Subgrade	Gray sandy clay	CL	1-1/2	16	0	1	3	60	35	12	-	-
Genoa	44 01 N 12 37 E	M	Surface: PEP Base: Gravel	-	Subgrade	Gray sandy clay	CL	1-1/2	16	0	1	3	60	35	12	-	-
Genoa	44 01 N 12 37 E	M	Surface: PEP Base: Gravel	-	Subgrade	Gray sandy clay	CL	1-1/2	16	0	1	3	60	35	12	-	-
Genoa	44 01 N 12 37 E	M	Surface: PEP Base: Gravel	-	Subgrade	Gray sandy clay	CL	1-1/2	16	0	1	3	60	35	12	-	-
Genoa	44 01 N 12 37 E	M	Surface: PEP Base: Gravel	-	Subgrade	Gray sandy clay	CL	1-1/2	16	0	1	3	60	35	12	-	-
Genoa	44 01 N 12 37 E	M	Surface: PEP Base: Gravel	-	Subgrade	Gray sandy clay	CL	1-1/2	16	0	1	3	60	35	12	-	-
Genoa	44 01 N 12 37 E	M	Surface: PEP Base: Gravel	-	Subgrade	Gray sandy clay	CL	1-1/2	16	0	1	3	60	35	12	-	-
Genoa	44 01 N 12 37 E	M	Surface: PEP Base: Gravel	-	Subgrade	Gray sandy clay	CL	1-1/2	16	0	1	3	60	35	12	-	-
Genoa	44 01 N 12 37 E	M	Surface: PEP Base: Gravel	-	Subgrade	Gray sandy clay	CL	1-1/2	16	0	1	3	60	35	12	-	-
Genoa	44 01 N 12 37 E	M	Surface: PEP Base: Gravel	-	Subgrade	Gray sandy clay	CL	1-1/2	16	0	1	3	60	35	12	-	-
Genoa	44 01 N 12 37 E	M	Surface: PEP Base: Gravel	-	Subgrade	Gray sandy clay	CL	1-1/2	16	0	1	3	60	35	12	-	-
Genoa	44 01 N 12 37 E	M	Surface: PEP Base: Gravel	-	Subgrade	Gray sandy clay	CL	1-1/2	16	0	1	3	60	35	12	-	-
Genoa	44 01 N 12 37 E	M	Surface: PEP Base: Gravel	-	Subgrade	Gray sandy clay	CL	1-1/2	16	0	1	3	60	35	12	-	-
Genoa	44 01 N 12 37 E	M	Surface: PEP Base: Gravel	-	Subgrade	Gray sandy clay	CL	1-1/2	16	0	1	3	60	35	12	-	-
Genoa	44 01 N 12 37 E	M	Surface: PEP Base: Gravel	-	Subgrade	Gray sandy clay	CL	1-1/2	16	0	1	3	60	35	12	-	-
Genoa	44 01 N 12 37 E	M	Surface: PEP Base: Gravel	-	Subgrade	Gray sandy clay	CL	1-1/2	16	0	1	3	60	35	12	-	-
Genoa	44 01 N 12 37 E	M	Surface: PEP Base: Gravel	-	Subgrade	Gray sandy clay	CL	1-1/2	16	0	1	3	60	35	12	-	-
Genoa	44 01 N 12 37 E	M	Surface: PEP Base: Gravel	-	Subgrade	Gray sandy clay	CL	1-1/2	16	0	1	3	60	35	12	-	-
Genoa	44 01 N 12 37 E	M	Surface: PEP Base: Gravel	-	Subgrade	Gray sandy clay	CL	1-1/2	16	0	1	3	60	35	12	-	-
Genoa	44 01 N 12 37 E	M	Surface: PEP Base: Gravel	-	Subgrade	Gray sandy clay	CL	1-1/2	16	0	1	3	60	35	12	-	-
Genoa	44 01 N 12 37 E	M	Surface: PEP Base: Gravel	-	Subgrade	Gray sandy clay	CL	1-1/2	16	0	1	3	60	35	12	-	-
Genoa	44 01 N 12 37 E	M	Surface: PEP Base: Gravel	-	Subgrade	Gray sandy clay	CL	1-1/2	16	0	1	3	60	35	12	-	-
Genoa	44 01 N 12 37 E	M	Surface: PEP Base: Gravel	-	Subgrade	Gray sandy clay	CL	1-1/2	16	0	1	3	60	35	12	-	-
Genoa	44 01 N 12 37 E	M	Surface: PEP Base: Gravel	-	Subgrade	Gray sandy clay	CL	1-1/2	16	0	1	3	60	35	12	-	-
Genoa	44 01 N 12 37 E	M	Surface: PEP Base: Gravel	-	Subgrade	Gray sandy clay	CL	1-1/2	16	0	1	3	60	35	12	-	-
Genoa	44 01 N 12 37 E	M	Surface: PEP Base: Gravel	-	Subgrade	Gray sandy clay	CL	1-1/2	16	0	1	3	60	35	12	-	-
Genoa	44 01 N 12 37 E	M	Surface: PEP Base: Gravel	-	Subgrade	Gray sandy clay	CL	1-1/2	16	0	1	3	60	35	12	-	-
Genoa	44 01 N 12 37 E	M	Surface: PEP Base: Gravel	-	Subgrade	Gray sandy clay	CL	1-1/2	16	0	1	3	60	35	12	-	-
Genoa	44 01 N 12 37 E	M	Surface: PEP Base: Gravel	-	Subgrade	Gray sandy clay	CL	1-1/2	16	0	1	3	60	35	12	-	-
Genoa	44 01 N 12 37 E	M	Surface: PEP Base: Gravel	-	Subgrade	Gray sandy clay	CL	1-1/2	16	0	1	3	60	35	12	-	-
Genoa	44 01 N 12 37 E	M	Surface: PEP Base: Gravel	-	Subgrade	Gray sandy clay	CL	1-1/2	16	0	1	3	60	35	12	-	-
Genoa	44 01 N 12 37 E	M	Surface: PEP Base: Gravel	-	Subgrade	Gray sandy clay	CL	1-1/2	16	0	1	3	60	35	12	-	-
Genoa	44 01 N 12 37 E	M	Surface: PEP Base: Gravel	-	Subgrade	Gray sandy clay	CL	1-1/2	16	0	1	3	60	35	12	-	-
Genoa	44 01 N 12 37 E	M	Surface: PEP Base: Gravel	-	Subgrade	Gray sandy clay	CL	1-1/2	16	0	1	3	60	35	12	-	-
Genoa	44 01 N 12 37 E	M	Surface: PEP Base: Gravel	-	Subgrade	Gray sandy clay	CL	1-1/2	16	0	1	3	60	35	12	-	-
Genoa	44 01 N 12 37 E	M	Surface: PEP Base: Gravel	-	Subgrade	Gray sandy clay	CL	1-1/2	16	0	1	3	60	35	12	-	-
Genoa	44 01 N 12 37 E	M	Surface: PEP Base: Gravel	-	Subgrade	Gray sandy clay	CL	1-1/2	16	0	1	3	60	35	12	-	-
Genoa	44 01 N 12 37 E	M	Surface: PEP Base: Gravel	-	Subgrade	Gray sandy clay	CL	1-1/2	16	0	1	3	60	35	12	-	-
Genoa	44 01 N 12 37 E	M	Surface: PEP Base: Gravel	-	Subgrade	Gray sandy clay	CL	1-1/2	16	0	1	3	60	35	12	-	-
Genoa	44 01 N 12 37 E	M	Surface: PEP Base: Gravel	-	Subgrade	Gray sandy clay	CL	1-1/2	16	0	1	3	60	35	12	-	-
Genoa	44 01 N 12 37 E	M	Surface: PEP Base: Gravel	-	Subgrade	Gray sandy clay	CL	1-1/2	16	0	1	3	60	35	12	-	-
Genoa	44 01 N 12 37 E	M	Surface: PEP														

TABLE 31. SUMMARY OF ADJUSTED TEST DATA (Cont.)

Group 2: Italy

Name and Location		Latitude and Longitude	Field Class.	Airfield Description	Location	Material	Description	Classification (Symbol)	Moist. (Gravel) Size No. 10 to 40	% Coarse Sand 40 to 60	% Fines 60 to 100	Adverse Effects	Remarks	Mod. AASD Compaction Max.	
San Severo		41 53 N 15 26 E	1B	Surfaces: Runway - gravel, oiled Taxiway - gravel Landing strip - gravel	Runway	-	Brown sandy clay	CL	-	0	1	11	73	-	-
					East taxiway	-	Brown clay	CH	-	0	1	24	75	-	-
Starpurone		41 46 N 15 13 E	1B	Surfaces: Landing strip - oiled Taxiway - gravel, oiled	West taxiway	-	Brown sandy clay	CL	-	0	1	11	75	-	-
					North taxiway	3 ft depth	Brown clay	CL	-	1	2	5	8	-	-
Saliceta		41 33 N 15 27 E	1B	No information	Runway	3-1/2 ft depth	Brown clay	CL	-	0	1	11	80	-	-
					Taxiway	2 ft depth	Brown clay	CH	-	1-1/2	0	1	11	80	-
Trivico		41 37 N 15 27 E	1B	Surfaces: Oiled landing strip	Runway	2 ft depth	Brown clay	CH	-	0	1	11	83	-	-
					Taxiway	2 ft depth	Brown clay	CH	-	0	0	6	9	84	-
Colama		41 33 N 15 34 E	1B	Surfaces: ROP runway	Runway	2 ft depth	Brown clay	CH	-	0	0	14	88	-	-
					East taxiway	2 ft depth	Brown clay	CH	-	0	0	0	14	88	-
Lucera		41 30 N 15 29 E	1B	Surfaces: Runway - ROP Taxiway - gravel, oiled	Runway	2 ft depth	Brown sandy clay	CL	-	0	0	11	76	-	-
					East taxiway	2 ft depth	Brown sandy clay	CL	-	0	0	9	29	62	-
Vieste		41 29 N 15 27 E	1B	Surfaces: Runway - oiled Taxiway - oiled	Runway	2 ft depth	Brown sandy clay	CL	-	0	0	3	21	-	-
					East taxiway	2 ft depth	Brown sandy clay	CL	-	0	0	6	23	73	-
Peglia Mela		41 26 N 15 32 E	1B	Surfaces: Northbound runway - asphalt Southbound runway - gravel, oiled Taxiway - asphalt and gravel	Runway	2 ft depth	Brown sandy clay	CL	-	0	0	1	17	-	-
					East taxiway	2 ft depth	Brown sandy clay	CL	-	0	0	1	21	78	-
Amadola		41 33 N 15 42 E	1B	Surfaces: Runway and taxiway. Oiled Landing strip	Runway	2 ft depth	Brown sandy clay	CL	-	0	0	1	17	-	-
					East taxiway	2 ft depth	Brown sandy clay	CL	-	0	0	1	21	78	-
Tortorella		41 26 N 15 39 E	1B	Surfaces: 2 runways - oiled turf Taxiway - gravel	Runway	2 ft depth	Brown sandy clay	CL	-	0	0	1	17	-	-
					East taxiway	2 ft depth	Brown sandy clay	CL	-	0	0	1	21	78	-
Castelluccio		41 19 N 15 33 E	1B	No information	Runway	2 ft depth	Brown sandy clay	CL	-	0	0	1	17	-	-
					East taxiway	2 ft depth	Brown sandy clay	CL	-	0	0	1	21	78	-
Starnone		41 17 N 15 44 E	1B	Surfaces: Runway - gravel, oiled. North Taxiway - gravel	Runway	2 ft depth	Brown sandy clay	CL	-	0	0	1	17	-	-
					East taxiway	2 ft depth	Brown sandy clay	CL	-	0	0	1	21	78	-
Cicilia		41 16 N 15 30 E	1B	Surfaces: Runway - gravel, oiled	Runway	2 ft depth	Brown sandy clay	CL	-	0	0	1	17	-	-
					East taxiway	2 ft depth	Brown sandy clay	CL	-	0	0	1	21	78	-
San Giovanni		41 14 N 15 46 E	1B	Surfaces: 2 runways - gravel, oiled ROP Taxiway - gravel	Runway	2 ft depth	Brown sandy clay	CL	-	0	0	1	17	-	-
					East taxiway	2 ft depth	Brown sandy clay	CL	-	0	0	1	21	78	-

TABLE 3. SUMMARY OF AIRFIELD TEST DATA (Cont.)

