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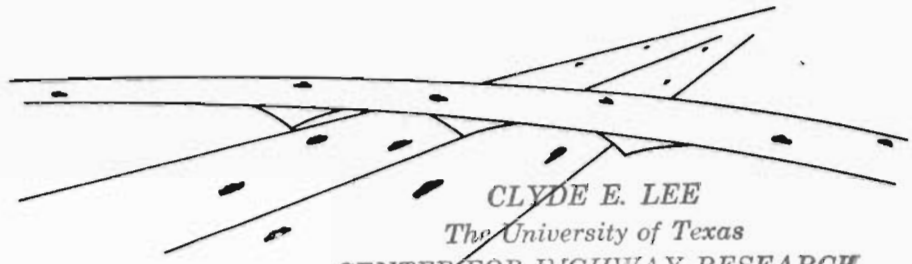

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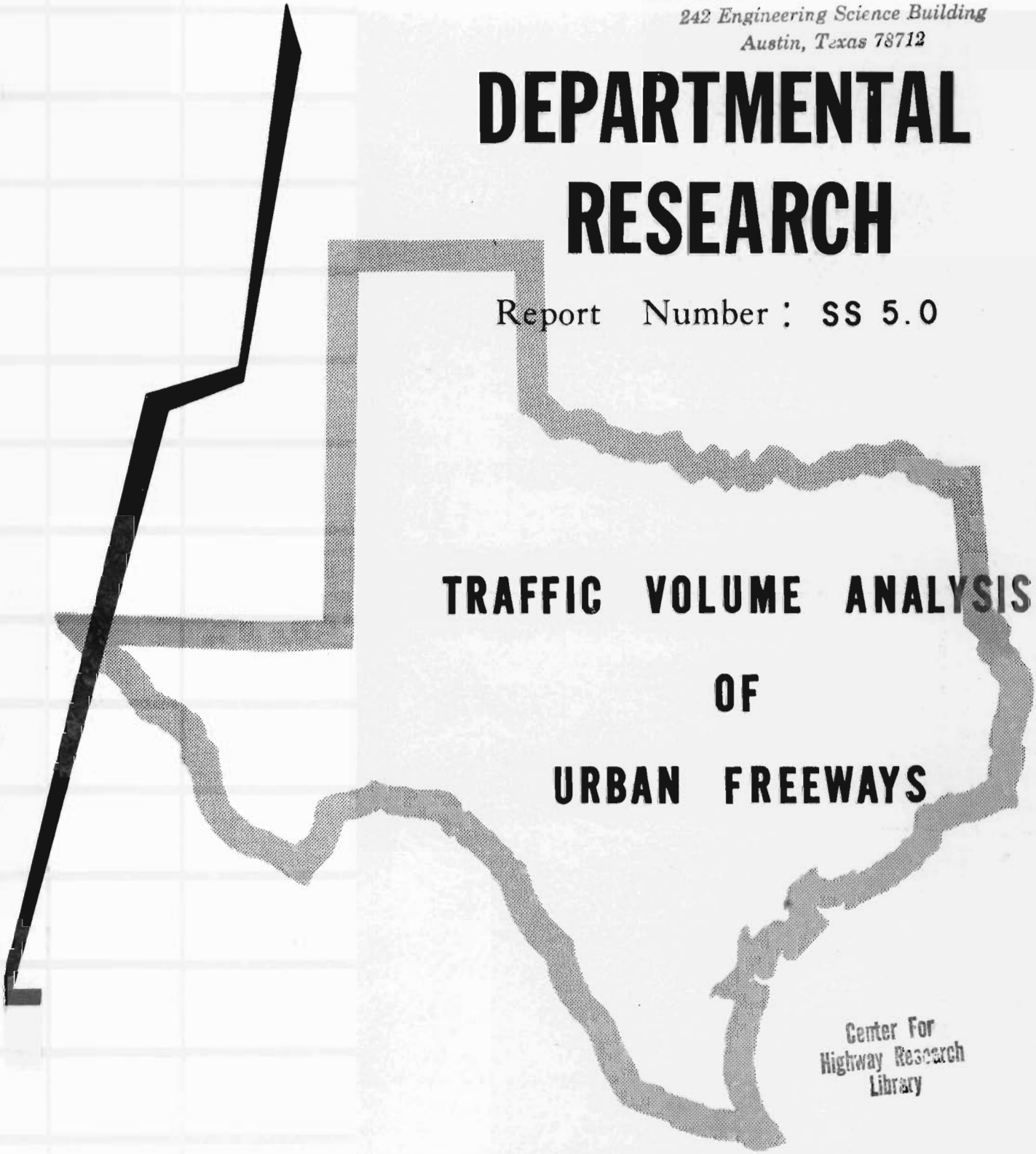

TRAFFIC VOLUME ANALYSIS OF URBAN FREEWAYS

TEXAS HIGHWAY DEPARTMENT

TRAFFIC VOLUME ANALYSIS OF URBAN FREEWAYS

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Texas Highway Department

In Cooperation With The

U.S. Department of Commerce, Bureau of Public Roads

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ACKNOWLEDGEMENTS

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CHAPTER I

INTRODUCTION

To properly design and to evaluate the traffic movement on any section of freeway, highway, or arterial street, it is necessary to determine a traffic volume for a number of specific periods of time. In urban areas these specific periods of time are generally of short duration. These short-time periods are peak periods ranging from about five minutes to about two hours. Also, it is necessary to know the 24-hour daily traffic volume that will occur during a given day on a given facility. The distribution of the traffic volume by lane is an important consideration in design. All of these characteristics should be ascertained in order to be able to carefully design and operate a facility.

In 1963 traffic volumes in 5-minute intervals were manually recorded at nineteen urban locations in six Texas cities. This 1963 data were analyzed and reported in "An Analysis of Peak Period Freeway Volume Characteristics."[1] In 1965 traffic volumes in 5-minute intervals were recorded with traffic actuated equipment at fifteen urban locations in six Texas cities. This study of the 1965 data was made to ascertain the reliability of the 1963 data to expand short-time peak volumes to volumes of longer time intervals. From the 1963 and 1965 data, a method to predict the peak hour volume in the inbound direction from the 24-hour traffic volume has been developed. The distribution by lane of the directional volumes for each 5-minute interval is graphically displayed.

The results of the analysis of the 1965 data generally show good correlation in the development of expansion factors for the locations under study. A statistically acceptable expansion factor has been determined and reported for various short-time peak volumes. These expansion factors

are very close to those developed from the 1963 data. Thus, over a two year period, the peak period volume characteristics of the urban freeways under study have followed a consistent pattern which can be described by various mathematical relationships.

CHAPTER II

DATA COLLECTION

The data for this research study were provided by the Planning Survey Division of the Texas Highway Department. Traffic actuated detectors were used at fifteen locations on controlled access facilities in Houston, San Antonio, Austin, Beaumont, Dallas, and Fort Worth. Figure 1 shows the location of these Texas cities.

All counts were taken during the five-day work week (Monday through Friday) in the summer of 1965. The counts were made for 5 minute intervals by direction and by lane at each location.

Location of the 5 minute count stations in the various cities are shown in Figures 2.A through 2.C. All of these stations were located on controlled access facilities where the number of lanes varied from four to ten.

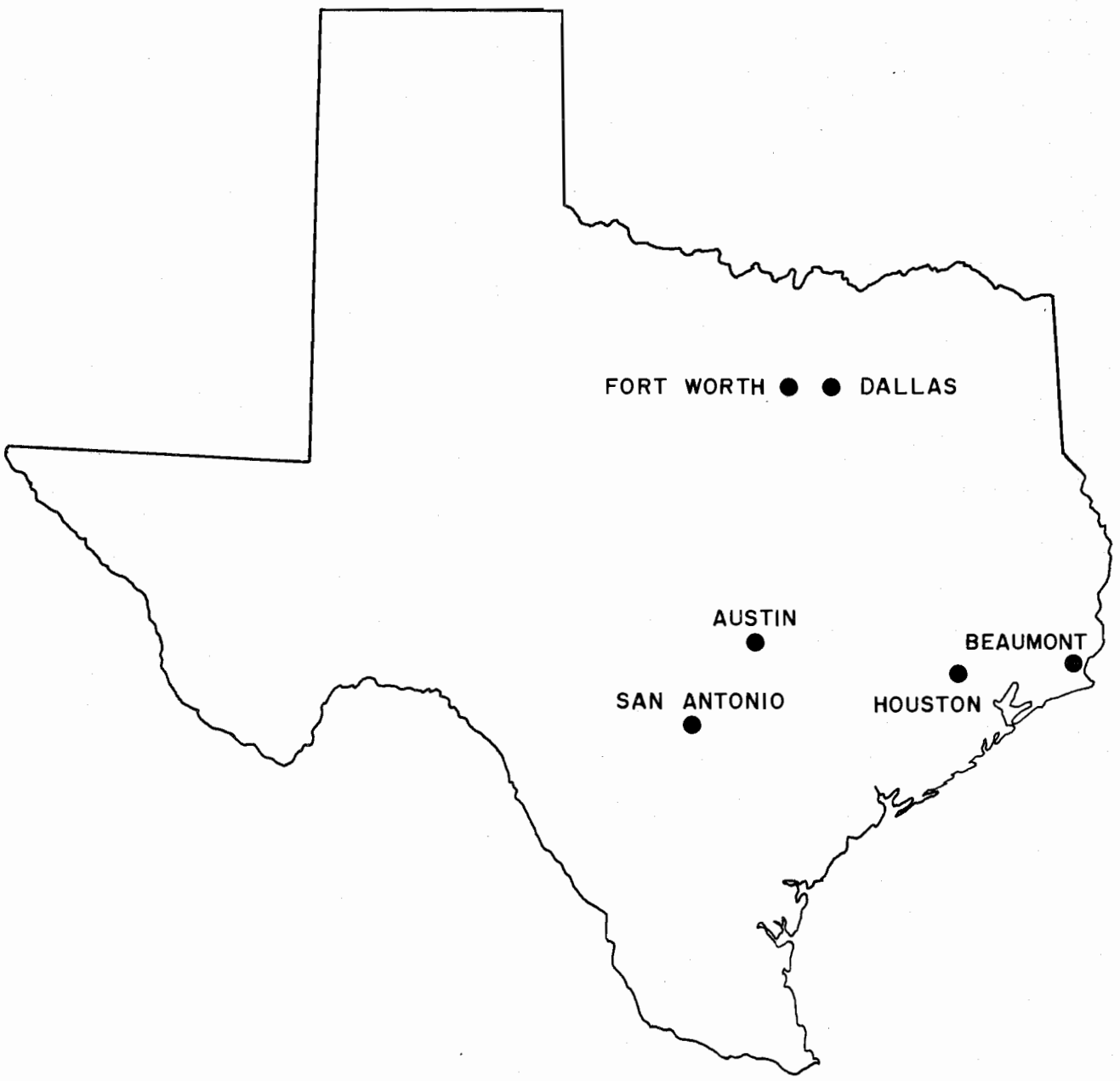
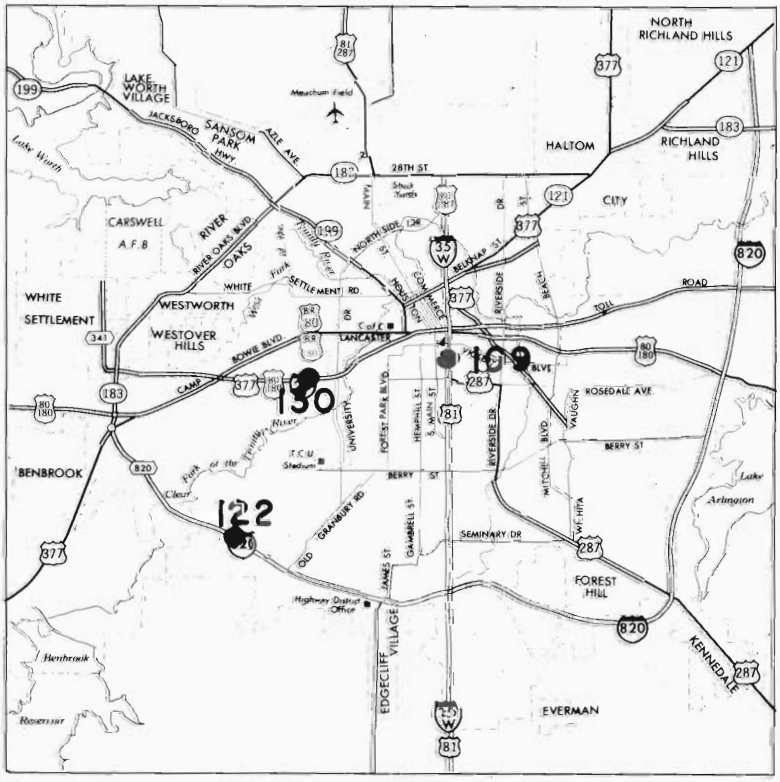


FIGURE 1

TEXAS CITIES IN WHICH FIVE MINUTE COUNTS WERE MADE IN 1963 AND 1965

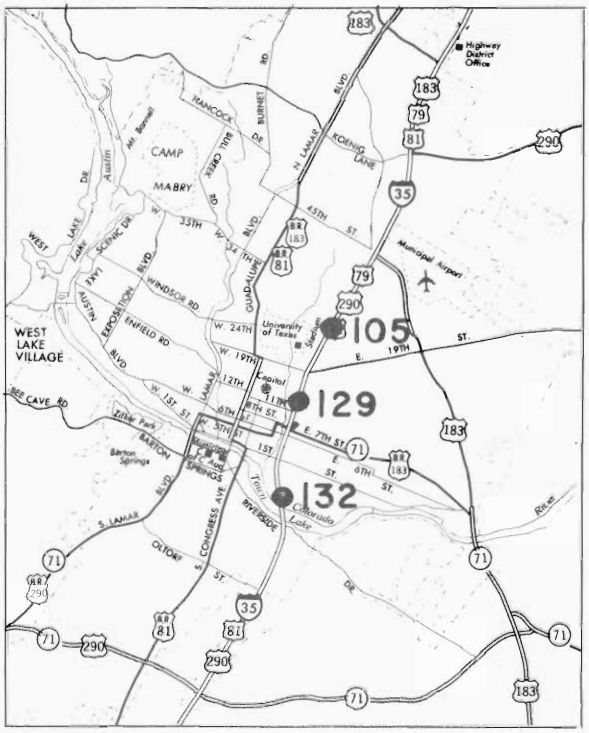
DALLAS



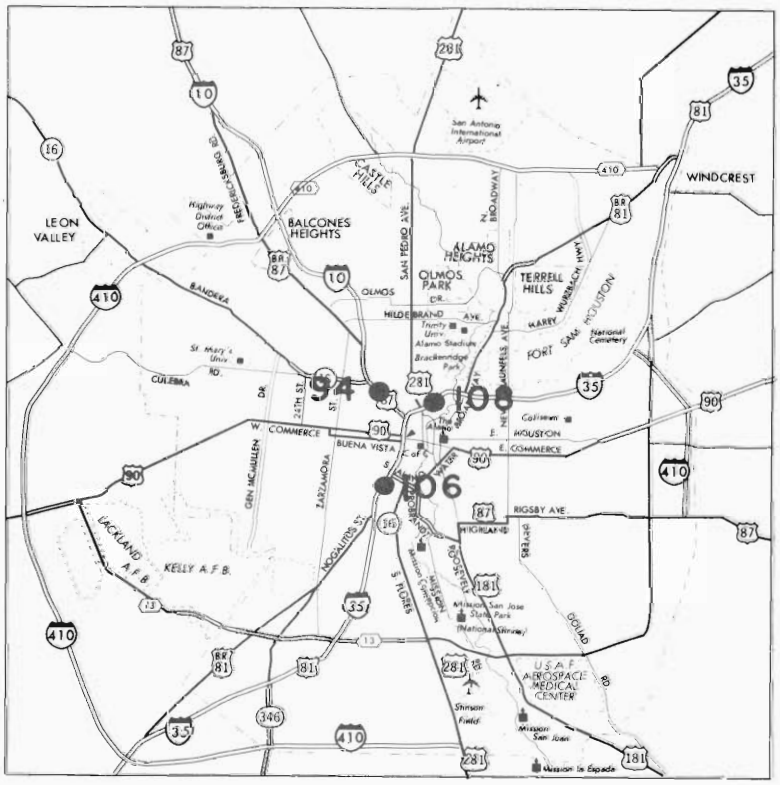
FORT WORTH

LOCATION OF INDIVIDUAL FIVE MINUTE COUNT STATIONS IN EACH CITY

FIGURE 2.A



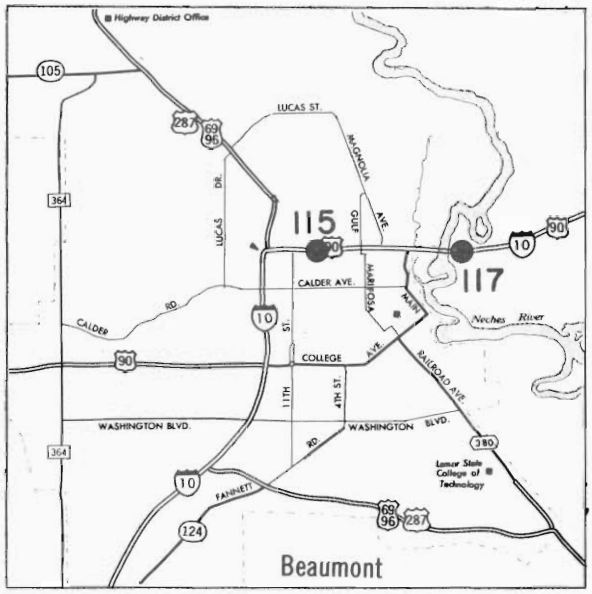
AUSTIN



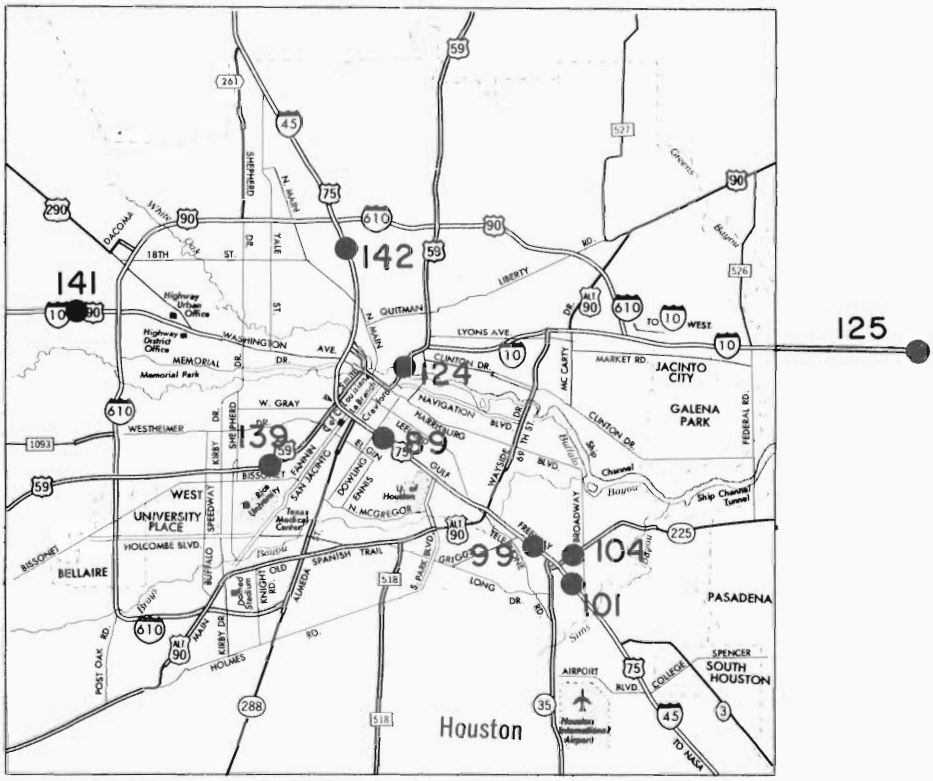
SAN ANTONIO

LOCATION OF INDIVIDUAL FIVE MINUTE COUNT STATIONS IN EACH CITY

FIGURE 2.B



BEAUMONT



HOUSTON

LOCATION OF INDIVIDUAL FIVE MINUTE COUNT STATIONS IN EACH CITY

FIGURE 2.C

CHAPTER III

CALCULATION PROCEDURE

In the analysis, the traffic volumes by lane for each 5-minute period during a 24-hour period in the inbound and outbound directions were utilized. This information from each station was coded onto data processing cards and electronic data processing equipment was used for the necessary calculations. The results of the calculations are shown in Appendix 1.

At each station, the peak 5-minute, peak 10-minute, peak 1-hour, peak 2-hour, and the total 24-hour volumes were determined. The beginning time of the occurrence of each of these peak periods was determined and is shown in Column (1) of the tabulations in Appendix 1. Each of these peaks was determined for the inbound and outbound directions, for the inbound A.M. and outbound A.M. directions, and for the inbound P.M. and outbound P.M. directions.

Approximately eleven determinations were made for each peak period selected for study. The volume during the peak period under consideration was determined and the opposing volume during this same period of time was computed. These two volumes are shown in Columns (2) and (3) respectively. These were added together to obtain the total volume for that peak period; the sum is shown in Column (4). The directional distribution, or split, is found in Column (5). The volume, Column (2), of each peak period was then divided by the total inbound 24-hour volume to obtain the values listed in Column (6). Column (7) shows the peak volume listed in Column (2) divided by the total outbound volume for the 24-hour period. Column (8) shows the peak volume listed in Column (2) divided by the total of the inbound and outbound volumes for the 24-hour period.

It was also desirable to determine the relationship of each of the

peak periods to the peak hour. Column (9) represents each peak volume divided by the volume of the peak hour in the inbound direction; whereas, Column (10) is the peak volume divided by the volume during the peak hour in the outbound direction. Column (11) shows the ratio of the peak volume to the volume in both directions during the inbound peak hour. The ratio of the peak volume to the volume in both directions recorded during the peak hour in the outbound direction is shown in Column (12).

