AIRCRAFT GROUND-FLOTATION INVESTIGATION

PART IX — DATA REPORT ON TEST SECTION 8

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FOREWORD

The investigation described herein constitutes one phase of studies conducted during 1964 and 1965 at the U. S. Army Engineer Waterways Experiment Station (WES) under U. S. Air Force Project No. 410-A, MIPR No. AS-4-177, "Development of Landing Gear Design Criteria for the CX-HLS Aircraft." (The CX-HLS is now designated C-5A.) This program was sponsored and directed by the Landing Gear Group, Air Force Flight Dynamics Laboratory, Research and Technology Division, Mr. R. J. Parker, Project Engineer.

These tests were conducted by personnel of the WES Flexible Pavement Branch, Soils Division, under the general supervision of Messrs. W. J. Turnbull, A. A. Maxwell, and R. G. Ahlvin and the direct supervision of Mr. D. N. Brown. Other personnel actively engaged in this study were Messrs. C. D. Burns, D. M. Ladd, W. N. Brabston, H. H. Ulery, Jr., A. J. Smith, Jr., W. J. Hill, Jr., and A. H. Rutledge. This report was prepared by Messrs. Rutledge and Hill.

Directors of WES during the conduct of this investigation and preparation of this report were Col. Alex G. Sutton, Jr., CE, and Col. John R. Oswalt, Jr., CE. Technical Director was Mr. J. B. Tiffany.

Publication of this technical documentary report does not constitute Air Force approval of the report's findings or conclusions. It is published only for the exchange and stimulation of ideas.

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ABSTRACT

This data report describes work undertaken as part of an overall program to develop ground-flotation criteria for the C-5A aircraft. A test section was constructed to a width adequate for four unsurfaced test lanes. One of these lanes had not failed at a high coverage level; therefore, traffic was suspended and recommenced with an increased tire inflation pressure giving a total of five test lanes in this group. Traffic was applied to all test lanes using the same single-wheel tracking assembly with 25,000-lb load, with only the tire inflation pressure varied. The wheel assembly consisted of a single 25.00x28, 30-ply aircraft tire with inflation pressures of 25, 40, 60, 80, and 100 psi for different test lanes.

The information reported herein includes layout of the test lanes, tire characteristics, tire-print dimensions, and data collected on soil strengths, surface deformations and deflections, and drawbar pull. The traffic-coverage level is given at which each test lane was considered failed.

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ILLUSTRATIONS AND TABLES

SUMMARY

Tests on Section 8 are one phase of a comprehensive research program to develop ground-flotation criteria for heavy cargo-type aircraft. Test Section 8 initially consisted of four similar traffic lanes (lanes 17, 18, 19, and 20) all of which were unsurfaced and constructed to approximately the same subgrade CBR value (figure 11).

The same single-wheel tracking assembly loaded to 25,000 lb was applied to each test lane with only the tire inflation pressure varied. A 25.00x28, 30-ply aircraft tire was used on the load vehicle. Tire-print dimensions and pertinent tire characteristics are given in figure 12 for each inflation pressure used. When trafficking lane 17 to a high coverage level with the designated tire inflation pressure produced no significant damage to the test surface, the lane was redesignated 17A and the tire pressure increased for trafficking the lane to failure. Each lane, with the exception of lane 17, was trafficked with the 25,000-lb load and designated tire inflation pressure until failure occurred in accordance with the criteria set forth in Part I of this report. Data were recorded at intervals throughout testing to give a behavior history of each lane.

Using the same test load and wheel assembly over similar traffic lanes with only the tire inflation pressure varied, a comparison of trafficking effects was obtained for the five tire pressures tested. Basic performance data are summarized in the following paragraphs.

Lane 17

Lane 17 was trafficked with a tire having an inflation pressure of 25 psi. The lane was still in a good condition when traffic was suspended at 200 coverages (figure 3). The rated CBR for the lane was 3.9.

Lane 17A

Lane 17, after suspension of traffic at 200 coverages, was redesignated 17A for trafficking with the tire inflation pressure increased

to 100 psi. Lane 17A was considered failed due to excessive transverse differential deformations after eight passes (approximately 3 coverages) of the load vehicle (figure 4). The rated CBR for the lane was 3.9.

Lane 18

Lane 18 was trafficked with a tire having an inflation pressure of 60 psi. The lane was considered failed due to excessive transverse differential deformations at 30 coverages (figure 6). The rated CBR for the lane was 4.6.

Lane 19

Lane 19 was trafficked with a tire having an inflation pressure of 40 psi. The lane was considered failed due to excessive transverse differential deformations at 150 coverages (figure 8). The rated CBR for the lane was 4.7.

Lane 20

Lane 20 was trafficked with a tire having an inflation pressure of 80 psi. The lane was considered failed due to excessive transverse differential deformations at 20 coverages (figure 10). The rated CBR for the lane was 5.0.

AIRCRAFT GROUND-FLOTATION INVESTIGATION

PART IX DATA REPORT ON TEST SECTION 8

SECTION I: INTRODUCTION

The investigation reported herein is one phase of a comprehensive research program being conducted at the U. S. Army Engineer Waterways Experiment Station (WES), Vicksburg, Miss., as part of U. S. Air Force Project No. 410-A, MIPR No. AS-4-177, to develop ground-flotation criteria for the C-5A, a heavy cargo-type aircraft. Specifically, the tests reported herein were conducted to determine the effect of tire inflation pressure of single-wheel landing-gear assemblies on unsurfaced soils under identical conditions of loading.

Prosecution of this investigation consisted of constructing similar test lanes and subjecting them to traffic of a 25,000-lb single-wheel load, with the tire inflation pressure varied for each lane. This report presents a description of the test section and wheel assembly, and gives results of traffic. Equipment used, types of data and method of recording them, and general test criteria are summarized herein and further explained and illustrated in Part I of this report.

SECTION II: DESCRIPTION OF TEST SECTION AND LOAD VEHICLE

Description of Test Section

Test Section 8 (figure 11) was constructed within a roofed area in order to allow control of the subgrade CBR (California Bearing Ratio) in the test lanes. Section 8 was located on the same site as Test Sections 7, 5, and 3 in this series; the construction is described in Part IV. The underlying subgrade was undisturbed by the prior tests on the site so that in construction of Section 8 only the upper 18 in. of soil was excavated. The excavated area was backfilled to the original grade level with a heavy clay soil (buckshot; classified as CH according to the Unified Soil Classification System, MIL-STD-619). The fill material was a local clay with a plastic limit of 27, liquid limit of 58, and plasticity index of 31. Gradation and classification data for the subgrade material are given in Part I.

Four unsurfaced traffic lanes having approximately the same subgrade CBR values were constructed in the test section. (One test lane did not fail at a high coverage level, and traffic was suspended and recommenced with a different tire inflation pressure. The lane was renumbered, thereby giving a total of five test lanes on the section.)

Load Vehicle

The load vehicle used for trafficking test lanes in Section 8 is shown in figure 1. Load cart construction, details of linkage between the load compartment and prime mover, and method of applying load are explained in Part I. For trafficking lanes 17, 17A, 18, 19, and 20, a 25,000-lb single-wheel load was used with the tracking tire inflated to 25, 100, 60, 40, and 80 psi, respectively. A 25.00x28, 30-ply aircraft tire was used on the assembly. Tire-print dimensions and pertinent tire characteristics are shown in figure 12.

SECTION III: APPLICATION OF TRAFFIC, FAILURE CRITERIA, AND DATA COLLECTED

Application of Traffic

Traffic was applied to the test lanes in a nonuniform pattern with intensity of traffic being varied within each lane to produce three zones of approximately 100, 80, and 20 percent traffic coverage. Traffic so distributed within a traffic lane simulates as nearly as feasible the bell-shaped traffic distribution curve which results from the wander of aircraft from the lane center line. The coverage levels referred to in the tables and text of this data report are the total number of coverages applied to the 100 percent coverage zone. The corresponding number of coverages applied to the outer traffic zones is proportional to the percentage factor for the respective zones, as shown in figure 13.

Failure Criteria and Data Collected

Failure criteria used in this investigation and descriptive terms used in presentation and discussion of data in all parts of this series are presented in Part I. A general outline of types of data collected is given in the following paragraphs. Details on apparatus and procedure for obtaining specific measurements are given in Part I.

CBR, water content, and dry density

CBR, water content, and dry density of the subgrade were measured for each test lane prior to application of traffic, at intermediate coverage levels, and at failure or suspension of traffic if no failure condition was reached. After traffic was concluded on a lane, a measure of subgrade strength termed "rated CBR" was determined. Rated CBR is generally the average CBR value obtained from all the determinations made in the top 12 in. of soil during the test life of a lane. In certain instances, extreme or irregular values may be ignored if the analyst decides that they are not properly representative.

Surface roughness, or differential deformation

Surface roughness, or differential deformation, measurements were made using a 10-ft straightedge at various traffic-coverage levels on each lane. Rut depths were also measured.