Group B: Italy

Name and Location	Latitude and Longitude	Field Class.	Airfield Description	Location	Material	Description	Classification Symbol	Grain Sizes										Atterberg Limits			Mod. AASD Compaction	
								Max. Gravel		Sand		Silt		Clay		Plasticity		Spec. Grav.	Liquid Limit	Shrinkage	Max. Density	Dry Density
								Gravel	Gravel	10 to 40	40 to 200	200 to 425	425 to 600	600 to 850	850 to 2000	Flow	Shrinkage					
Torrestra	41 11 N 15 46 E	B	Surface: 2 runways - gravel, oiled MP Runway - gravel. Taxiway - gravel.	West runway	2 ft depth	Brown sandy clay	CL	-	-	2	4	18	76	43	19	-	-	-	-	-	-	-
				East runway	2 ft depth	Brown clay	ML	-	-	0	2	14	84	41	23	-	-	-	-	-	-	-
				West taxiway	2 ft depth	Brown sandy clay	CL	-	-	1	1	27	63	34	16	-	-	-	-	-	-	-
				Southwest taxiway	2 ft depth	Brown sandy clay	CH	-	-	0	1	43	66	36	31	-	-	-	-	-	-	-
Pantazola	41 06 N 15 25 E	B	Surface: Runway - MP Runway - gravel. Taxiway - gravel.	Shoulder south	2 ft depth	Brown sandy clay	CL	-	-	0	0	25	75	43	14	-	-	-	-	-	-	-
				Runway	2 ft depth	Brown clay	ML	-	-	0	0	1	14	63	23	-	-	-	-	-	-	-
				North taxiway	2 ft depth	Brown sandy clay	CL	-	-	0	2	28	72	34	16	-	-	-	-	-	-	-
				South taxiway	2 ft depth	Brown sandy clay	CH	-	-	3	3	23	74	43	17	-	-	-	-	-	-	-
Pari	41 09 N 16 47 E	B	Surface: Runway - gravel, oiled Runway - tuff Taxiway - oiled	South taxiway	2 ft depth	Brown clay	CL	-	-	0	1	13	86	31	13	-	-	-	-	-	-	-
				North of runway	2 ft depth	Brown clay	ML	-	-	0	0	7	93	34	26	-	-	-	-	-	-	-
				South taxiway	2 ft depth	Brown clay & crushed rock	CL	-	-	-	-	-	-	36	13	-	-	-	-	-	-	-
				Runway	2 ft depth	Brown clay (organic)	CH	-	-	2	3	12	83	41	23	-	-	-	-	-	-	-
Ponoma	41 00 N 15 50 E	B	Surface: Runway - MP Runway - gravel.	North taxiway	2 ft depth	Brown clay (organic)	CH	-	-	0	4	13	86	31	26	-	-	-	-	-	-	-
				South taxiway	2 ft depth	Brown sandy clay	CH	-	-	0	0	24	76	37	23	-	-	-	-	-	-	-
				North taxiway	2 ft depth	Dark brown clay	CL	-	-	0	4	22	74	46	23	-	-	-	-	-	-	-
				Runway	2 ft depth	Brown silt	ML	-	-	0	1	11	88	26	6	-	-	-	-	-	-	-
Epimeresia	40 37 N 16 11 E	B	Surface: Runway - MP on tuff Runway - tuff	North taxiway	2 ft depth	Brown clay with crushed rock	ML	-	-	0	2	15	83	41	23	-	-	-	-	-	-	-
				South taxiway	2 ft depth	Brown clay with crushed rock	CL	-	-	0	2	12	86	32	12	-	-	-	-	-	-	-
				Runway	2 ft depth	Brown sandy clay	CH	-	-	0	0	43	57	26	11	-	-	-	-	-	-	-
				North taxiway	2 ft depth	Red brown sandy clay	CH	-	-	1-1/2	67	7	3	1	23	2	-	-	-	-	-	-
Gleia	40 47 N 16 36 E	B	Surface: Runway - tuff Runway - oiled Taxiway - oiled	Runway	2 ft depth	Red brown sandy clay	CL	-	-	0	1	30	69	23	11	-	-	-	-	-	-	-
				West taxiway	2 ft depth	Red brown sandy clay	CL	-	-	0	10	30	56	27	11	-	-	-	-	-	-	-
				East taxiway	2 ft depth	Red brown clay	CL	-	-	0	0	9	91	34	23	-	-	-	-	-	-	-
				Runway	2 ft depth	Red brown clay with marine fossils	CL	-	-	0	3	14	80	34	17	-	-	-	-	-	-	-
Brindisi	40 39 N 17 47 E	B	Surface: Runway - MP, tuff and asphalt Runway - MP, tuff and asphalt Taxiway - MP, tuff and asphalt	Runway	2 ft depth	Red brown clay with marine fossils	CL	-	-	0	0	0	92	43	18	-	-	-	-	-	-	-
				West taxiway	2 ft depth	Sandy clay	CL	-	-	1	9	23	61	31	12	-	-	-	-	-	-	-
				East taxiway	2 ft depth	Red brown sandy clay	CL	-	-	0	1	23	76	35	18	-	-	-	-	-	-	-
				Runway	2 ft depth	Red brown sandy clay	CL	-	-	0	5	23	72	38	14	-	-	-	-	-	-	-
Grottaglie	40 31 N 17 28 E	B	Surface: Runway - asphalt Runway - asphalt Taxiway - tuff	Runway	2 ft depth	Red brown sandy clay	CL	-	-	0	1	24	79	43	19	-	-	-	-	-	-	-
				West taxiway	2 ft depth	Red brown sandy clay	CL	-	-	0	2	26	72	38	12	-	-	-	-	-	-	-
				East taxiway	2 ft depth	Red brown sandy clay	CL	-	-	0	1	20	79	45	20	-	-	-	-	-	-	-
				Runway	2 ft depth	Red brown sandy clay	CL	-	-	0	2	41	57	26	12	-	-	-	-	-	-	-
Manduria	40 26 N 17 30 E	B	Surface: Runway - oiled tuff Runway - oiled tuff Taxiway - tuff	Runway	2 ft depth	Red brown sandy clay	CL	-	-	0	0	0	92	43	18	-	-	-	-	-	-	-
				West taxiway	2 ft depth	Red brown sandy clay	CL	-	-	0	3	14	80	34	17	-	-	-	-	-	-	-
				East taxiway	2 ft depth	Red brown sandy clay	CL	-	-	0	0	0	92	43	18	-	-	-	-	-	-	-
				Runway	2 ft depth	Red brown sandy clay	CL	-	-	0	0	0	92	43	18	-	-	-	-	-	-	-
San Pancrazio	40 26 N 17 31 E	B	Surface: Runway - soil cement & stone Runway - soil cement & stone Taxiway - soil cement & stone	Runway	2 ft depth	Red brown sandy clay	CL	-	-	0	1	24	79	43	19	-	-	-	-	-	-	-
				West taxiway	2 ft depth	Red brown sandy clay	CL	-	-	0	2	26	72	38	12	-	-	-	-	-	-	-
				East taxiway	2 ft depth	Red brown sandy clay	CL	-	-	0	1	20	79	45	20	-	-	-	-	-	-	-
				Runway	2 ft depth	Red brown sandy clay	CL	-	-	0	2	41	57	26	12	-	-	-	-	-	-	-
Lecce	40 14 N 18 06 E	B	Surface: Runway - asphalt with tuff extension Runway - asphalt with tuff extension Taxiway - tuff	Runway	2 ft depth	Red brown sandy clay	CL	-	-	0	0	0	92	43	18	-	-	-	-	-	-	-
				West taxiway	2 ft depth	Red brown sandy clay	CL	-	-	0	0	0	92	43	18	-	-	-	-	-	-	-
				East taxiway	2 ft depth	Red brown sandy clay	CL	-	-	0	0	0	92	43	18	-	-	-	-	-	-	-
				Runway	2 ft depth	Red brown sandy clay	CL	-	-	0	0	0	92	43	18	-	-	-	-	-	-	-
Cianpino	41 14 N 12 35 E	B	No information	Runway	2 ft depth	Red brown sandy clay	CL	-	-	0	0	0	92	43	18	-	-	-	-	-	-	-
				West taxiway	2 ft depth	Red brown sandy clay	CL	-	-	0	0	0	92	43	18	-	-	-	-	-	-	-
				East taxiway	2 ft depth	Red brown sandy clay	CL	-	-	0	0	0	92	43	18	-	-	-	-	-	-	-
				Runway	2 ft depth	Red brown sandy clay	CL	-	-	0	0	0	92	43	18	-	-	-	-	-	-	-
Corrida	40 20 N 18 21 E	B	Surface: Oiled	Runway	2 ft depth	Red brown sandy clay	CL	-	-	0	0	0	92	43	18	-	-	-	-	-	-	-
				West taxiway	2 ft depth	Red brown sandy clay	CL	-	-	0	0	0	92	43	18	-	-	-	-	-	-	-
				East taxiway	2 ft depth	Red brown sandy clay	CL	-	-	0	0	0	92	43	18	-	-	-	-	-	-	-
				Runway	2 ft depth	Red brown sandy clay	CL	-	-	0	0	0	92	43	18	-	-	-	-	-	-	-

TABLE 31. SUMMARY OF ADVANCED TEST DATA (Cont.)

