Errata Sheet

STUDY OF CHANNELIZED TRAFFIC

TECHNICAL MEMORANDUM NO. 3-426, FEBRUARY 1956

Plates 1, 2, and 3. Change the numbers on the graphic scales in the title blocks from 50, 0, 50, and 100 ft to 500, 0, 500, and 1000 ft.

CORPS OF ENGINEERS, U. S. ARMY

STUDY OF CHANNELIZED TRAFFIC

TECHNICAL MEMORANDUM NO. 3-426

CONDUCTED FOR

OFFICE OF THE CHIEF OF ENGINEERS

AIRFIELDS BRANCH

ENGINEERING DIVISION

MILITARY CONSTRUCTION

BY

WATERWAYS EXPERIMENT STATION

VICKSBURG, MISSISSIPPI

ARMY-MRC VICKSBURG, MISS.

FEBRUARY 1956

Preface

This report presents the results of a traffic survey performed at Lake Charles, Pinecastle, and MacDill Air Force Bases. The investigation was authorized by the Chief of Engineers in identical letters to the Division Engineer, Ohio River Division, Cincinnati, Ohio, and the Director, Waterways Experiment Station, Vicksburg, Mississippi, dated 21 January 1955, subject "Traffic Characteristics of the B-47 and B-52 Aircraft."

The investigation was accomplished by personnel from the Ohio River Division Laboratories and the Waterways Experiment Station during the period 7-27 March 1955. The team was composed of Mr. K. H. McKee, engineer, and Mr. C. R. Meloy, engineering aide, from the Ohio River Division Laboratories; and Mr. P. J. Vedros, engineer, and Mr. F. B. Gauthier, photographer, from the Waterways Experiment Station. Mr. J. F. Redus, engineer from the Waterways Experiment Station, accompanied the team to Lake Charles Air Force Base and assisted in the study the first two days. The team was assisted by the following officers of the Strategic Air Command: Major Garrison and Major Stewart, Lake Charles Air Force Base; Colonel Fuller, Colonel Bone, and Major Lovett, Pinecastle Air Force Base; and Colonel Lucich, Captain Huntington, and Captain Greene, MacDill Air Force Base.

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Summary

The design of many contemporary aircraft, layout of base facilities, and operational characteristics of planes necessitate movements of these aircraft along prescribed paths. Undesirable effects on pavements have been observed at a number of places under this type of traffic from B-47 planes. A survey was conducted at four B-47 bases to provide information on the following items:

a. Location of areas of channelization.

b. Distribution of traffic in channelized areas.

c. Volume of traffic.

The survey showed that channelization was greatest on the straightaway portions of taxiways and apron taxilanes. Traffic was channelized to a lesser extent at curves and at runway (take-off) ends. The distribution plots showed that about 75 per cent of the B-47 traffic on the straightaways of taxiways fell in a lane 7.5 ft wide. The majority of the take-offs at most of the fields were made in a width of about 30 ft at runway ends. The volume of traffic on main taxiways of two-wing bases may be expected to average about 5000 coverages per year.

During the survey sufficient data were collected for KC-97 planes to indicate that channelization occurred with these aircraft on the straightaways of the main taxiways and apron taxilanes. The distribution in these areas was about the same as for the B-47 planes.

STUDY OF CHANNELIZED TRAFFIC

Introduction

1. Design of many contemporary aircraft, layout of base facilities, and operational characteristics of planes necessitate movements of these aircraft along prescribed paths. These paths are clearly marked with painted stripes, and the planes follow the painted lines during taxiing as closely as possible. The result of this type of operation is that the traffic is "channelized" in a narrow path. The major portion of the undesirable effects (rutting and grooving of the pavements) of channelized traffic has been noted at B-47 bases. This survey was conducted to study the occurrence of channelized traffic and the distribution of the traffic in the channelized areas.

2. Specifically, the survey was planned to provide information on the following items:

a. Location of areas of channelization.

b. Distribution of traffic in channelized areas.

c. Volume of traffic.

Survey

Location

3. Lake Charles, Pinecastle, and MacDill Air Force Bases were selected for the survey because of the layout of facilities and types of operation. These bases are used by both B-47 and KC-97 planes and since the KC-97 aircraft travel in channelized paths also, data for these planes were obtained. There were no fields where there was extensive operation of B-52 aircraft. Plates 1, 2, and 3 are vicinity maps and layouts of pavements at the three bases. Locations of the painted taxi stripes are also shown on the plates. Results of a condition survey performed on the runway at Lockbourne AFB by the Ohio River Division

Laboratories in August 1955 are included as additional information to that obtained in this survey.

Methods

4. The survey consisted of visual observations to record the areas of channelization and photographic records to measure the distribution of traffic. Traffic records from the three bases, supplemented by available records from other bases, were used to estimate the anticipated volume of traffic. The photographic procedures are described below.

5. Movie cameras were placed at strategic locations along straightaways and curves as shown on plates 1, 2, and 3 and trained to photograph the relative position of the pavement stripes and the landing gear of the aircraft during taxiing operations. The cameras were placed on stands to provide sufficient elevation and were generally operated at 8 frames per sec while the plane was in the immediate vicinity. Transverse reference lines were painted across the taxi stripes at strategic locations (fig. 1). These lines were broken at 1-ft intervals so that lateral distribution could be determined. Subsequently, the movie film was projected by individual frames and the distribution of the landing gear at specific reference lines was scaled from the projected image.