Columns (2) through (12) represent the basic calculations that were made from the 5-minute count data. It was from these calculations for each of the fifteen count stations that the relationship of short-time counts to longer periods of time was determined for the 1965 data.

CHAPTER IV

TRAFFIC VOLUME RELATIONSHIPS ON URBAN FREEWAYS

Comprehensive traffic data from field studies are essential to engineering analysis for location and design. This fact is accepted by all design personnel in the highway field. The data presently considered to be essential are:

1. ADT - Average Daily Traffic
2. DHV - Design Hour Volume
3. K - Ratio of DHV to ADT
4. D - Percent of Traffic in Heavier Direction of flow
5. T - Percent Trucks During the Design Hour

The "K" factor generally varies from 12 to 14% for freeways in urban areas. The maximum hourly volumes in urban areas average from 1.2 to 1.4 times the thirtieth highest hourly volumes. The directional distribution or split (D) is generally accepted to be approximately 55 to 60% in urban areas, with a tendency toward 50% likely as the urban development becomes more concentrated. The "T" factor, or the percent of DHV made up of trucks in urban areas, is generally 3 to 7%.[2]

The DHV should be representative of the traffic flow expected for some future year. Inherent in any projection into the future are the possibilities of major changes that cannot be forecast; therefore, in order to have the best possible forecast one must utilize the best data and forecasting techniques available. This dictates that all basic data such as ADT, DHV, D and T must be as precise as practicable.

It should be noted that the thirtieth highest hour has been used in the past as the DHV for most facilities. In rural areas this has been accepted as a practical and reasonable approach. In large metropolitan areas, the use

of the thirtieth highest hour as the basis for design is considered an out dated practice by most authorities. The volume of vehicles using the facilities during peak demand periods in urban areas are of such magnitude that the use of the thirtieth highest hour as the Design Hourly Volume normally results in traffic congestion of considerable magnitude and duration. It has become apparent to those responsible for the design and regulation of urban traffic that a design volume other than the thirtieth highest hour volume is required to obtain a satisfactory level of service.

One approach to the derivation of a design volume is to study the existing characteristics of peak volumes existing in an area and from analysis of these studies determine a practical design volume. The selection of a design volume for an urban area should take into consideration the magnitude and duration of various peak periods, the financial status of participating agencies, and should be coordinated with planned improvements of other facilities in the area.

Perhaps the ideal approach to data collection for design studies would require maintaining continuous 365 day a-year count stations in all areas, with equipment capable of recording 5-minute volumes by lane and direction. Since this type of operation is not economically feasible, an acceptable substitute is needed. An investigation was made of the characteristics of various periods to determine a peak period of short duration that could be expanded to an acceptable volume of longer duration. Traffic volumes were manually recorded in 5 minute intervals on nineteen urban freeway locations in Texas in 1963. The result of the analysis of these data were reported in "An Analysis of Peak Period Freeway Volume Characteristics." [1]

Correlations by other agencies have related short-time count volumes to longer volumes of time intervals. Moskowitz and Newman of the California Division of Highways have shown the relationship of the peak 5-minutes to the

peak hour for different urban area sizes.[3] Drew and Keese of the Texas Transportation Institute show the relationship of the peak 2-hour period to the peak hour period for ninety-five studies in several states.[4]

Carll and Homburger of the University of California, Berkeley, have studied three facilities in California and have illustrated the relationship of the peak hour to the 24-hour volume. They have also made a 6-minute count and expressed this volume as a ratio to the 24-hour directional volume.[5]

The Bureau of Public Roads has stated that a 24-hour volume in an urban area on a weekday can be considered the same as the ADT with a ± 10% standard error of the estimate.[6] This concept expressed by the Bureau of Public Roads can be a valuable tool for estimating the ADT.

This study of traffic volumes recorded in 5-minute intervals in 1965 at fifteen urban locations in Texas is broken down into three areas of correlation, which are:

1. Volumes in the inbound direction
2. Volumes in the outbound direction
3. The combined volumes in both directions

A comparison of the 24-hour volume taken from the 5-minute counts to the calculated ADT, which was furnished by the Planning Survey Division of the Texas Highway Department, for each count station has been made.

The analysis of the 1965 5-minute count data has been performed to validate the reliability of the relationships developed from the 1963 5-minute count data that were reported in "An Analysis of Peak Period Freeway Volume Characteristics."[1] However, there are some additional relationships developed from the study of the 1965 5-minute count data.

Several traffic volumes and related characteristics of Texas urban

freeways are shown in Table 1. This table includes the data from the 1963 and 1965 5-minute count stations. It is noted that of the fifteen urban count stations in 1965, the traffic volume during the peak A.M. and P.M. hours exceeds the practical capacity at eight of the locations. In 1963 only at five locations of the nineteen count stations did the traffic volumes exceed the practical capacity of the facility during the peak hours. The beginning of the peak A.M. and P.M. hours remains approximately the same in 1965 as it was in 1963.

The percentage that the peak 5-minute volume is of the peak hour for the A.M. period ranges from 9.4 to 12.3% for the 1963 data and from 9.0 to 12.0% for the 1965 data. The percentage that the peak 5-minute volume is of the peak hour for the P.M. period ranges from 9.2 to 13.7% for the 1963 data and from 8.8 to 11.4% for the 1965 data. The percentage that the peak 5-minute volume is of the peak hour for the 1965 data is slightly less than this percentage for the 1963 data. As the practical capacity is exceeded during the peak hour, the percent that the 5-minute peak volume is of the peak hour should decrease because the 5-minute volume cannot increase due to capacity limitations.

The peak 5-minute rate of flow ("F") varies from approximately 1.2 for large metropolitan areas to 1.4 for the smaller cities. The rate of flow ("F") should decrease as the peak hour volume approaches practical capacity because the 5-minute volume cannot increase due to capacity limitations.

Table 2 shows the comparison of 24-hour volumes measured at the 5-minute count stations to the ADT calculated from data recorded at permanent count stations. Of the seventeen stations for which the ADT was available for 1963, the 24-hour volume calculated from the 5-minute manual counts deviated from the ADT by $\pm$ 10% or less at twelve stations. The calculated 24-hour

volume at two locations deviated 11.3 and 11.0% from the ADT. Of the ten stations for which the ADT was available for 1965, the 24-hour volume calculated from the 5-minute counts deviated from the ADT by ± 10% or less at seven stations. The calculated 24-hour volume at two locations deviated by 10.4 and 11.9%.

Table 1

Traffic Volumes and Facility Characteristics At The 1963 and 1965 Texas 5-Minute Count Locations

City	1960 Population In Thousands	Count Stations Number	Capacity Data A.M. & P.M. ** 1963	1965	1963	1965	Number of Lanes	Distance Count Station is From CBD in Miles	A.M. Peak Hour Begins 1963	1965	P.M. Peak Hour Begins 1963	1965	% 5 Min. Peak is of A.M. Peak Hour 1963	1965	% 5 Min. Peak is of P.M. Peak Hour 1963	1965	*AM "F" Factor 1963	1965	*PM "F" Factor 1963	1965
Austin	187	105	-	+	-	+	4	3	7:15	7:15	16:35	16:35	11.9	11.1	11.3	10.3	1.43	1.33	1.35	1.24
Austin	187	129	-		-		6	3	7:05		16:45		11.9		11.8		1.42		1.43	
Austin	187	132	-		-		6	3	7:05		16:35		11.9		13.7		1.43		1.64	
Beaumont	119	115	-	-	-	-	4	2	7:10	7:15	16:50	16:20	11.3	10.3	12.2	11.4	1.35	1.24	1.46	1.36
Beaumont	119	117	-		-		4	2	6:20		16:20		10.3		12.0		1.24		1.45	
San Antonio	642	94	+	+	+	+	4	2	7:00	7:10	16:40	16:55	10.3	9.0	9.4	9.8	1.24	1.08	1.13	1.18
San Antonio	642	106	+	+	+	+	4	2	6:50	6:55	16:40	16:35	10.8	9.7	9.8	9.4	1.29	1.17	1.17	1.12
San Antonio	642	108	-	-	-	-	4	2	7:10	7:05	16:30	16:35	10.1	9.8	11.1	9.4	1.20	1.18	1.33	1.13
Fort Worth	503	109	-	-	-	-	6	1	7:00	7:10	16:35	16:40	10.1	10.8	10.1	10.4	1.21	1.29	1.21	1.24
Fort Worth	503	122	-		-		4	6	6:55		16:55		11.8		12.8		1.41		1.53	
Fort Worth	503	130	-	+	-	+	4	3	7:10	7:15	16:35	16:40	10.6	12.0	11.1	10.1	1.27	1.44	1.33	1.21
Dallas	932	93	+	+	+	+	6	1	7:10	7:00	16:35	16:35	9.4	9.7	9.2	8.8	1.13	1.16	1.10	1.06
Dallas	932	126	-	-	-	-	10	3	7:20	7:15	16:35	16:45	9.6	9.2	9.5	9.4	1.15	1.10	1.14	1.12
Houston	1,140	89	+	+	+	+	6	1	6:50	7:00	16:25	16:10	10.5	9.2	9.9	9.2	1.26	1.10	1.19	1.10
Houston	1,140	99	+	+	+	+	6	5	6:35	6:35	17:00	16:25	10.4	9.7	9.7	9.0	1.25	1.17	1.16	1.08
Houston	1,140	101	-		-		6	6	7:30		16:35		12.3		9.2		1.47		1.10	
Houston	1,140	104	-		-		6	6	6:40		16:35		10.5		9.2		1.26		1.11	
Houston	1,140	124	-	-	-	-	6	1	7:00	6:25	16:35	16:35	9.6	9.3	10.7	9.3	1.16	1.12	1.29	1.11
Houston	1,140	125	-		-		4	18	6:40		17:00		11.8		11.3		1.42		1.36	
Houston	1,140	139		-		-	10	2		7:15		17:20		9.6		10.0		1.15		1.20
Houston	1,140	141		-		-	8	8		7:05		16:50		9.7		10.2		1.16		1.23
Houston	1,140	142		+		+	8	3		6:50		16:35		9.7		9.6		1.16		1.15

* "F" Factor determined as follows: $F = \frac{\text{Peak 5-Minute Volume} \times 12}{\text{Peak Hour Volume}}$

** A "+" indicates the peak hourly volume in the peak direction exceeds the practical capacity.
A "-" indicates the peak hourly volume in the peak direction is less than the practical capacity.

TABLE 2

COMPARISON OF 24-HOUR VOLUMES FROM 5-MINUTE COUNTS
TO AVERAGE DAILY TRAFFIC FROM PERMANENT TRAFFIC COUNTERS

Station	ADT From Permanent Counter Data		24-Hour Volume From 5-Minute Count Data		Difference (Vehicles)		Difference (%)	
	1963	1965	1963	1965	1963	1965	1963	1965
89	96,818	107,128	102,052	116,920	5,234	9,792	5.4	9.1
93	62,751	72,579	71,530	78,490	8,779	5,911	14.0	8.1
94	56,026	58,687	60,902	62,290	4,876	3,603	8.7	6.1
99	85,682*	92,440	88,078	100,515	2,396	8,075	2.8	8.7
101	**	**	56,265	**	____	____	___	___
104	**	**	30,463	**	____	____	___	___
105	36,370	**	39,253	46,825	2,883	____	7.9	___
106	44,627	49,323	46,905	55,170	2,278	5,847	5.1	11.9
108	37,798	40,578	42,063	44,805	4,265	4,227	11.3	10.4
109	54,807	58,889	58,328	63,185	3,521	4,296	6.4	7.3
115	23,881	30,078	24,532	33,085	651	3,007	2.7	10.0
117	19,129	**	22,111	**	2,982	____	15.6	____
122	9,979	**	12,128	**	2,149	____	21.5	____
124	40,666	42,312	40,485	43,475	-181	1,163	.4	2.7
125 Rural	6,599	**	7,165	**	566	____	8.6	___
126	56,527	72,797	61,847	83,385	5,320	10,588	9.4	14.5
129	34,302	**	33,156	**	-1,146	____	3.3	___
130	46,506	50,435	48,948	54,375	2,442	3,940	5.3	7.8
132	27,772	**	30,821	**	3,049	____	11.0	___

TABLE 2 (Continued)

Station	ADT From Permanent Counter Data		24-Hour Volume From 5-Minute Count Data		Difference (Vehicles)		Difference (%)	
	1963	1965	1963	1965	1963	1965	1963	1965
139	**	75,442	**	85,030	____	9,588	____	12.7
141	**	40,522	**	44,770	____	4,248	____	10.5
142	**	71,222	**	75,885	____	4,663	____	6.5

*1965 Data

** Data Not Available

CHAPTER V

TRAFFIC VOLUME DISTRIBUTION BY LANE ON URBAN FREEWAYS

Figures 3 through 32 represent the traffic volume distribution by lane at the fifteen 5-minute count locations in 1965. Each 5-minute volume for each lane was expanded to an hourly flow rate by multiplying each volume by 12.

The data on this subject is very meager and does not lend itself to very definite conclusions. The number of locations and the number of lanes at each location are as tabulated below:

Number of Freeway Lanes	Number of Locations Studied
4	6
6	5
8	2
10	2

In addition to the fact that the amount of data is small, it is evident that certain of the locations have been influenced by factors peculiar to that particular location. This, of course, further confirms the fact that lane distribution is extremely sensitive to location and a means, such as television surveillance, will be required to determine what can be expected as the freeway flow is influenced by various factors such as ramps, grades, etc.

However, several items are evident in this data which do justify comment. In general, the locations which represent relatively normal freeway flow tend to follow earlier conclusions along these lines.[7] This would be that the percent of traffic in the right hand lanes tends to be higher at low total volumes and that as the volume on the freeway increases, the percentage of traffic in the left hand lanes tends to increase to the point that a 35-35-30 distribution

will prevail at volumes in the vicinity of the design capacity of a six lane freeway. The traffic volumes on the eight and ten lane locations studied have not as yet reached capacity and at least two of these locations are definitely influenced by incomplete freeway connections near the point where the data was taken. The figures, however, do not show any decrease in traffic volumes on the fourth and fifth lanes as has been suspected by some authorities on freeway operation.

At this point, no attempt has been made to relate this data to the Level of Service concept advocated in the recently published Highway Capacity Manual.[8] As more data becomes available, however, it is our intention to determine what, if any application is possible here.