Name and Location	Latitude and Longitude	Field Class.	Airfield Description	Location	Material	Description	Classi- fication Symbol	SOIL TESTS									
								Grain Sizes					Atterberg Limits				
								Max. Gravel Size >No. 10 Sieve	% Gravel >No. 10 Sieve	% Sand No. 40 to No. 200 Sieve	% Fines <No. 200 Sieve	Moisture Content, %	Shrinkage, %	LL	PL	NP	Mod. AASHTO Compaction, %
(1) <u>RED HILL CREEK</u> <u>Chico Valley</u>	27 27 N 12 56 W	2	Description missing	Center of field	-	Thin fine sand	SP	-	0	8	92	0	20	14	8	-	-
(2) <u>FRANK KNOX</u> <u>Marathon</u>	31 37 N 06 02 W	VB	Description missing	Original runway	Base course 1 ft depth	Red clayey sandy gravel	OC	1	48	12	40	20	24	8	-	-	-
				Present runway	Base course 6 ft depth	Red silty sandy gravel	OM	1	67	12	9	12	21	6	-	-	-
				Runway Area	Base course 4 ft depth	Red silty sandy gravel	OM	1	53	26	12	11	21	5	-	10	110
	31 34 N 07 40 W	2	Surface: Asphalt median runway & taxiway	End of runway	Composite subgrade	Brown sandy clay	CL	-	2	10	24	64	30	13	2.71	-	-
				Runway shoulders	Composite subgrade	Black sandy clay	CL	-	12	12	23	53	22	12	2.79	-	-
Red Hill No	34 00 N 05 09 W	VB	Description missing	Runway pit	Fill	Gray sandy clay	CL	5/8	78	19	3	66	24	9	2.63	-	-
				Quarry	-	Gray crumbled rock	GP	3/4	51	9	13	87	-	-	-	-	-
				-	-	Red silty sandy gravel	OM	3/4	35	7	16	40	20	2	2.70	-	-
				-	-	Brown silty sandy gravel	OM	3/4	35	7	16	40	20	2	2.70	-	-
				-	-	Brown clay	CL	-	0	3	14	83	49	25	2.69	-	-
(3) <u>ALUMINIA</u> <u>(a) <u>Chico Valley</u></u> <u>La Bamba</u>	35 36 N 00 57 W	VB	Surface: One paved runway	Runway missing	-	-	-	-	-	-	-	-	-	-	-	-	-
Marina	-	-	Surface: Asphalt seal coat runway	Centerline	1 ft depth	Red brown sandy clay	CL	-	0	5	29	70	30	9	-	-	-
			Surface: Gravel north. Run 2-1/2 ft below	Centerline	2 ft depth	Red brown sandy clay	CL	-	0	3	26	69	33	11	-	-	-
			Surface: Gravel	Centerline	2-1/2 ft depth	Red clay	CL	1-1/2	75	9	11	5	NP	-	-	-	-
	35 31 N 00 59 W	VB	Description missing	Runway shoulder	1 ft depth	Gray clay	CL	-	0	2	13	86	43	20	2.70	-	-
Barron	35 40 N 00 11 W	-	Incomplete	Runway shoulder	2 ft depth	Gray clay	CL	-	0	2	12	88	41	20	2.70	-	-
				Runway shoulder	3 ft depth	Gray clay	CL	-	0	1	13	86	41	19	2.66	-	-
Pratt	-	-	General: Emergency field, no runway	Runway missing	-	-	-	-	-	-	-	-	-	-	-	-	-
	-	-	General: Emergency field, no runway	-	1 ft depth	Red clay	CL	-	0	0	10	90	33	14	2.69	-	-
Cogan	-	-	General: Emergency field, no runway	-	2 ft depth	Red clay	CL	-	0	0	6	94	42	21	2.70	-	-
	-	-	General: Emergency field, no runway	-	2-1/2 ft depth	Red clay	CL	-	0	3	6	91	37	17	2.70	-	-
La Puente	36 10 N 00 26 E	VB	Surface: Wet runway	-	-	Brown clay	CL	-	0	0	4	96	44	21	2.67	-	-
				-	-	Brown clay	CL	-	0	0	6	94	44	20	2.68	-	-
(4) <u>ALUMINIA</u> <u>Marina</u>	36 30 N 00 46 E	VB	Surface: One hard surfaced runway	Runway shoulder	-	Red brown sandy silt	ML	-	0	3	23	44	17	3	-	-	-
			Surface: One hard surfaced runway	Runway shoulder	-	Red brown sandy clay	CL	-	0	3	23	44	17	3	-	-	-
Wilson Blanche	36 42 N 01 13 E	2	Surface: Asphalt runway	Runway missing	-	Red brown silty sand	SM	-	0	4	69	31	NP	-	-	-	-
				-	-	Brown clayey gravel	OC	1	68	6	4	22	26	9	-	-	-
La Bamba	36 45 N 01 23 E	VB	Surface: Red & blue landing mat on runway	-	-	Brown clayey gravel	OC	1-1/2	82	3	3	12	25	10	-	-	-
			Surface: Clayey sandy soil, heavy after rain	-	-	Red silty gravel	OM	-	-	-	-	-	22	5	-	-	-
La Bamba	36 45 N 01 23 E	VB	Surface: Red & blue landing mat on runway	-	-	Red silty sand	SM	-	2	7	27	34	21	3	-	12	118
			Surface: Clayey sandy soil, heavy after rain	-	-	Red silty sand	SM	-	1	24	70	5	21	3	-	-	16
La Bamba	36 45 N 01 23 E	VB	Surface: Red & blue landing mat on runway	-	-	Red silty sand	SM	-	2	12	48	6	21	5	-	-	-
			Surface: Clayey sandy soil, heavy after rain	-	-	Red silty sand	SM	-	2	12	48	6	21	5	-	-	-

TABLE 3. SUMMARY OF AIRFIELD TEST DATA (Cont.)

Group C: Africa

SAMPLE

AIRFIELD

SOIL TESTS

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TABLE 3: SUMMARY OF AIRFIELD TEST DATA (Cont.)

Graig C. Africa

Name and Location	Latitude and Longitude	Field Class.	Airfield Description	Location	Material	Description	Classi- fication Symbol	Grain Sizes										Mod. ASCE		
								Gravel		Sand		Silt		Clay		Plasticity		Spec. Grav. G _s	Opt. U _c	Max. Compaction
								Max. Size	Gravel	Gravel	10 to 40	40 to 200	200 < No. 200	Atterberg Limits	Atterberg	Atterberg	Atterberg			
								in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.
La Kroub	36 15 N 08 41 E	-	Subgrade: Clay-sand, soft after rains General: Double all the time. Half of runway is of stone. Incomplete	-	-	Black sandy clay	CL	-	0	0	7	20	73	41	15	2.63	-	-	-	-
Lamasara	-	M	Description missing	-	-	Black sandy clay	CL	-	0	0	7	19	74	39	15	2.65	-	-	-	-
Charguier	37 51 N 07 06 E	M	Surface: Rolled earth strip Subgrade: Light quick drying turf soil, soft after rains	-	-	Red clay	CL	-	0	0	3	7	40	43	17	2.63	-	-	-	-
Montecatini	36 05 N 07 52 E	M	Subgrade: Clay & turf soils General: Runway graded with scrapers. Double after rains with precautions	-	-	Red clay	CL	-	0	0	3	12	85	45	16	2.67	-	-	-	-
Yonke la Bataie	37 30 N 07 56 E	P	Description missing	-	-	Brown & grey sandy clay	CL	-	0	0	4	18	78	30	17	2.76	-	-	-	-
Tebenen	37 25 N 08 08 E	M	Subgrade: Clayey soil General: Double only in dry weather, danger- ous even after light rains. Underlying silt surface	-	-	Brown clay	CL	1/4	10	0	1	9	80	36	15	2.64	-	-	-	-
(a) Campagna Area Lagouat	31 15 N 22 52 E	M	Subgrade: Clayey sand General: Firm after rains	-	-	Tan sandy clay	CL	-	0	0	7	19	74	42	17	2.67	-	-	-	-
(c) Tangant Area Tangant	-	M	Description missing	-	-	Tan sandy clay	CL	-	0	0	8	18	73	40	16	2.64	-	-	-	-
(b) TUBERIA Tubol N'el Bafm	-	M	Surface: None General: Plowed field at present	-	-	Tan sandy clay	CL	-	0	0	5	17	78	38	13	2.65	-	-	-	-
Utique	-	M	Surface: None General: Plowed field at present	-	-	Tan clay	CL	-	0	0	0	3	97	42	19	2.66	-	-	-	-
Preville No. 2	-	M	Surface: None General: Plowed field at present	-	-	Tan clay	CL	-	0	0	0	6	94	41	19	2.66	-	-	-	-
La Sebala No. 1	-	M	Surface: None General: Plowed field at present	-	-	Brown clay	CL	-	0	0	1	3	96	44	18	2.64	-	-	-	-
La Sebala No. 2	-	M	Surface: None General: Plowed field at present	-	-	Brown clay	CL	-	0	0	0	0	100	45	22	2.67	-	-	-	-
Djoudia No. 1	36 32 N 08 47 E	M	Surface: None General: Plowed field at present	-	-	Grey clay (organic)	CL	-	-	-	-	-	-	31	6	-	-	-	-	-
Djoudia No. 2	36 49 N 09 37 E	M	Surface: Asphalt paving	-	-	Grey clay (organic)	CL	1/4	45	26	20	9	-	35	14	-	-	-	-	-
Djoudia No. 3	36 32 N 08 56 E	M	Surface: None General: Plowed field at present	-	-	Tan fine sand	SP(1)	-	-	-	-	-	-	-	-	-	-	-	-	-
Soc. el Daria No. 1	36 30 N 08 55 E	M	Surface: None General: Plowed field at present	-	-	Tan silty sand	SM	-	-	-	-	-	-	-	-	-	-	-	-	-
Soc. el Daria No. 2	36 30 N 08 55 E	M	Surface: None General: Plowed field at present	-	-	Tan clay	CL	-	-	-	-	-	-	-	-	-	-	-	-	-
Soc. el Daria No. 3	36 30 N 08 55 E	M	Surface: None General: Plowed field at present	-	-	Tan clay	CL	-	-	-	-	-	-	-	-	-	-	-	-	-
Soc. el Daria No. 4	36 30 N 08 55 E	M	Surface: None General: Plowed field at present	-	-	Tan clay	CL	-	-	-	-	-	-	-	-	-	-	-	-	-
Soc. el Daria No. 5	36 30 N 08 55 E	M	Surface: None General: Plowed field at present	-	-	Tan clay	CL	-	-	-	-	-	-	-	-	-	-	-	-	-
Soc. el Daria No. 6	36 30 N 08 55 E	M	Surface: None General: Plowed field at present	-	-	Tan clay	CL	-	-	-	-	-	-	-	-	-	-	-	-	-
Soc. el Daria No. 7	36 30 N 08 55 E	M	Surface: None General: Plowed field at present	-	-	Tan clay	CL	-	-	-	-	-	-	-	-	-	-	-	-	-
Soc. el Daria No. 8	36 30 N 08 55 E	M	Surface: None General: Plowed field at present	-	-	Tan clay	CL	-	-	-	-	-	-	-	-	-	-	-	-	-
Soc. el Daria No. 9	36 30 N 08 55 E	M	Surface: None General: Plowed field at present	-	-	Tan clay	CL	-	-	-	-	-	-	-	-	-	-	-	-	-
Soc. el Daria No. 10	36 30 N 08 55 E	M	Surface: None General: Plowed field at present	-	-	Tan clay	CL	-	-	-	-	-	-	-	-	-	-	-	-	-
Soc. el Daria No. 11	36 30 N 08 55 E	M	Surface: None General: Plowed field at present	-	-	Tan clay	CL	-	-	-	-	-	-	-	-	-	-	-	-	-
Soc. el Daria No. 12	36 30 N 08 55 E	M	Surface: None General: Plowed field at present	-	-	Tan clay	CL	-	-	-	-	-	-	-	-	-	-	-	-	-
Soc. el Daria No. 13	36 30 N 08 55 E	M	Surface: None General: Plowed field at present	-	-	Tan clay	CL	-	-	-	-	-	-	-	-	-	-	-	-	-
Soc. el Daria No. 14	36 30 N 08 55 E	M	Surface: None General: Plowed field at present	-	-	Tan clay	CL	-	-	-	-	-	-	-	-	-	-	-	-	-
Soc. el Daria No. 15	36 30 N 08 55 E	M	Surface: None General: Plowed field at present	-	-	Tan clay	CL	-	-	-	-	-	-	-	-	-	-	-	-	-
Soc. el Daria No. 16	36 30 N 08 55 E	M	Surface: None General: Plowed field at present	-	-	Tan clay	CL	-	-	-	-	-	-	-	-	-	-	-	-	-
Soc. el Daria No. 17	36 30 N 08 55 E	M	Surface: None General: Plowed field at present	-	-	Tan clay	CL	-	-	-	-	-	-	-	-	-	-	-	-	-
Soc. el Daria No. 18	36 30 N 08 55 E	M	Surface: None General: Plowed field at present	-	-	Tan clay	CL	-	-	-	-	-	-	-	-	-	-	-	-	-
Soc. el Daria No. 19	36 30 N 08 55 E	M	Surface: None General: Plowed field at present	-	-	Tan clay	CL	-	-	-	-	-	-	-	-	-	-	-	-	-
Soc. el Daria No. 20	36 30 N 08 55 E	M	Surface: None General: Plowed field at present	-	-	Tan clay	CL	-	-	-	-	-	-	-	-	-	-	-	-	-

TABLE 11. SUMMARY OF AIRFIELD TEST DATA (Cont.)