6. The following table lists the camera positions, reference lines, type of pavement (curve or straightaway), and number of planes observed at each location.

Photograph 1. Transverse reference lines used to determine position of wheels

Base	Camera Position No.	Ref Line No.	Type of Pavement	No. of Plane Movements B-47	KC-97
Lake Charles	1	1	Curve	45	--
		2	Straightaway	57	--
		3	Curve	56	--
	2	-	Curve	--	--
	3	-	Curve	--	--
	4	-	Straightaway	6	--
	5	-	Straightaway	6	--
Pinecastle	1	1	Straightaway	6	--
		2	Straightaway	5	2
		3	Curve	6	2
		4	Curve	11	2
	2	1	Straightaway	9	--
		2	Curve	8	--
		3	Curve	5	--
	3	1	Straightaway	7	--
		2	Straightaway	7	--
		3	Straightaway	7	--
		4	Curve	6	--
		5	Curve	5	--
MacDill	1	1	Curve	53	29
		2	Straightaway	57	30
		3	Straightaway	56	28
	2	1	Straightaway	12	6
		2	Straightaway	12	6
		3	Straightaway	12	6
		4	Curve	12	6
		5	Curve	12	6
	3	1	Straightaway	24	21
		2	Straightaway	21	21
		3	Straightaway	21	21
		4	Curve	21	21
	4	1	Curve	7	14
		2	Straightaway	7	14
		3	Curve	7	8

A preliminary analysis of the data from all locations showed that the results were highly repetitious and only typical selected data are presented herein. Plate 4 shows the distribution of B-47 traffic along straightaways and plate 5 shows distribution along three selected curved sections. Plates 6 and 7 show traffic distribution for KC-97's for similar locations. The locations from which data were used for each distribution plot are shown on the plates.

Analysis and Discussion

Location of areas of channelization

7. The traffic of both the B-47 and the KC-97 aircraft was observed during the full cycle of operations which included taxiing for take-off, take-offs, landings, and movement following landing. On landing the B-47 aircraft generally taxied to the refueling areas and then were towed to the parking areas. Travel from parking areas to maintenance docks was also observed.

8. Taxiing. The observations showed that the painted stripes control the channelization of the aircraft during taxiing or while it is being towed. Some restriction on wandering of the aircraft is necessary when taxiing or being towed on aprons because of the proximity of parked planes. Some restriction may be necessary on 75-ft-wide taxiways because the outrigger wheels of the B-47 or main landing gear of the KC-97 might be damaged by hitting taxiway lights or running off the pavement. The outrigger wheels on the B-47 are approximately 38 ft outside to outside so that it is necessary to operate the aircraft with its center line remaining in the central 37 ft of the taxiway. The main gears on the KC-97 are approximately 31 ft outside to outside so that less restriction is needed for this aircraft.

9. It was noted that the aircraft are operated to ride the stripe very closely on straightaways, which produces a high degree of channelization. Some wandering occurs as the aircraft approaches and turns into intersecting taxiways, runways, or aprons. It was found that in approximately 90 per cent of the cases at right-angle intersections of runways and 75-ft taxiways, the traffic was highly channelized at a distance of 75 ft from the end of the fillet. On flatter curves or wider pavements, the distance was greater, reaching a maximum of about 125 ft (plate 8).

10. Take-off and landing. From observations it was noted that planes ready for take-off were moved out onto the runway and aligned for take-off. Take-off position was within the central 30 ft of the runway (laterally) and was within 200 ft of the end of the runway. No specific spot was used repeatedly; therefore, operation of the aircraft from the

taxiway to the take-off position did not produce channelization approaching the degree noted on the straightaways on the taxiways.

11. A condition survey made on a runway end at Lockbourne AFB showed that a section two slabs wide and about 500 ft long failed from overload by B-47 planes and had to be replaced. Although two slab widths had to be replaced, it is probable that the whole 50 ft was not intensely trafficked. The length of 500 ft is significant in showing that on take-off the full effects of the loading are not felt beyond this point because of the uplift.

12. Fig. 2 is a photograph which was taken from the juncture between the rigid and flexible pavements on the runway at Pinecastle AFB. At the joint the flexible pavement was 1-2 in. lower than the rigid pavement causing "porpoising" of the B-47 aircraft on take-off. The "bird-baths" shown in the picture have been caused by bouncing of the planes. The depressions are restricted to an area about 20 ft wide in the center of the runway.

13. Inspection of tire marks made by landing planes showed that the major portion of the planes touch down in the central third of the runway (laterally) and within a distance of 700-2000 ft from the end of the runway. The marks were fairly well distributed, indicating no channelization at touchdown. After the touchdown the aircraft is slowed and generally operates in a taxiing condition for about one-third the length of the runway (slightly more for KC-97's). Operations during this portion of the landing did not follow stripes and there was no indication of channelization.

14. Summation. In summary, the observations indicate that the areas of highest channelization are on the straightaways on taxiways and on taxilanes on aprons. Slightly less channelization occurs at right-angle curves, and still less at fairly flat curves. At some of the fields channelization on the runway, in a width of about 30 ft, was noted on take-offs at runway ends. These observations are in agreement with reported grooving resulting from channelized traffic.