Deformations

Deformations, defined as permanent cumulative surface changes in cross section or profile of a lane, were charted by means of level readings at pertinent traffic-coverage levels.

Deflection

Deflection of the test surface under an individual static load of the tracking assembly was measured at various traffic-coverage levels. Level readings on the lane surface on each side of the load wheel and on a pin and cap device directly beneath the load wheel provided deflection data. Both total (for a single loading) and elastic (recoverable) deflections were measured.

Rolling resistance

Rolling resistance, or drawbar pull, measurements were performed with the load vehicle over each test lane at designated coverage levels. Three types of drawbar measurements were taken: (a) maximum force required to overcome static inertia and commence forward movement of the load cart, termed "initial DBP"; (b) average force required to maintain a constant speed once the load vehicle is in motion, termed "rolling DBP"; and (c) maximum force obtained during the constant speed run, termed "peak DBP."

SECTION IV: BEHAVIOR OF LANES UNDER TRAFFIC AND TEST RESULTS

Lane 17

Behavior of lane under traffic

Figure 2 shows lane 17 prior to traffic. The lane held up well under traffic, and no signs of failure were evident when traffic was suspended at 200 coverages (figure 3). The rated CBR for the lane was 3.9.

Test results

Results of trafficking lane 17 are summarized in table 1. Soil test data are given in table 2. The following information was obtained from traffic tests on lane 17.

a. Roughness. Table 1 shows the development of small differential deformations during testing. When traffic was suspended at 200 coverages, the average transverse differential deformation was 1.29 in. No significant rutting was noted in the lane.

b. Deformation. Figure 14 shows average cross-section deformations at 20 and 200 coverages. Profile plots are shown in figure 15 for the same coverage levels. The profile plots illustrate the general settlement along the lane length.

c. Deflection. Average total soil deflections measured at 0, 20, and 200 coverages are shown in figure 16. Deflections increased consistently with traffic coverages. As shown in table 1, elastic soil deflections showed a similar increase.

d. Rolling resistance. Drawbar pull values are given in table 1. Highest values were recorded during 0-coverage measurements except for rolling drawbar pull which increased slightly with traffic.

Lane 17A

Behavior of lane under traffic

Since lane 17 was essentially undamaged after 200 coverages, the lane was redesignated 17A for further trafficking with tire inflation pressure increased from 25 psi to 100 psi.

Lane 17A prior to trafficking with a tire inflated to 100 psi is shown in figure 3. Severe damage to the lane surface occurred during preliminary passes of the load vehicle in the process of recording drawbar and deflection data. The lane was considered failed due to excessive transverse differential deformations after eight passes (approximately 3 coverages; figure 4). The rated CBR for the lane was 3.9.

Test results

The effect on the lane surface of preliminary passes of the load vehicle is shown in table 1. Soil test data given in table 2 for lane 17 at 200 coverages also apply to lane 17A at the 0-coverage level. Table 1 shows drawbar pull values for the load vehicle operated over an asphalt-paved strip for comparison with drawbar pull values recorded on the test lane. The following information was obtained from traffic tests on lane 17A.

a. Roughness. Table 1 shows the differential deformations and ruts that developed with a few passes of the load vehicle. Average transverse and diagonal differential deformations reached 3.43 and 3.50 in., respectively, at eight passes. Rut depths averaged 2.0 in.

b. Deformation. Figure 14 shows average cross-section deformations at eight passes of the load vehicle. A profile plot in figure 15 shows the highly irregular surface that developed along the length of the lane.

c. Deflection. Average total soil deflection at eight passes is shown in figure 16. Elastic soil deflection was 0.8 in. (see table 1).

d. Rolling resistance. Drawbar pull values at 0 coverages are given in table 1.

Lane 18

Behavior of lane under traffic

Figure 5 shows lane 18 prior to traffic. The lane was considered failed at 30 coverages due to excessive differential deformations and rutting (figure 6). The rated CBR for the lane was 4.6.

Test results

Results of trafficking lane 18 are summarized in table 1. Soil test data are given in table 2. Table 1 contains drawbar pull values for the load vehicle operated over an asphalt-paved strip for comparison with drawbar values recorded on the test lane. The following information was obtained from traffic tests on lane 18.

a. Roughness. Table 1 shows the progressive development of differential deformations and rut depths with trafficking. A large increase in rut depth occurred between 20 and 30 coverages with an average value of 4.62 in. at failure.

b. Deformation. Figure 14 shows average cross-section deformations at 20 and 30 coverages. The badly rutted area near the lane center line is evident. Profile deformations at 20 and 30 coverages in figure 15 show progressive settlement along the lane center line.

c. Deflection. Average total soil deflections at 0, 20, and 30 coverages are shown in figure 16. Consistent increases in total deflection occurred with increased coverages. Elastic soil deflections (see table 1) increased steadily with trafficking and measured 2.1 in. at 30 coverages.

d. Rolling resistance. Drawbar pull values are given in table 1. Rolling drawbar pull values decreased slightly during the final 10 coverages while increases were measured for initial and peak drawbar pull.

Lane 19

Behavior of lane under traffic

Figure 7 shows lane 19 prior to traffic. The lane sustained traffic to the 150-coverage level when it was considered failed due to excessive differential deformations (figure 8). The rated CBR for the lane was 4.7.

Test results

Results of trafficking lane 19 are summarized in table 1. Soil test data are given in table 2. Table 1 contains drawbar pull values for the load vehicle operated over an asphalt-paved strip for comparison with drawbar values recorded on the test lane. The following information was obtained from traffic tests on lane 19.

a. Roughness. Table 1 shows the progressive development of differential deformations and rut depths with trafficking. Transverse and diagonal differential deformations were primary contributors to lane roughness as rut depths did not exceed 2.0 in. at failure.

b. Deformation. Figure 14 shows average cross-section deformations at 20 and 150 coverages. Profile deformations at the same coverage levels are presented in figure 15 and show the longitudinal settlement that accompanied trafficking.

c. Deflection. Average total soil deflections at 0, 20, and 150 coverages are shown in figure 16. Small but consistent increases in total deflection were measured at higher traffic coverages. Elastic soil deflections (shown in table 1) were essentially unchanged with trafficking.

d. Rolling resistance. Drawbar pull values are given in table 1. Rolling and peak drawbar values were unchanged with trafficking and initial drawbar pull varied only slightly, registering a minimum at 150 coverages.

Lane 20

Behavior of lane under traffic

Figure 9 shows lane 20 prior to traffic. The lane deformed readily under traffic and was considered failed due to excessive differential deformations at 20 coverages (figure 10). The rated CBR for the lane was 5.0.

Test results

Results of trafficking lane 20 are summarized in table 1. Soil test data are given in table 2. Table 1 contains drawbar pull values for the load vehicle operated over an asphalt-paved strip for comparison with drawbar values recorded on the test lane. The following information was obtained from traffic tests on lane 20.

a. Roughness. Table 1 shows the differential deformations and rut depths measured at 20 coverages. Transverse and diagonal differential deformations were severe and constituted the principal factors in failure of the lane. Rut depths did not exceed 3.0 in. at failure.

b. Deformation. Figure 14 which shows average cross-section deformations at 20 coverages illustrates the severe deformation at the center line of the cross section. The center-line profile deformation plot shown in figure 15 reflects the longitudinal settlement that occurred with trafficking.

c. Deflection. Average total soil deflections at 0 and 20 coverages are shown in figure 16. Total deflection at 20 coverages was greatest with an average of 1.9 in. Elastic soil deflections increased significantly from 0.5 in. at 0 coverages to 1.2 in. at 20 coverages (see table 1).

d. Rolling resistance. Drawbar pull values, presented in table 1, showed little change with trafficking.

SECTION V: PRINCIPAL FINDINGS

From the foregoing discussion, the principal findings relating test load, wheel assembly, tire inflation pressure, subgrade CBR, and traffic coverages are as follows:

Load, Wheel Assembly, and Tire Pressure	Rated Subgrade CBR*	Coverages At Failure
25,000-lb load; single-wheel assembly; 25.00x28, 30-ply tire at 25-psi inflation pressure	3.9	No failure at 200 coverages; traffic suspended
25,000-lb load; single-wheel assembly; 25.00x28, 30-ply tire at 100-psi inflation pressure	3.9	8 passes (approximately 3 coverages)
25,000-lb load; single-wheel assembly; 25.00x28, 30-ply tire at 60-psi inflation pressure	4.6	30
25,000-lb load; single-wheel assembly; 25.00x28, 30-ply tire at 40-psi inflation pressure	4.7	150
25,000-lb load; single-wheel assembly; 25.00x28, 30-ply tire at 80-psi inflation pressure	5.0	20

* All test lanes were unsurfaced.