Name and Location	Latitude and Longitude	Field Class.	Airfield Description	Location	Material	Description	Classi- fication Symbol	SOIL TESTS									
								Grain Sizes									
								Max. Gravel Size > No. 10 Sieve, in.	% Gravel > No. 10 Sieve	% Sand > No. 40 to 200 Sieve	Atterberg Limits, %	Spec. Grav. Y _d	Mod. ASHED Compaction Max.				
											LL	PL	Spec. Grav. Y _d				
K1 Bathan	36 48 N 09 51 E	M	Surface: None General: Plowed field at present	-	-	Brown clay	CL	-	0	0	5	99	34	15	-	-	-
Muscault	36 43 N 09 59 E	M	Surface: None General: Plowed field at present	-	-	Brown clay	CL	-	0	3	13	84	46	26	-	19	102 8 Low
Oudre	36 38 N 10 06 E	-	Surface: Asphalt paving	-	-	Brown clay	CL	-	0	3	3	94	46	24	-	-	-
Deplenne	36 25 N 10 02 E	M	Surface: Asphalt paving	-	-	Brown clay	CL	-	0	1	7	92	30	12	-	16	112 10 Low
Pont du Pabu	36 20 N 09 50 E	M	Surface: None General: Plowed field at present	-	-	Brown sandy clay	CL	-	0	2	19	79	33	16	-	13	117 10 Low
Le Sere	36 02 N 09 15 E	M	Surface: None General: Plowed field at present	-	-	Gray clay (Organic) Gray clay Gray clay	CH CH CH	- - -	0 0 0	1 1 7	7 92 92	55 31 29	- - -	- - -	-	-	-
Le Kouif	-	M	Description missing	-	-	Brown clay Tan gravelly sandy clay White gravelly sand	ML ML SL	- 1/2 3/8	0 15 43	0 13 36	8 12 15	92 60 6	34 35 8	2.71 2.65	-	-	-
Arian	-	M	Description missing	-	-	Brown clay	CL	-	0	0	14	86	27	10	-	12	121 7 Low
La Nerve	-	M	Surface: None General: Plowed field at present	-	-	Gray sandy clay Tan silty sand Tan silty sand	CL SH SH	- - -	0 0 11	0 71 78	1 28 11	59 28 11	39 22 11	- - -	-	-	-
Toula (possibly El Aouine)	-	-	Description missing	-	-	Silty sand	SM(1)	-	0	0	72	28	-	-	-	-	-
Fech	-	M	Surface: None General: Plowed field at present	-	-	Brown clay	CL	-	0	0	9	91	40	23	-	15	114 13 Low
Solima No. 1	-	M	Description missing	-	-	Clay Brown gravelly sand	CE SL	- -	0 45	0 19	3 30	92 6	56 30	30 -	-	19	109 7 Low
Solima No. 2	-	M	Surface: None General: Plowed field at present	-	-	Brown clay Gray clay	CL CL	- -	0 0	0 0	6 100	94 53	43 35	21 -	-	-	-
Solima No. 3	-	M	Surface: None General: Plowed field at present	-	-	Brown clay Brown sandy clay (Organic)	CL CL	- -	0 1	4 5	14 17	82 77	42 39	24 20	-	14	116 7 Low
Grubalis	-	M	Surface: None General: Plowed field at present	-	-	Brown clay with small shells	CL	-	0	0	11	89	46	25	-	13	114 6 Low
El Mouraria	-	N	Surface: None	-	-	Gray sandy clay, cemented with small shells	CL	-	0	0	54	46	32	16	-	-	-
Moussal-Toussine	-	M	Surface: None General: Plowed field at present	-	-	Brown sandy gravel (white rock)	CP	1	54	10	30	6	-	-	-	13	116 50 Low
Elr Mesouda	-	M	Surface: None General: Plowed field at present	-	-	Red-brown sandy clay (Organic)	CL	-	0	5	53	42	25	10	-	12	118 7 Low
Korta	-	M	Surface: None	-	-	Red sandy clay	CL	-	0	8	48	44	24	10	-	-	-
Bousser	-	M	Surface: None General: Plowed field at present	-	-	Brown clay	CH	-	0	1	3	96	75	48	-	23	100 5 High
(1) ZUYA Peyrache (Tripetil) el-Moussale field	36 34 N 13 16 E	-	Surface: Asphalt runway, taxiway & apron	-	Subgrade Subgrade Base course	Tan sandy silt Tan silty sand Gray crushed rock	ML SM CL	- - 1-1/2	2 0 100	2 2 0	51 59 0	45 39 0	- - -	- - -	-	10 14 -	117 106 20 Low

TABLE 3. SUMMARY OF AIRFIELD TEST DATA (Cont.)

Sheet 10 of 24

Group C1 Africa

AIRFIELD

SAMPLE

SOIL TESTS

Name and Location	Latitude and Longitude	Field Class.	Airfield Description	Location	Material	Description	Classification Symbol	Grain Size										Atterberg Limits			Spec. Grav.			Moi. ASD Comparative Mar.
								Test Gravel Size	Test Sand Size	Test Silt Size	Test Clay Size	Plasticity	Liquid Limit	Plastic Limit	Shrinkage	Opt. Grav.	Y. S.	C. P. S.						
(6) FRANCE WEST: MILITARY (Nahur)	14 44 N 17 30 W	80,000 1b grass	Description missing	Agren E-S runway E-W runway	- - -	Gray rock Gray silty sand Gray rock with asphalt	GP SM GP	1-1/2 1 1-1/2	100 0 100	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	- - -					
(7) GOLD COAST: Nahur	04 24 N 01 40 W	20 1b	Description missing	East edge of runway at mid-point	1 ft depth 2 ft depth 3 ft depth	Red sandy clay Red clayey sandy gravel Brown sandy clay	CL OC CL	1 1/2 1 -	14 40 -	1 3 3	35 20 45	50 37 50	32 31 24	13 13 5	2.77 2.91 2.74	- - -	- - -	- - -	- - -					
Acra	05 15 N 00 10 W	VB 1b	Description missing	North edge at approx. center of runway	1 ft depth 2 ft depth 3 ft depth	Red sandy clay Red sandy silt Red sandy silt	CL ML ML	- - -	0 5 0	0 9 9	38 38 39	34 38 36	26 23 26	2.68 2.62 2.62	- - -	- - -	- - -	- - -	- - -					
(8) FRANCE WEST: MILITARY (Nahur)	04 49 S 11 51 E	75,000 1b grass	Description missing	North edge at approx. center of runway	1 ft depth 2 ft depth 3 ft depth	Gray silty sand (Organic) Gray silty sand (Organic) Gray silty sand (Organic)	SM SM SM	- - -	0 0 0	9 9 9	74 74 74	17 17 17	17 17 17	2.50 2.59 2.60	- - -	- - -	- - -	- - -	- - -					
(9) MEXICO: Lampulville	04 20 S 15 10 E	100,000 1b grass	Description missing	North edge at approx. center of runway	1 ft depth 2 ft depth 3 ft depth	Black silty sand Dark gray silty sand Light gray silty sand	SM SM SM	- - -	0 0 0	10 10 6	78 75 75	12 15 19	12 15 19	2.60 2.63 2.60	- - -	- - -	- - -	- - -	- - -					
Elizabethtown	11 39 S 27 20 E	72,000 1b grass	Description missing	- - -	1 ft depth 2 ft depth 3 ft depth	The sandy gravelly clay The sandy gravelly clay The sandy gravelly clay	CL CL CL	- - -	18 - -	7 - -	8 - -	67 - -	36 - -	15 - -	- - -	- - -	- - -	- - -	- - -					
(10) MEXICO: Agren	06 26 N 03 23 E	26,000 1b grass	Description missing	North edge at approx. center of runway	1 ft depth 2 ft depth 3 ft depth	The coarse to fine sand The coarse to fine sand The coarse to fine sand	SM SM SM	- - -	0 0 0	48 56 50	52 39 50	0 3 0	0 3 0	2.63 2.62 2.62	- - -	- - -	- - -	- - -	- - -					
Nahur	11 22 N 13 08 E	VB 1b	Description missing	North edge at approx. center of runway	1 ft depth 2 ft depth 3 ft depth	The silty sand The silty sand The silty sand	SM SM SM	- - -	0 0 0	9 10 10	69 61 56	26 29 34	26 29 34	2.63 2.66 2.66	- - -	- - -	- - -	- - -	- - -					
Acra	12 03 N 00 32 E	VB 1b	Description missing	North edge at approx. center of runway	1 ft depth 2 ft depth 3 ft depth	Reddish silty sand Red silty sand Red silty sand	SM SM SM	- - -	0 0 0	4 2 2	69 66 62	27 32 36	27 32 36	2.62 2.61 2.62	- - -	- - -	- - -	- - -	- - -					
(11) MEXICO: Elizabethtown	13 27 N 22 26 E	VB 1b	Description missing	- -	- -	The coarse to fine sand Brown silty sand	SM SM	- -	0 0	41 9	54 69	5 22	5 22	- -	- -	8 9	127 125	75 44	Low Low					
Elizabethtown	13 38 N 27 20 E	VB 1b	Description missing	- -	- -	Brown sandy silt	ML	-	0	14	41	45	45	6	-	10	127	6	Low					
(12) MEXICO: Acra	15 18 N 30 50 E	130,000 1b grass	Description missing	- -	- -	Brown sandy clay	ML	-	0	9	16	75	75	14	-	21	124	12	Low					

TABLE 3. SUMMARY OF AIRFIELD TEST DATA (Cont.)

Sheet 11 of 26

Group C: Africa

AIRFIELD										SAMPLE										SOIL TESTS									
Name and Location	Latitude and Longitude	Field Class.	Airfield Description	Location	Material	Description	Classi- fication Symbol	Grain Sizes					Atterberg Limits	Spec. Grav. G.S.	Y.d	CER	Swell												
								Var. Gravel Size	Coarse Sand	Fine Sand	Fines	Plasticity Index																	
								No. 10 to 40 Sieve	40 to 200 Sieve	<No. 200 Sieve																			
Gura	15 01 N 39 06 E	ED	Description missing			Thin sandy clay	CL	0	34	22	44	27	0	2	1.7	1	Low												
(13) MITY: Pagan Field (Colony)																													
	30 00 N 31 26 E	VED	Description missing	Sample missing																									

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TABLE 3: SUMMARY OF AIRFIELD TEST DATA (Cont.)