Lateral distribution of traffic

15. Taxiways. Observations and preliminary examination of the data showed that traffic could be divided into two general areas with

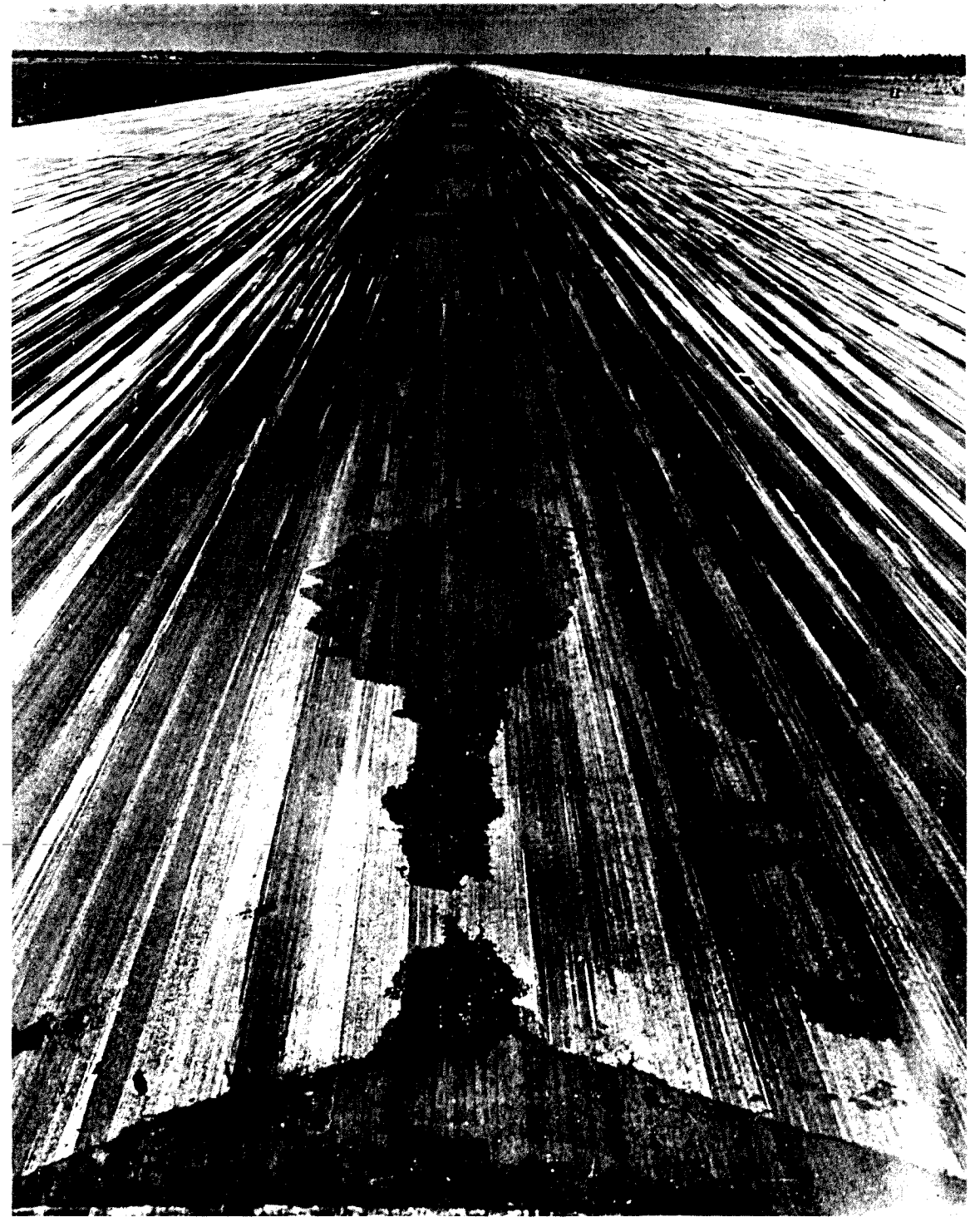


Fig. 2. Effects of concentration of traffic in the central 20 ft of runway at Pinecastle AFB

respect to lateral distribution, for analytical purposes: one, the straightaway portions of the taxiways where the traffic was highly channelized, and the other, the curved parts or intersections where the traffic was distributed over a wider path. The following analysis is based on data obtained from main taxiways, but is applicable to any portion of the taxiway or apron system where it is necessary for planes to follow a definite line.

16. The results of 314 observations of the distribution of B-47 planes on taxiway straightaways are shown on plate 4. In the plot on the left the distribution of each wheel of a dual assembly over the central portion of the taxiway is shown by the two dashed lines, and the distribution of the entire assembly by the heavy solid line. The right-hand graph shows a cumulative plot of the distribution starting at a point about 10 ft from the center line. The cumulative curve shows that about 75 per cent of the traffic falls into a lane about 7.5 ft wide, spaced symmetrically about the center line.

17. Plate 5 shows the distribution of B-47 traffic at three typical curves or intersections. The top plot represents a location where traffic is moving from a rather wide area into a taxiway of normal width. The average amount of turn is about 50 deg. The middle plot is from a location where traffic is moving from a taxiway about 125 ft wide, through a wide intersection, and into an old 150-ft-wide runway. The bottom plot represents conditions at a 90-deg curve on a typical taxiway. An analysis of the top plot discloses that channelization in this area reached about the same concentration as that on the straightaways. The middle plot shows a rather even distribution over a width of about 20 ft, and the bottom graph indicates an even distribution over about 15 ft.