TABLE 1

SUMMARY OF TRAFFIC DATA, TEST SECTION 8

Test Lane	Tire Inflation Pressure (psi)	Rated CBR	Traffic Coverages	Differential Deformation (in.) Longitudinal Max	Longitudinal Avg	Transverse Max	Transverse Avg	Diagonal Max	Diagonal Avg	Rutting (in.) Max	Rutting Avg	Drawbar Pull (kips) Initial	Peak	Rolling	Subgrade Deflection at Center Line of Assembly (in.) Avg Total	Elastic	Remarks
17	25	3.9	0	--	--	--	--	--	--	--	--	4.6	3.2	0.7	0.4	0.3	Traffic suspended at 200 coverages; no failure
			20	0.75	0.60	1.38	1.19	1.25	1.16	--	--	3.5	0.8	0.3	0.6	0.4	
			200	1.13	0.91	1.38	1.29	1.50	1.25	--	--	3.5	1.7	0.9	0.8	0.6	
Asphalt strip	25	--	--	--	--	--	--	--	--	--	--	2.2	--	--	--	--	
17A	100	3.9	0	--	--	--	--	--	--	--	--	5.2	3.6	1.6	2.2	0.8	Lane failed due to excessive transverse differential deformation at 8 passes (approximately 3 coverages)
			8 passes	1.13	0.60	3.75	3.43	4.00	3.50	2.00	2.00	--	--	--	--	--	
Asphalt strip	100	--	--	--	--	--	--	--	--	--	--	3.3	2.5	0.2	--	--	
18	60	4.6	0	--	--	--	--	--	--	--	--	4.2	2.4	1.2	0.7	0.7	Lane failed due to excessive transverse differential deformation at 30 coverages
			20	0.38	0.28	4.13	2.88	4.00	3.07	2.50	2.19	4.1	2.4	1.6	2.1	1.2	
			30	0.75	0.63	5.00	4.25	4.75	4.47	5.50	4.62	6.3	3.1	1.3	2.8	2.1	
Asphalt strip	60	--	--	--	--	--	--	--	--	--	--	5.3	3.7	1.2	--	--	
19	40	4.7	0	--	--	--	--	--	--	--	--	3.8	3.1	0.7	1.0	0.6	Lane failed due to excessive transverse differential deformation at 150 coverages
			20	0.88	0.47	3.00	2.44	2.88	2.44	1.38	1.32	4.4	3.2	0.7	1.1	0.6	
			150	2.50	2.00	5.50	4.88	6.50	5.69	2.00	1.69	3.4	3.1	0.7	1.2	0.7	
Asphalt strip	40	--	--	--	--	--	--	--	--	--	--	2.5	1.5	0.5	--	--	
20	30	5.0	0	--	--	--	--	--	--	--	--	4.6	3.7	1.5	1.4	0.5	Lane failed due to excessive transverse differential deformation at 20 coverages
			20	0.50	0.47	8.75	6.75	8.38	6.91	3.00	2.53	4.5	3.1	1.3	1.9	1.2	
Asphalt strip	30	--	--	--	--	--	--	--	--	--	--	2.9	1.7	0.5	--	--	

Note: A 25-kip load on a single-wheel assembly was used for trafficking all test lanes. In all tests, 25.00x28, 30-ply tires were used. All test lanes were unsurfaced.

TABLE 2

SUMMARY OF CBR, DENSITY, AND WATER CONTENT DATA, TEST SECTION 8

Lane No.*	Traffic Coverages	Depth (in.)	CBR	Water Content (%)	Dry Density (lb/cu ft)
17	0	0	4.0	27.6	91.9
		6	4.1	28.4	93.8
		12	3.5	28.4	90.2
		18	3.1	29.1	89.4
	200	0	3.0	28.3	91.9
		6	5.3	27.0	93.8
		12	3.6	27.0	91.2
		18	2.6	29.3	90.1
17A	200	Same values as measured for Lane 17			
18	0	0	4.0	27.6	91.9
		6	4.1	28.4	93.8
		12	3.5	28.4	90.2
		18	3.1	29.1	89.4
	30	0	5.1	28.3	92.1
		6	5.7	28.1	93.0
		12	5.2	28.0	90.8
		18	2.9	31.8	87.0
19	0	0	3.4	27.9	92.1
		6	5.1	26.5	92.3
		12	5.7	27.4	91.8
		18	3.6	28.4	91.3
	150	0	4.5	27.4	92.9
		6	4.6	27.1	92.4
		12	4.6	27.1	92.0
		18	2.2	32.2	85.3
20	0	0	3.4	27.9	92.1
		6	5.1	26.5	92.3
		12	5.7	27.4	91.8
		18	5.6	28.4	91.3
	20	0	4.4	28.5	92.6
		6	5.5	27.1	94.5
		12	5.9	27.8	90.9
		18	1.8	32.4	87.1

Note: Coverage-failure information given in remarks column in table 1.
* All test lanes were unsurfaced. Subgrade material was heavy clay (buckshot; classified as CH).