TRAFFIC VOLUME DISTRIBUTION BY LANE
ON URBAN FREEWAYS

TRAFFIC LANE ONE

TRAFFIC LANE TWO

TRAFFIC LANE THREE

TRAFFIC LANE FOUR

TRAFFIC LANE FIVE

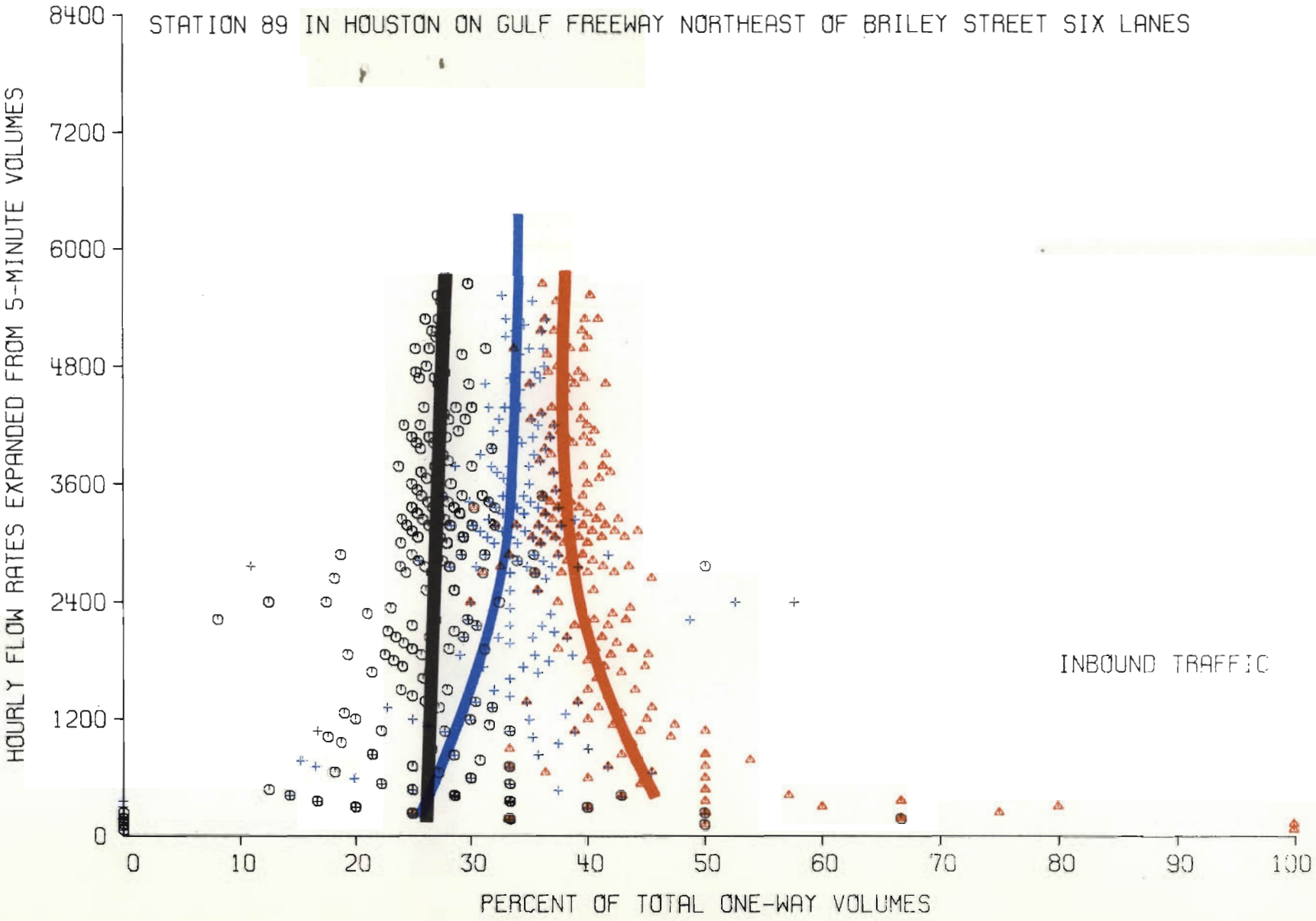


FIGURE 3

TRAFFIC VOLUME DISTRIBUTION BY LANE ON URBAN FREEWAYS

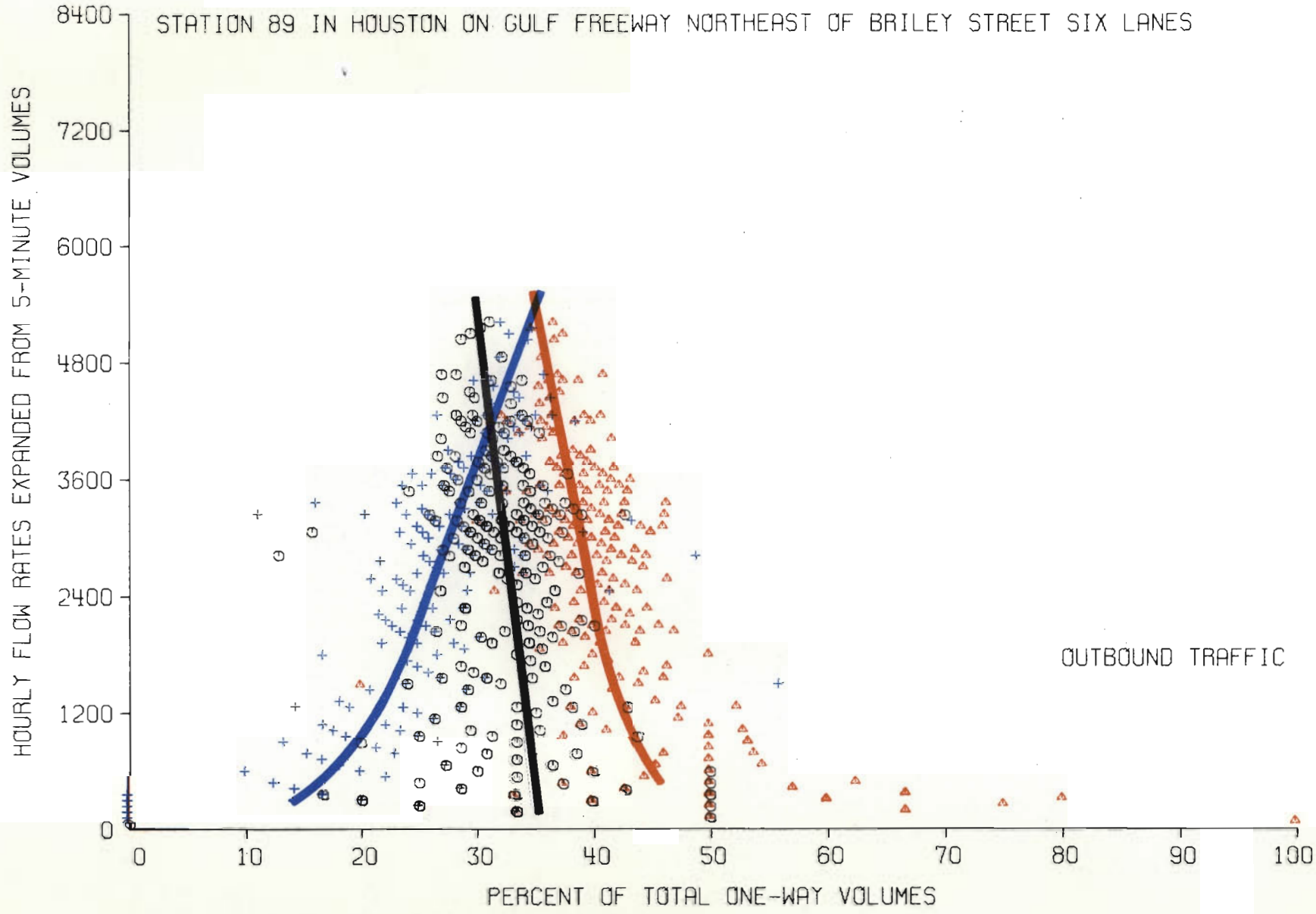


FIGURE 4

TRAFFIC VOLUME DISTRIBUTION BY LANE ON URBAN FREEWAYS

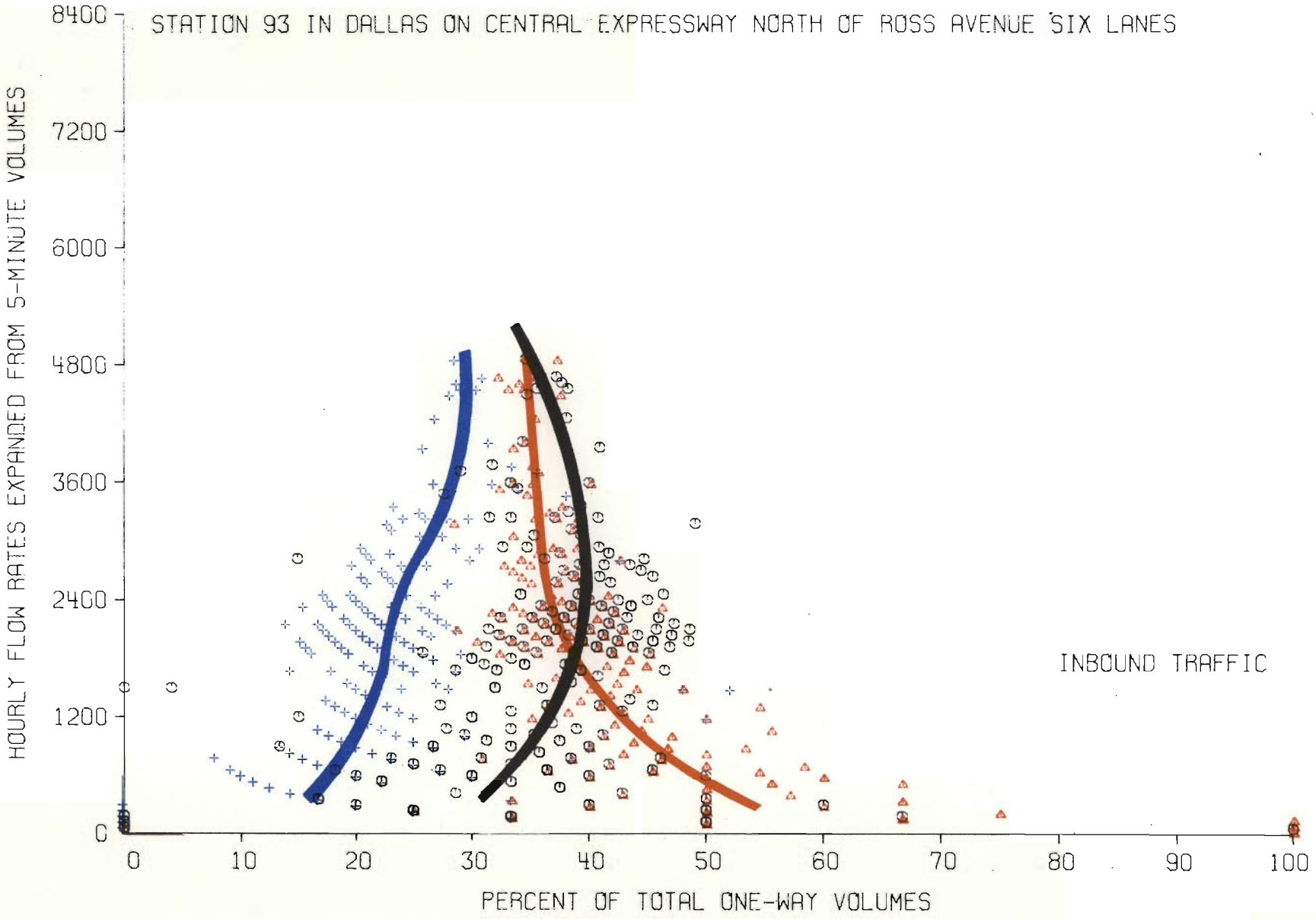


FIGURE 5

TRAFFIC VOLUME DISTRIBUTION BY LANE ON URBAN FREEWAYS

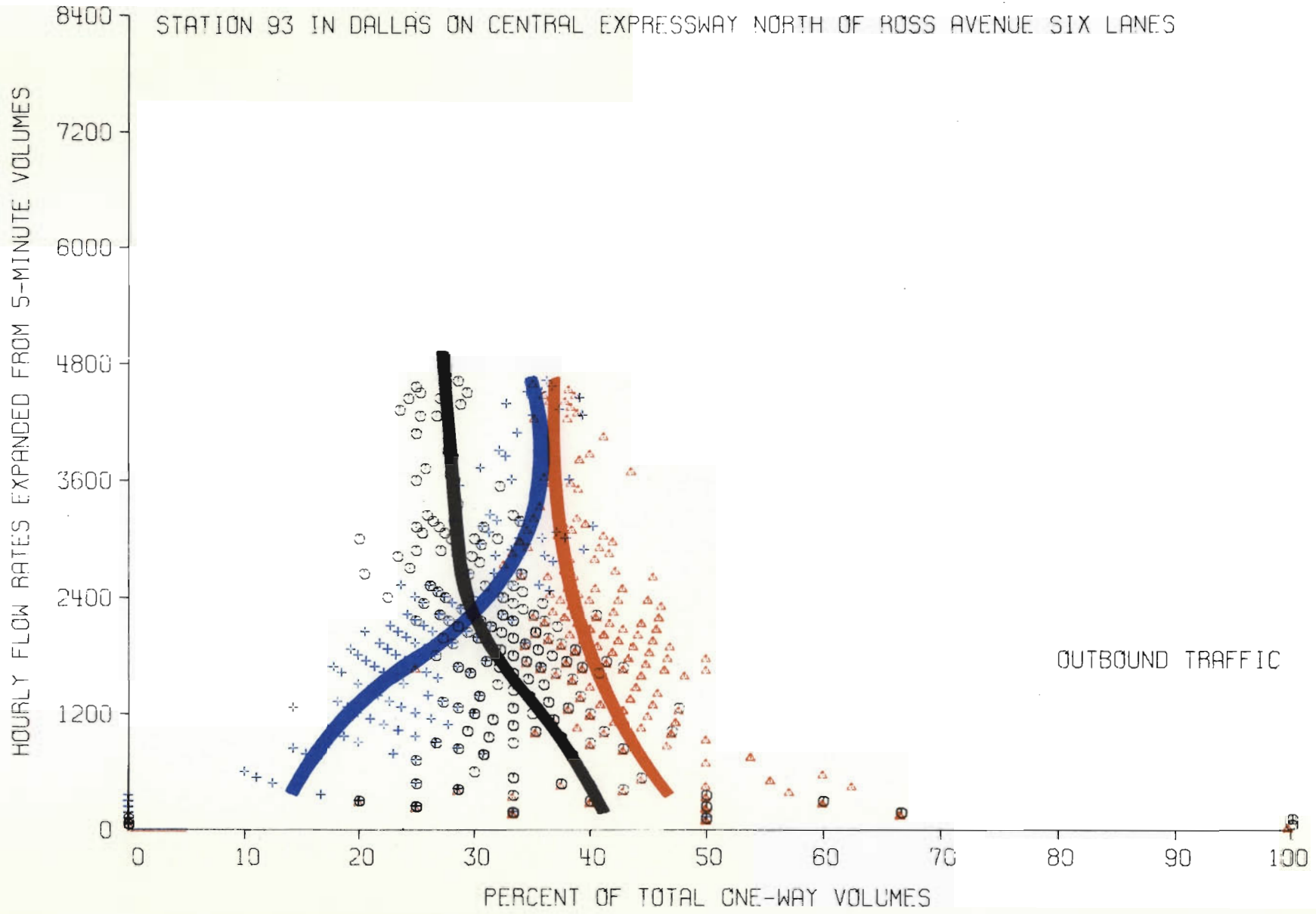


FIGURE 6

TRAFFIC VOLUME DISTRIBUTION BY LANE ON URBAN FREEWAYS

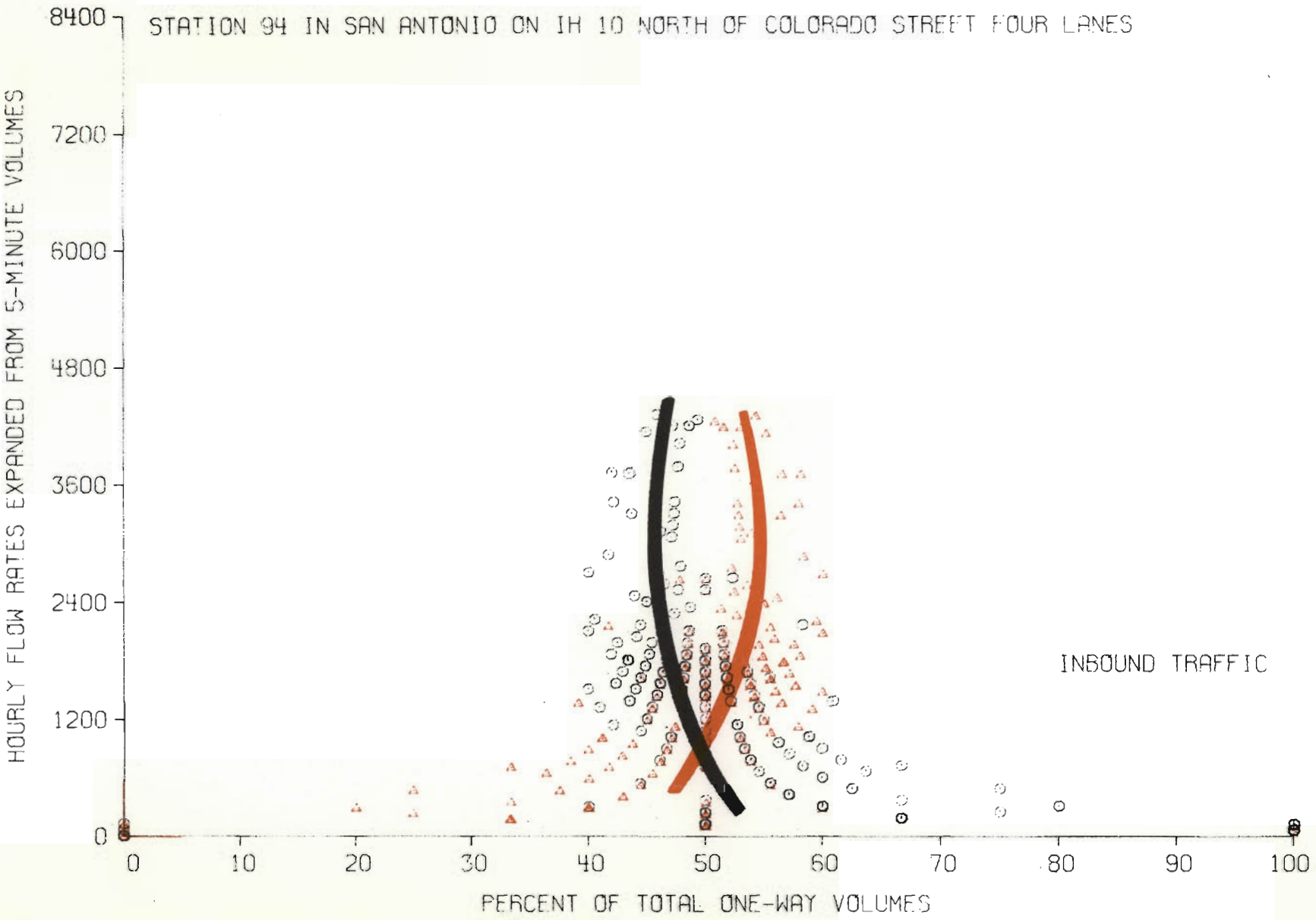


FIGURE 7

TRAFFIC VOLUME DISTRIBUTION BY LANE ON URBAN FREEWAYS

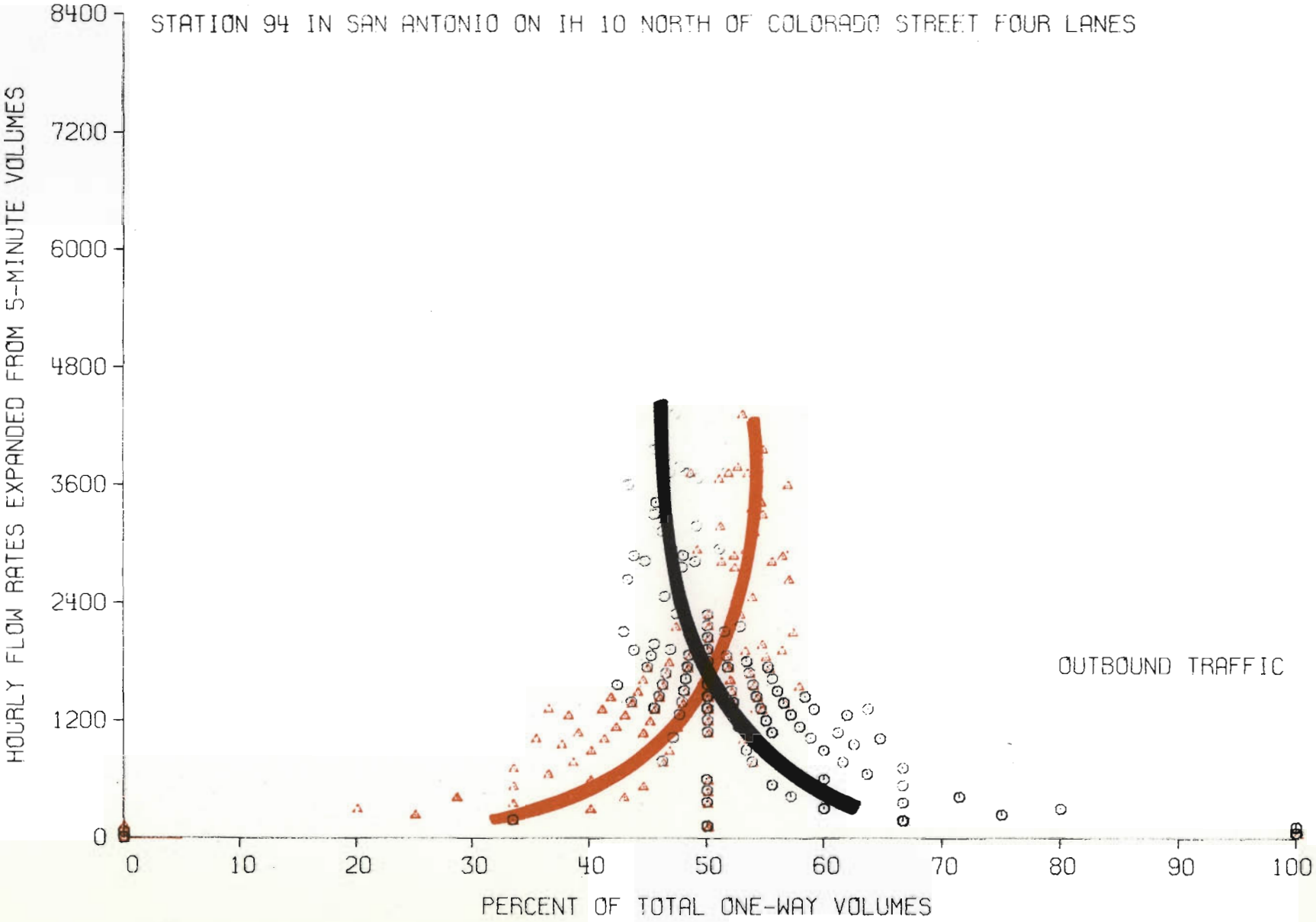


FIGURE 8

TRAFFIC VOLUME DISTRIBUTION BY LANE ON URBAN FREEWAYS

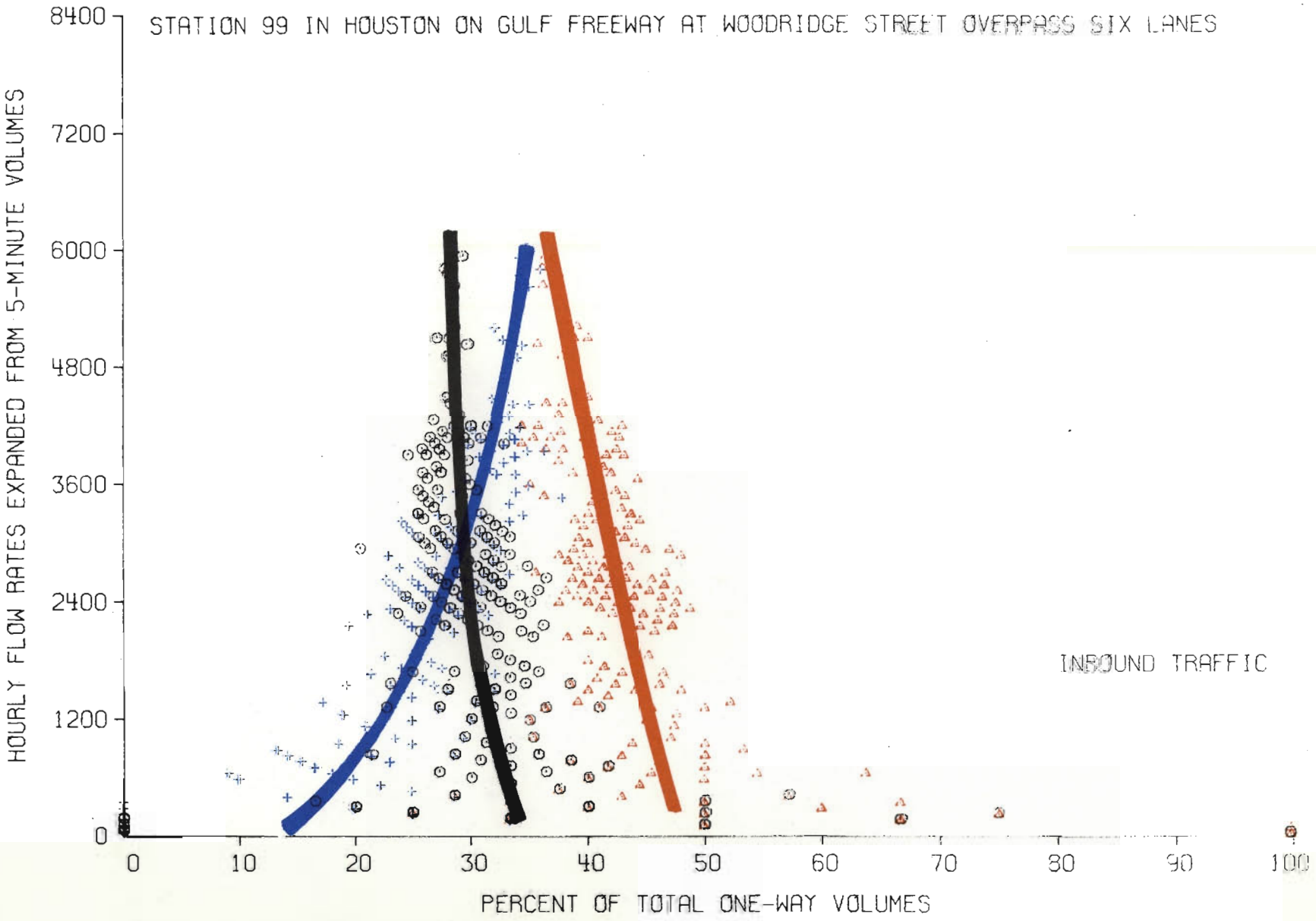


FIGURE 9

TRAFFIC VOLUME DISTRIBUTION BY LANE ON URBAN FREEWAYS

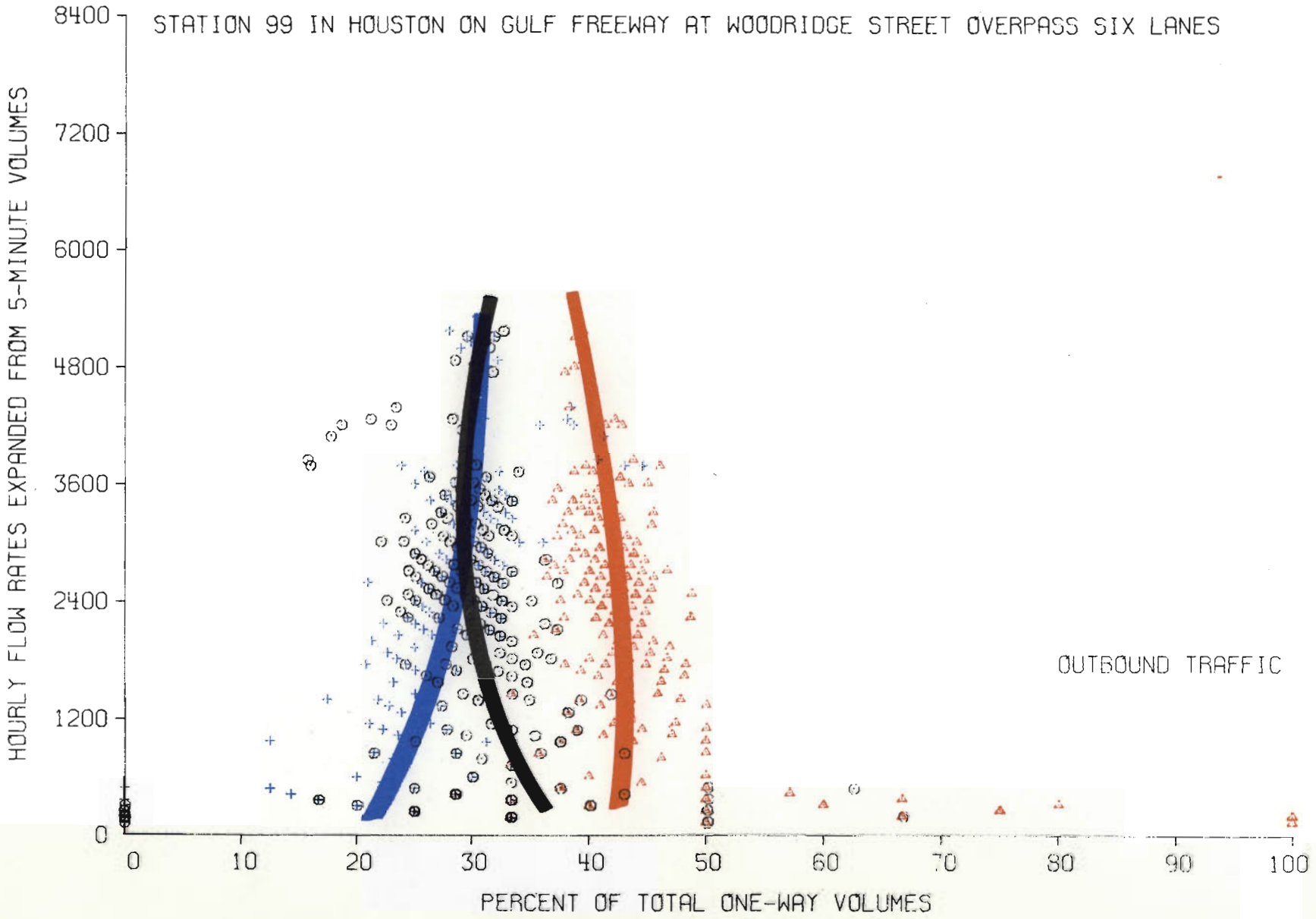


FIGURE 10

TRAFFIC VOLUME DISTRIBUTION BY LANE ON URBAN FREEWAYS