Group D: Near East, India, Burma, China

AIRFIELD			SAMPLES			SOIL TESTS																					
Name and Location	Latitude and Longitude	Field Class.	Airfield Description	Location	Material	Description	Classification Symbol	Max. Gravel Size In.	Grain Sizes						Atterberg Limits			Moisture Content									
									Gravel >No. 10 Sieve	Sand No. 10 to No. 40 Sieve	Fine Sand No. 40 to 200 Sieve	Silt >No. 200 Sieve	Clay	LL	PI	Spec. Grav. G _s	Opt. Moist. W _L	Comp. Moist. W _p									
(1) CHINA MAP:																											
(a) Tientsin																											
Wang Tung	39 57 N	12	No information	Runway	Subgrade	Brown clay	CL	-	0	0	0	6	94	0	0	66	42	-	19	106	5	Low					
Wang Tung	39 57 N	12	No information	Runway	Subgrade	Brown clay	CL	-	0	0	0	0	100	0	0	63	34	-	22	96	5	High					
Wang Tung	39 57 N	12	No information	Runway	Subgrade	Brown clay	CL	-	0	0	0	4	96	0	0	106	92	-	23	100	2	High					
(b) Burma																											
Civil Airport	39 57 N	12	No information	East taxiway	Subgrade	Brown clay	CL	-	0	0	0	3	97	0	0	59	34	-	10	110	5	Low					
Wang Tung	39 57 N	12	No information	Runway	Subgrade	Gray sandy clay	CL(t)	-	2	15	23	75	75	0	0	-	-	-	-	-	-	-					
Wang Tung	39 57 N	12	No information	West taxiway	Base course	Gray sandy gravel	GM	1	72	27	1	0	0	0	0	NP	-	-	7	129	60	Low					
(c) India																											
Boris (Lahore)	33 52 N	75	No information	-	-	Brown fine sand	SP	-	0	10	90	0	0	0	0	NP	-	-	-	-	-	-					
Wang Tung	33 52 N	75	No information	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-					
(d) Pakistan																											
Wang Tung	32 00 N	75	No information	-	Subgrade	Brown clay	CL	-	0	2	6	92	42	20	-	-	-	-	-	-	-	-					
Wang Tung	34 34 N	75	No information	-	-	Brown sandy clay	CL(t)	-	4	36	17	63	63	-	-	-	-	-	-	-	-	-					
(e) Iraq																											
Wang Tung	32 23 N	43 35 E	No information	Runway inter-section	-	tan sandy gravelly clay	CL	3/4	34	5	16	45	28	7	-	-	-	-	-	-	-	-					
Wang Tung	32 23 N	43 35 E	No information	South end long runway	-	Brown silty gravelly sand	SM	1/4	20	18	49	13	NP	-	-	-	-	-	-	-	-	-					
Wang Tung	32 23 N	43 35 E	No information	South end short runway	-	Black silty sandy gravel	OM	3/4	46	9	22	21	22	1	-	-	-	-	-	-	-	-					
(f) Iran																											
Wang Tung	30 22 N	53 15 E	No information	South end short runway	-	Black sandy clay	CL	-	-	-	-	-	34	11	-	34	11	-	13	111	10	Low					
(g) Saudi Arabia																											
Wang Tung	26 16 N	50 30 E	No information	PPP runway	Soil typical of entire island	White silty sand	UM	-	0	15	64	21	NP	-	-	-	-	-	-	-	-	-					
(h) South China Sea																											
Wang Tung	12 52 N	104 50 E	No information	-	-	Brown silty sand	SM	-	-	-	-	-	NP	-	-	-	-	-	-	-	-	-					
(i) Malaya																											
Wang Tung	17 03 N	104 04 E	No information	-	-	Tan sandy silt	ML	-	10	20	23	47	22	5	-	9	128	7	Low	Low	Low	Low					
(j) Malaya																											
Wang Tung	20 40 N	104 50 E	No information	-	-	Brown sandy silt	ML	-	1	14	36	47	17	3	-	8	134	12	Low	Low	Low	Low					
(k) Malaya																											
Wang Tung	27 06 N	101 50 E	No information	Short runway southeast end	-	Brown sandy silt	ML	-	0	0	70	50	NP	2.66	9	120	12	Low	Low	Low	Low						
Wang Tung	27 06 N	101 50 E	No information	Short runway center	-	Tan sandy silt	ML	-	0	0	45	55	NP	2.68	10	122	7	Low	Low	Low	Low						
Wang Tung	27 06 N	101 50 E	No information	Long runway northeast end	-	Brown sandy silt	ML	-	0	0	40	60	19	1	2.66	-	-	-	-	-	-	-					
(l) Malaya																											
Wang Tung	24 34 N	101 50 E	No information	Borrow area	-	Tan coarse to fine sand	SM	3/4	14	51	35	0	NP	2.68	-	-	-	-	-	-	-	-					
Wang Tung	24 34 N	101 50 E	No information	Borrow area	-	Tan sandy gravel	GM	1	72	25	3	0	NP	2.68	-	-	-	-	-	-	-	-					
Wang Tung	24 34 N	101 50 E	No information	West of runway	Subgrade	Tan silty gravelly sand	SM	1/10	35	24	18	83	17	2	2.68	5	138	35	Low	Low	Low	Low					
Wang Tung	24 34 N	101 50 E	No information	South approach to runway	-	Tan silty sand	SM	-	13	28	29	30	-	-	2.68	8	134	-	-	-	-	-					
Wang Tung	24 34 N	101 50 E	No information	Disposal area	-	Tan sandy silt	ML	-	2	10	46	42	NP	-	-	-	-	-	-	-	-	-					

TABLE 11. SUMMARY OF ADDED TEST DATA (Cont.)

Group D: Near East, India, Burma, China

AIRFIELD			SAMPLE			SOIL TESTS													
Name and Location	Latitude and Longitude	Field Class.	Airfield Description	Location	Material	Description	Classification Symbol	Grain Sizes						Atterberg Limits		Mod. ASBO Compaction			
								Max. Gravel %	Gravel > No. 10	Sand 10 to 40	Sand > No. 200	Flint	Clay	Clay	Clay	Clay	Clay	LL	PL
(1) Sample Data	24 45 N 124 50 E	ED	2 runways: 4" conc. on original tarmac surface Turnaround: North-South runway: Base: 6 in. concrete Base: 3" layer of sand & crushed rock over 6"-8" layer of large stone General: Low ground with water table near surface. Concrete broke up under medium traffic	Turnaround	Upper base course	White & black rock	GP	1-1/2	96	3	1	0	0	0	0	0	0	0	0
				Turnaround	Subgrade	Gray clay	CL		1	6		66	13	13	10	125	10	Low	
Cebu	10 45 N 124 50 E	ED	2 runways: 5" conc. on 3" tarmac on 6" stone test pit Surface: 6"-8" conc. on 3" tarmac on two courses of brick General: Medium traffic. Cond. excellent	Runway	Tarmac layer	Crushed gray & red laterite	GM	1-1/2	98	7	5	0	0	0	0	0	0	0	0
				Runway	Subgrade	Gray clay	CH		0	0	11	63	50	16	17	112	5	Low	
Florida	24 40 N 81 20 E	VB	Surface: 7" conc. over original runway surface, 9" conc. on runway extension Base: Runway extension: 5" (stone) General: Excellent	Runway		The silty sand	GM		1	94	26	17	0	0	0	0	0	0	0
						Red sandy clay	CL		0	17	37	42	0	0	0	0	0	0	0
						The sandy silt	ML		0	15	59	96	13	3					
China	22 20 N 106 40 E	VB	North-South runway: Surface: Original runway: 11" concrete; extension: 10" concrete Base: Original runway: 6" base course; extension: stabilized subgrade East-West runway: Surface: Original runway: 6" concrete; extension: 9" concrete Base: 6 in.	Runway	Subgrade	Red clayey sandy gravel	GC	1/2	51	23	10	16	27	11	7	115	69	Low	
				Runway	Base course	Red silty gravelly sand	GM	1	40	22	22	16	0	0	0	0	0	0	0
Davao	22 16 N 125 12 E	VB	Surface: 5" conc. over original runway surface, 10" conc. on runway extension Base: 6" laterite (extension)	Runway	Subgrade	Gray clay	ML		0	1	4	95	29	1	2.65				
				Runway	Subgrade	Gray clay	ML		0	1	4	95	29	1	2.65				
Davao	22 30 N 125 27 E	ED	North-South runway: Surface: Original runway: 1 brick course on 6" conc. on 2 brick courses. Runway extension: 9" conc. Base: Extension: 5 in. East-West runway: Tarmac on brick General: Runway: Tarmac on brick Base: Gauges delta; water table 2-4' below ground. Heavy traffic (NB & T). Condition good	Runway	Subgrade	Gray clay	CH		0	0	0	100	50	27					
Taragon	23 40 N 90 23 E	ED	Surface: 3 courses of cement-grouted brick General: (Relating topography) no water table. Medium traffic. Cond. excellent	Runway	Subgrade	Red clay	ML		2	2	13	83	37	12	2.96				
Chambarranger	24 24 N 91 55 E	ED	Surface: 6 in. concrete Base: Cement and subgrade General: Two lanes, no ground water problem Medium traffic. Condition excellent	Runway	Subgrade	Red sandy clay	ML		0	2	31	67	39	11	2.64				
Calamintat	25 53 N 124 26 E	T	Surface: 8"-7" concrete Base: 8"-6" stone base course General: River valley; water table 3-6' below ground. Medium traffic. Condition excellent	Runway	Subgrade	Gray silt	ML		0	0	6	94	0	0	0	0	0	0	0

TABLE 3: SUMMARY OF AIRFIELD TEST DATA (Cont.)

Group 2: Near East, India, Burma, China

Name and Location	Latitude and Longitude	Field Class.	Airfield Description	Location	Material	Description	Classification Symbol	SOIL TESTS									
								Grain Sizes					Atterberg Limits				
								Max. Gravel Size > No. 10 Sieve	Gravel > No. 10 Sieve	Coarse Sand 10 to 40 Sieve	Fines < No. 200 Sieve	Plasticity Index	U	FL	Shrinkage %	Mod. ASD	Compaction Spec. Opt.
(1) Asian Test F																	
	26 45 N 92 45 E	EB	Surface: Sand-asphalt on 4" concrete base. Water table near runway. Original concrete surface broke up, necessitating sand-asphalt topdressing.	Samples missing													
Chabua	27 25 N 92 04 E	EB	Surface: 6 in. tar-mac. Base: 6 in. stone on sand cushion. General: Two land; water table close to surface. Very heavy traffic. Condition excellent.	Runway	Subgrade	Gravel and asphalt. Tan sandy silt.	MC		0	1	31	69					
(2) Asian Test F																	
	12 57 N 77 35 E	EB	Surface: Sand-asphalt on cement-grouted stone. General: Undulating ground; no water problem. Medium traffic. Condition excellent.	Samples missing													
(3) Asian Test F																	
	26 41 N 96 12 E	EB	Surface: Asphalt surface treatment. Base: Stabilized gravel. General: Jungle area; no ground water problem. Medium traffic. Good condition.	Runway	Subgrade	Gravel and asphalt. Gray sandy gravel. Brown sandy clay.	GM	2	75	5	13	7					
Witkyim South	25 23 N 97 21 E	EB	Surface: 1" asphalt surface treatment. Base: Mechanically stabilized clay-gravel.	Runway	Subgrade	Gravel and asphalt. Brown silty sandy gravel.	GM	1-1/2	50	1	6	35					
Promo	28 16 N 97 15 E	EB	Surface: 1" asphalt surface treatment. Base: Mechanically stabilized clay-gravel.	Runway	Subgrade	Gravel and asphalt. Brown silty gravelly sand.	GM	1/2	20	18	23	39					
Ischia	22 59 N 97 15 E	EB	Surface: 3/8" asphalt surface treatment. Base: Crushed rock.	Runway	Subgrade	Gravel and asphalt. Crushed rock. Red clayey sand.	GM	1	87	7	4	2					
(4) Asian Test F																	
	25 16 N 105 45 E	EB	Base: Portland, 7" to 8" thick. General: Heavy traffic. (MB, T & F)			Gray sandy clay	CL		1	16	38	45					
Wachau	33 16 N 107 16 E	EB	Base: Water-bound gravel, 8" thick. General: Light traffic. (MB, T & F)			Brown sandy clay	CL		0	8	37	55					
Muehling	33 06 N 107 03 E	EB	Base: Portland, 16" thick. General: Moderate to heavy traffic. (MB & T)			Brown sandy silt	ML		0	3	31	66					
(5) Asian Test F																	
	30 42 N 106 05 E	EB	Base: Water-bound gravel, 8" thick. General: Severe drainage problem. Moderate traffic. (T & F)			Brown & gray gravelly clay	CL	1/10	20	2	6	72					
Shuang-Lin	30 33 N 103 54 E	EB	Base: Water-bound gravel, 8" thick. General: Soft in wet weather. Light traffic.			Gray clay	CL		0	1	9	87					
Wai-Ching	30 25 N 103 49 E	EB	Surface: Single asphalt treatment. Base: Water-bound gravel, 20" thick. General: Very heavy traffic. (VMB)			Gray clay	ML		0	0	2	97					

TABLE 3: SUMMARY OF AIRFIELD TEST DATA (Cont.)