Figure 1. Test load vehicle

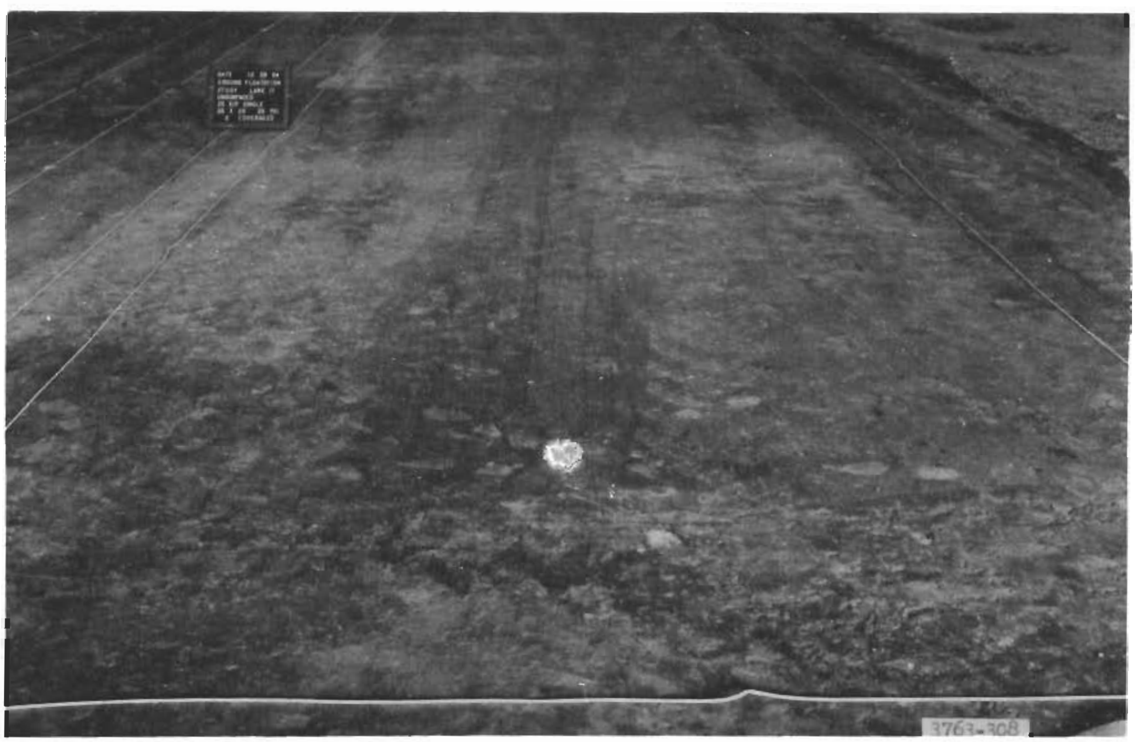


Figure 2. Lane 17 prior to traffic

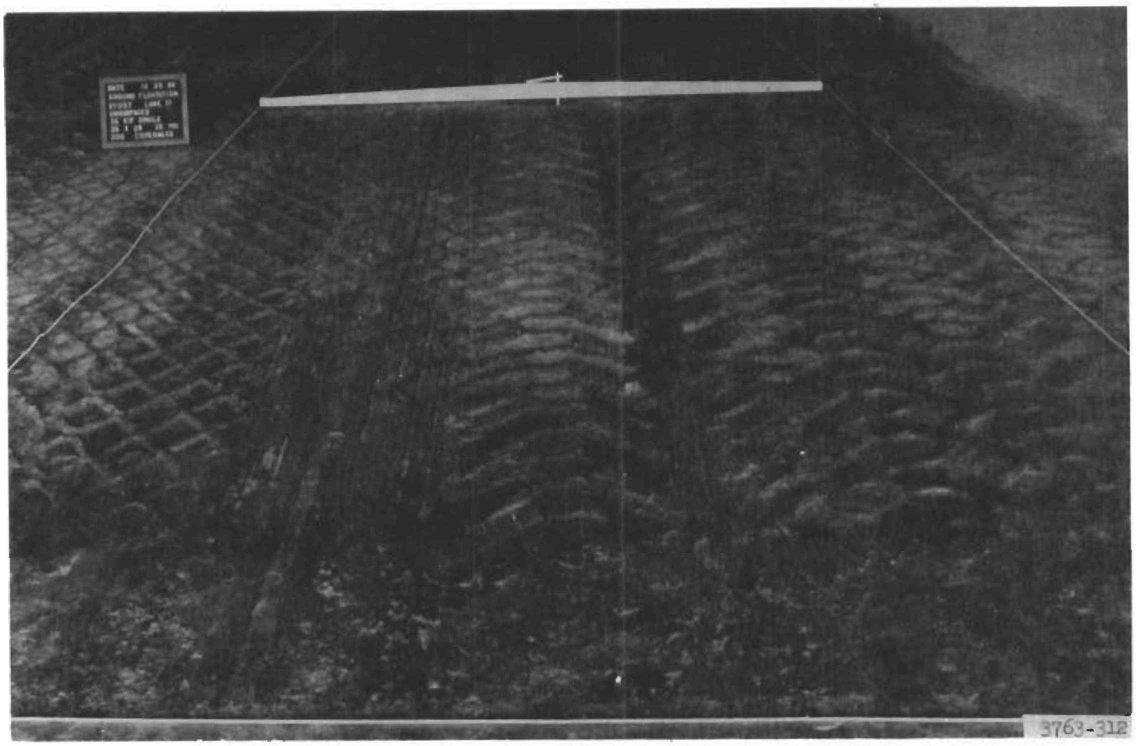


Figure 3. Lane 17, general view showing transverse straightedge measurement at 200 coverages when traffic was suspended (no failure)

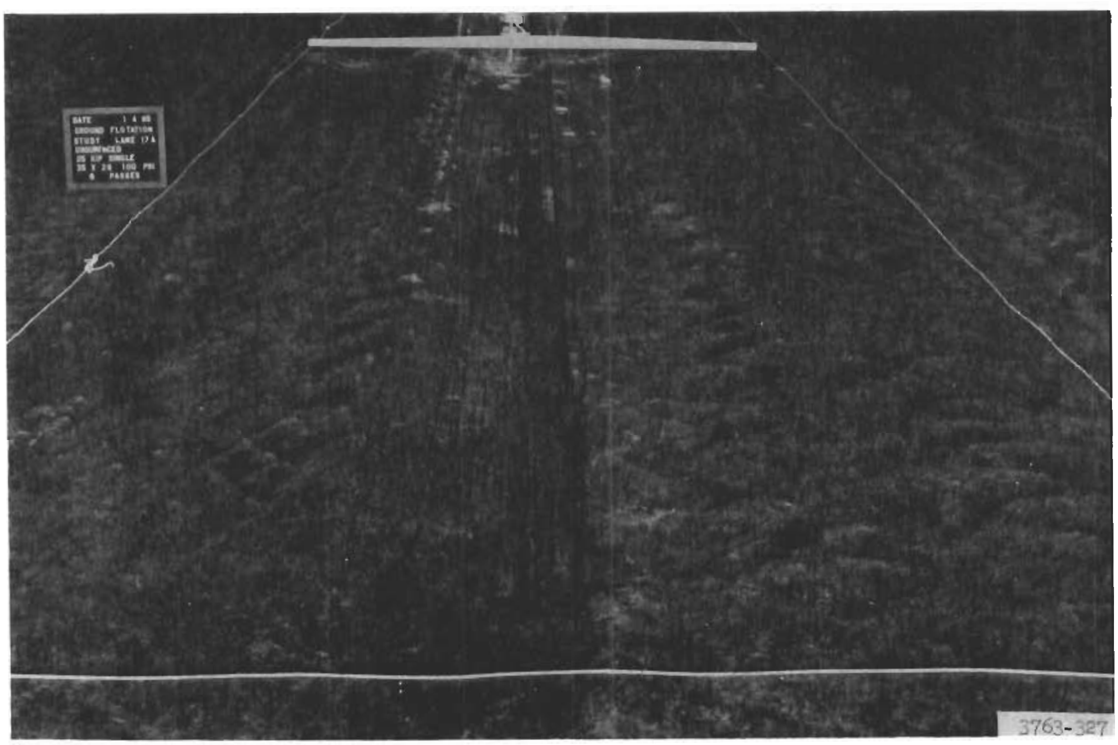


Figure 4. Lane 17A, general view showing transverse straightedge measurement at 8 passes (failure; approximately 3 coverages)

Figure 5. Lane 18 prior to traffic

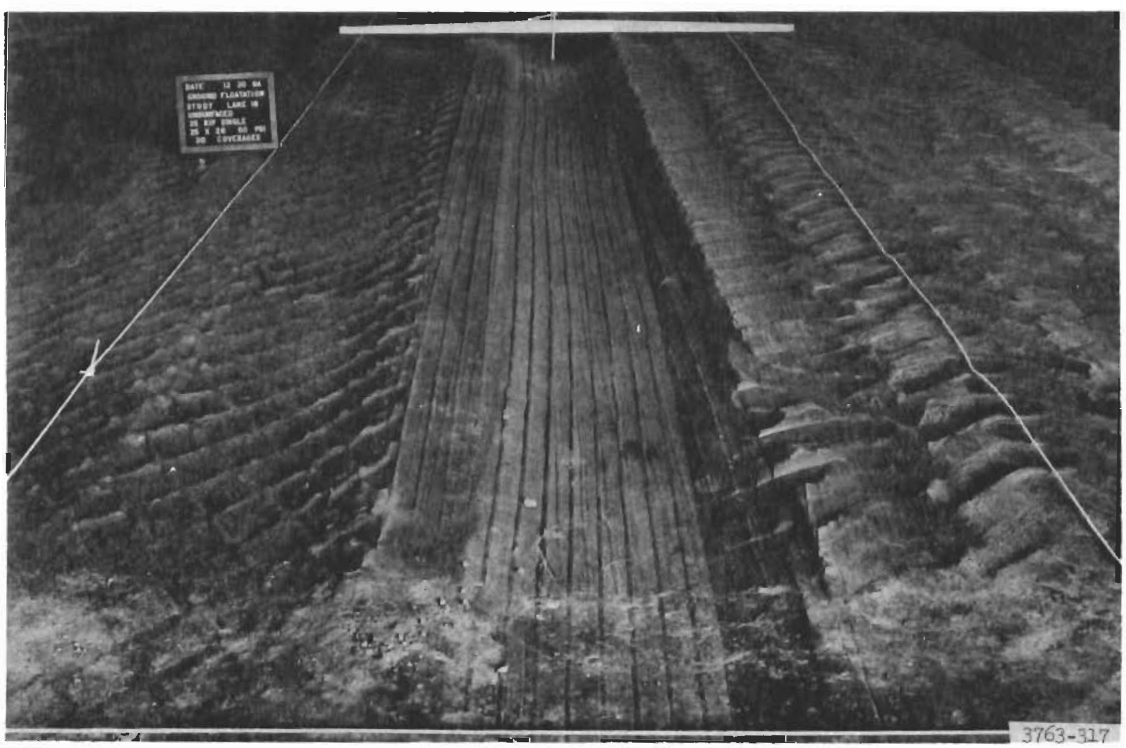


Figure 6. Lane 18, general view showing transverse straightedge measurement at 30 coverages (failure)