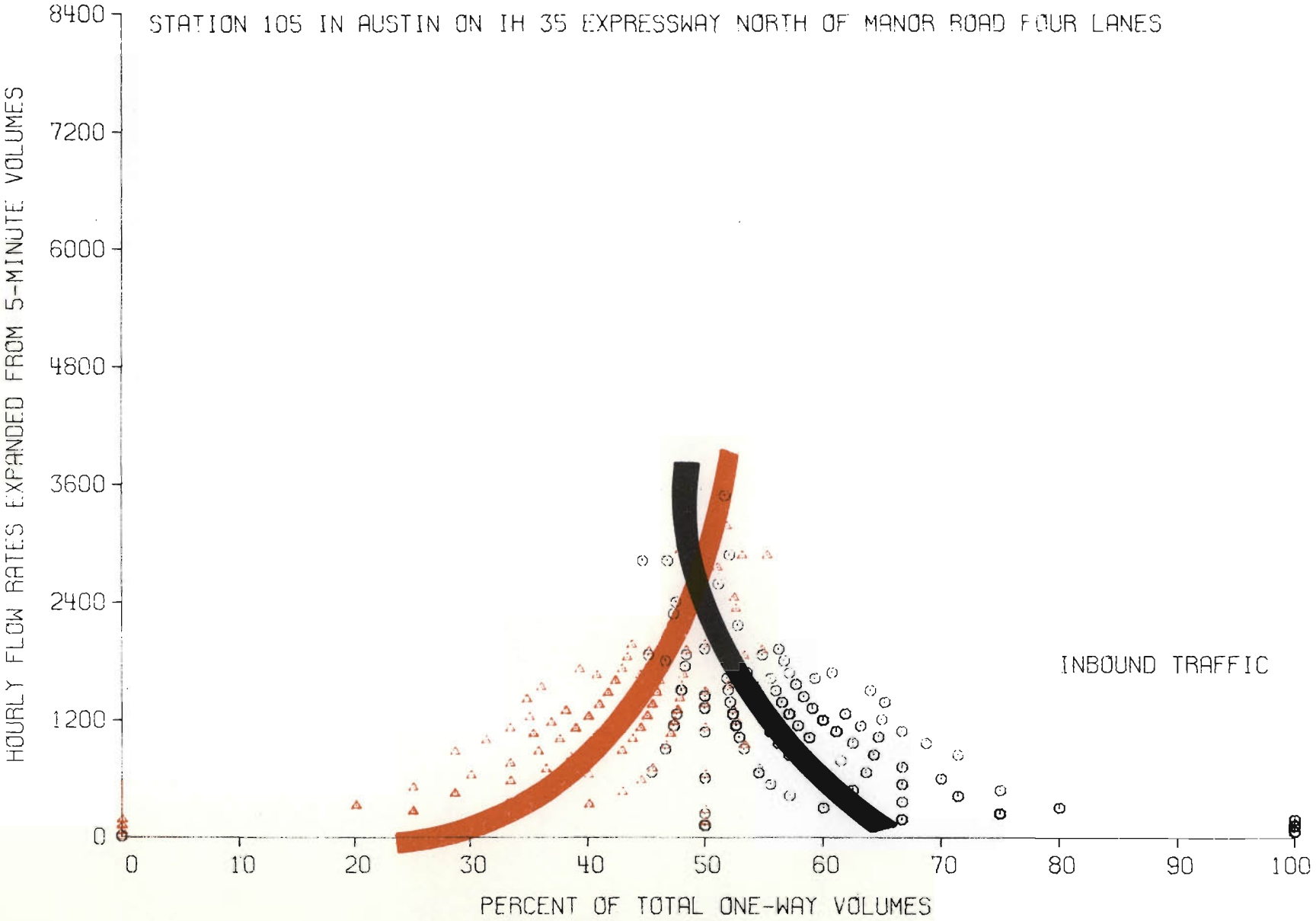


FIGURE 11

TRAFFIC VOLUME DISTRIBUTION BY LANE ON URBAN FREEWAYS

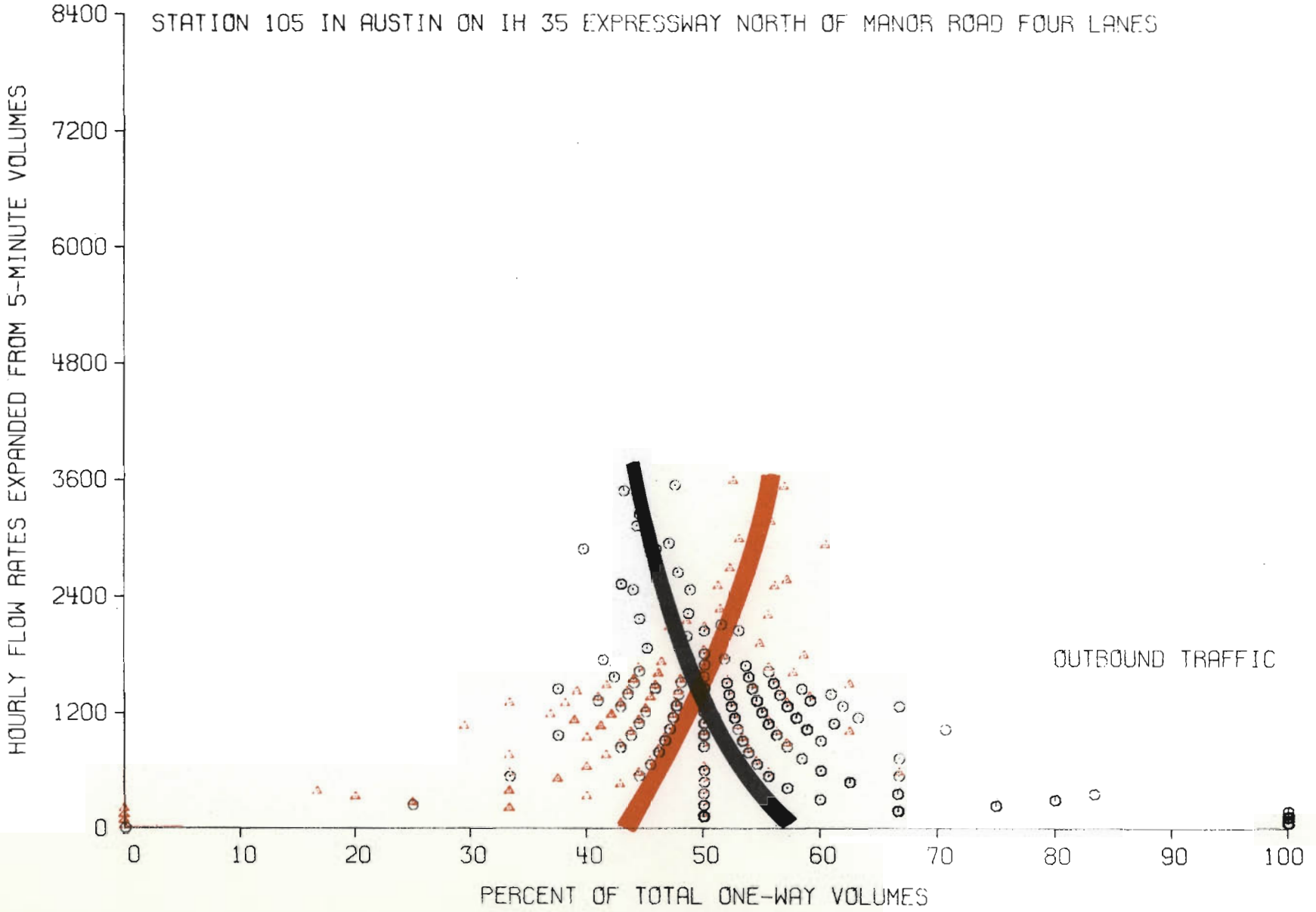


FIGURE 12

TRAFFIC VOLUME DISTRIBUTION BY LANE ON URBAN FREEWAYS

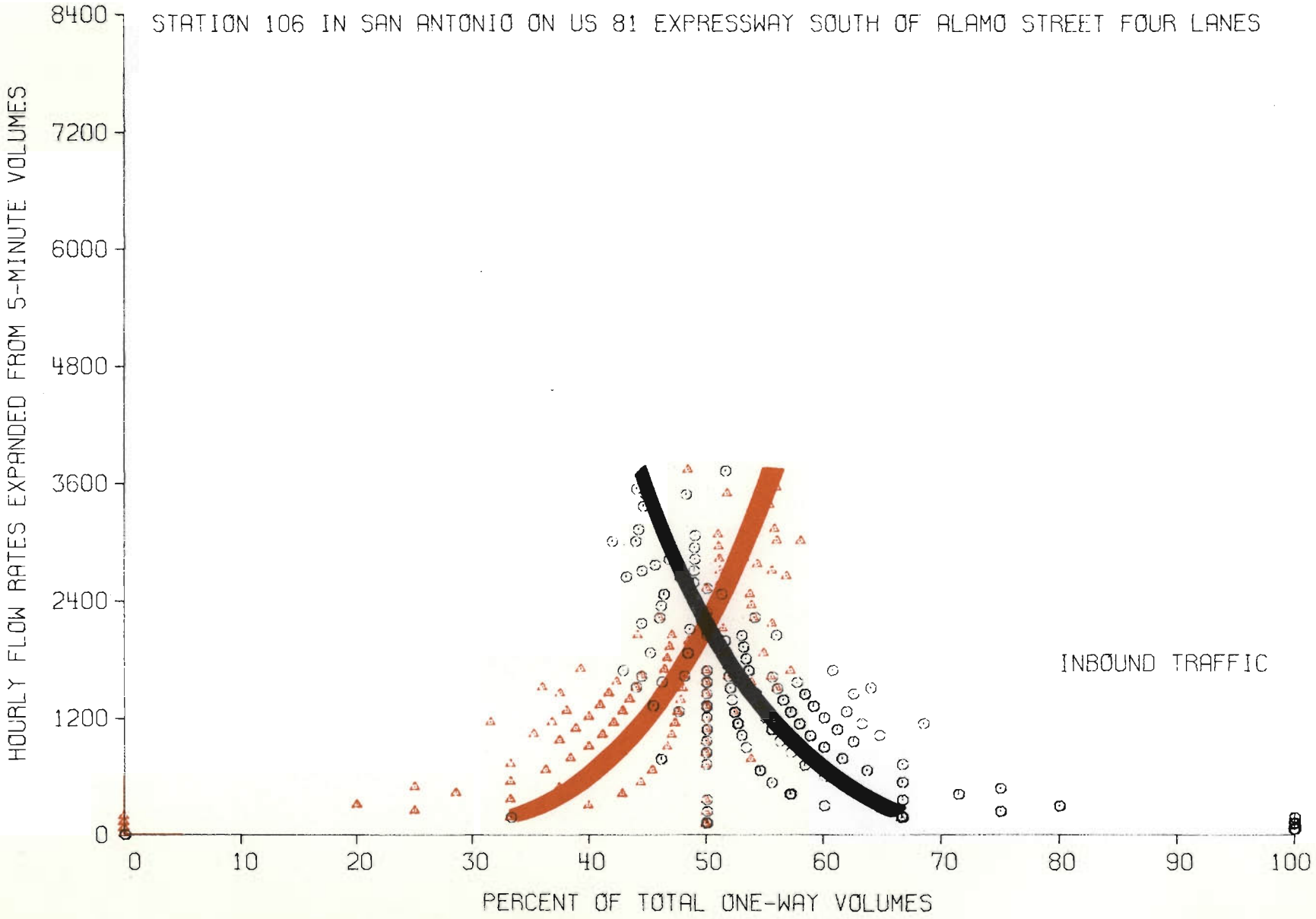


FIGURE 13

TRAFFIC VOLUME DISTRIBUTION BY LANE ON URBAN FREEWAYS

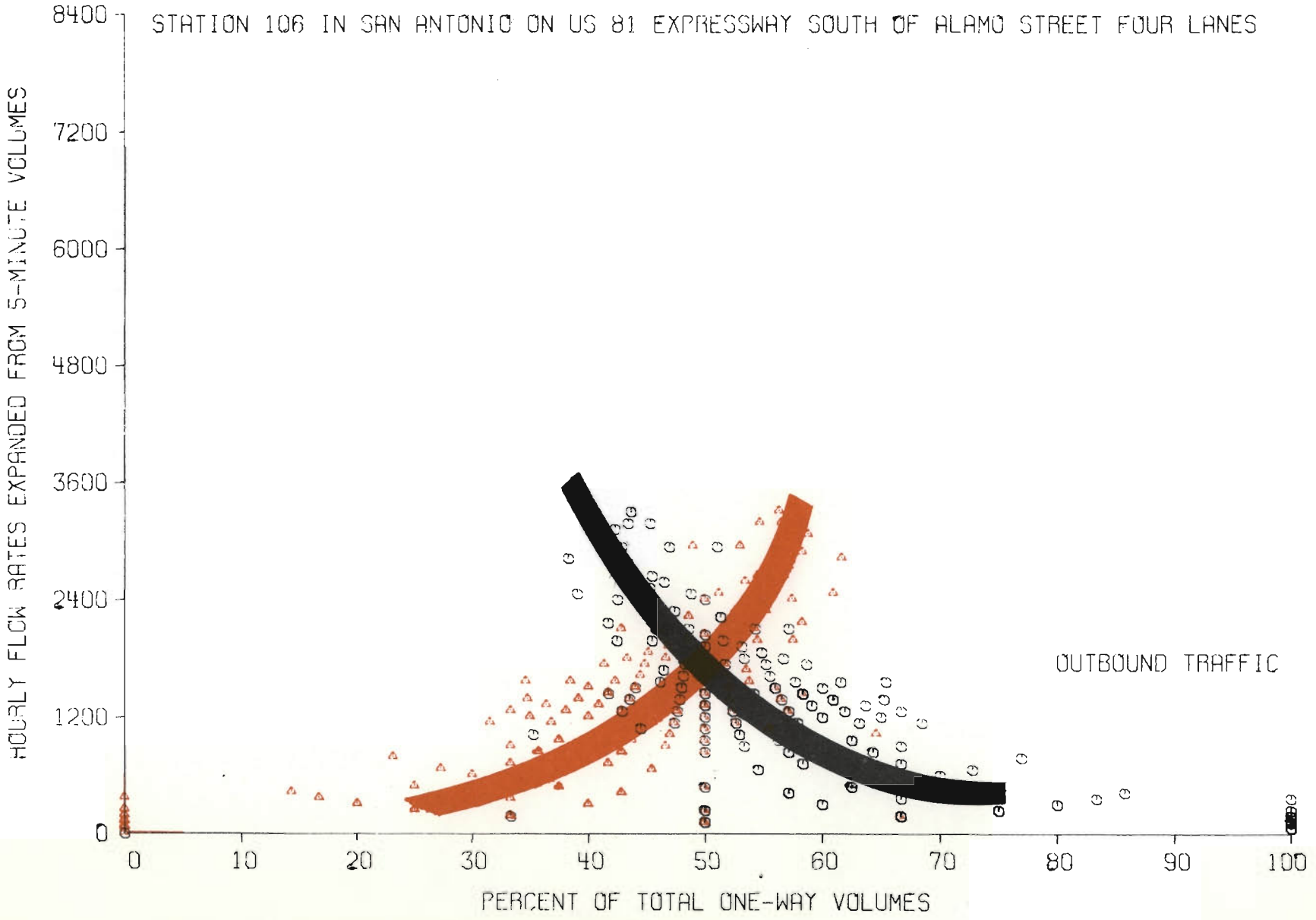


FIGURE 14

TRAFFIC VOLUME DISTRIBUTION BY LANE ON URBAN FREEWAYS

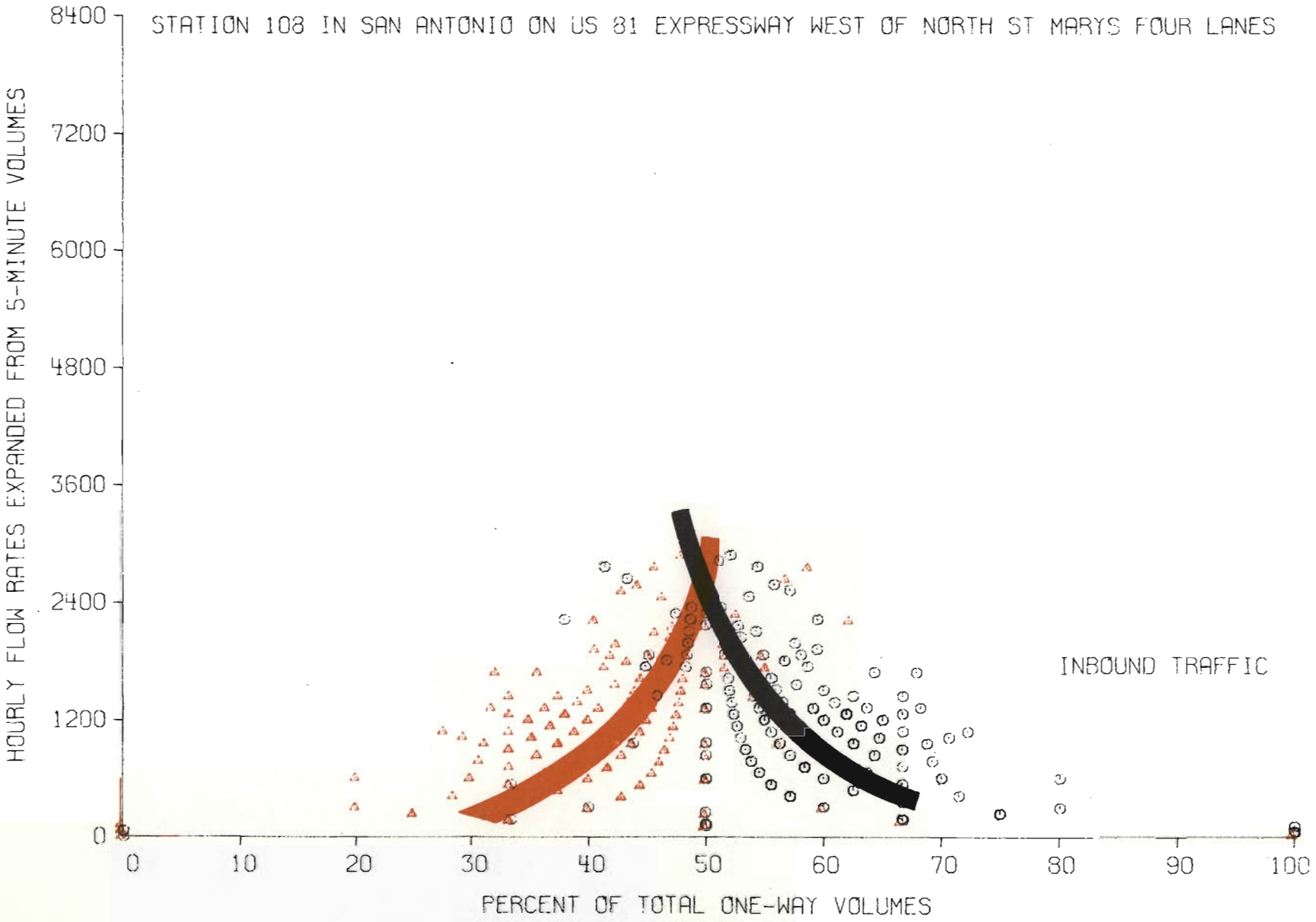


FIGURE 15

TRAFFIC VOLUME DISTRIBUTION BY LANE ON URBAN FREEWAYS

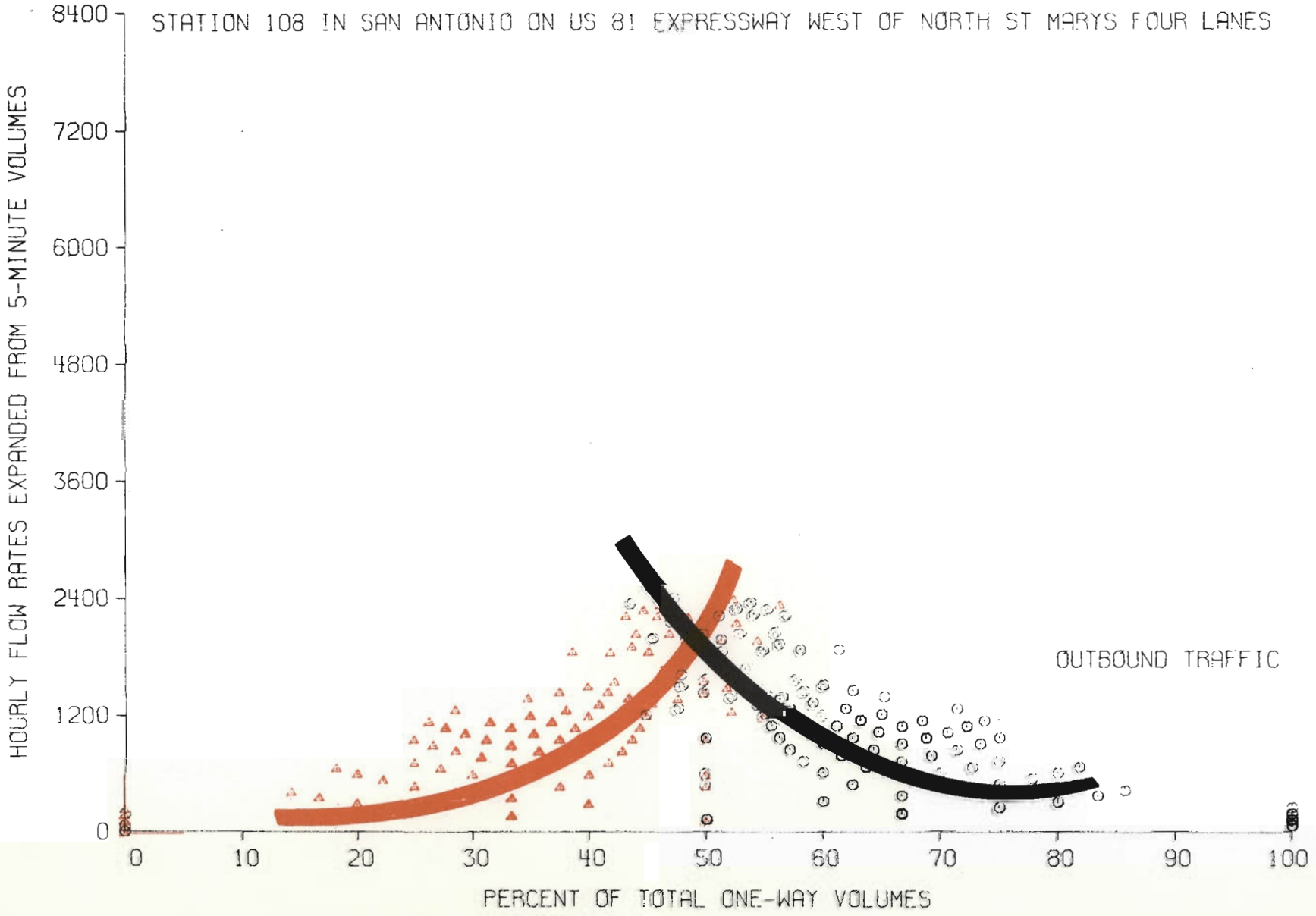


FIGURE 16

TRAFFIC VOLUME DISTRIBUTION BY LANE ON URBAN FREEWAYS

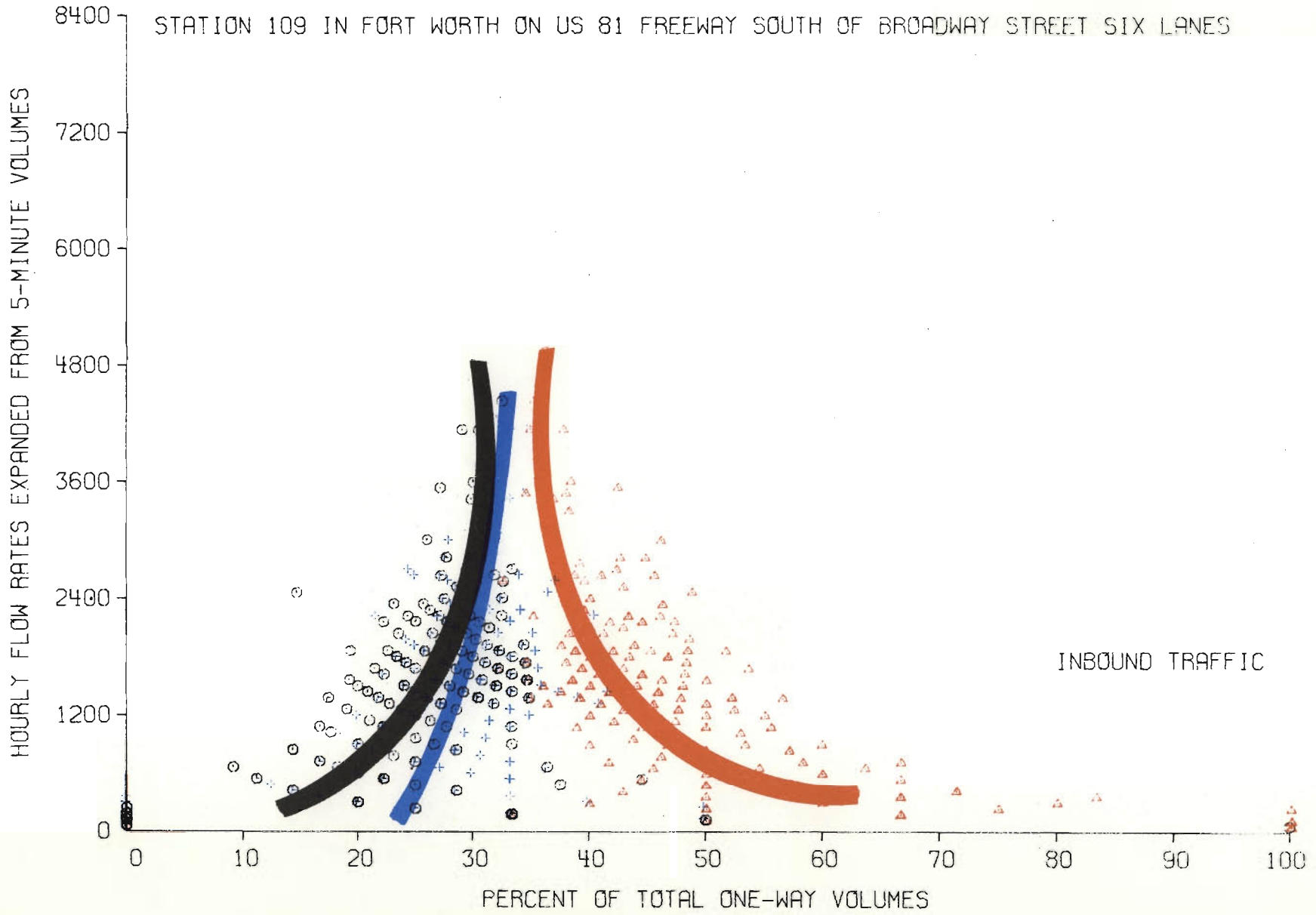


FIGURE 17

TRAFFIC VOLUME DISTRIBUTION BY LANE ON URBAN FREEWAYS

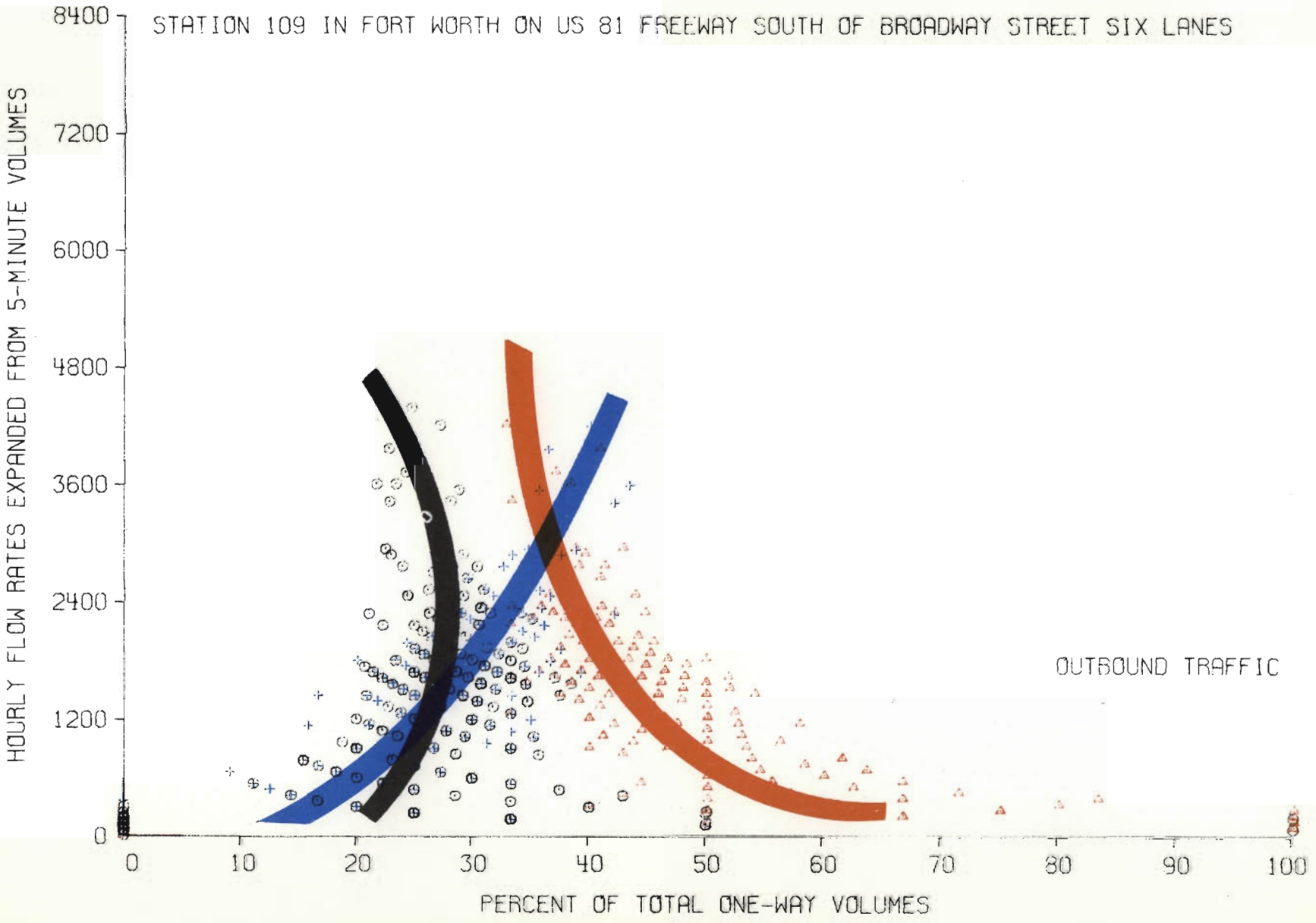


FIGURE 18

TRAFFIC VOLUME DISTRIBUTION BY LANE ON URBAN FREEWAYS

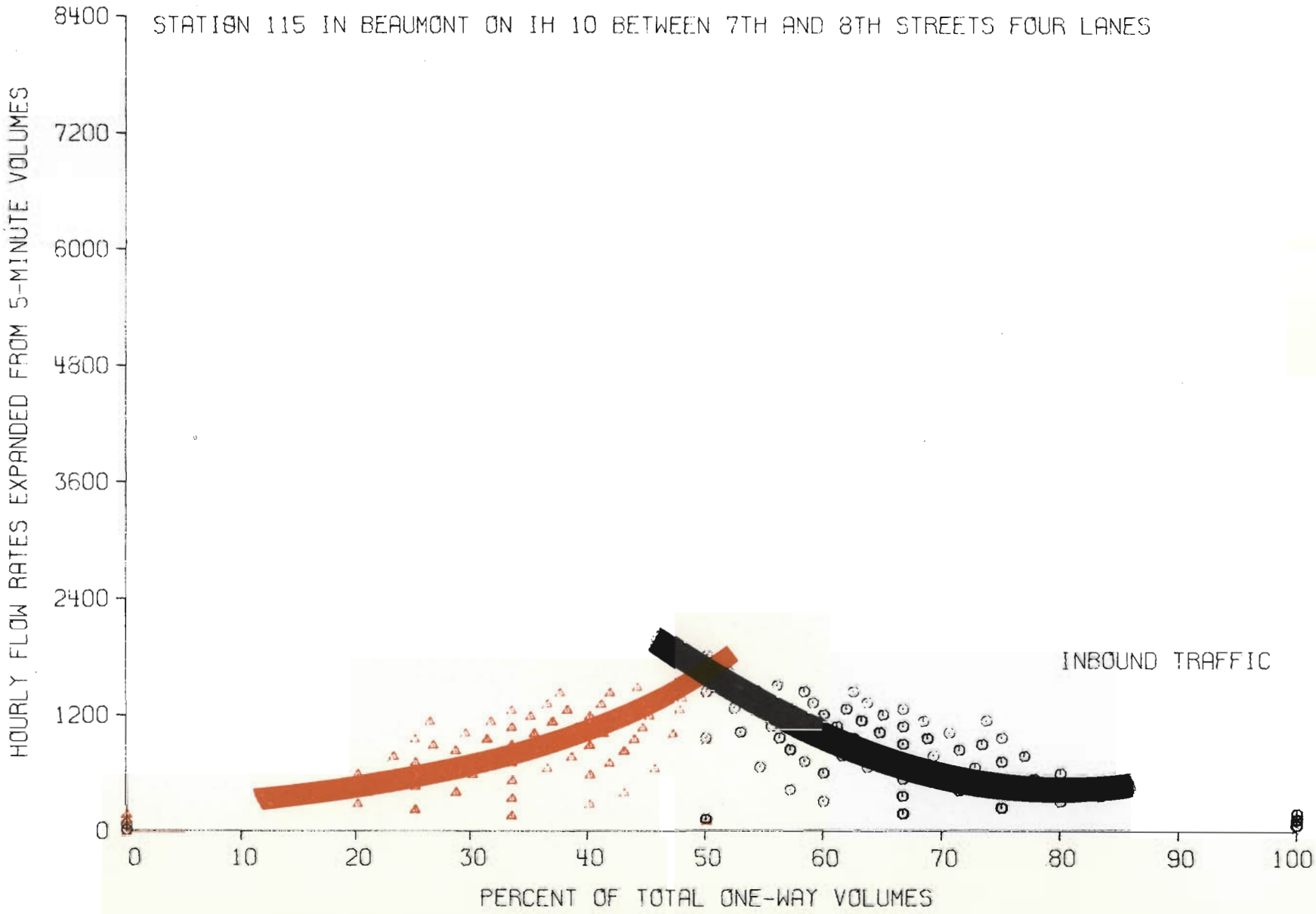


FIGURE 19

TRAFFIC VOLUME DISTRIBUTION BY LANE ON URBAN FREEWAYS