Sheet 15 of 24

Group 2: Near Lashio, India, Burma, China

SOIL TESTS

SAMPLE

AIRFIELD

Name and Location	Latitude and Longitude	Field Class.	Airfield Description	Location	Material	Description	Classi- fication Symbol	Grain Sizes					Atterberg Limits			Moisture Content		
								No. of Gravel Site	Gravel >20.0 in.	% Coarse Sand 40 to 200 Sieve			Liquid Limit LL	Plastic Limit PL	Shrinkage Shr.	No. of Tests	Remarks	Remarks
										Gravel >20.0 Sieve	Sand 40 to 200 Sieve	Fine <No. 200 Sieve						
Pai-Sai-I	29 32 N 106 22 E	50,000 lb gross	Base: Water-bound gravel, 14" thick General: Heavy traffic. (M, T & F)	Sample missing														
La-Bates	29 31 N 106 21 E	64,000 lb gross	Surface: 6" cement-bound macadam Base: Water-bound gravel, 10" thick General: Heavy traffic. (T)		Subgrade	Brown sandy silt	MC		0	3	42	57	25	4	2.74			
(c) Burma Province																		
Maung-Pa	27 52 N 113 34 E	100 lb	Base: Telford, 14" thick General: Light traffic		Subgrade	Red sandy clay	CH		0	12	17	71	51	25	2.71			
Chai-Chiang	27 26 N 109 36 E	15,000 lb gross	Base: Telford, 14" thick		Subgrade	Brown clay	CL						30	11	2.62			
(d) Kweichow Province																		
Chia-Chin	26 27 N 107 42 E	35,000 lb gross	Base: Water-bound gravel, 12" thick General: Moderate traffic. (M & F)		Subgrade	Tan sandy clay	CL		0	6	20	74	30	11	2.60			
Ching-Chen	26 35 N 106 25 E	35,000 lb gross	Base: Telford, 12" thick General: Moderate traffic. (F & Lt. T)		Subgrade	Tan clay	CH		0	0	8	92	54	31	2.71			
Tu-Shen	25 46 N 107 31 E	35,000 lb gross	Base: Telford, 12" thick General: Light traffic. (Light T)		Subgrade	Gray sandy silt	ML	3/8	11	9	11	69	23	6	2.66			
(e) Yunnan Province																		
Chia-I	25 37 N 103 50 E	64,000 lb gross	Base: Telford, 20" thick General: Heavy traffic		Subgrade	Red clay	CL		0	4	12	84	39	17	2.70			
La-Liang	25 00 N 103 30 E	110,000 lb gross	Base: Telford, 18" and 10" thick General: Heavy traffic. (VB)		Subgrade	Brown clayey sand	SC		0	26	50	24	42	8		23	117	20
(f) Hainan Province																		
Li-Chuan	20 18 N 109 14 E	VB	Base: Telford, 20" thick General: Twice destroyed and rebuilt. Heavy traffic of all types		Subgrade	Tan sandy clay	CL		0	10	30	52	32	18	2.68			
Maung	22 49 N 100 37 E	14,000 lb gross	Base: Telford and brick, 18" and 10" thick General: Destroyed and rebuilt twice. Moderate traffic		Subgrade	Tan sandy clay	ME		0	14	12	74	52	21	2.60			

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TABLE 1. SUMMARY OF AIRFIELD TEST DATA (Cont.)

Sheet 15 of 24

Group I: Pacific Islands

AIRFIELD			SAMPLE			SOIL TESTS												
Base and Location	Latitude and Longitude	Field Class.	Airfield Description	Locality	Material	Description	Classification Symbol	Gravel Fls. > No. 10	Coarse Sand No. 10 to 40	Fine Sand No. 40 to 200	Silt < No. 200	Plasticity Limit	Atterberg Limits	Spec. Grav.	Moist. Cont.	Moist. Ratio		
(1) PHILIPPINES																		
(a) Zamboanga																		
Manila	14 11 N 120 32 E	F, M	Surface: Bank-run gravel with penetration asphalt.	-	Base course: 1" thick	Brown coarse to fine sand	CM	-	13	47	40	-	-	-	-	-	-	-
			Base: Sand & gravel, 4 in. (4" base plus surface)	-	Principal upper subgrade: 0-3" thick	Dark brown silty sand	SM	-	0	16	24	-	-	-	-	-	-	-
			Subgrade: Up to 6" fine organic sand overlying coarse uniform beach sand	-	Intermediate subgrade: 0-6" thick	Tan silty sand	SM	Test incomplete	-	-	-	-	-	-	-	-	-	-
			General: Terrain: Flat coastal plain, grassland surrounded by rice paddies. Drainage problems during rainy season. Maximum monthly rainfall: 7.6" in August. Water table: 4-15" depth. Condition 1 use: Surface unsatisfactory under heavy planes, necessitating patching	-	Lower & intermediate subgrade: 1/2" - 3-1/2" thick	Gray silty gravelly sand	SM	1	24	17	35	21	1.7	-	-	-	-	-
Manila	16 23 N 120 23 E	D	Surface: Road all treatment	-	Surface: 3" thick	Oiled soil	CL	-	-	-	-	-	-	-	-	-	-	-
			Base: Base	-	Typical soil	Brown sandy clay	CL	-	-	-	-	-	-	-	-	-	-	-
			Subgrade: Put yellow to brown clay	-	Typical soil	Brown sandy clay	CL	-	-	-	-	-	-	-	-	-	-	-
			General: Terrain: Low flat plain, grassland. Maximum monthly rainfall: 23" in August. Water table: 4-6" depth. Condition 1 use: Abandoned invasion field now overgrown with grass	-	Typical soil	Brown sandy clay	CL	-	-	-	-	-	-	-	-	-	-	-
Iloilo	16 08 N 120 20 E	D	Surface: Steel mat over asphalt treatment	-	Base course: 6" thick	Brown gravelly sand	GP	1-1/2	45	13	38	4	1.1	-	-	-	-	-
			Base: 6" mix of river gravel & subgrade soil	-	Upper subgrade: 0-2" thick	Brown fine sand	SP	-	0	1	99	4	1.1	-	-	-	-	-
			Subgrade: Uniform beach sand	-	Lower subgrade: 0-2" thick	Gray & tan fine sand	SP	-	0	1	97	2	1.1	-	-	-	-	-
			General: Terrain: Beach area; strip parallel to Gulf of Graceland. Maximum monthly rainfall: Same as Negros. Water table: 4-6" depth. Condition 1 use: Good, but surface very rough	-	Typical base	Gray silty sandy gravel	GM	1-1/2	35	13	25	24	1.1	-	-	-	-	-
Clark	15 11 N 120 33 E	F, M	Surface: Wet runway; asphalt. Base runway: Put over asphalt. Aggregate: crushed river gravel < 3/4"	-	Typical fill: 1/2" - 3-1/2" thick	Gray clayey sand with pebbles	SC	-	-	-	-	-	-	-	-	-	-	-
			Base: Thin layer of asbestos perlite gravel	-	Upper subgrade: 0-3" thick	Gray sandy silt (organic)	ML	-	1	7	45	44	1.1	-	-	-	-	-
			Subgrade: Poorly graded organic sand with some fine gravel & organic matter in upper zone. Top all stripped. Selected fill imported	-	Lower subgrade: 0-3" thick	Gray silty sand	SM	3/8	10	29	42	13	1.1	-	-	-	-	-
			General: Terrain: Flat to gently rolling; grassland with a few rice paddies. Surface made easily erodible. Water table: At great depth. Condition 1 use: Runways in good condition. Under very heavy traffic of all types	-	Typical topsoil	Black sandy silt	ML	-	2	13	42	43	1.1	-	-	-	-	-
San Marcelino	14 25 N 120 22 E	D	Surface: Same	-	Selected fill: 1-6" thick	Tan sandy silt	ML(1)	-	6	22	29	43	-	-	-	-	-	-
			Base: Well-compacted 1" decomposed asbestos coarse (in effect clay-gravel course)	-	Upper subgrade: 3-1" thick	Brown silty sand	SM	-	6	24	26	12	1.1	-	-	-	-	-
			Subgrade: Upper - fine gray organic sand (striated in center of runway); lower - essentially a coarse organic sand	-	Lower subgrade: 3-1" thick	Gray gravelly sand	SM	1/2	19	37	44	1	1.1	-	-	-	-	-
			General: Terrain: Flat valley surrounded by mountains; grassland, probably partially flooded during heavy rains. Use: Advance fighter strip. Dry weather runway	-	Typical topsoil	Gray gravelly sand	SM	-	-	-	-	-	-	-	-	-	-	-

TABLE 3: SUMMARY OF AIRFIELD TEST DATA (Cont.)

Group 1: Pacific Islands

Name and Location		Latitude and Longitude	Field Class.	Airfield Description	Location	Material	Description	Classification Symbol	Max. Gravel Size	Gravel	Sand	Fines	Atterberg Limits	Moist. Compaction	Mod. AASD		
									In.	Sieve	Sieve	<No. 200	LL	Pl	U _c		
SAMPLE																	
AIRFIELD																	
Pearl	15 01 N 120 30 E	B(1)	Surface: Asphalt. Aggregate from Pease River Base: 6" to 2-1/2" thick, well-compacted fill from Pease River. Well-compacted Subgrade: Poorly graded volcanic sand (similar to Clark Field) General: Typical of Clark Field area Maximum monthly rainfall: 15" in August Water table: About 15" depth Condition & use: Excellent. Fighter plane traffic. Now out of use	-	Base course & 1/2 - 2 1/2' thick Upper subgrade: 2 - 3' thick Typical sub- soil: 0 - 2 1/2' thick fine sand	Brown sandy gravel Black silty sand Brown coarse to fine sand	GM SM SV	1-1/2 - -	6 0 0	13 15 40	15 47 57	7 38 3	H P - H P	- - -	- - -		
Florida Blanca	15 59 N 120 30 E	VB	Surface: Asphalt. Rock aggregate from Oumain River Base: 6" thick, well-compacted mix of sub- grade sands & Oumain River gravel Subgrade: Similar to Clark Field General: Typical of Clark Field area Maximum monthly rainfall: 14" in July Water table: About 5' depth Condition & use: Constructed March 1945. Principal traffic: F, B, VB. Surface is good condition	-	Base course: 6" thick Typical top- soil: 0 - 2' thick Intermediate subgrade: 1 - 2' thick Lower subgrade	Brown silty gravel Black silty sand Brown silty sand Brown silty sand	GM SM SM SM	1 - - -	70 0 3 14	6 21 15 40	9 46 47 32	15 33 35 14	23 H P H P H P	2 2.66 2.73 2.70 2.69	- - - -	- - -	
Belton	14 33 N 121 01 E	F	Surface: Asphalt extension of concrete hard- stand. Asphalt aggregate; crushed rock Base: About 6" thickness of black sandstone or of volcanic ash-river gravel mix Subgrade: Runway ends on volcanic tuff out- crop; in central fill section natural soil is heavy black organic clay overlying volcanic ash. Fill: recompact volcanic tuff from cut sections General: Typical of Clark Field area Maximum monthly rainfall: 15" in August Water table: Deep, but perched water table found throughout area Condition & use: Completed in spring of 1945; 15 planes per day (F, B, F)	Central fill: section Central fill: section Central fill: section Central fill: section Southwest end runway	Typical fill: 1 - 10' thick Upper soil: 0 - 3' thick Subsoil: 0 - 3' thick Fill: 1 - 2' thick Subgrade & outcrop	Gray clayey sand (volcanic tuff) Brown sandy clay Gray clay Brown clayey sand (volcanic tuff) Yellowish-brown clayey sand (volcanic tuff)	SC CL OM(?) SC(?) SC(?) SC(?)	- - - - - -	8 2 0 0 0	33 7 4 17 23	30 20 12 62 53	29 71 84 21 24	50 46 - - -	8 2.54 - - -	24 22 - - -	24 99 - - -	
Michals	14 32 N 121 01 E	VB	Surface: Asphalt. Crushed rock aggregate primarily from Pease River Base: 3" thick of volcanic tuff & river gravel; sand well-compacted Subgrade: Typically a mantle of black volcanic clay overlying partially weathered marine scum. Fill up to 2' depth at each runway end is compacted volcanic tuff General: Typical of Clark Field area Maximum monthly rainfall: 16" in August Water table: Close to surface Condition & use: Asphalt surface in good cond. after 6 months use by all types except B-29	-	Typical base course Principal top- soil: 0 - 3' thick Intermittent topsoil: 0 - 2' thick Upper subgrade: avg. 3' thick Typical sub- soil Selected fill: 0 - 2 1/2' thick	Sample missing Gray clay Gray sandy gravelly clay (from volcanic ash) Brown clay (volcanic tuff) Tan silty sand (from volcanic ash sand- stone) Gray sandy gravelly clay	- CM CL(?) OM SM MC	- - 3/4 - - 3/4	- 0 18 1 0 27	- 0 2 2 16 4	- 12 14 9 49 14	- 88 66 35 88 77	- 96 - - - -	- - - - -	- 27 29 85 36 76	- - - -	- 3 4 3 -

TABLE 31. SUMMARY OF AIRFIELD TEST DATA (CONT.)