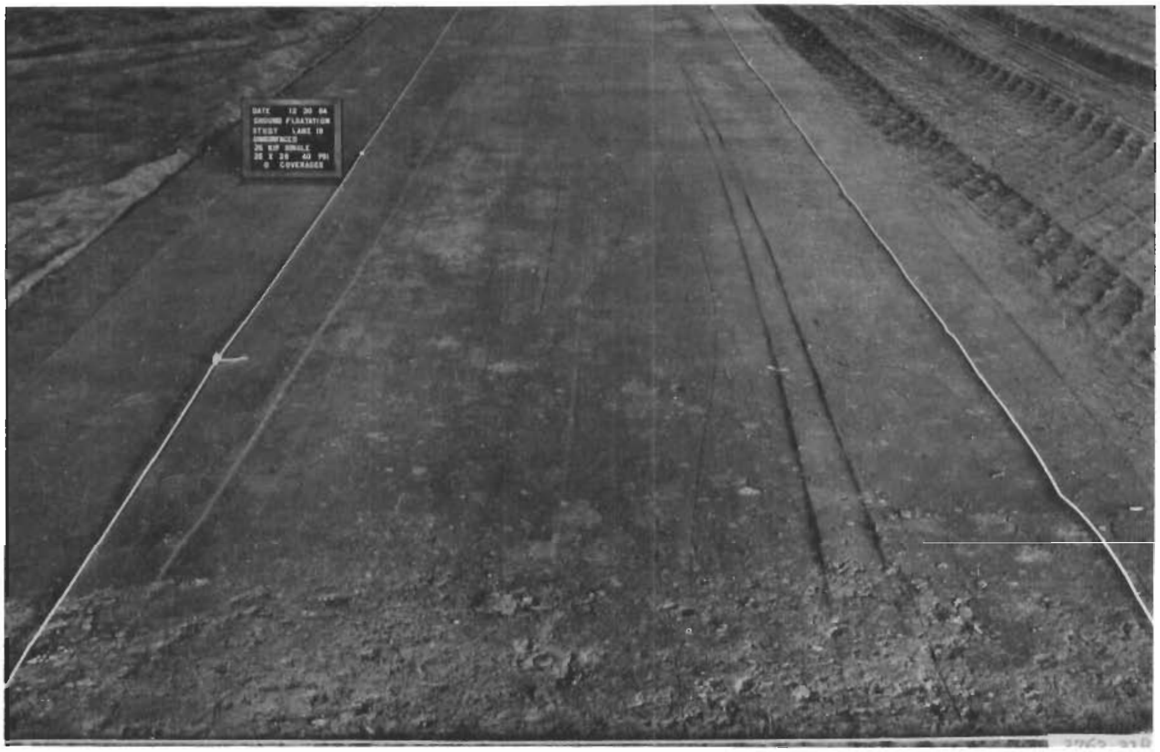


Figure 7. Lane 19 prior to traffic

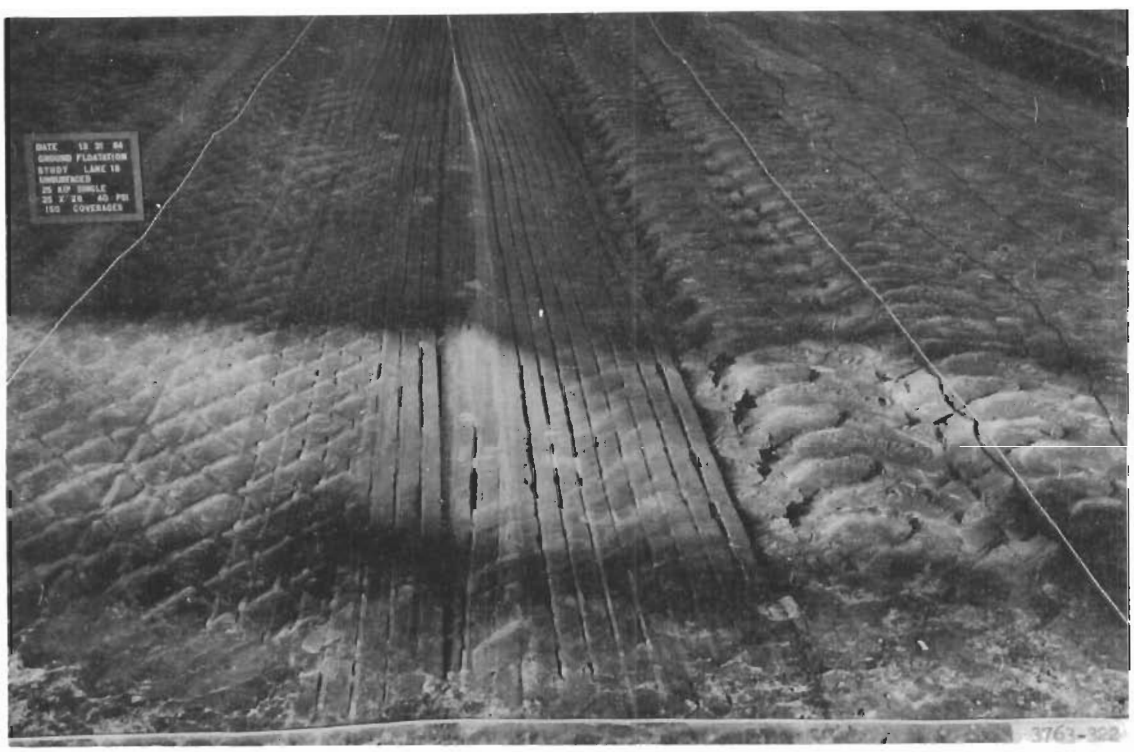


Figure 8. Lane 19, general view at 150 coverages (failure)

Figure 9. Lane 20 prior to traffic

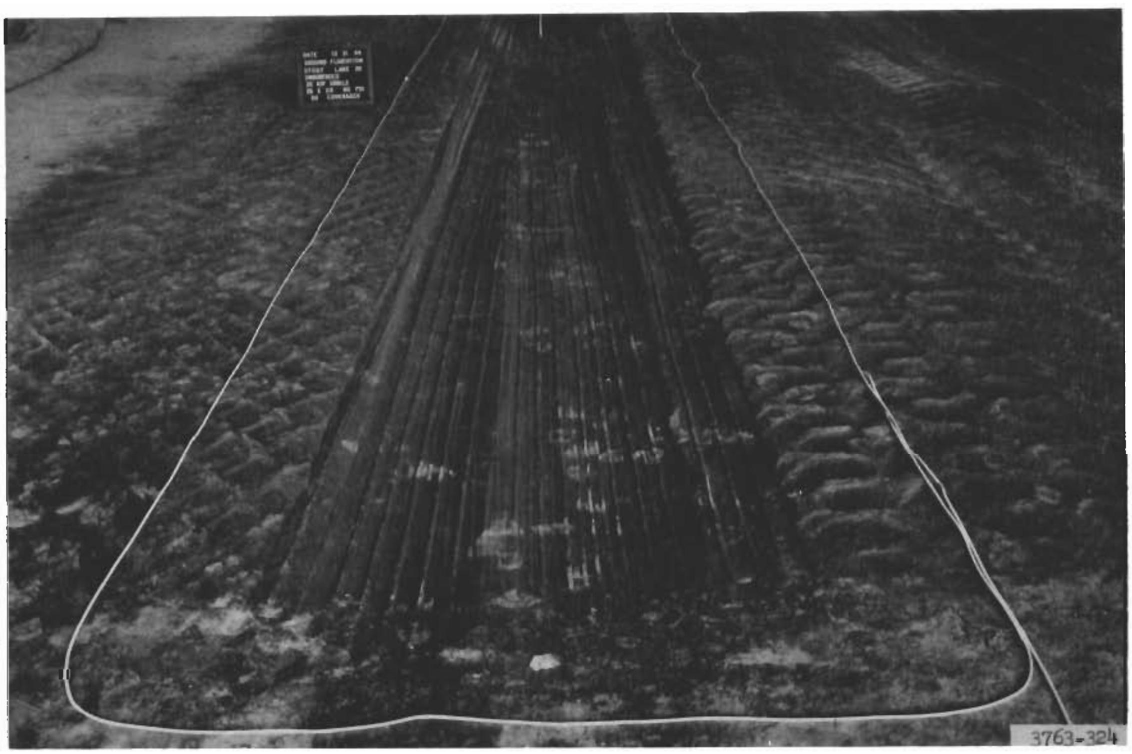


Figure 10. Lane 20, general view showing transverse straightedge measurement at 20 coverages (failure)