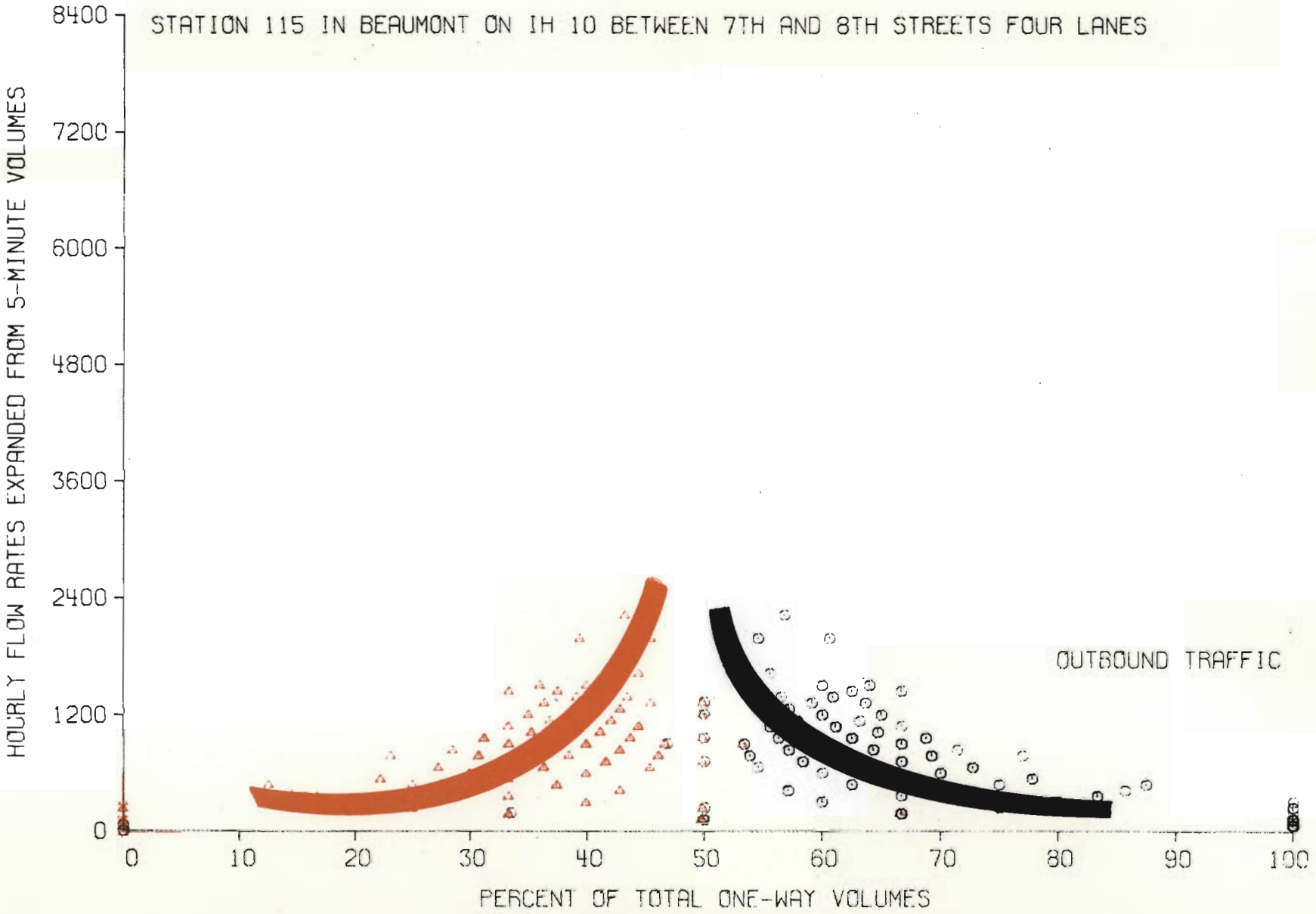


FIGURE 20

TRAFFIC VOLUME DISTRIBUTION BY LANE ON URBAN FREEWAYS

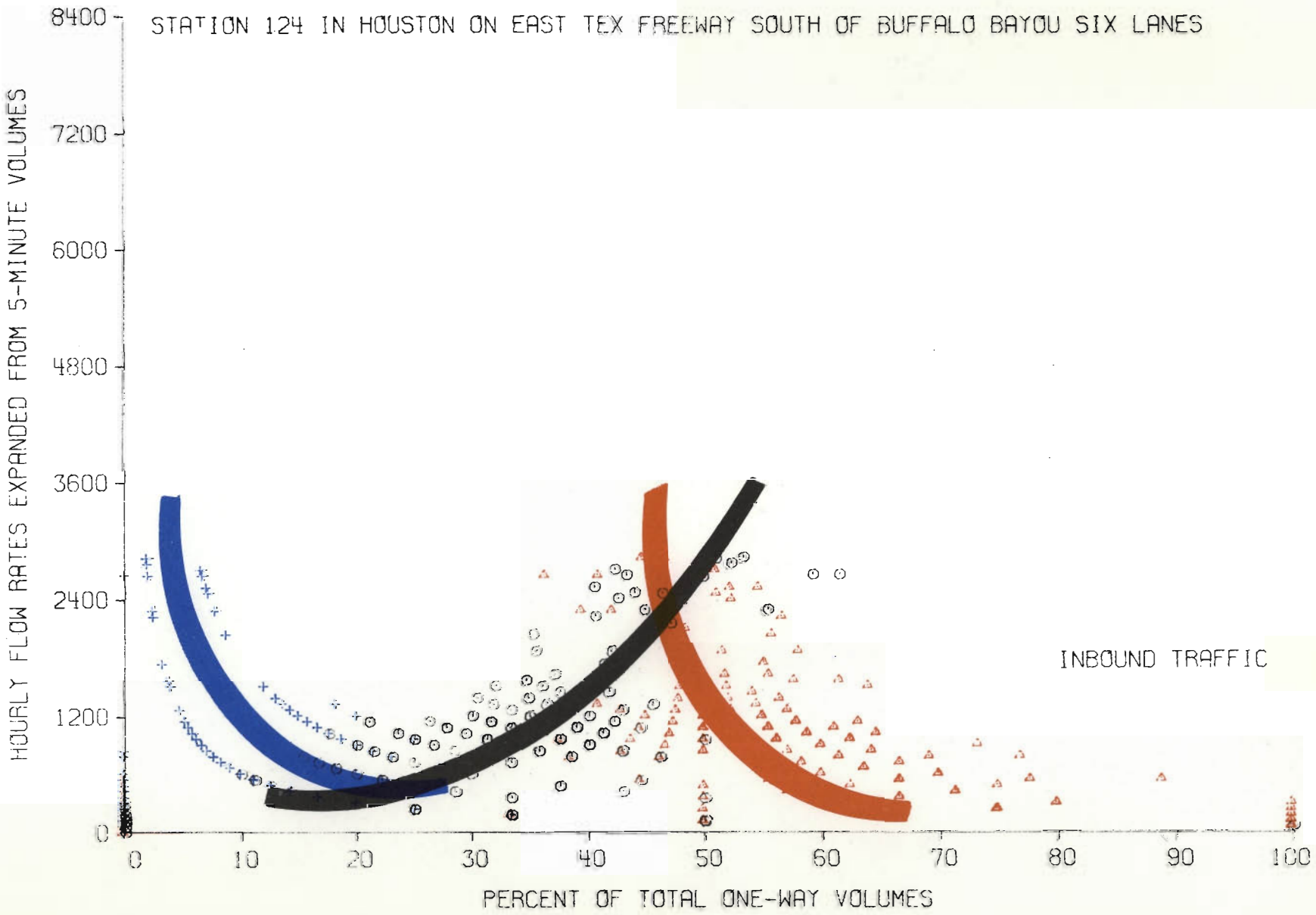


FIGURE 21

TRAFFIC VOLUME DISTRIBUTION BY LANE ON URBAN FREEWAYS

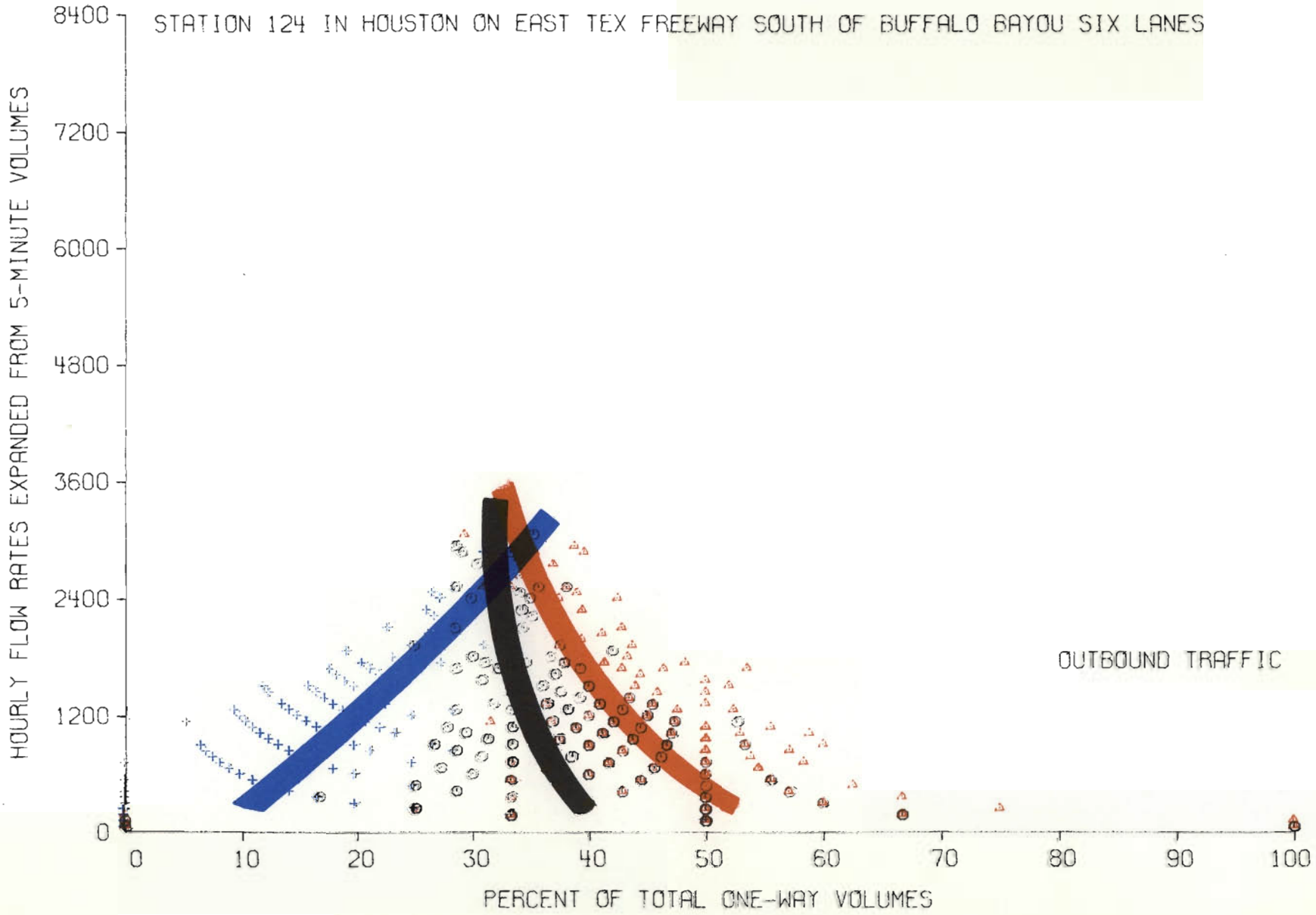


FIGURE 22

TRAFFIC VOLUME DISTRIBUTION BY LANE ON URBAN FREEWAYS

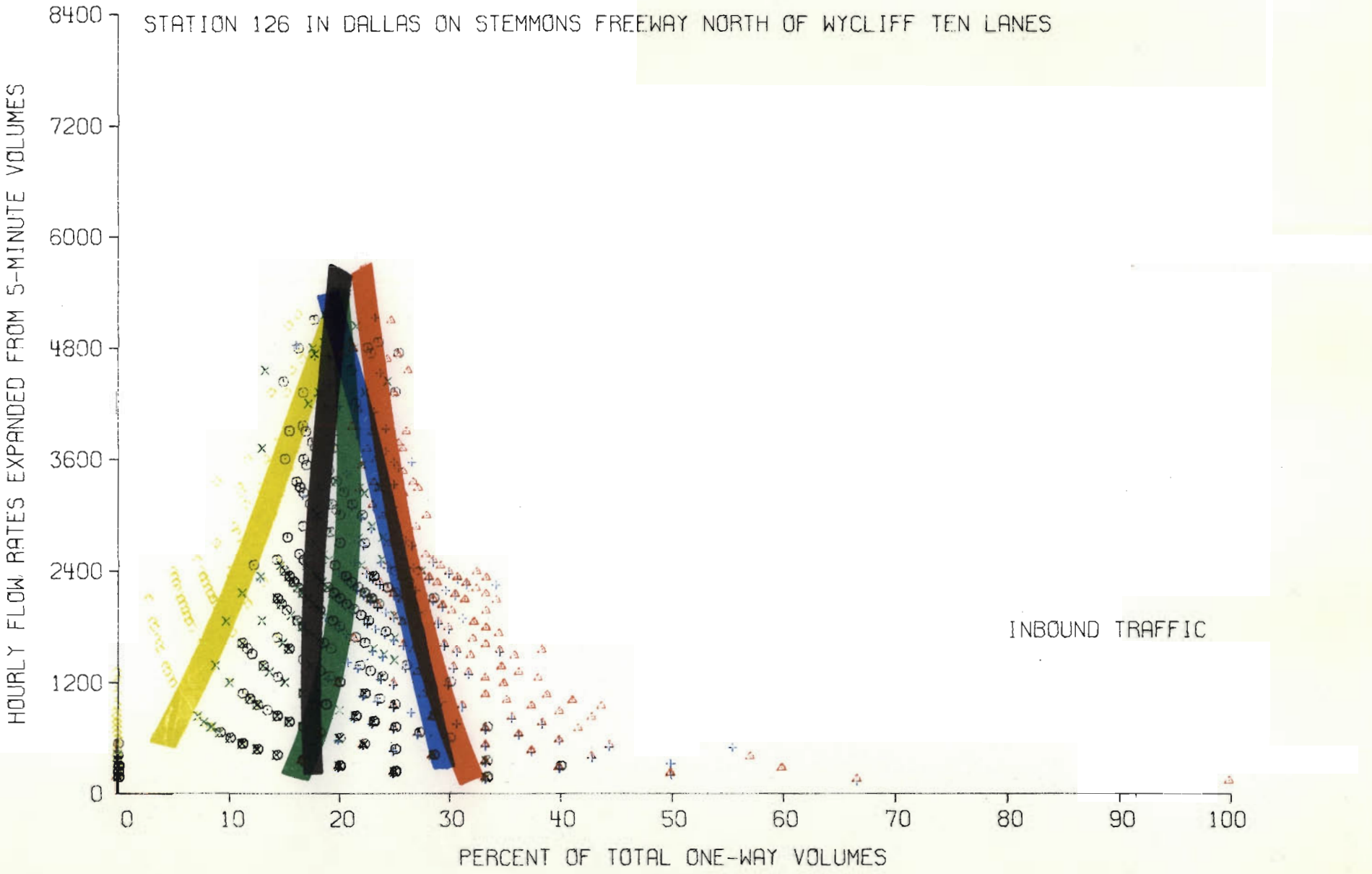


FIGURE 23

TRAFFIC VOLUME DISTRIBUTION BY LANE ON URBAN FREEWAYS

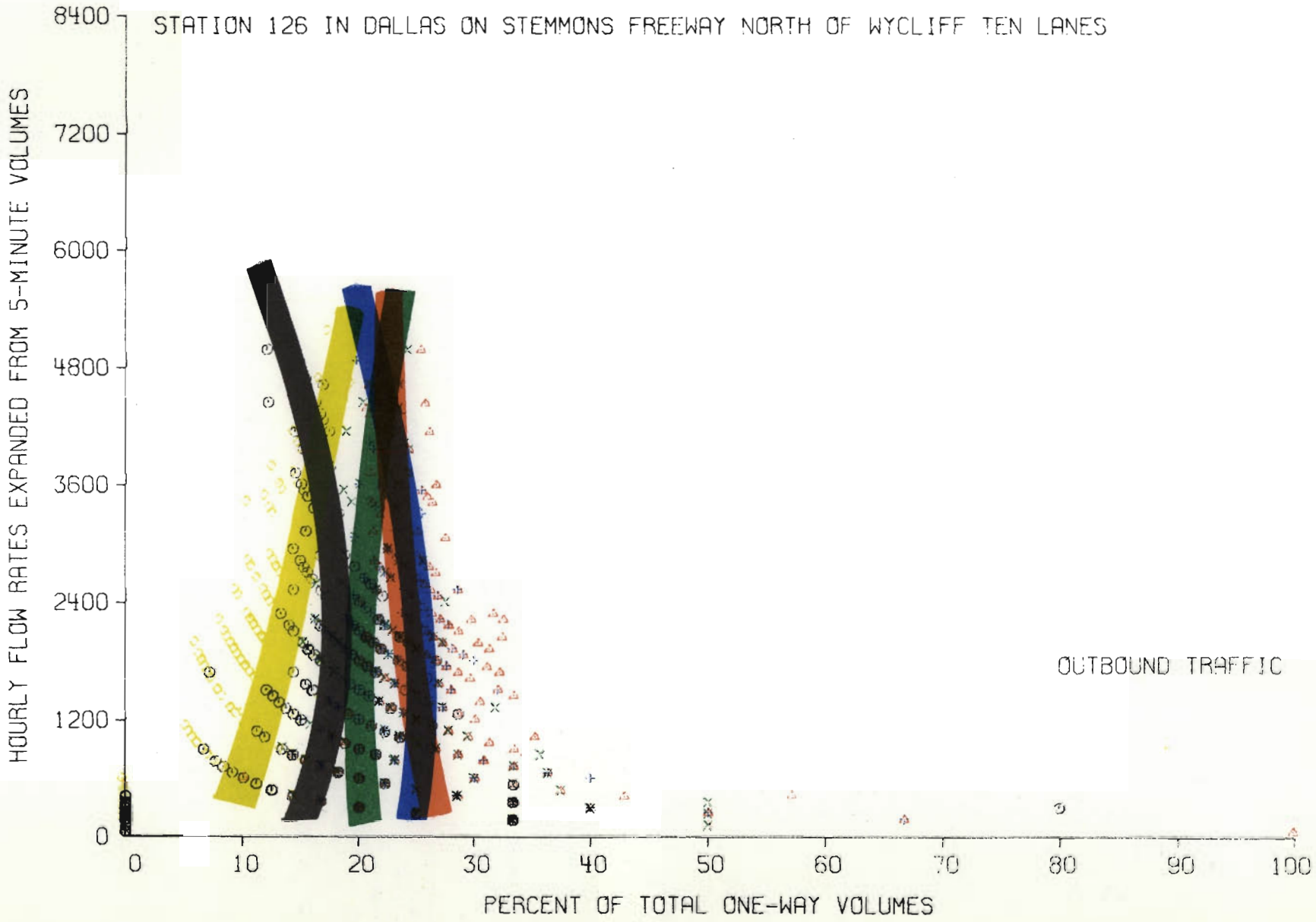


FIGURE 24

TRAFFIC VOLUME DISTRIBUTION BY LANE ON URBAN FREEWAYS

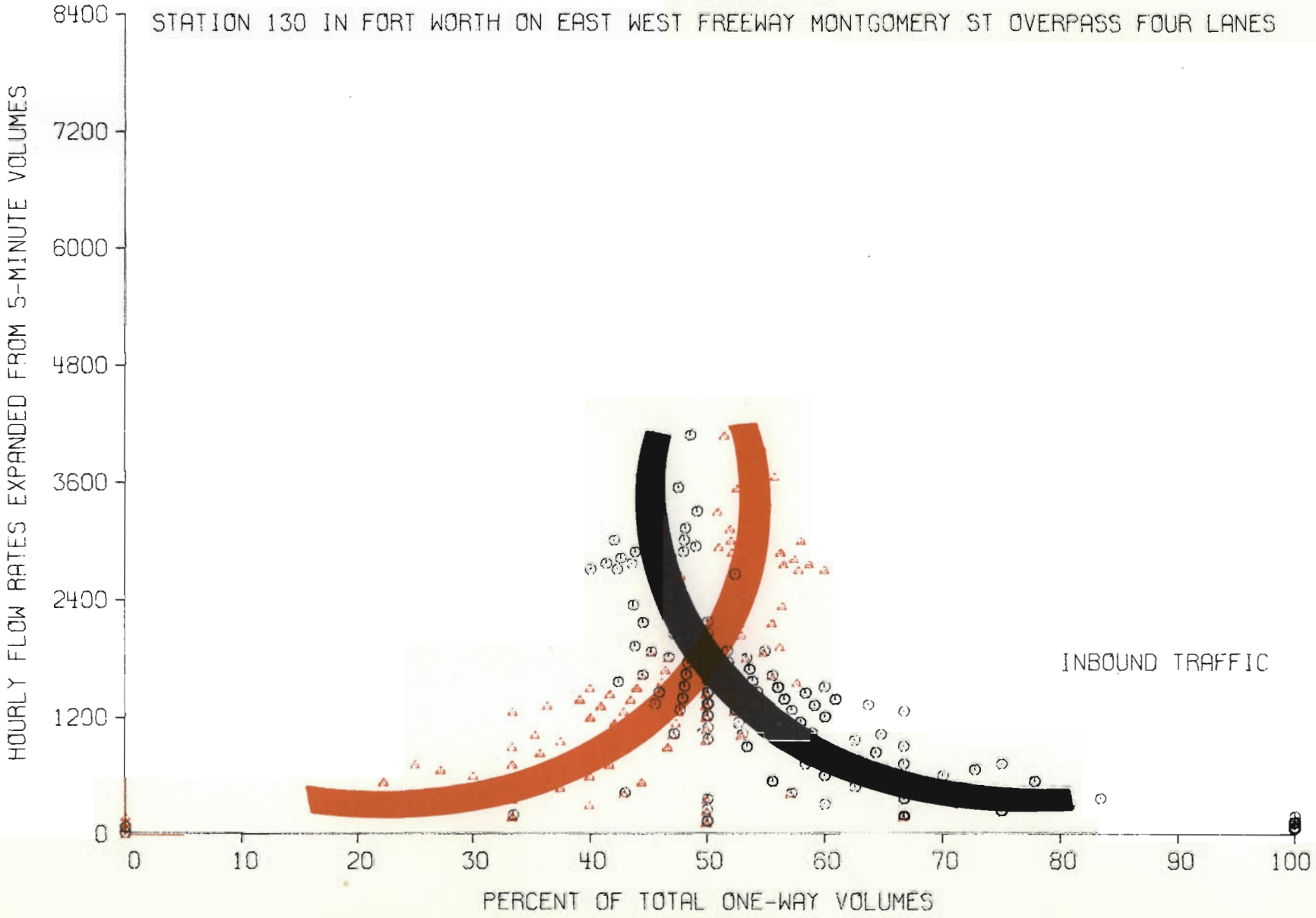


FIGURE 25

TRAFFIC VOLUME DISTRIBUTION BY LANE ON URBAN FREEWAYS

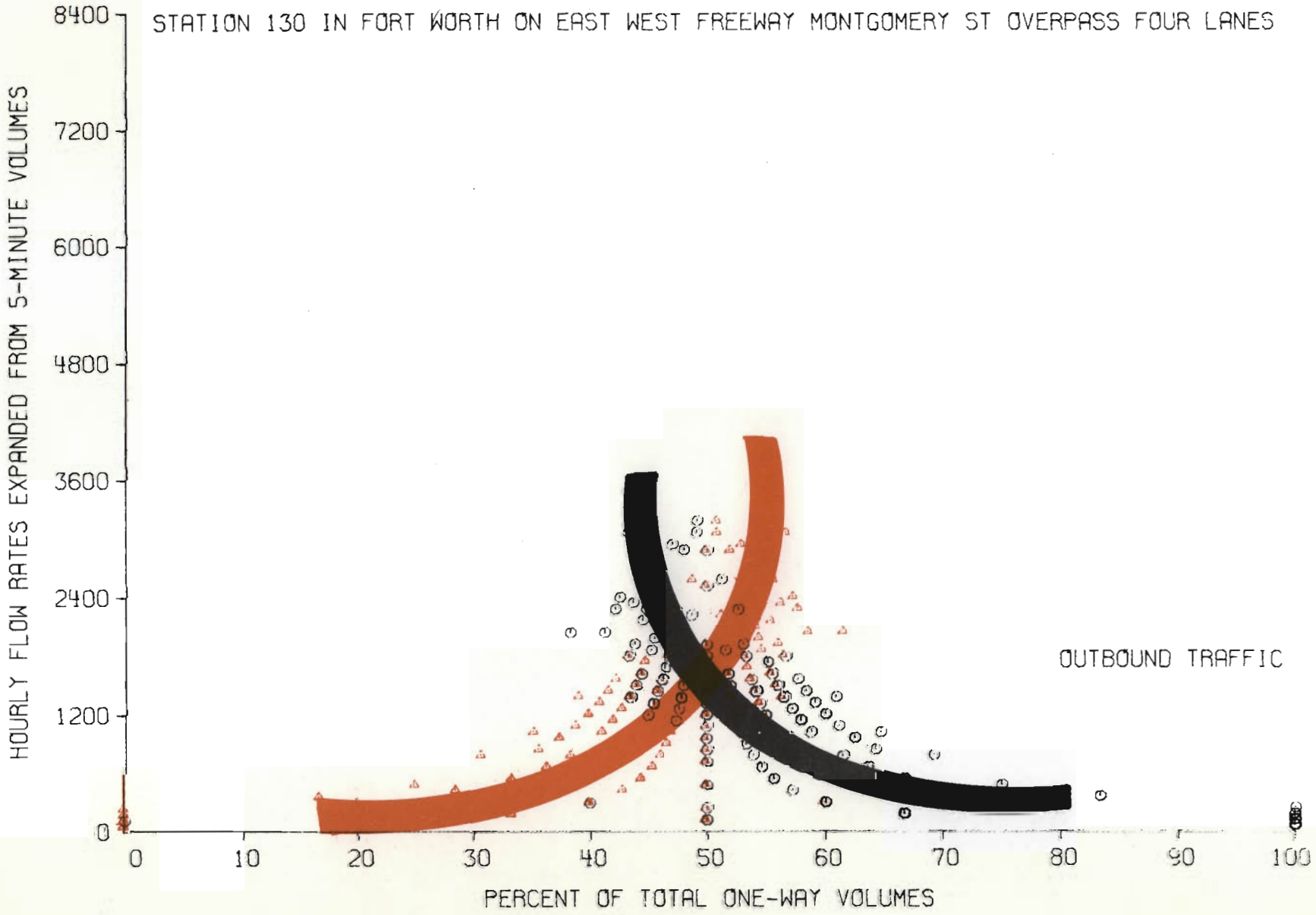


FIGURE 26

TRAFFIC VOLUME DISTRIBUTION BY LANE ON URBAN FREEWAYS

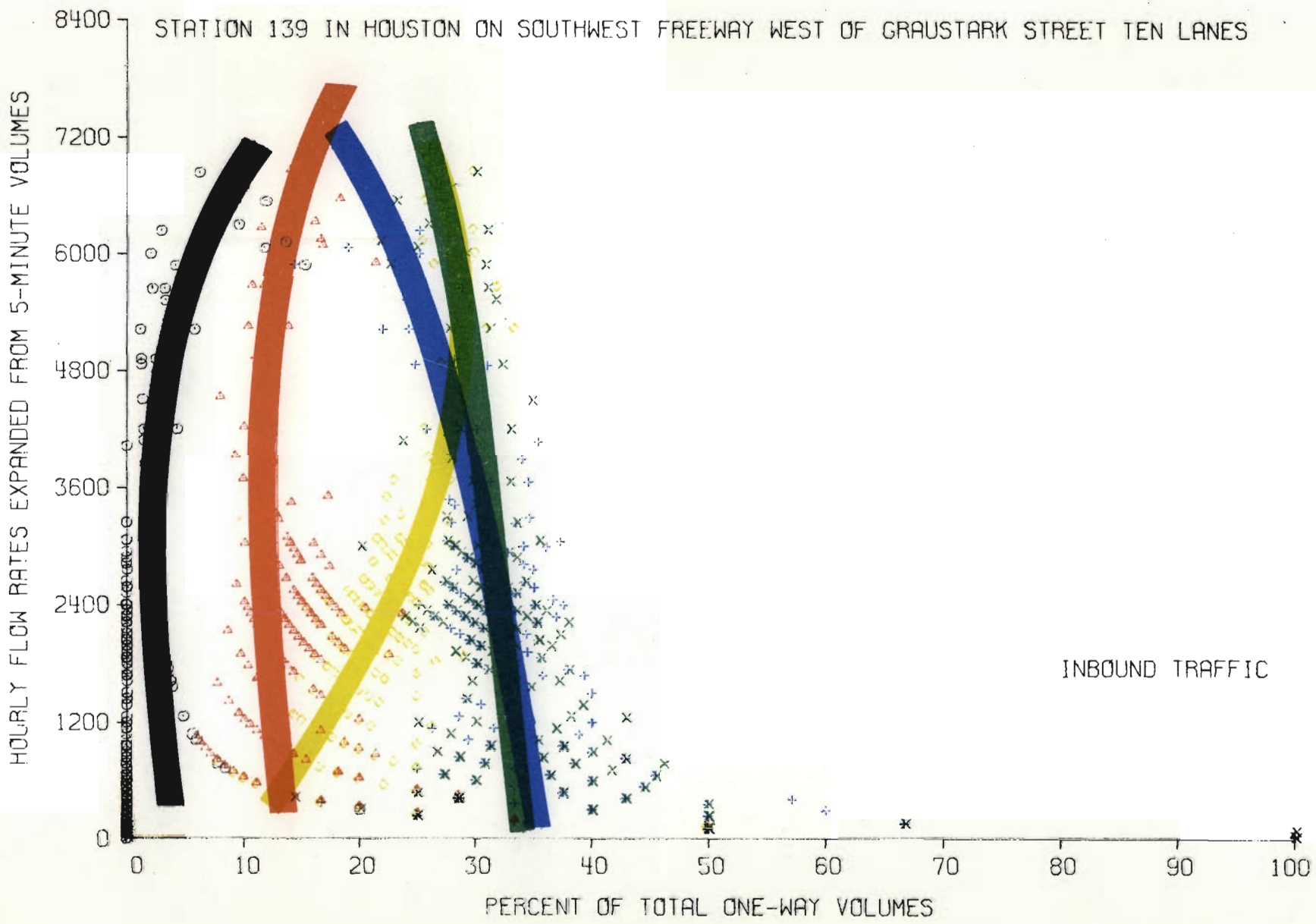


FIGURE 27

TRAFFIC VOLUME DISTRIBUTION BY LANE ON URBAN FREEWAYS

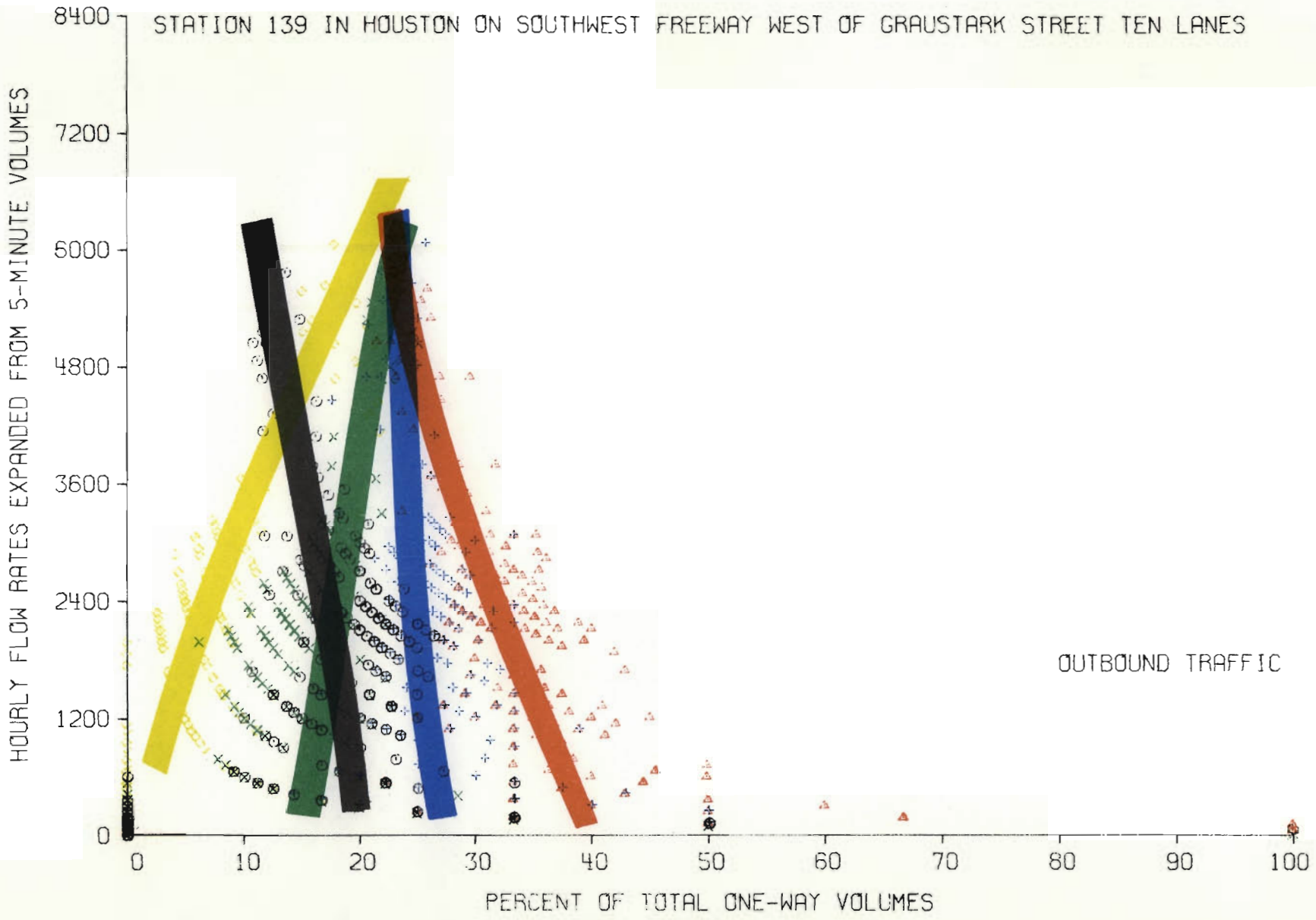


FIGURE 28

TRAFFIC VOLUME DISTRIBUTION BY LANE ON URBAN FREEWAYS