Sheet 15 of 24

Group I: Pacific Islands

SOIL TESTS

SAMPLE

AIRFIELD

Name and Location	Latitude and Longitude	Field Class.	Airfield Description	Location	Material	Description	Classi- fication Symbol	Max. Gravel Size, in.	Grain Sizes					Atterberg Limits LL, PL	Spec. Grav., G _s	Moist. AL ₂₀ Con- sist. Unit.		
									Coarse Sand No. 10 to 40 Sieve	Medium Sand No. 40 to 60 Sieve	Fine Sand No. 60 to 200 Sieve	Slits No. 200 Sieve	Clay No. 200 Sieve					
(b) <u>Midway Island</u>	12 27 N 121 01 E	M2	Surface: Rolled natural ground (vegetation stripped) Base: Sand Subgrade: Highly plastic dark brown clay General: Typical rolling terraces above river; grassland with little natural drainage Maximum monthly rainfall: 22" in August Water table: 8-10' depth Condition I use: Advanced fighter base used January-May 1945. Dry weather use only	-	Typical sub-grade	Gray & tan clay	CI	-	0	2	8	90	40	18	2.68	15	11*	
	12 23 N 121 01 E	M3	Surface: Compacted soil Base: Sand Subgrade: Highly plastic brown clay, small amount of fill (sand-gravel-clay) borrowed to bring low spots at north end to grade General: Typical rolling grassland with old rice paddies. Drainage difficult Maximum monthly rainfall: 22" in August Water table: About 10' depth Condition I use: Advanced fighter base. Dry weather use only. Now abandoned	-	Typical sub-grade Selected fill: 0 - 1' thick	Brown clay Tan sandy clay	CI	-	0	3	14	83	23	35	2.75	-	-	
Marine	12 25 N 121 06 E	M3	Surface: RCP on asphalt & rock chips Base: Sand-clay-gravel mix. Appears to be poorly compacted Subgrade: This layer of black organic clay (stripped); over medium to highly plastic clay General: Typical rolling grassland with a few cultivated areas Maximum monthly rainfall: 22" in August Water table: About 10' depth Condition I use: Extensively used for 9 months 12 1945. Good cond. except at south end where base course failed causing rutted surface	-	Base course & fill: 1/2 - 1' thick Typical sub-grade	Brown & gray medium gravel Brown sandy clay	OM CI	1 -	86 0	10 6	4 25	0 69	42 23	2.68 2.69	14 14	11.6	9	
	12 22 N 121 06 E	M3	Surface: RCP on asphalt topped with crushed gravel Base: 6-12" thickness of clay-gravel mix. Rounded gravel grading from 1-1/2 to 6" Subgrade: Thin layer of fine sand overlying medium to coarse beach sand containing 3/4" gravel at about 5-ft depth. Apparently no cut or fill required General: Typical rolling grassland with few rice paddies. Drainage problem Maximum monthly rainfall: 22" in August Water table: About 8' depth Condition I use: Used since December 1944, extensively in period March-May 1945, and limited use since. Runway in excellent condition	-	Base course & fill: 1/2 - 1-1/2" thick Typical lower subgrade 2 - 2-1/2" thick	Tan clayey gravel Gray & tan sandy gravel	OC OP	1-1/2 3/4	57 54	5 34	9 12	29 0	37 0	15 15	-	11	12.5	25
Low																		
Low																		
Low																		

TABLE 3: SUMMARY OF AIRFIELD TEST DATA (Cont.)

Group B: Pacific Islands

A I R F I E L D			S A M P L E		S O I L T E S T S																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
Name and Location	Latitude and Longitude	Field Class.	Airfield Description	Location	Material	Description	Classification Symbol	Grain Sizes													Mod. ASCE Completion Nat.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
								Max. Size	Gravel	Coarse Sand	Fine Sand	Clay	Atterberg Plasticity	Spec. Grav.	Opt. Moist.	Y _s	W _p	Opt. Moist.	Y _s	W _p																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																												
(c) Palamau Puerto Princesa	09 44 N 116 49 E	EB	Surface: Steel mat on top cover runway & on base course of runway extension. Base: Mixture of crushed coral, clay, & beach gravel. Thickness: 6" over coral bedrock, 12" over residual clay. Subgrade: Coral bedrock; and residual red clay, medium to high plasticity, 0-6' thick between coral outcrops. General: Terrain: Flat coastal plain on coral reef, surrounded by coconut grove & rain forest. Maximum monthly rainfall: 21" in December. Water table: About 8' depth. Use: Motorcade.	-	Base course: 1/2 - 1' thick Subgrade: 0 - 6' thick	Crushed coral and clay Red clay	-	Sample missing	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

TABLE 3: SUMMARY OF AIRFIELD TEST DATA (Cont.)

Group II: Pacific Islands																																
SAMPLE														SOIL TESTS																		
AIRFIELD														Grain Sizes																		
Name and Location	Latitude and Longitude	Field Class.	Airfield Description	Location	Material	Description	Classification Symbol	Max. Gravel Sieve					Gravel Sieve					Coarse Sand Sieve					Fine Sand Sieve					Atterberg Limits	Spec. Grav. γ_s	Opt. γ_d	Mod. AASD Compaction	Swell
								In.	Gravel > No. 10	Coarse Sand No. 10 to 40	Fine Sand No. 40 to 200	Slime	Plastic	Shrinkage	LL	PL	PI	Spec. Grav. γ_s	Opt. γ_d	Mod. AASD Compaction	Opt. γ_d	Mod. AASD Compaction	Opt. γ_d									
(f) <u>Lytle</u> Thames	11 06 N 125 01 E	MF	Surface: Steel mat on coral sprayed with penetration asphalt. Base: 6" thickness crushed coral, partially weathered & containing yellowish brown clay. Subgrade: Fine poorly-graded beach sand. General: Terrain: Flat coastal plain; grassland, erodible sand soil. Bottom mostly rainfall; 14" in December (Water table: About 8" depth). Note: Built late 1944; F & M base during Campaign. Not abandoned.	-	Typical base coarse	Crushed coral	-	1-1/2	59	13	25	3	3	3	3	3	3	2.62	2.62	3	3	3	3	3	3	3	3	3				
Thalaba	11 11 N 125 01 E	EB	Surface: Steel mat on coral sprayed with penetration asphalt. Base: 6" to 8" thick coral (the greater depth is wet fill requirements). Subgrade: Thin clay layer at surface over-lying fine poorly-graded beach sand. General: Terrain: Flat coastal bar surrounded by water (as 1 side); grassland; erodible soil; surface drainage problem due to low elevation. Bottom mostly rainfall; 14" in December (Water table: About 5-7" depth). Note: Former commercial field enlarged by Japs & later by U.S. Considerable traffic of all types.	-	Typical base coarse; 1" to 1 1/2" thick	Crushed coral	-	1/2	46	12	20	2	2	2	2	2	2	2.75	2.75	2	2	2	2	2	2	2	2	2				
		EB	Surface: Steel mat on coral sprayed with penetration asphalt. Base: 6" to 8" thick coral (the greater depth is wet fill requirements). Subgrade: Thin clay layer at surface over-lying fine poorly-graded beach sand. General: Terrain: Flat coastal bar surrounded by water (as 1 side); grassland; erodible soil; surface drainage problem due to low elevation. Bottom mostly rainfall; 14" in December (Water table: About 5-7" depth). Note: Former commercial field enlarged by Japs & later by U.S. Considerable traffic of all types.	-	Typical sub-grade	Gray fine sand	SP	-	0	8	91	1	1	1	1	1	1	2.80	2.80	1	1	1	1	1	1	1	1					
Baye	10 59 N 125 02 E	MB	Surface: M.P. Base: Very thin layer of beach-run river gravel. Subgrade: 1/2-1' of brown sandy clay over more plastic black clay. General: Terrain: Flat coastal plain; grassland. Bottom mostly rainfall; 14" in December (Water table: About 5-7" depth). Note: Former commercial field enlarged by Japs & later by U.S. Considerable traffic of all types.	-	Upper subgrade	Brown sandy clay	ML	-	0	3	25	69	69	69	69	69	69	2.70	2.70	69	69	69	69	69	69	69	69	69				
		MB	Surface: M.P. Base: Very thin layer of beach-run river gravel. Subgrade: 1/2-1' of brown sandy clay over more plastic black clay. General: Terrain: Flat coastal plain; grassland. Bottom mostly rainfall; 14" in December (Water table: About 5-7" depth). Note: Former commercial field enlarged by Japs & later by U.S. Considerable traffic of all types.	-	Lower subgrade	Black sandy clay	ML	-	0	4	29	67	67	67	67	67	67	2.67	2.67	67	67	67	67	67	67	67	67					
Dulas	10 57 N 125 02 E	MB	Surface: M.P. sprayed with penetration asphalt. Base: 6-12" thickness beach sand & river gravel. Cobble up to 8" diam. used. Subgrade: Highly plastic yellow alluvial clay. General: Terrain: Flat coastal & flood plain; natural drainage; grassland. Bottom mostly rainfall; 14" in December (Water table: About 5" depth). Note: Built by Japs; enlarged by U.S. & used as F & M base. Surface rough & uneven due to poor subgrade.	-	Typical base coarse	Sandy gravel	GM	1	80	11	9	0	0	0	0	0	0	2.91	2.91	0	0	0	0	0	0	0	0	0				
		MB	Surface: M.P. sprayed with penetration asphalt. Base: 6-12" thickness beach sand & river gravel. Cobble up to 8" diam. used. Subgrade: Highly plastic yellow alluvial clay. General: Terrain: Flat coastal & flood plain; natural drainage; grassland. Bottom mostly rainfall; 14" in December (Water table: About 5" depth). Note: Built by Japs; enlarged by U.S. & used as F & M base. Surface rough & uneven due to poor subgrade.	-	Typical sub-grade	Brown clay	MH	-	2	6	10	82	82	82	82	82	82	2.65	2.65	82	82	82	82	82	82	82	82					
(d) <u>Samoa</u> Olatua	11 02 N 125 43 E	EB	Surface: Penetration asphalt on coral. Base: Coral subgrade certified & recomputed. Subgrade: Massive coral, somewhat weathered at surface & mixed with yellow clay. General: Terrain: Flat, but drained satisfactorily; surrounded by rain forests. Bottom mostly rainfall; 14" in December (Water table: About 7" depth). Note: Built late 1944. Used as F & M base. Formerly naval air base. Capacity: all types. Traffic: 75 planes per day.	-	Typical base coarse	Coral with yellow clay	-	1	68	6	10	16	16	16	16	16	16	2.66	2.66	16	16	16	16	16	16	16	16	16				

TABLE 31. SUMMARY OF AIRFIELD TEST DATA (Cont.)

Group 31: Pacific Islands

AIRFIELD			SAMPLE										SOIL TESTS									
Name and Location	Latitude and Longitude	Field Class.	Airfield Description	Location	Material	Description	Classi- fication Symbol	Grain Sizes					Atterberg Limits		Spec. Grav.		Mod. ASD					
								Max. Gravel Size In.	Gravel > No. 10 Sieve	Sand 10 to 40 Sieve	Coarse Sand 40 to 200 Sieve	Fine Sand < No. 200 Sieve	U.S. Sieve	U.S. Sieve	U.S. Sieve	U.S. Sieve	U.S. Sieve	U.S. Sieve	U.S. Sieve	U.S. Sieve	U.S. Sieve	U.S. Sieve
(h) Midway Tikub (Midway)	07 37 N 154 03 E	1B	Surface: Steel mat over asphalt Base: 3-6" thickness of coarse beach gravel Subgrade: About 18" brown silty sand over coarse poorly-graded volcanic sand General: Terrain: Flat coastal terrace; low-lying a coconut plantation Monthly rainfall: 4" average June thru December Use: Advanced F & B base, now on reserve status	-	Upper subgrade Lower subgrade	Brown silty sand (flood plain) Black silty sand (volcanic)	SM	-	6	24	40	22	NP	NP	2.69	17	102	48	Low			
Marot	06 56 N 128 04 E	1B	Surface: Asphalt, using beach gravel for aggregate Base: Sand-placed coral rubble bound with pulled crushed coral, 6-12" thick Subgrade: Generally 1-3" black organic clay overlying highly plastic yellow clay. At west end a reddish-brown silt up to 3-1/2" thick covers these soils General: Terrain: Flat coastal plain; rice paddies Monthly rainfall: 4" average June thru December Use: Primary field, colored by dyes & later U.S. Used as F & B base, now on limited status	-	Asphalt aggregate Base course Bladder: 6-12" thick Upper subgrade: 1-3" thick Lower subgrade: 0-3-1/2" thick	Samples missing Crushed coral Black clay Brown clay Brown & tan clay	-	-	-	-	-	-	-	-	-	-	-	-	-			
(2) PALAU GROUP: Palau Island Palau	06 50 N 134 14 E	1B(1)	Surface: Roll of coral Base & subgrade: Coral bedrock General: Terrain: Flat coastal plain; well-cultivated artificially; grassland surrounded by rain forest & grove Use: Built after capture & used as bomber base. Now a permanent level air base	Coral pit	Surfacing	White coral	-	3/4	66	20	9	5	NP	NP	-	13	113	78	Low			
(1) ANIMALLY Palau Palau	06 03 S 147 26 E	2B	Surface: Rolled coral Base & subgrade: Coral bedrock General: Terrain: Flat coral reef; surrounding area covered by rain forest Use: Built after capture & used as bomber base. Now a permanent level air base	Coral pit	Surfacing	White coral	-	1/2	51	30	15	4	NP	NP	-	16	110	94	Low			
(4) NEW GUINEA AREA: Palaup Palaup	01 10 S 156 05 E	1B	Surface: Rolled coral Base & subgrade: Coral bedrock General: Terrain: Flat coastal area surrounded by coconut groves & rain forest Use: Built after occupation of island. Was one of major airfields in GFA. Now under Dutch control	Coral pit	Surfacing	Coral	-	-	2	21	29	40	NP	NP	2.56	14	111	52	Low			

TABLE 3: SUMMARY OF AIRFIELD TEST DATA (Cont.)