18. Frequency distributions of KC-97 traffic on straightaways are shown on plate 6; plots for curved locations are shown on plate 7. The channelization on the straightaways is almost the same as that for B-47's (plate 4) with about 75 per cent falling in a width of about 8 ft. The two graphs on plate 7 show data for the KC-97 at two of the locations shown on plate 5 for the B-47. The plot for position 1 at MacDill shows that there is a tendency toward channelization with 50 per cent of the

traffic falling in a path about 8 ft wide. However, it will be noted that this distribution is based on only 29 observations and it is possible that additional data would show a distribution more like that plotted for the B-47 on plate 5. The plot for position 3 is based on only 21 observations and is indicative of the general trend. The data for the wide intersection at position 1 indicate a generally wide distribution (75 per cent in 19 ft) with some evidences of concentration; the data for the normal 90-deg turn at position 3 indicate a rather uniform, wide distribution (75 per cent in about 13 ft).

19. Runways. The photographic procedure of measuring lateral distribution of traffic could not be applied to runways because the cameras would have interfered with landing operations. However, visual observations of plane positions at the time of take-off, blast effects of B-47 motors, and pavement conditions provide information on the lateral position of B-47 planes at take-off. Longitudinal lines are painted on most runways at a distance of 15 ft on either side of the center line. It was observed at Lake Charles and Pinecastle that the take-offs were made from between these lines. The runway at MacDill was wider than the others and the distribution was found to be wider. Blast effects substantiated these observations. As discussed previously the Lockbourne data indicated that the most intensive loading was over a width of less than 50 ft. Fig. 2 (taken at Pinecastle) indicated a concentration of traffic in the central 20 ft. No such concentration was observed during taxiing after landing.

Volume of traffic

20. Information as to the volume of B-47 traffic at the three fields visited was limited because long-term records were not available at the fields. The available information is tabulated below. In addition, available data on traffic at other bases are also listed. The information from March AFB and Davis-Monthan AFB was obtained from failure reports prepared by the Los Angeles District. Insufficient KC-97 traffic data were available for use in this analysis. A cycle of operation is considered to consist of one take-off and one landing.

B-47 Traffic Record

Base	Record Period	Months	Cycles in Period	Indicated Cycles per Year
Lake Charles	July 1953-Feb 1955	8.0	1,616	2,420
Pinecastle	Jan-Mar 1955	3.0	2,184	8,736
MacDill	1-25 Mar 1955	0.83	335	4,850
March	Mar-May 1954	3.0	1,785*	7,140
Davis-Monthan	Mar-Aug 1954	6.0	2,016	4,032
Lockbourne	Jan 1953-July 1955	31.0	12,586	4,872
Brize Norton	Mar-Aug 1954	6.0	2,189	4,378
Upper Heyford	Mar-Nov 1954	9.0	692**	925
Fairford	Apr-Oct 1954	7.0	4,132	7,080

* The report gives this figure as the aircraft using a main taxiway. Layout of the field is such that aircraft would normally use this taxiway either to move out for take-off or to return from landing; therefore, this figure is believed to also represent total cycles at the field.

** Not typical because of maintenance periods throughout the year.

21. The bases listed above are nominally two-wing bases having 90 B-47 aircraft as a full complement. A third wing was stationed at MacDill during the period of observation, and it was noted that operations at Pinecastle were at a slowed rate during the period of observation. For this reason, generalization as to the traffic that can be anticipated may be more reliable than the figures listed in the table. Assuming 90 aircraft and the highest figure in the table for cycles per month (for Pinecastle), the average number of cycles per plane per week is 1.87. Two cycles per plane per week would result in 9360 cycles per year.

22. The figures listed in the preceding tabulation do not include touch-and-go landings except for the figures for Davis-Monthan and possibly March. The failure report states that the figures for March are for the aircraft using a main taxiway. If actual counts were made, then touch-and-go landings are excluded, but if records from the control tower were used to estimate aircraft using the taxiway, then the figures probably include touch-and-go landings.

23. Actual volume of taxiing traffic is difficult to approximate from available information, but it appears that an upper limiting value would be in the order of 20,000 operations per year (operation is used instead of cycle to refer to movement from parking position through take-off, flight, landing, and back to parking). A figure of 10,000 per year would probably be conservative since none of the fields listed in the table received cycles of this magnitude.

24. Traffic on specific pavements will vary with the layout of the field, and at any one field will vary with the wind direction if more than one runway is used. Generally, B-47 traffic is concentrated largely on one runway and the field layouts are such that the main taxiways receive one movement of plane either as it goes out to take-off or as it returns from landing.

25. Observations of the movements of planes on aprons showed that the volume of traffic varied considerably over the area, but that the apron could be divided into sections of various amounts by studying the layout. The main taxilane and the area around fuel pits normally receive about the same volume of traffic as main taxiways. After refueling, the planes disperse to their respective parking locations and the amount of traffic decreases rapidly with distance from the pits. Movements of planes to maintenance docks and wash racks are few compared to areas of high intensity and, consequently, are of minor consideration in analyzing volume of traffic. However, it is possible in special cases where the layout is such that the planes retrace their paths to and from the fuel pits that the access lane to the pits will receive twice as many cycles as applied to the main taxiways.