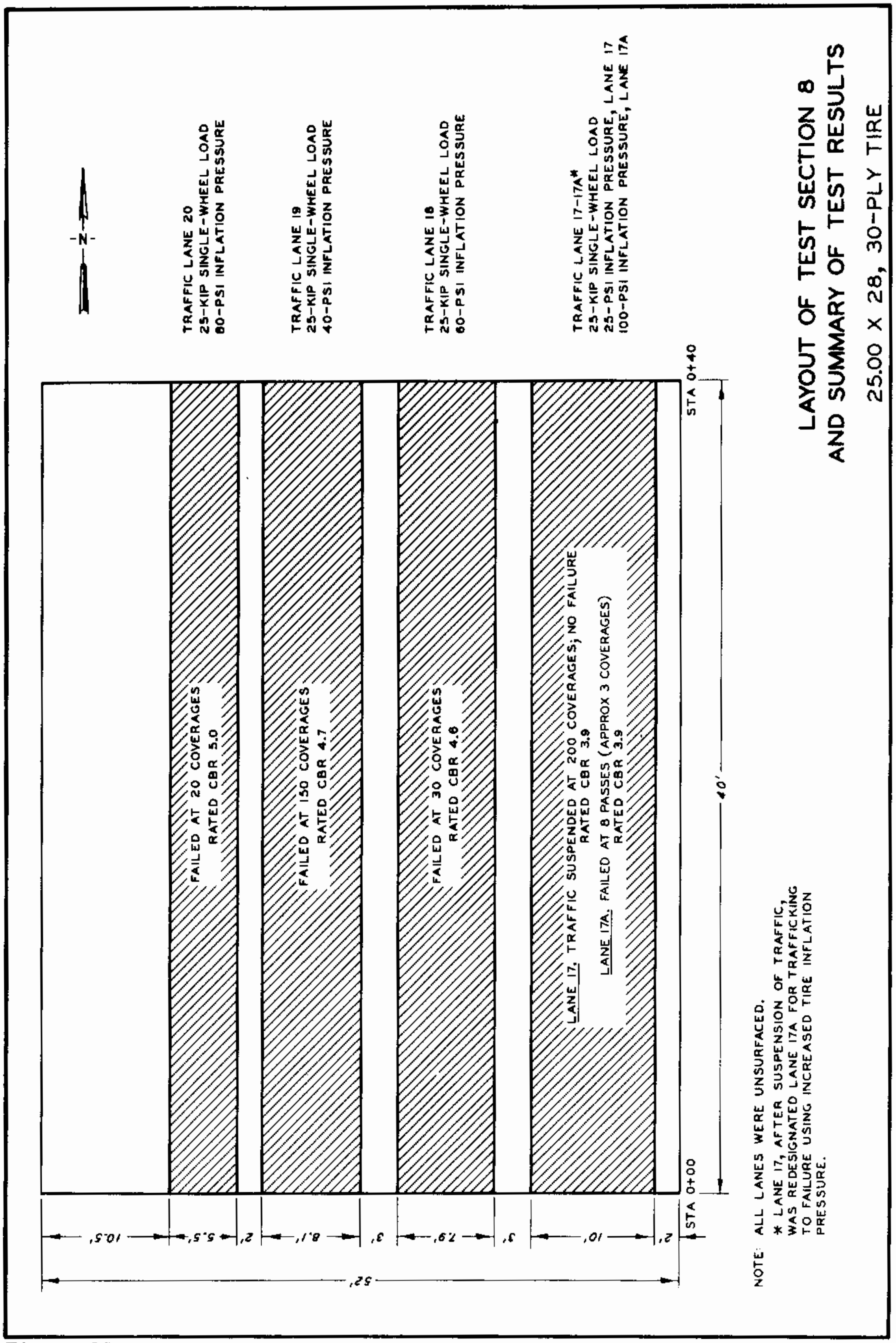

-N-
TRAFFIC LANE 20
25-KIP SINGLE-WHEEL LOAD
80-PSI INFLATION PRESSURE
TRAFFIC LANE 19
25-KIP SINGLE-WHEEL LOAD
40-PSI INFLATION PRESSURE
TRAFFIC LANE 18
25-KIP SINGLE-WHEEL LOAD
60-PSI INFLATION PRESSURE
TRAFFIC LANE 17-17A*
25-KIP SINGLE-WHEEL LOAD
25-PSI INFLATION PRESSURE, LANE 17
100-PSI INFLATION PRESSURE, LANE 17A
FAILED AT 20 COVERAGES
RATED CBR 5.0
FAILED AT 150 COVERAGES
RATED CBR 4.7
FAILED AT 30 COVERAGES
RATED CBR 4.6
LANE 17. TRAFFIC SUSPENDED AT 200 COVERAGES; NO FAILURE
RATED CBR 3.9
LANE 17A. FAILED AT 8 PASSES (APPROX 3 COVERAGES)
RATED CBR 3.9
STA 0+40
STA 0+00
40'
10.5'
5.5'
2'
8.1'
3'
7.9'
3'
10'
2'
52'
LAYOUT OF TEST SECTION 8
AND SUMMARY OF TEST RESULTS
25.00 X 28, 30-PLY TIRE
NOTE: ALL LANES WERE UNSURFACED.
* LANE 17, AFTER SUSPENSION OF TRAFFIC, WAS REDESIGNATED LANE 17A FOR TRAFFICKING TO FAILURE USING INCREASED TIRE INFLATION PRESSURE.

Figure 11

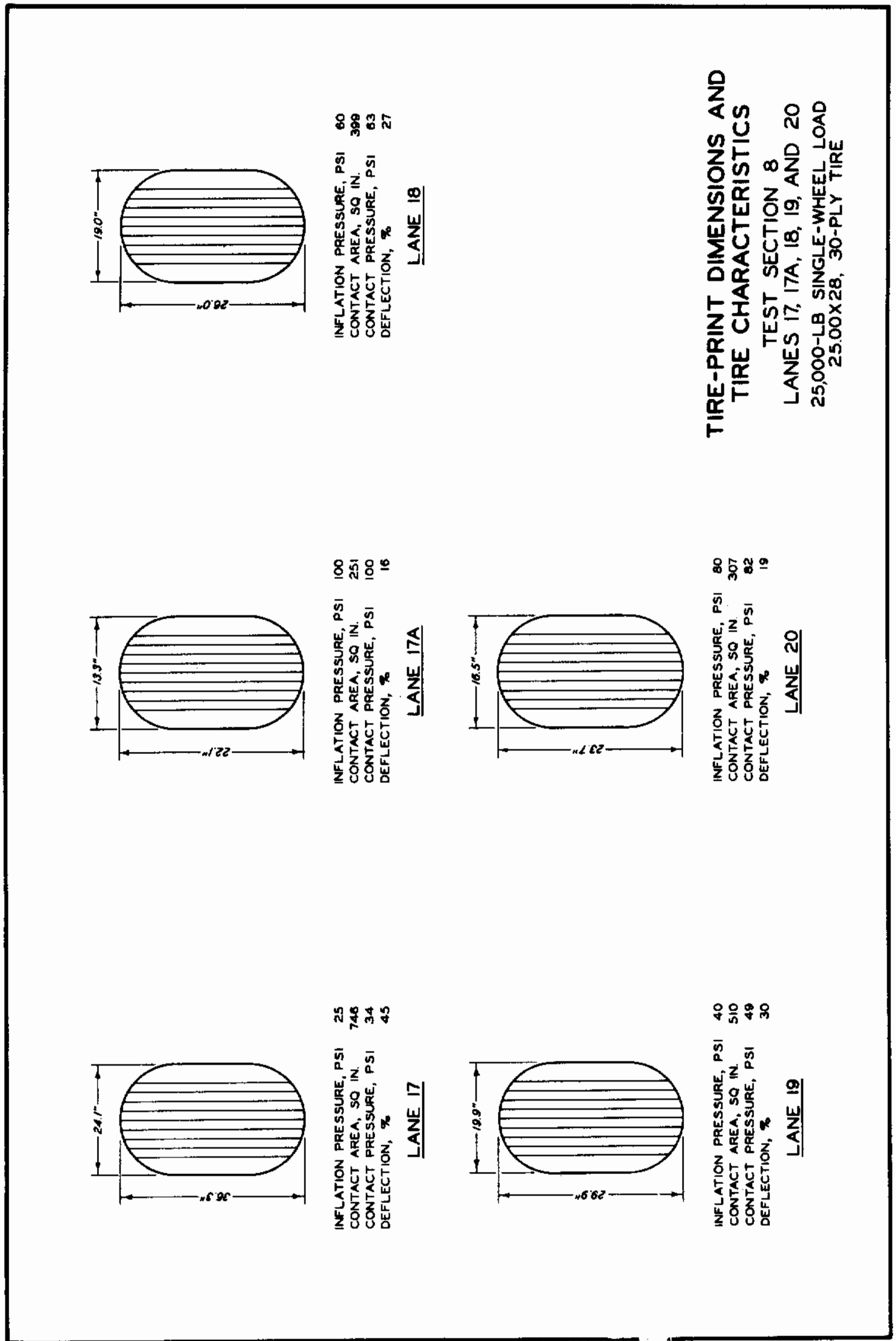
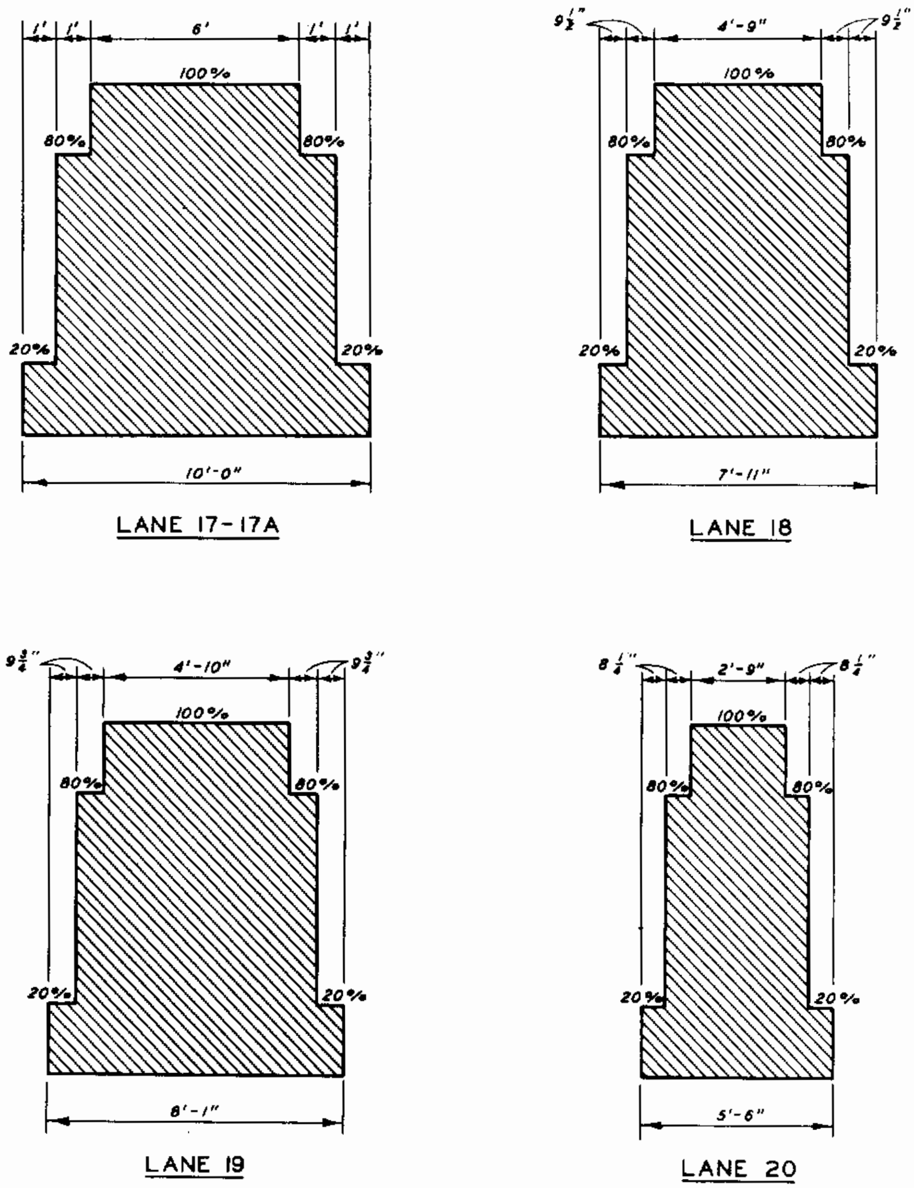