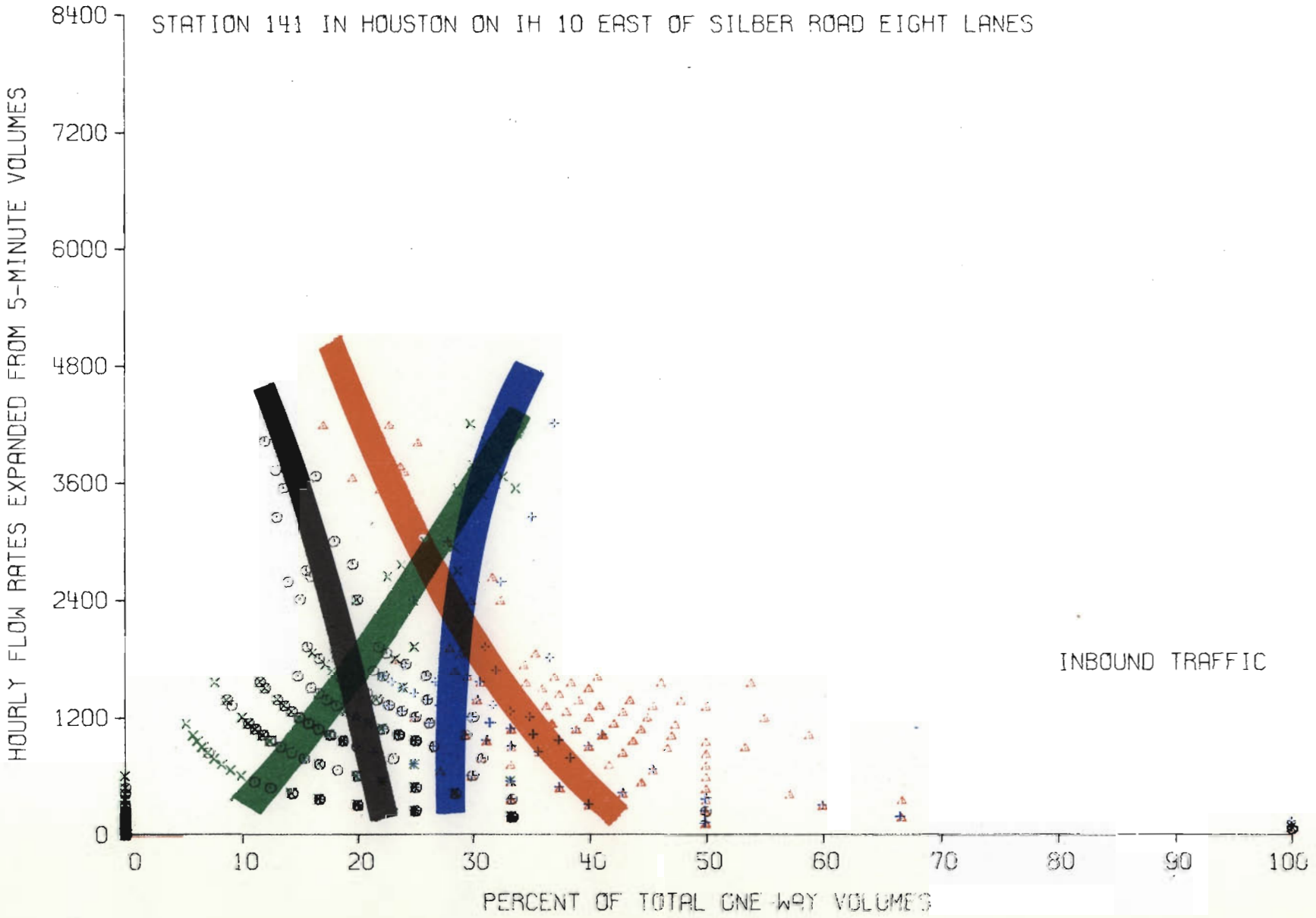


FIGURE 29

TRAFFIC VOLUME DISTRIBUTION BY LANE ON URBAN FREEWAYS

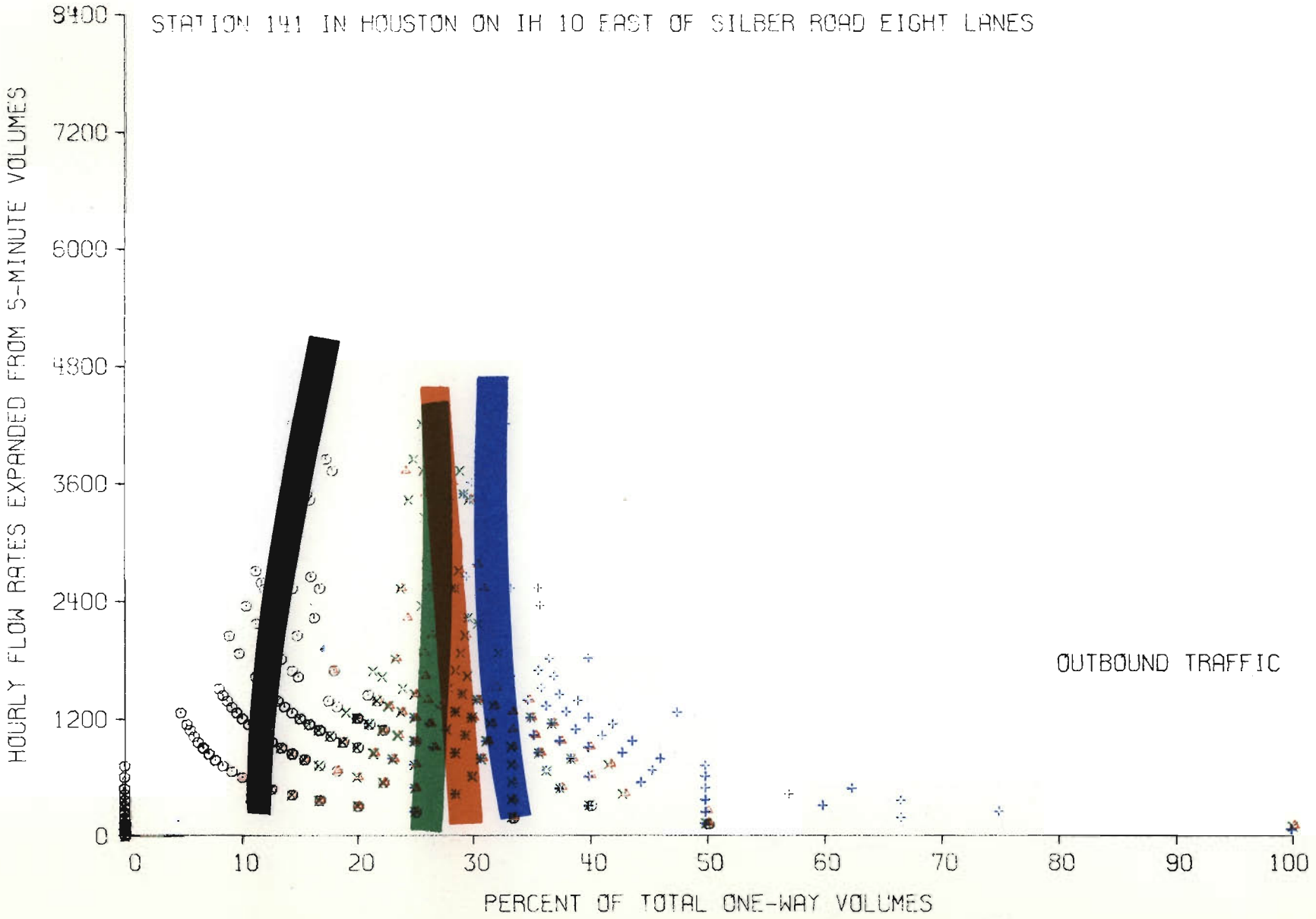


FIGURE 30

TRAFFIC VOLUME DISTRIBUTION BY LANE ON URBAN FREEWAYS

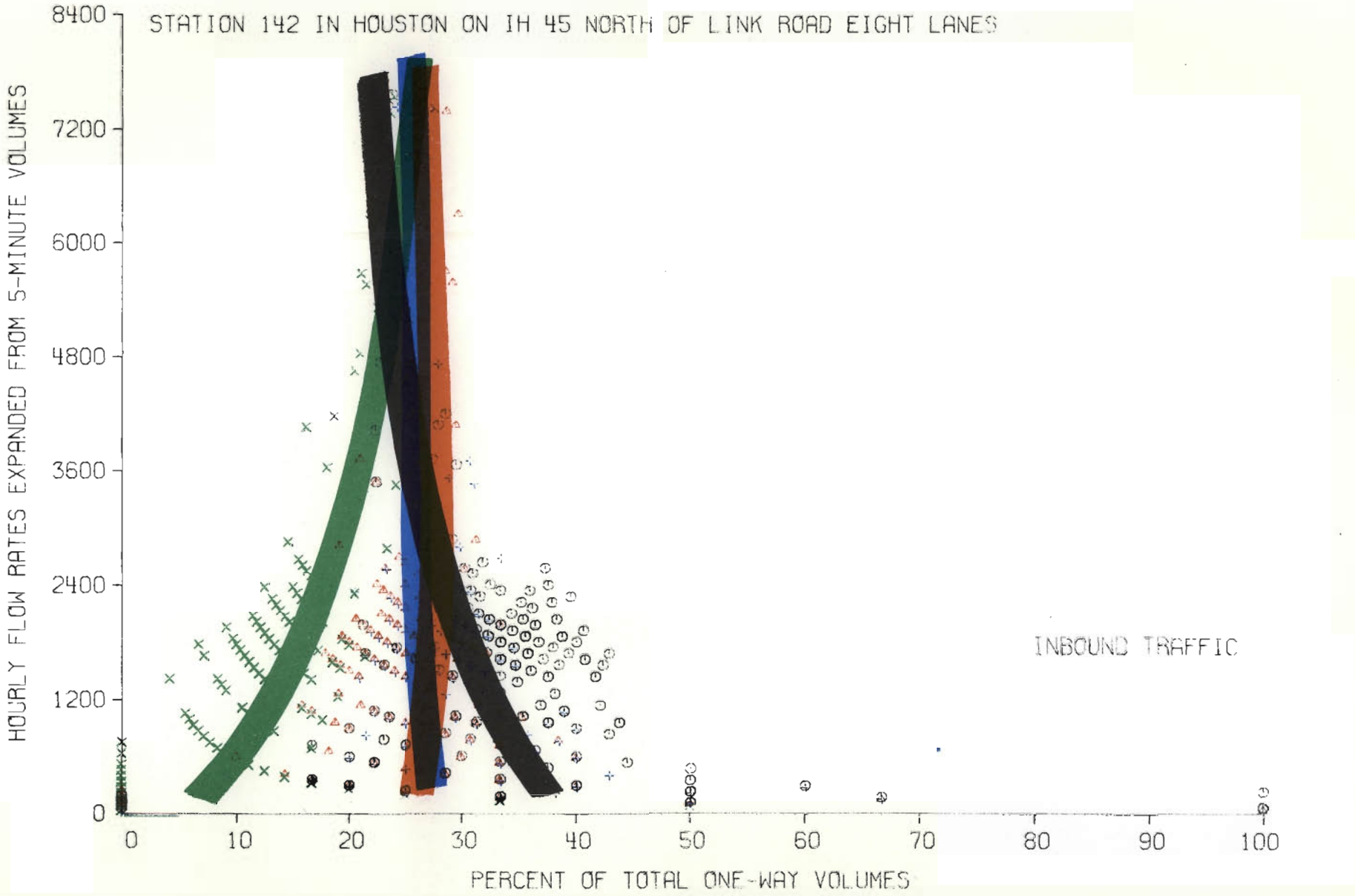


FIGURE 31

TRAFFIC VOLUME DISTRIBUTION BY LANE ON URBAN FREEWAYS

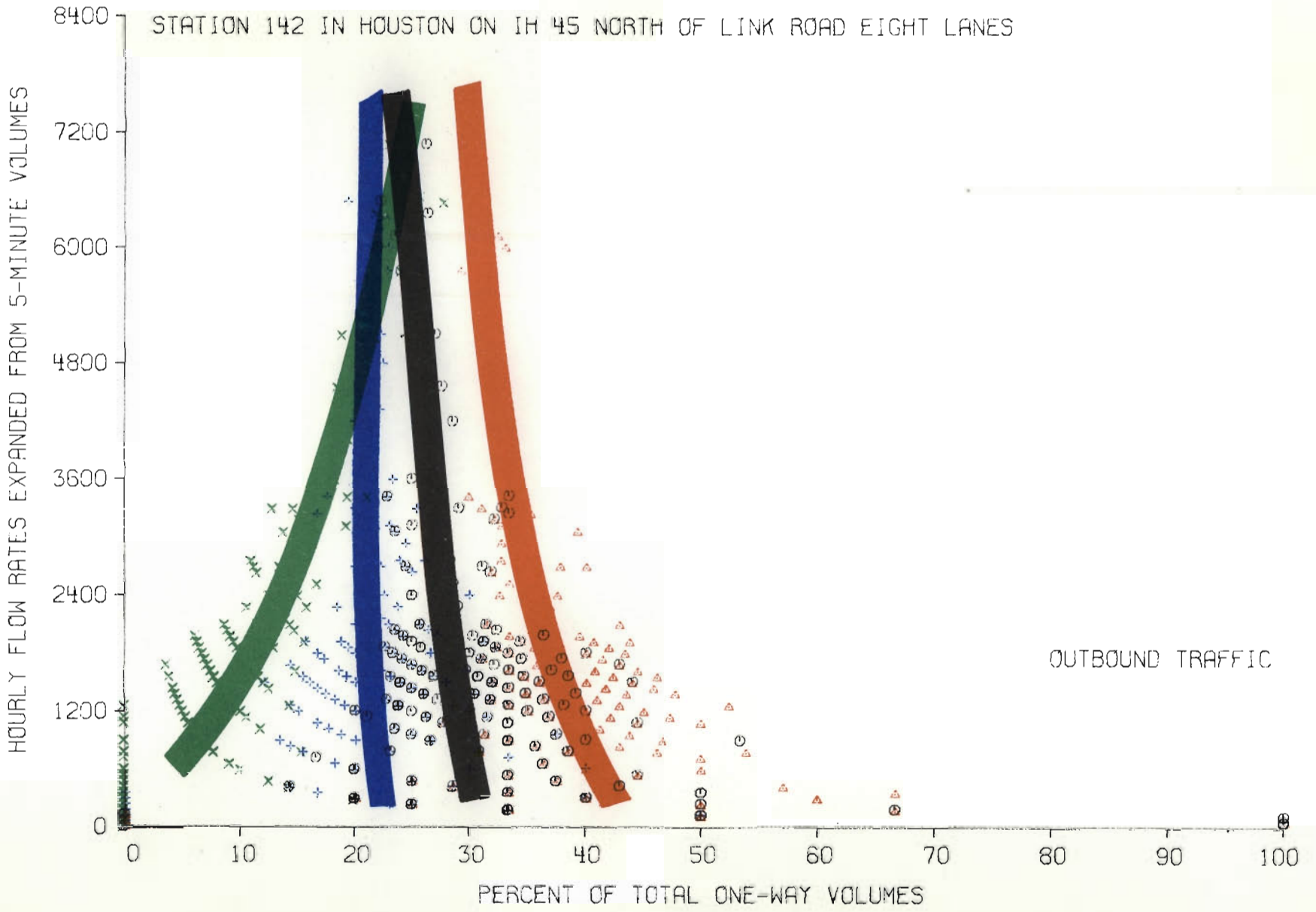


FIGURE 32

TRAFFIC VOLUME DISTRIBUTION BY LANE ON URBAN FREEWAYS

CHAPTER VI

CORRELATION OF SHORT-TIME COUNT VOLUMES TO VOLUMES OF LONGER TIME INTERVALS

Figures 33.A through 33.T and Figures 34.A through 34.T represent the correlation of short-time counts to long-time counts. These figures were derived from the calculations found in Appendix 1. Figures 33.A through 33.T show the relationships derived for inbound and outbound directions; whereas, Figures 34.A through 34.T express the relationship for the total volumes in both directions.

In each of these figures the short-time counts fell within the time interval of the long-time counts. The regression equation is shown on each figure.

In Figures 33.A and 33.B the 5-minute peak volume is plotted against the 10-minute peak volume for the inbound and outbound direction respectively. The slope of the regression line for the inbound direction is 1.96 and for the outbound is 1.95. If the Y-intercept of each regression equation is omitted, then the reciprocal of the slope will be an approximation of the percent that the short-time count volume is of the long-time count volume. Therefore, the 5-minute peak volume in the inbound direction will be approximately 51.02 percent $(\frac{1}{1.96} \times 100)$ of the 10-minute peak volume. The 5-minute peak volume in the outbound direction will be approximately 51.28 percent $(\frac{1}{1.95} \times 100)$ of the 10-minute peak volume. Thus, the 5-minute peak volume will be approximately 51.15 percent $(\frac{51.02 + 51.28}{2})$ of the 10-minute peak volume regardless of direction of the traffic flow.