26. The traffic distribution curves for B-47 aircraft discussed previously showed that on taxiway and taxilane straightaways about 75 per cent of the traffic occurred in a width of 7.5 ft. Tire contact width for the B-47 tire averages 13.2 in. Assuming uniform distribution of traffic across the 7.5-ft center of a main taxiway, cycles of operation for a one-runway field can be converted to coverages on the taxiway as follows:

$$\text{Coverages} = \text{cycles} \frac{(0.75 \times 4 \times 13.2)}{(7.5 \times 12)} = \text{cycles} \times 0.44 .$$

Applying this formula to the indicated cycles of operation (10,000 average maximum per year; 20,000 extreme limiting value) gives 4,400 and 8,800 coverages per year. A figure of 5,000 is believed to be a reasonable estimate of the maximum that can be anticipated.

Significant Findings

27. The foregoing analysis is believed to form an adequate basis for the following statements concerning traffic of B-47 planes:

a. Channelized traffic occurs on the straightaway portion of taxiways and on apron taxilanes and to a lesser extent at flat curves, intersections, and runway ends.

b. Traffic is not channelized at curves and intersections where the curve or intersection has an angle of about 45 deg or more.

c. There is a tendency toward channelization of traffic on runway ends on take-off, but on landing the traffic is more widely distributed.

d. On straightaway portions of taxiways and taxilanes, traffic is channelized within a 16-ft-wide lane; 75 per cent of the traffic occurs within a 7.5-ft-wide lane.

e. The area of channelization extends to within 75 ft of the ends of fillets on 75-ft taxiways and to within about 125 ft of the ends of fillets on 100-ft taxiways.

f. Traffic distribution on runways can be generalized as follows: Take-offs are started in the central 30-50 ft laterally and at various points longitudinally within 200-500 ft of the end of the runways. Channelization occurs on take-off in about the central 20 ft on some fields. Touchdowns for landings generally occur in the central third of the runway laterally and between 700 and 2000 ft from the end of the runway. The plane, on landing, is usually operated under taxiing condition for the final third of the runway, but there is no tendency toward channelization of traffic.

g. Average coverages that can be anticipated on main taxiways at two-wing bases appear to be about 5000 per year.

28. Items a through e of the previous paragraph apply to KC-97 planes as well as B-47's.

NORTH TAXIWAY SYSTEM
(PORTIONS OF ORIGINAL CONSTRUCTION NOT SCHEDULED FOR OVERLAY OR REMOVAL)

8"-6"-8" P.C.C.

NO. 1

17" UNIFORM P.C.C.

16" UNIFORM P.C.C.

NW-SE RUNWAY

16" UNIFORM P.C.C.

17" UNIFORM P.C.C.

17" UNIFORM P.C.C.

SEE DETAIL A

TAXIWAY NO. 1

TAXIWAY NO. 2
(17" UNIFORM P.C.C.)

TAXIWAY NO. 3
(17" UNIFORM P.C.C.)

TAXIWAY NO. 4
(17" UNIFORM P.C.C.)
(NOT STRIPED)

WARM-UP APRON

8"-6"-8" P.C.C.

OLD PAVEMENT - TO REMAIN

NO. 2

NW-SE TAXIWAY

17" UNIFORM P.C.C.

NO. 5

NO. 4

NO. 3

8"-6"-8" P.C.C.

PARKING AROUND PERIMETER

FUTURE APRON

TAXIWAY CLOSED NO. 5

REFUELING AREA

KC-97 PARKING APRON
17" UNIFORM P.C.C.

B-47 PARKING

B-47 PARKING

B-47 PARKING

B-47 PARKING

100' WIDE

50' ROADWAY

8"-6"-8" E-W PARKING AREA P.C.C.

TO BE OVERLAYED AT FUTURE DATE

N

CAMERA POSITION NO. 1

RUNWAY

450'

180'

180'

LINE 1

LINE 2

LINE 3

DETAIL A
POSITION NO. 1

LEGEND

INDICATES TRAFFIC IN EITHER DIRECTION ON A TAXI STRIPE

CAMERA POSITION

VICINITY MAP

Sam Houston SP

Houston River

Calcasieu River

WESTLAKE

SULPHUR

LAKE CHARLES

MAPLEWOOD

IOWA

Lake Charles Air Force Base

HOLMWOOD

Intracoastal Waterway

GRAND LAKE

MAGNOLIA BEACH

Calcasieu Lake

N

SCALE OF MILES

LAKE CHARLES AIR FORCE BASE
LAKE CHARLES, LOUISIANA

TRAFFIC AND PARKING PATTERN

SCALE : 50 0 50 100 FT

OHIO RIVER DIVISION LABORATORIES, MARIEMONT, OHIO

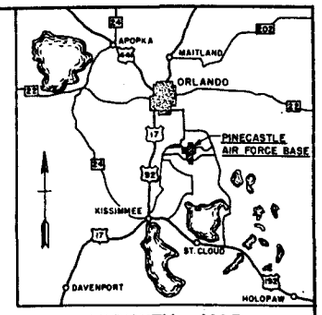
DRAWN BY:
TRACED BY:
CHECKED BY:

MARCH 1955

FILE NO. V2-13-38-1

080455-A

PLATE 1



VICINITY MAP

SCALE IN MILES

TAXIWAY NO. 11

CLOSED

NW-SE RUNWAY

TAXIWAY NO. 10

NO. 1

SEE DETAIL A

APRON "A"

TAXIWAY NO. 1

EAST N-S RUNWAY

RUNWAY

TAXIWAY NO. 2

TAXIWAY NO. 3

APRON "G"