26.0"
19.0"
INFLATION PRESSURE, PSI 60
CONTACT AREA, SQ IN. 399
CONTACT PRESSURE, PSI 63
DEFLECTION, % 27
LANE 18
22.1"
13.3"
INFLATION PRESSURE, PSI 100
CONTACT AREA, SQ IN. 251
CONTACT PRESSURE, PSI 100
DEFLECTION, % 16
LANE 17A
36.3"
24.1"
INFLATION PRESSURE, PSI 25
CONTACT AREA, SQ IN. 748
CONTACT PRESSURE, PSI 34
DEFLECTION, % 45
LANE 17
23.7"
16.5"
INFLATION PRESSURE, PSI 80
CONTACT AREA, SQ IN. 307
CONTACT PRESSURE, PSI 82
DEFLECTION, % 19
LANE 20
29.9"
19.9"
INFLATION PRESSURE, PSI 40
CONTACT AREA, SQ IN. 510
CONTACT PRESSURE, PSI 49
DEFLECTION, % 30
LANE 19
TIRE-PRINT DIMENSIONS AND
TIRE CHARACTERISTICS
TEST SECTION 8
LANES 17, 17A, 18, 19, AND 20
25,000-LB SINGLE-WHEEL LOAD
25.00X28, 30-PLY TIRE

Figure 12



NOTE: PERCENTAGE FIGURES SHOW PERCENT OF TOTAL COVERAGES.

TRAFFIC DISTRIBUTION PATTERNS
TEST SECTION 8
LANES 17-17A, 18, 19, AND 20

Figure 13

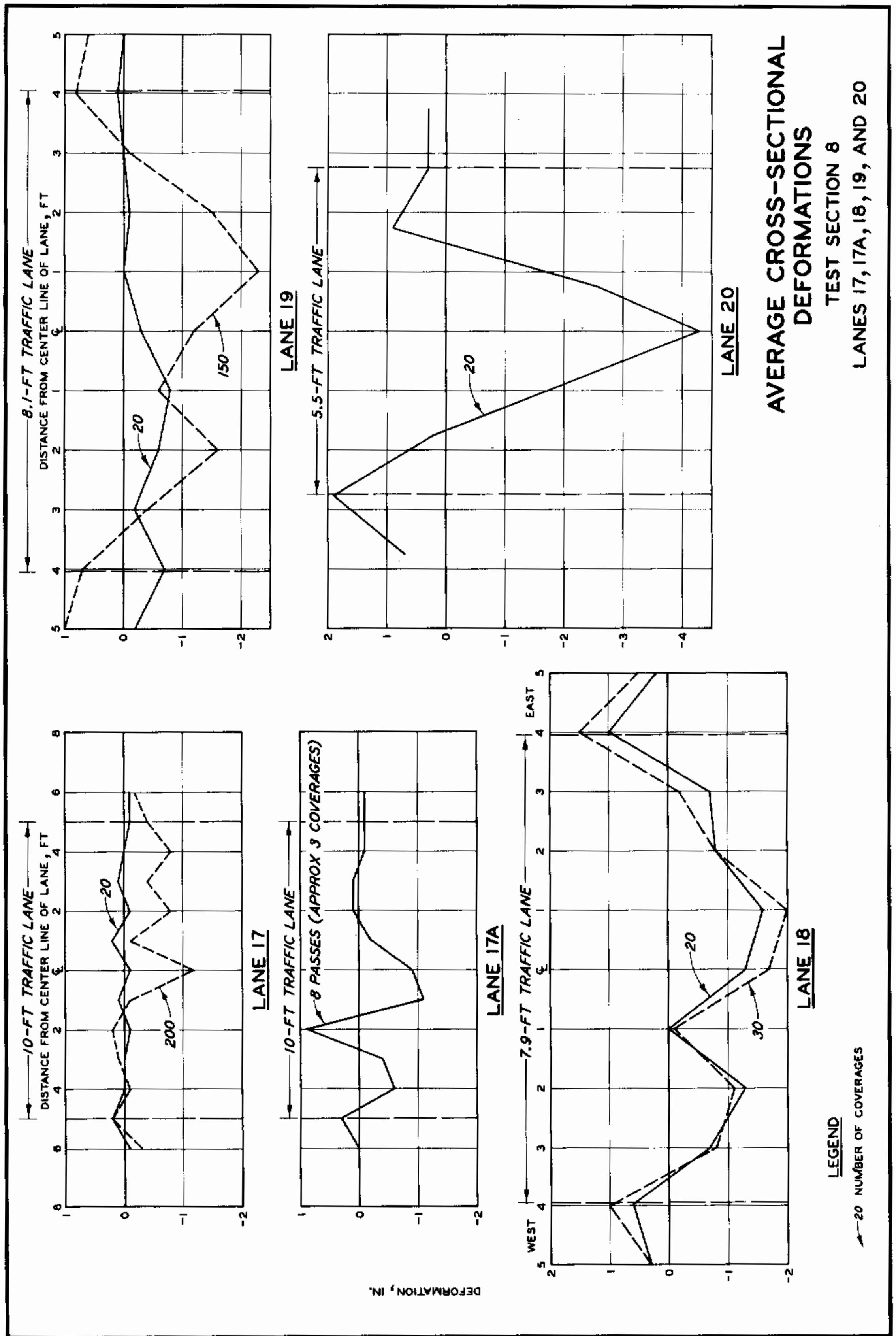

AVERAGE CROSS-SECTIONAL DEFORMATIONS
TEST SECTION 8
LANES 17, 17A, 18, 19, AND 20
LANE 17
10-FT TRAFFIC LANE
DISTANCE FROM CENTER LINE OF LANE, FT
LANE 17A
10-FT TRAFFIC LANE
8 PASSES (APPROX 3 COVERAGES)
LANE 18
7.9-FT TRAFFIC LANE
WEST
EAST
LANE 19
8.1-FT TRAFFIC LANE
DISTANCE FROM CENTER LINE OF LANE, FT
LANE 20
5.5-FT TRAFFIC LANE
DEFORMATION, IN.
LEGEND
20 NUMBER OF COVERAGES