SAMPLE																						
SOIL TESTS																						
Name and Location	Latitude and Longitude	Field Class.	Airfield Description	Location	Material	Description	Classification Symbol	Grain Sizes										Atterberg Limits LL, PL, Sh	Spec. Grav. G _s	Mod. ASGD Compaction No.		
								Max. Gravel		Gravel		Sand		Fine Sand		Silt					Clay	
								In.	Size	Sieve	10 to 40	Sieve	40 to 200	Sieve	200	Sieve	200				Sieve	200
(1) BAHAIAN MAKRUH Oman Makruh	21 43 N 127 52 E	EB	No Information	ME-82 runway Sta 19+00 ME-84 runway Sta 19+00 ME-84 runway Sta 19+00 ME-84 runway Sta 19+00	Base course Subgrade 1 - 1' depth Base course Subgrade 1-1/2' to 3-1/2' depth Pitrun base course	Corel rock Black clay Corel rock & sand Course to fine sand	- OM - SP	1 - 3/4 1	43 - 47 13	36 2 5 37	18 8 34 90	3 89 14 0	NP 64 18 NP NP	- - - -	- 44 68 10 117 80 14 113 90	- - Low Low						
Ushair	21 29 N 126 04 E	EB	No Information	Runway "B" Runway "C"	Subgrade 1 - 2-1/2' depth Subgrade 3 - 6' depth	Red sandy clay Red clay	ME ME	- -	0 0	4 7	21 9	79 64	24 67 32	- -	34 69 8 33 89 9	Low Low						
Elzapa	21 27 N 126 04 E	EB	No Information	ME-88 runway ME-88 runway	Subgrade 2 - 4' depth Subgrade 0 - 2' depth	Red sandy clay Red sandy clay	ME ME	- -	0 0	5 13	17 20	78 67	52 19 47 13	- -	24 98 13 27 99 8	Low Low						
San Riquien near Bichan Field	21 20 N 127 56 E	-	-	-	Pitrun base course	Corel rock	-	1	99	27	21	7	NP	-	-	-						
(2) ALASER PALEI SPANER	65 12 N 167 00 E	-	Surface: NP Two types of base courses: (a) 2" well-graded sand with cut back treatment over 3" road mix sand-gravel-binder oil. (b) 5" mix 30% crushed gravel - 70% pitrun gravel with treatment of oil and cut back Subgrade: 1 to 1 1/2' binder with 6 to 12" making in deeper areas overlying smooth gravel (< 1/4") & clean sand. Tundra removed if less than 10" below finished grade. Fill consisting of coarse gravel & sand-gravel mix used to bring runways up to grade Quarry: Located on runway aprt. 6-7' mil. 10' from runway. Runway 30' in gravel & 6-12' from the tundra. 1' for sand from 300' west of runway	Runway missing	-	-	-	-	-	-	-	-	-	-	-	-						
Hume (JAA)	64 31 N 165 27 E	-	Surface: Concrete Runway missing Subgrade: Tundra overlying silt soil. Tundra was probably stripped to some minimum depth below finished grade	Runway missing	-	-	-	-	-	-	-	-	-	-	-	-						
Ladd Field (Palumbus)	64 50 N 147 36 E	VB	Surface: 4 to 6" asphaltic concrete Runway 10 to 60' gravel General: Flat valley with alluvial deposits of gravels, sands and silts. Organic matter in varying depths & order. All types of traffic. Performance good but some localized settlement attributed to poor compaction of base course	Runway pit #5 Runway pit #6 Runway pit #7 Runway pit #8 Runway pit #9 Runway pit #10 Runway pit #11 Runway pit #12 Runway pit #13 Runway pit #14 Runway pit #15 Runway pit #16 Runway pit #17 Runway pit #18 Runway pit #19 Runway pit #20 Runway pit #21 Runway pit #22 Runway pit #23 Runway pit #24 Runway pit #25 Runway pit #26 Runway pit #27 Runway pit #28 Runway pit #29 Runway pit #30 Runway pit #31 Runway pit #32 Runway pit #33 Runway pit #34 Runway pit #35 Runway pit #36 Runway pit #37 Runway pit #38 Runway pit #39 Runway pit #40 Runway pit #41 Runway pit #42 Runway pit #43 Runway pit #44 Runway pit #45 Runway pit #46 Runway pit #47 Runway pit #48 Runway pit #49 Runway pit #50 Runway pit #51 Runway pit #52 Runway pit #53 Runway pit #54 Runway pit #55 Runway pit #56 Runway pit #57 Runway pit #58 Runway pit #59 Runway pit #60 Runway pit #61 Runway pit #62 Runway pit #63 Runway pit #64 Runway pit #65 Runway pit #66 Runway pit #67 Runway pit #68 Runway pit #69 Runway pit #70 Runway pit #71 Runway pit #72 Runway pit #73 Runway pit #74 Runway pit #75 Runway pit #76 Runway pit #77 Runway pit #78 Runway pit #79 Runway pit #80 Runway pit #81 Runway pit #82 Runway pit #83 Runway pit #84 Runway pit #85 Runway pit #86 Runway pit #87 Runway pit #88 Runway pit #89 Runway pit #90 Runway pit #91 Runway pit #92 Runway pit #93 Runway pit #94 Runway pit #95 Runway pit #96 Runway pit #97 Runway pit #98 Runway pit #99 Runway pit #100	Base course Aggregate Base course Subgrade																	

TABLE 3: SUMMARY OF AIRFIELD TEST DATA (Cont.)

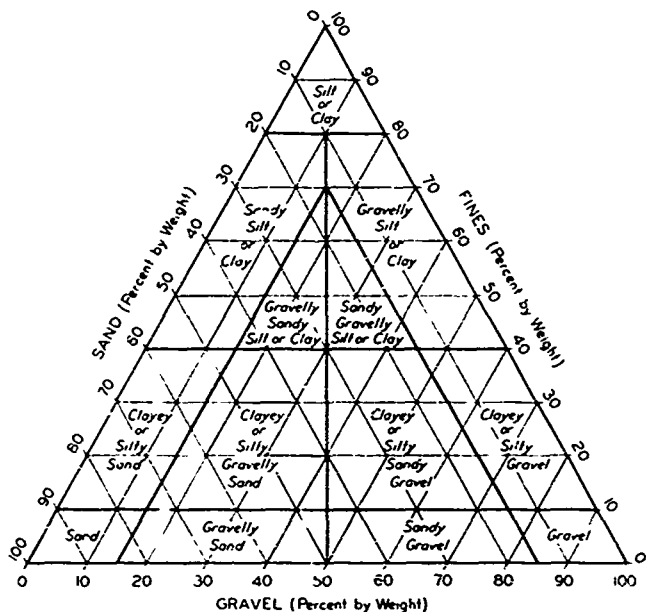
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TABLE 3: SUMMARY OF AIRFIELD TEST DATA (Cont.)

Group F: Hawaiian Islands, Alaska, Aleutians

AIRFIELD			SAMPLE			SOIL TESTS												
Name and Location	Latitude and Longitude	Field Class.	Airfield Description	Location	Material	Description	Classification Symbol	Grain Sizes					Atterberg Limits			Mod. AASHTO Compaction		Swell
								Max. Gravel Size In.	Gravel > No. 10 Sieve	Coarse Sand 10 to 40 Sieve	Fine Sand 40 to 200 Sieve	Fines < No. 200 Sieve	LL	PL	Opt. Moist. %	Sp. Grav.	Y _d	
(b) Atka Island, Alaska	52 15 N 176 15 W	T	Surface: Steel mat runway Base: Sand General: Little traffic on field after 1945	South end runway	Subgrade	Black fine sand	SP	-	0	13	80	7	NP	-	-	-	-	-
					Subgrade	Black fine sand	EP	-	0	9	81	10	NP	-	-	-	-	-
					Subgrade	Black fine sand	SP	-	0	15	75	10	NP	-	14	109	33	Low
					Typical sub-grade	Black fine sand	EP	-	0	12	83	9	NP	-	-	-	-	-
(c) Adak Island, Alaska	51 53 N 176 39 W	VB	Surface: 5" asphaltic conc. (aggregate crushed andesite porphyry, 1-1/4" max. size) Base: 12" crushed andesite porphyry (1" max. size) General: Moderate traffic (MB, V) with good performance	-	Subgrade	Brown fine sand	SP	-	0	8	79	13	NP	-	-	15	110	
					Typical sub-grade	Gray sandy silt	ML	-	8	21	23	43	NP	-	-	42	69	
					Typical base course	Crushed rock	GM	3	87	3	10	0	NP	-	-	-	-	
(d) Unalaska Island, Alaska	52 44 N 176 08 W	VB	Surface: 5" asphaltic concrete Base: 7" crushed rock (2" max. size) Subgrade: Fill composed of sand, beach gravel & pitrun stone. Layers 1 to 8' thick overlying sand was stripped to 6" below subgrade elevation General: Fair traffic (F, MB, B, V)	Samples missing	-	-	-	-	-	-	-	-	-	-	-	-	-	

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NOTES

- 1 Identification based on following grain size ranges
 Gravel 3in to no.10 sieve (20mm)
 Sand No.10(20mm) to no.200(G074mm)
 Fines(silt or clay) Below no.200(G074mm)
2. Soil is called "silt" or "clay" based upon Atterberg limits values of minus 40 mesh fraction as follows
 Silt LL28 or less, and PI 6 or less
 Clay LL over 28 or PI over 6.
- 3 Sieve sizes are U S Standard

SOIL TRIANGLE

CLASSIFICATION OF SOILS

MAJOR DIVISIONS		LETTER	NAME
COARSE GRAINED	GRAVEL	GW	Gravel or Sandy Gravel, well-graded
	AND	GP	Gravel or Sandy Gravel, poorly-graded
	GRAVELLY	GM	Silty Gravel or Silty Sand: Gravel
	SOILS	GC	Clayey Gravel or Clayey Sandy Gravel
FINE GRAINED	SAND	SW	Sand or Gravelly Sand, well-graded
	AND	SP	Sand or Gravelly Sand, poorly-graded
	SANDY	SM	Silty Sand or Silty Gravelly Sand
	SOILS	SC	Clayey Sand or Clayey Gravelly Sand
FINE GRAINED	LOW PLASTICITY	ML	Silts, Sandy Silts, Gravelly Silts, or Diatomaceous Soils
		CL	Lean Clays, Sandy Clays, or Gravelly Clays
		OL	Organic Silts or Lean Organic Clays
FINE GRAINED	HIGH PLASTICITY	MH	Micaceous Clays or Diatomaceous Soils
		CH	Fat Clays
		OH	Fat Organic Clays
PEAT AND OTHER FIBROUS ORGANIC SOILS		Pt	Peat, Humus, and other Organic Swamp Soils