TAXIWAY NO. 12

TAXIWAY NO. 12

TAXIWAY NO. 8

B-47 PARKING

B-47 PARKING

B-47 PARKING

NO. 3

SEE DETAIL C

TAXIWAY NO. 4

NO. 2

SEE DETAIL B

TAXI STRIPE 7½' FROM EDGE OF PAVEMENT

WEST N-S RUNWAY

TAXIWAY NO. 6

TAXIWAY NO. 7

TAXIWAY NO. 13

TAXIWAY NO. 5

TAXIWAY NO. 5

TAXIWAY NO. 5

APRON "I"

NEW APRON

APRON "B"

NEW APRON

B-47 PARKING

APRON "D"

REFUELING AREA

APRON "E"

APRON "C"

CAMERA POSITION NO. 1

RUNWAY

LINE 4

LINE 3

LINE 2

LINE 1

100'

75'

75'

200'

200'

DETAIL A

POSITION NO. 1

CAMERA POSITION NO. 2

LINE 3

LINE 2

LINE 1

EDGE OF PCC

100'

150'

100'

100'

YELLOW STRIPE

DETAIL B

POSITION NO. 2

CAMERA POSITION NO. 3

EDGE OF PCC

25'

LINE 5

LINE 4

LINE 3

LINE 2

YELLOW STRIPE

100'

LINE 1

DETAIL C

POSITION NO. 3

LEGEND

INDICATES TRAFFIC IN EITHER DIRECTION ON A TAXI STRIPE

CAMERA POSITION

PINECASTLE AIR FORCE BASE
PINECASTLE, FLORIDA

TRAFFIC AND PARKING PATTERN

SCALE: 50 0 50 100 FEET

OHIO RIVER DIVISION LABORATORIES, MARIEMONT, OHIO

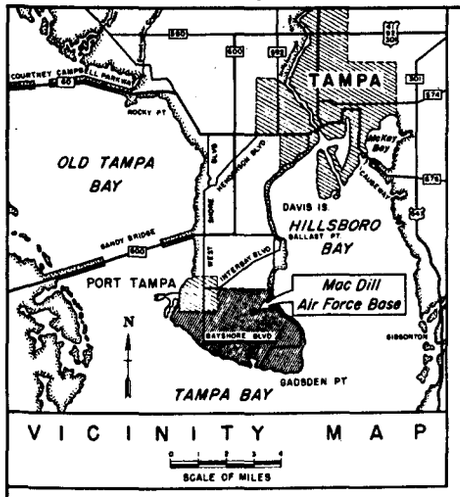
DRAWN BY: R. H. Walker
TRACED BY: Shirley Klatter
CHECKED BY: R. H. Walker

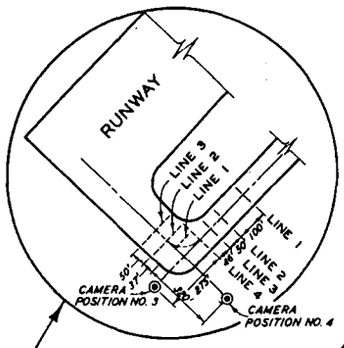
MARCH 1955

FILE NO. V2-13-40-1

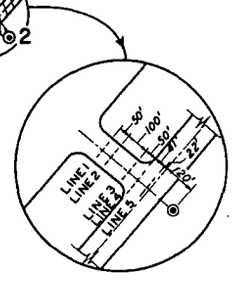
080455-B

PLATE 2





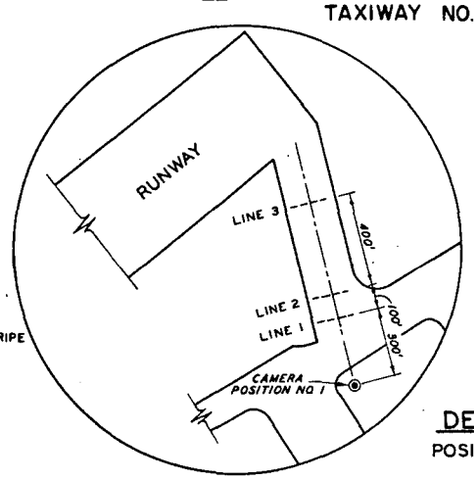
DETAIL A
POSITION NO. 3 & 4



DETAIL B
POSITION NO. 2

LEGEND

- P.C.C. – PORTLAND CEMENT CONCRETE
- – FLEXIBLE PAVEMENTS
- – BITUMINOUS CONCRETE OVERLAY OVER P.C. CONCRETE
- INDICATES TRAFFIC IN EITHER DIRECTION ON A TAXI STRIPE
- – CAMERA POSITION