Figure 14

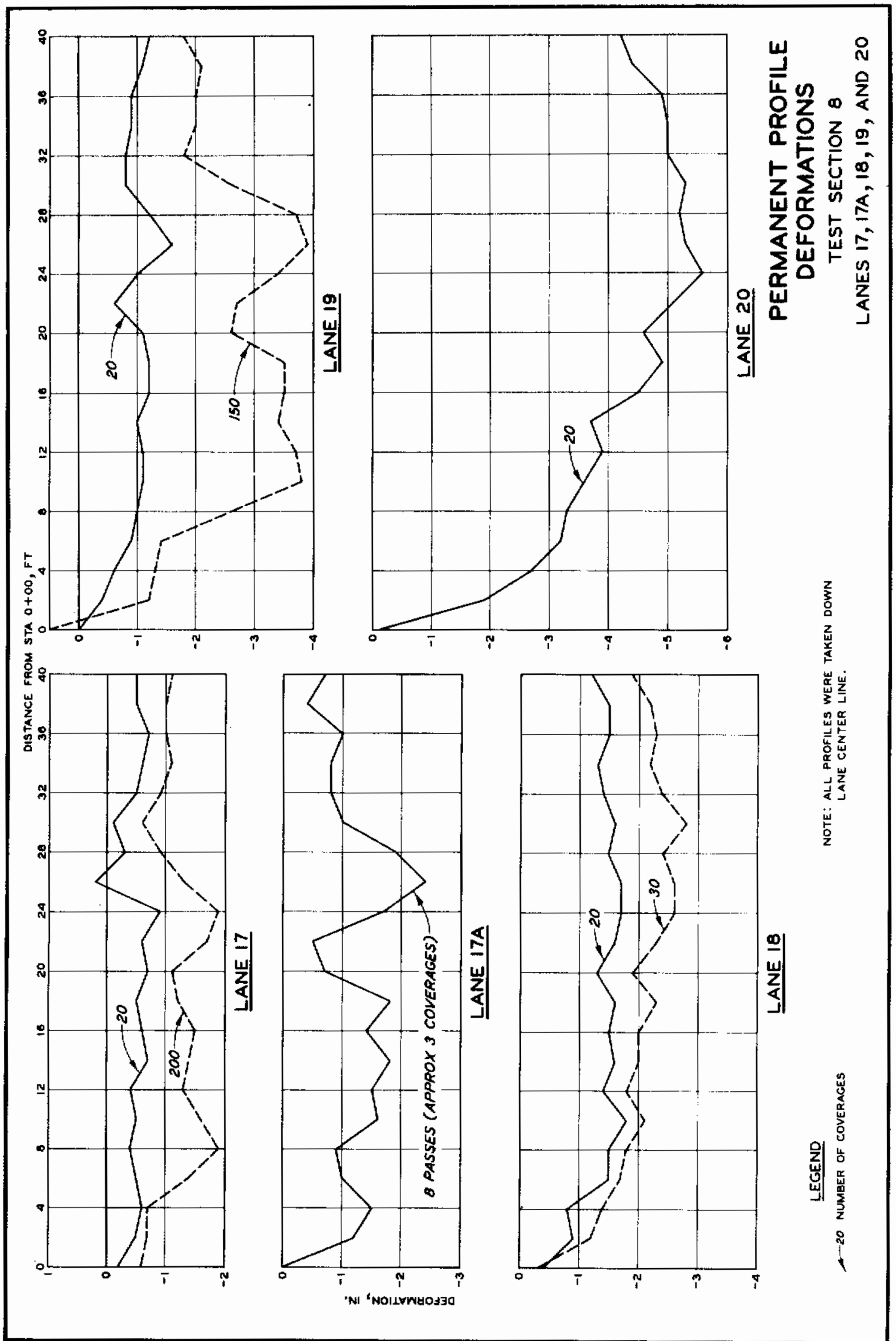
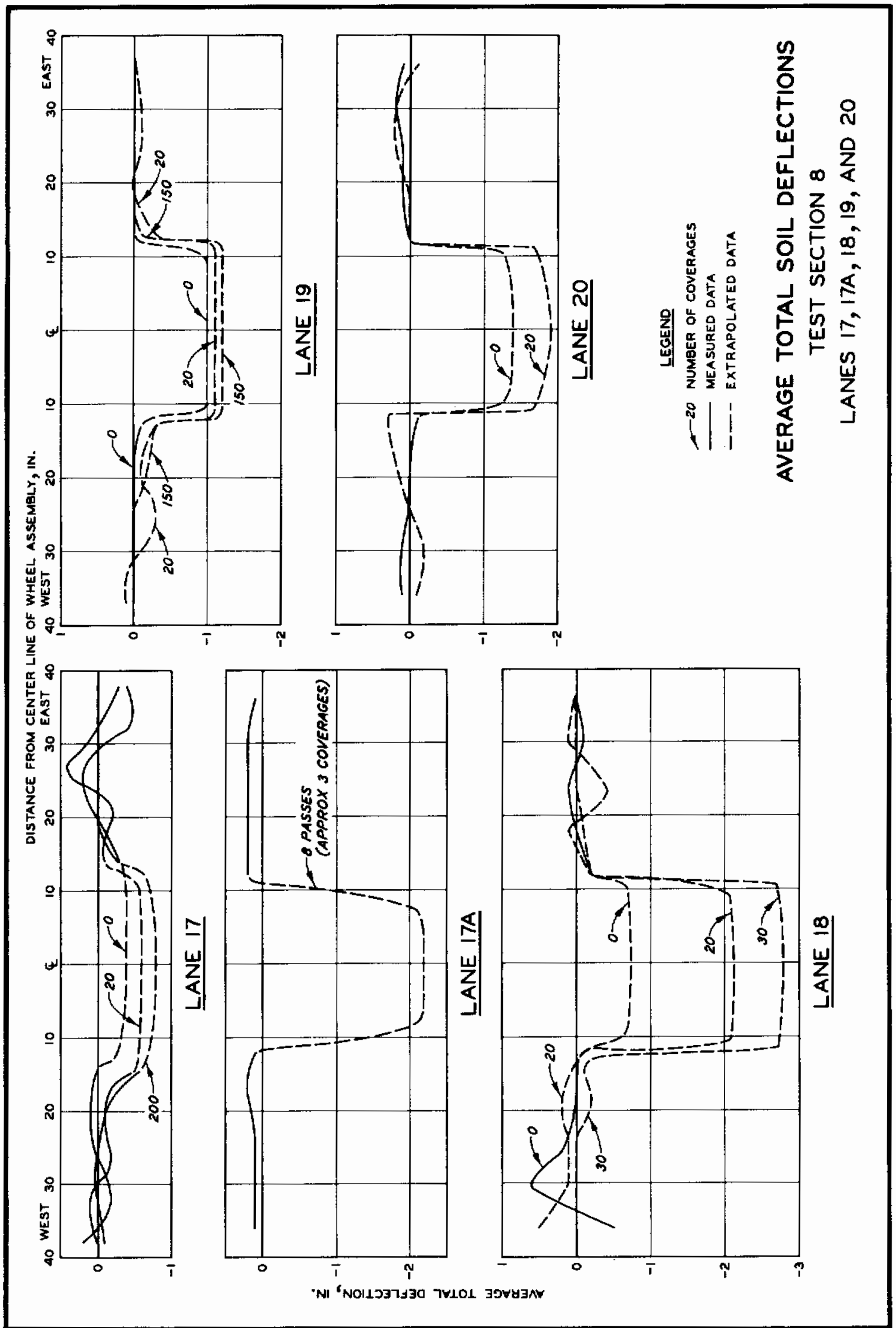

PERMANENT PROFILE DEFORMATIONS
TEST SECTION 8
LANES 17, 17A, 18, 19, AND 20
LANE 17
LANE 17A
LANE 18
LANE 19
LANE 20
DISTANCE FROM STA 0+00, FT
DEFORMATION, IN.
8 PASSES (APPROX 3 COVERAGES)
LEGEND
20 NUMBER OF COVERAGES
NOTE: ALL PROFILES WERE TAKEN DOWN LANE CENTER LINE.

Figure 15



AVERAGE TOTAL SOIL DEFLECTIONS
TEST SECTION 8
LANES 17, 17A, 18, 19, AND 20
LEGEND
20 NUMBER OF COVERAGES
MEASURED DATA
EXTRAPOLATED DATA
DISTANCE FROM CENTER LINE OF WHEEL ASSEMBLY, IN.
WEST
EAST
AVERAGE TOTAL DEFLECTION, IN.
LANE 17
LANE 17A
LANE 18
LANE 19
LANE 20
8 PASSES
(APPROX 3 COVERAGES)

Figure 16

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Security Classification

DOCUMENT CONTROL DATA - R&D

(Security classification of title, body of abstract and indexing annotation must be entered when the overall report is classified)

1. ORIGINATING ACTIVITY (Corporate author) U. S. Army Engineer Waterways Experiment Station	2a. REPORT SECURITY CLASSIFICATION UNCLASSIFIED 2b. GROUP

3. REPORT TITLE

Aircraft Ground-Flotation Investigation
Part IX Data Report on Test Section 8

4. DESCRIPTIVE NOTES (Type of report and inclusive dates)

Final Technical Report

5. AUTHOR(S) (Last name, first name, initial)

Rutledge, A. H.
Hill, W. J., Jr.

6. REPORT DATE	7a. TOTAL NO. OF PAGES	7b. NO. OF REFS
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b. PROJECT NO. 410A	
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d.	

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11. SUPPLEMENTARY NOTES	12. SPONSORING MILITARY ACTIVITY Air Force Flight Dynamics Laboratory Research and Technology Division AF Systems Command, WPAFB, Ohio

13. ABSTRACT

This data report describes the results of work undertaken as part of an overall program to develop ground-flotation criteria for the C-5A aircraft.

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14. KEY WORDS	LINK A		LINK B		LINK C	
	ROLE	WT	ROLE	WT	ROLE	WT
Aircraft Ground Flotation						
Rolling Resistance						
Rear Area Airfields						
Support Area Airfields						
Forward Area Airfields						
Vehicle Mobility						

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