DETAIL C
POSITION NO. 1

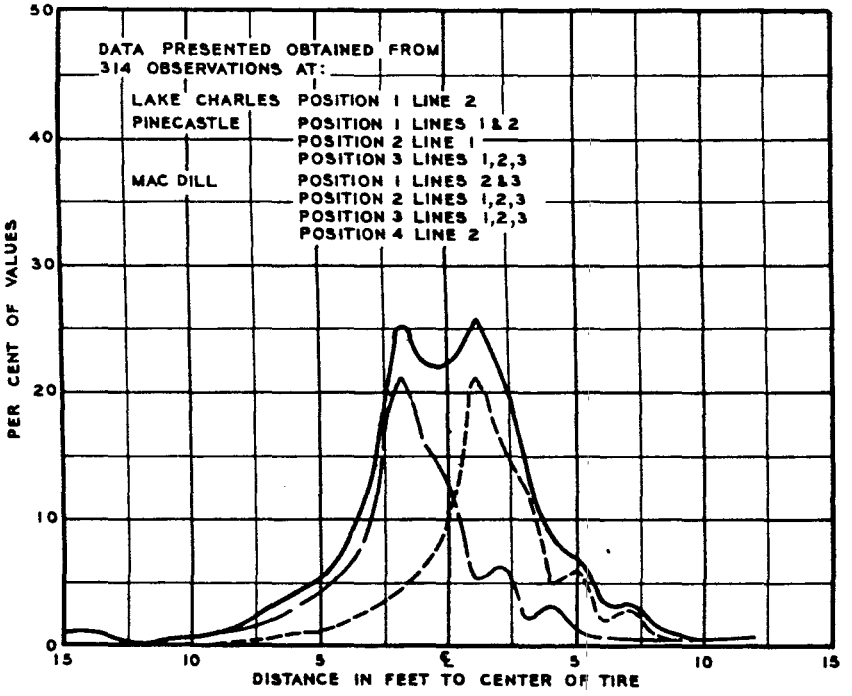
MAC DILL AIR FORCE BASE
TAMPA, FLORIDA
TRAFFIC AND PARKING PATTERN
SCALE: 500 0 500 1000 FT
OHIO RIVER DIVISION LABORATORIES, MARIEMONT, OHIO

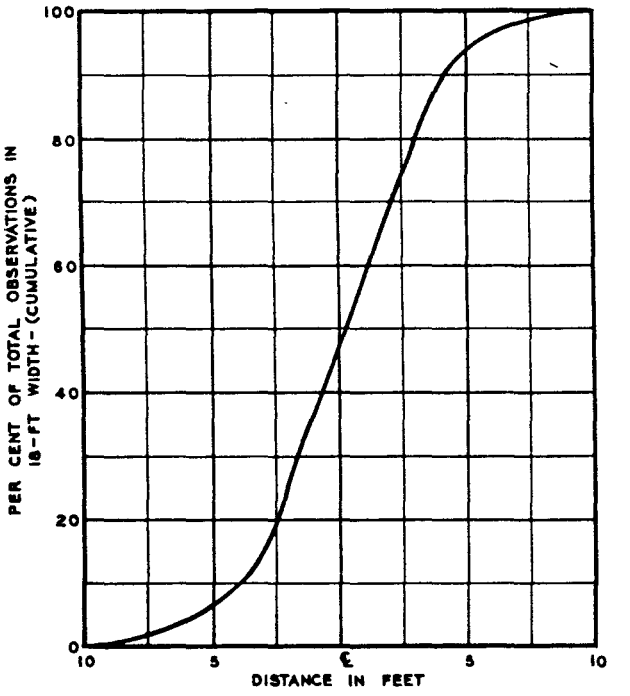
DRAWN BY:
TRACED BY: A.B.
CHECKED BY:

FILE NO. V2-13-39-1

080455-C

PLATE 3





LEGEND

RIGHT TIRE OF ASSEMBLY
LEFT TIRE OF ASSEMBLY
CUMULATIVE

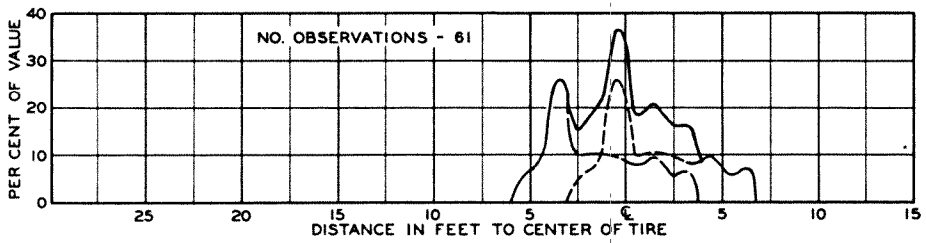
DISTRIBUTION OF TRAFFIC ALONG STRAIGHTAWAYS OF TAXIWAYS

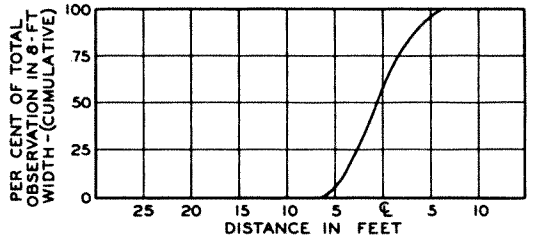
B-47 AIRCRAFT

080455-D

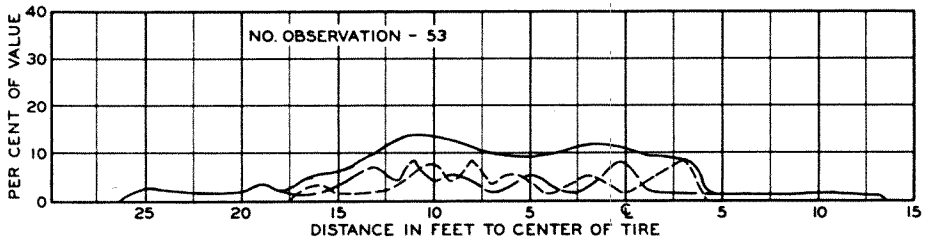
PLATE 4

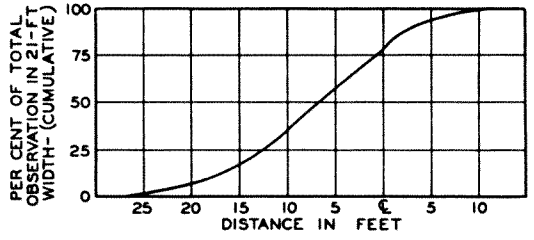
PLATE 5



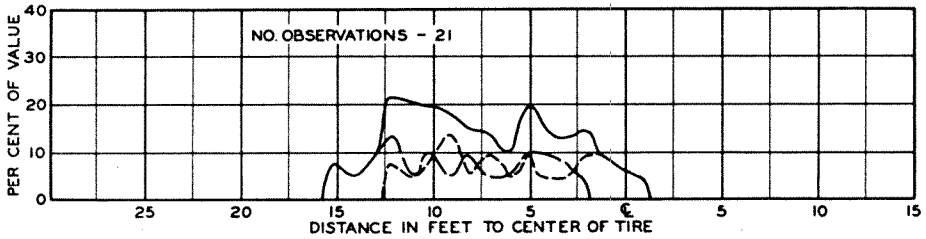


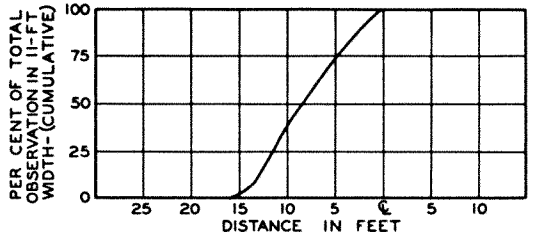
POSITION 1 - LINE 3 - LAKE CHARLES





POSITION 1 - LINE 1 - MACDILL





POSITION 3 - LINE 4 - MACDILL

LEGEND

RIGHT TIRE OF ASSEMBLY
LEFT TIRE OF ASSEMBLY
CUMULATIVE

DISTRIBUTION OF TRAFFIC IN TAXIWAY CURVES

B-47 AIRCRAFT

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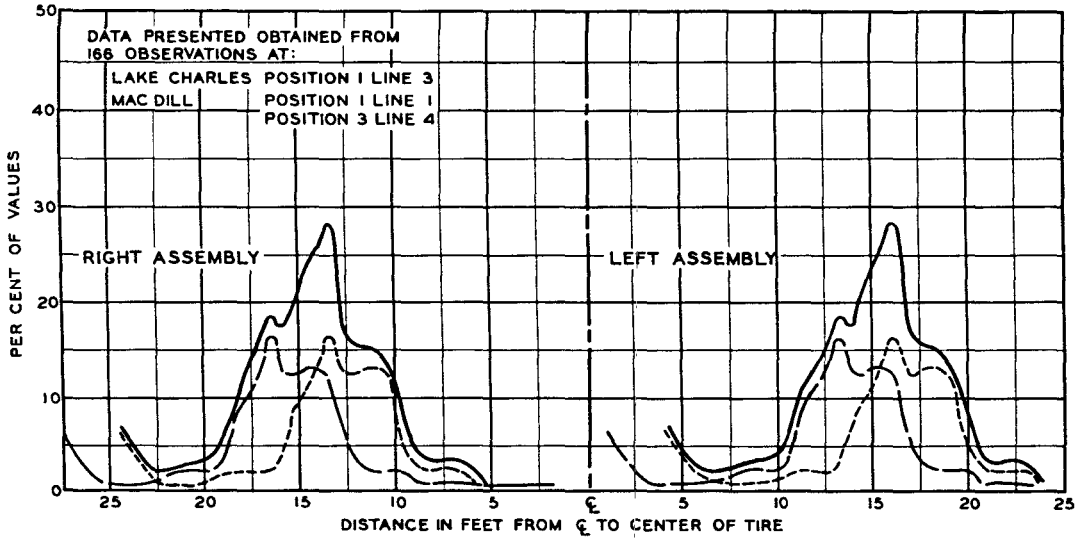

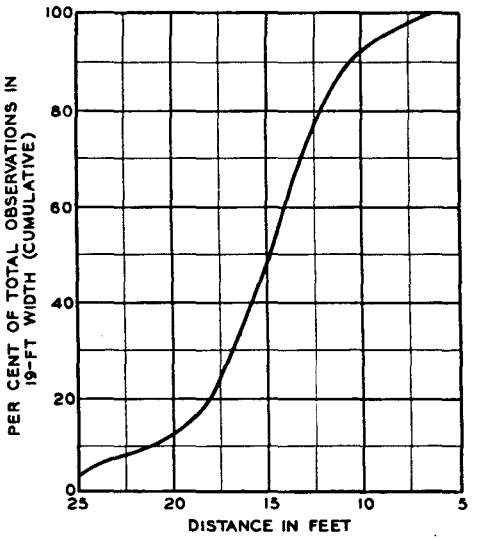

LEGEND

- RIGHT TIRE OF ASSEMBLY
- LEFT TIRE OF ASSEMBLY
- CUMULATIVE

DISTRIBUTION OF TRAFFIC ALONG STRAIGHTAWAYS OF TAXIWAYS

KC-97 AIRCRAFT

PLATE 6

080455-F