In Figures 33.C and 33.D the 5-minute peak volume is plotted against the peak hour volume for the inbound and outbound directions respectively. The slope of the regression line for the inbound direction is 10.92 and for the

outbound direction is 10.87. The 5-minute peak volume in the inbound direction is approximately 9.16 percent of the peak hour volume. The 5-minute peak volume in the outbound direction is approximately 9.20 percent of the peak hour volume. The average value that the 5-minute peak volume will be of the peak hour volume, regardless of the direction of the traffic flow, is 9.18 percent.

Figures 33.E and 33.F represent the relationship of the 5-minute peak volume to the 2-hour peak volume for the inbound and outbound directions respectively. The slope of the regression line in Figure 33.E is 19.00 and in Figure 33.F is 19.10. The 5-minute peak volume is approximately 5.26 percent of the 2-hour peak volume for the inbound direction. For the outbound direction the 5-minute peak volume is approximately 5.24 percent of the 2-hour peak volume. As an average value, the 5-minute peak volume is 5.25 percent of the 2-hour peak volume.

Figures 33.G and 33.H show the relationship of the 5-minute peak volume to the 24-hour volume for the inbound and outbound directions. The coefficient of determination is 0.572 for the inbound relationship and 0.509 for the outbound relationship. It is seen from Figures 33.G and 33.H that there is considerable scatter of the data about each linear regression line. From these data on urban freeways in Texas, it is seen that a simple linear projection of a short-time count of 5-minute duration to a long-time count of 24-hour duration by direction does not produce the desired accuracy.

Figures 33.I and 33.J represent the relationship of the 10-minute peak volume to the hourly peak volume for the inbound and outbound directions. The slope of the regression line for the inbound and outbound direction is 5.59. The 10-minute peak volume will be approximately 17.89 percent of the hourly peak volume for either the inbound or outbound direction.

In Figures 33.K and 33.L the 10-minute peak volume is plotted against the 2-hour peak volume for the inbound and outbound directions. The slope of the regression line in Figure 33.K is 9.71 and in Figure 33.L is 9.88. The 10-minute peak volume will be approximately 10.30 percent of the 2-hour peak volume for the inbound direction and 10.12 percent for the outbound direction.

Figures 33.M and 33.N represent the relationship of the 10-minute peak volume to the 24-hour volume for the inbound and outbound directions. The coefficient of determination is 0.563 for the inbound relationship and 0.559 for the outbound relationship. It is seen from Figures 33.M and 33.N that there is considerable scatter of data about each linear regression line. From these data on urban freeways in Texas, it is seen that a simple linear projection of a short-time count of 10-minutes duration to a long-time count of 24-hour duration by direction would not produce the desired accuracy.

Figures 33.O and 33.P show the relationship of the peak hourly volume to the 2-hour peak volume. The slope of the regression line in Figure 33.O and in Figure 33.P is 1.77. The peak hourly volume will be approximately 56.50 percent of the 2-hour peak volume regardless of the direction of traffic flow.

In Figures 33.Q and 33.R the peak hour volume is plotted against the 24-hour volume in the inbound and outbound direction. The coefficient of determination of the regression line in Figure 33.Q is 0.639 and in Figure 33.R is 0.607. Again it is seen that for the urban freeways studied, a simple linear expansion of a peak hour volume to a 24-hour volume would not produce the desired results.

Figures 33.S and 33.T represent the linear relationship of the 2-hour peak volume to the 24-hour volume for the inbound and outbound direction.

The coefficient of determination of the linear regression line in Figure 33.S is 0.723 and in Figure 33.T is 0.724. While these coefficients of determination are higher than the ones for the shorter time intervals, a simple linear expansion of a 2-hour peak volume to a 24-hour volume is not as good as would be desired.

Figures 34.A through 34.T represent the correlation of short-time counts to long-time counts for volumes in both directions. The linear relationships developed for volumes recorded in both directions during a specific peak period generally produce about the same accuracy as the relationship of directional volumes recorded during selected peak periods. However, there are some linear relationships that definitely improve when using volumes in both directions. Figures 33.G and 33.H show the correlation of the 5-minute peak volume to the 24-hour volume for the inbound and outbound direction. It was noted that the coefficient of determination was 0.572 and 0.509 for the inbound and outbound relationship respectively. Figures 34.G and 34.H show the correlation of the 5-minute peak volume in both directions during the inbound and outbound 5-minute peak period with the 24-hour volume in both directions. The coefficient of determination for the linear regression line in Figure 34.G is 0.852 and in Figure 34.H is 0.916. This is an improvement over the directional relationships. Therefore, a 24-hour total volume for both directions could be predicted with reasonable accuracy from a volume recorded in both directions during the inbound or outbound peak 5-minutes.

Figures 33.M and 33.N represent the relationship of the 10-minute peak volume to the 24-hour volume for the inbound and outbound directions. The coefficient of determination is 0.563 for the inbound relationship and 0.559 for the outbound relationship. Figure 34.M represents the relationship of

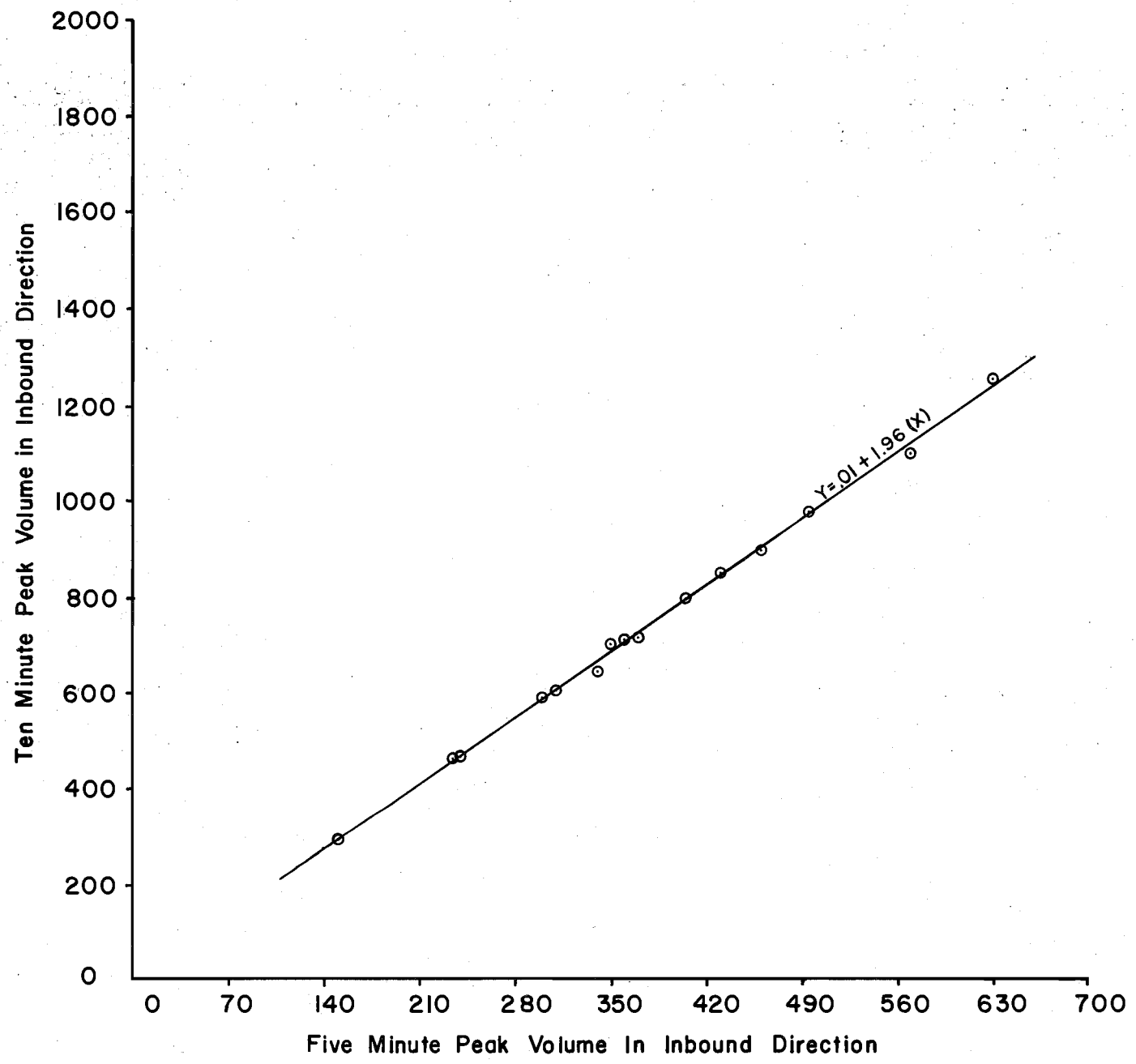
the 10-minute volume in both directions during the inbound peak 10-minutes to the 24-hour volume in both directions. Figure 34.N represents the relationship of the 10-minute volume in both directions during the outbound peak 10-minutes to the 24-hour volume in both directions. The coefficient of determination for the linear regression line in Figure 34.M is 0.877 and in Figure 34.N is 0.921. Again it is seen that when a simple linear relationship is used to project short-time count volumes to a 24-hour volume, volumes in both directions during a given peak period should be used.

Figures 33.S and 33.T represent the linear relationship of the 2-hour peak volume to the 24-hour volume for the inbound and outbound directions. The coefficient of determination of the linear regression line in Figure 33.S is 0.723 and in Figure 33.T is 0.724. Figures 34.S and 34.T represent the linear relationship of the 2-hour volume in both directions during the inbound and outbound peak 2-hour period to the 24-hour volume in both directions. The coefficient of determination of the linear regression line in Figure 34.S is 0.932 and in Figure 34.T is 0.950. When estimating a 24-hour volume from a short-time count volume by simple linear methods, volumes in both directions should be used.

Table 3 lists the coefficient of determination, coefficient of correlation, and the standard error of the estimate for the linear regression relationships shown in Figures 33.A through 33.T. Table 4 lists the coefficient of determination, coefficient of correlation and the standard error of the estimate for the linear regression relationships shown in Figures 34.A through 34.T.

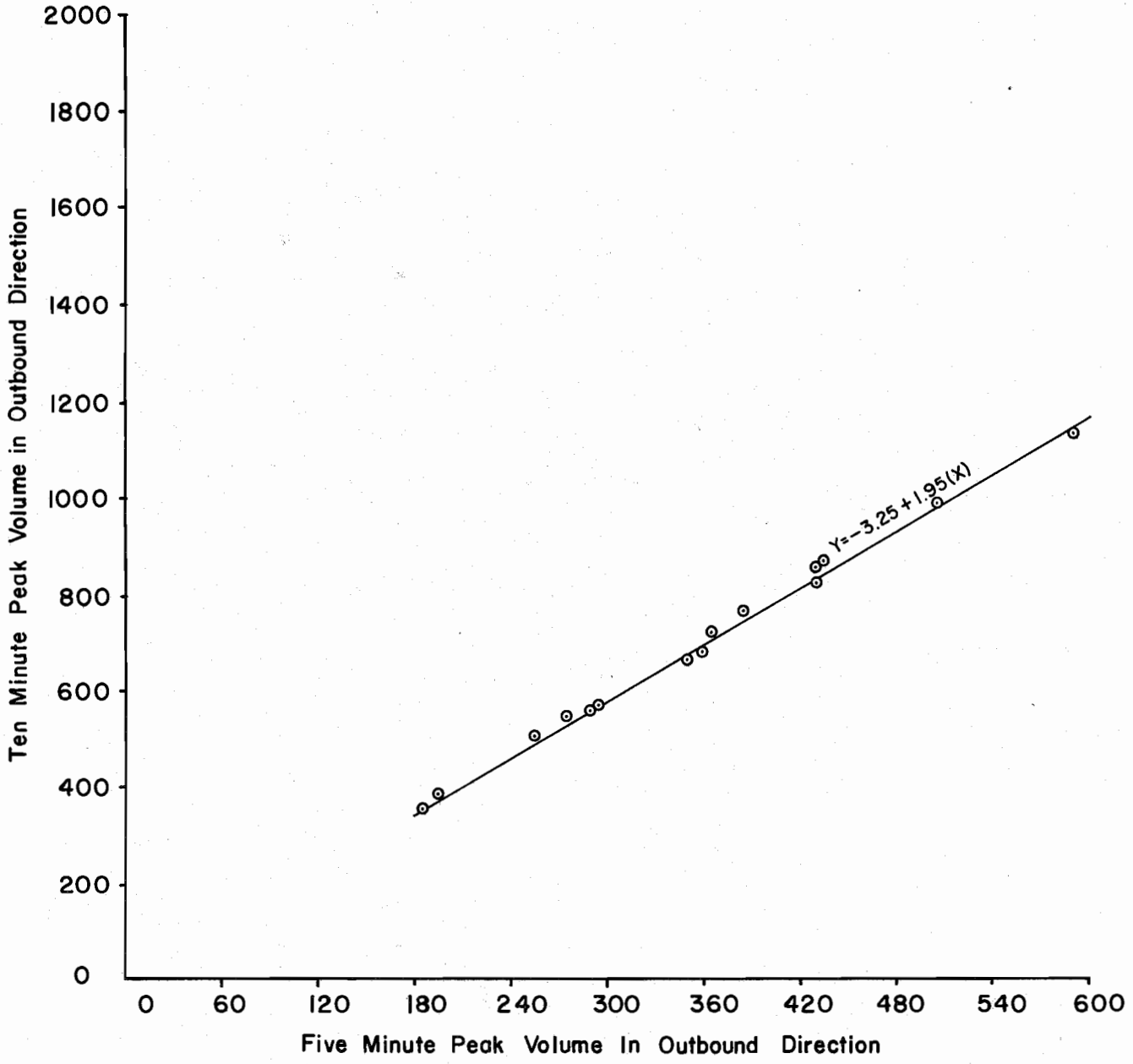
Table 5 lists the percent that the short-time count volume will be of the long-time count volume for directional volumes. The reciprocal

of the slope of each of the linear regression lines in Figures 33.A through 33.T was calculated and is expressed as a percent in Table 5. Table 6 lists the percent that the short-time count volume will be of the long-time count volume for volumes in both directions. Again the reciprocal of the slope of each of the linear regression lines in Figures 34.A through 34.T was calculated and is expressed as a percent in Table 6.



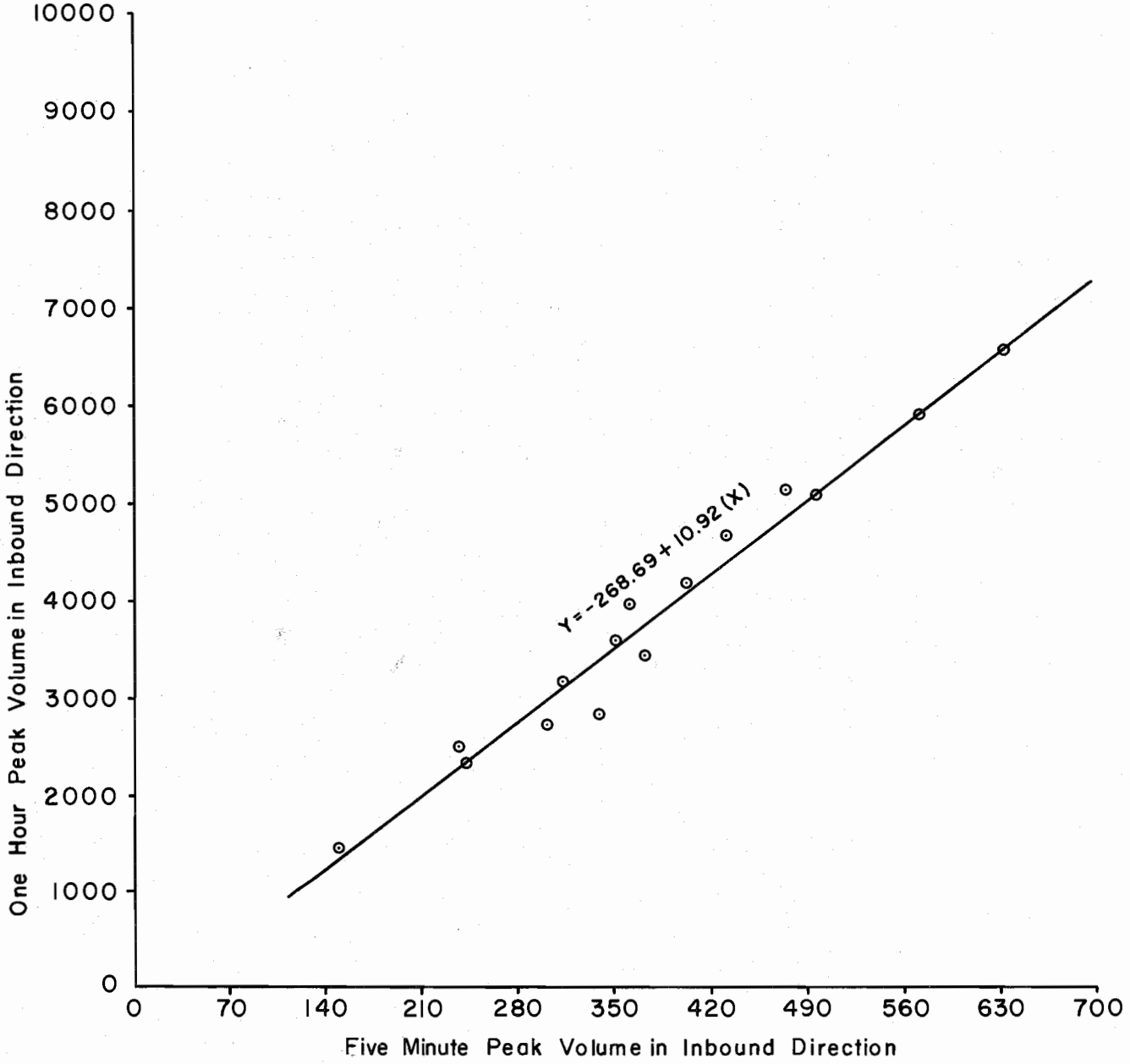
VOLUME CORRELATION BY DIRECTION

FIGURE 33.A



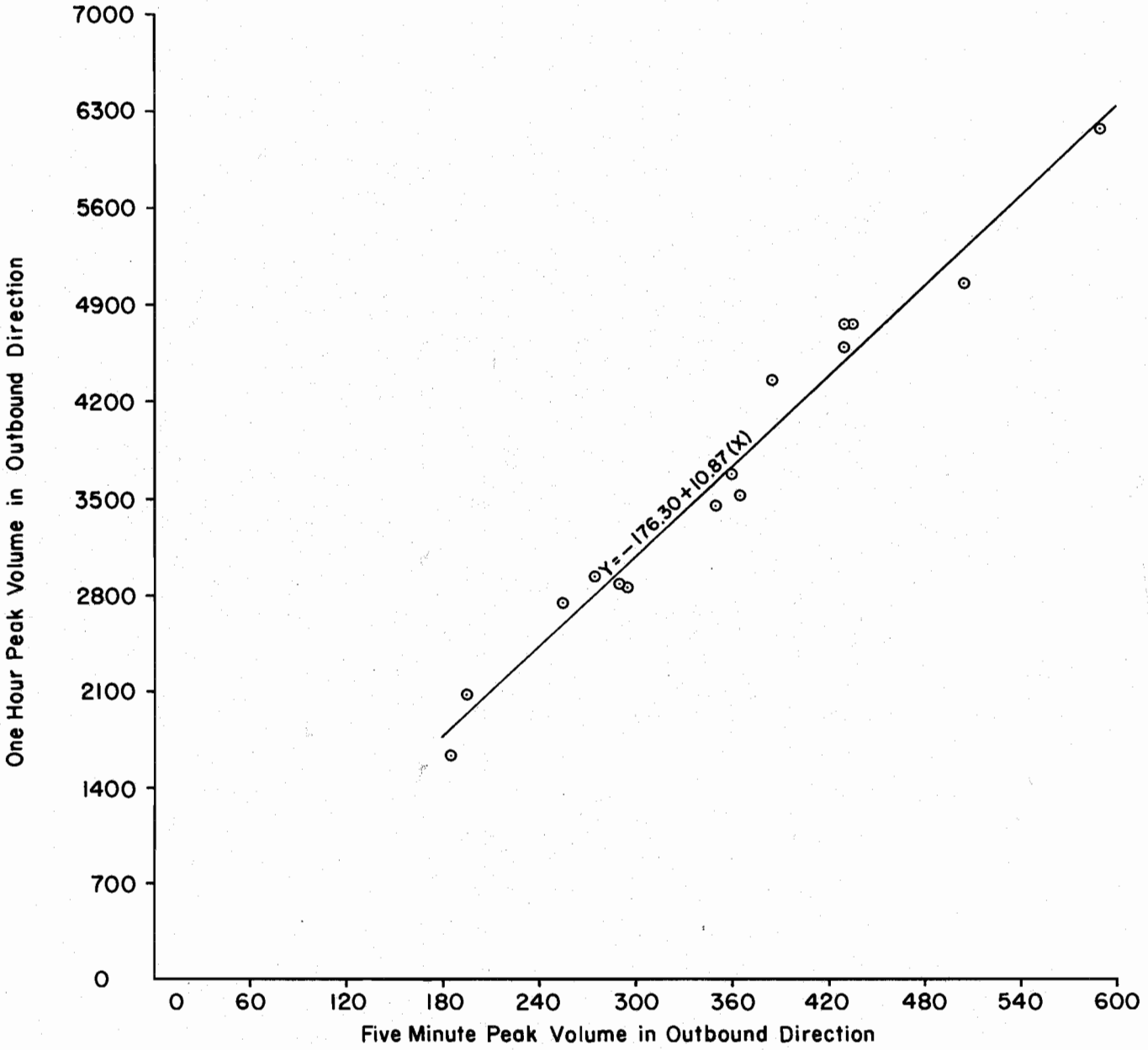
VOLUME CORRELATION BY DIRECTION

FIGURE 33. B



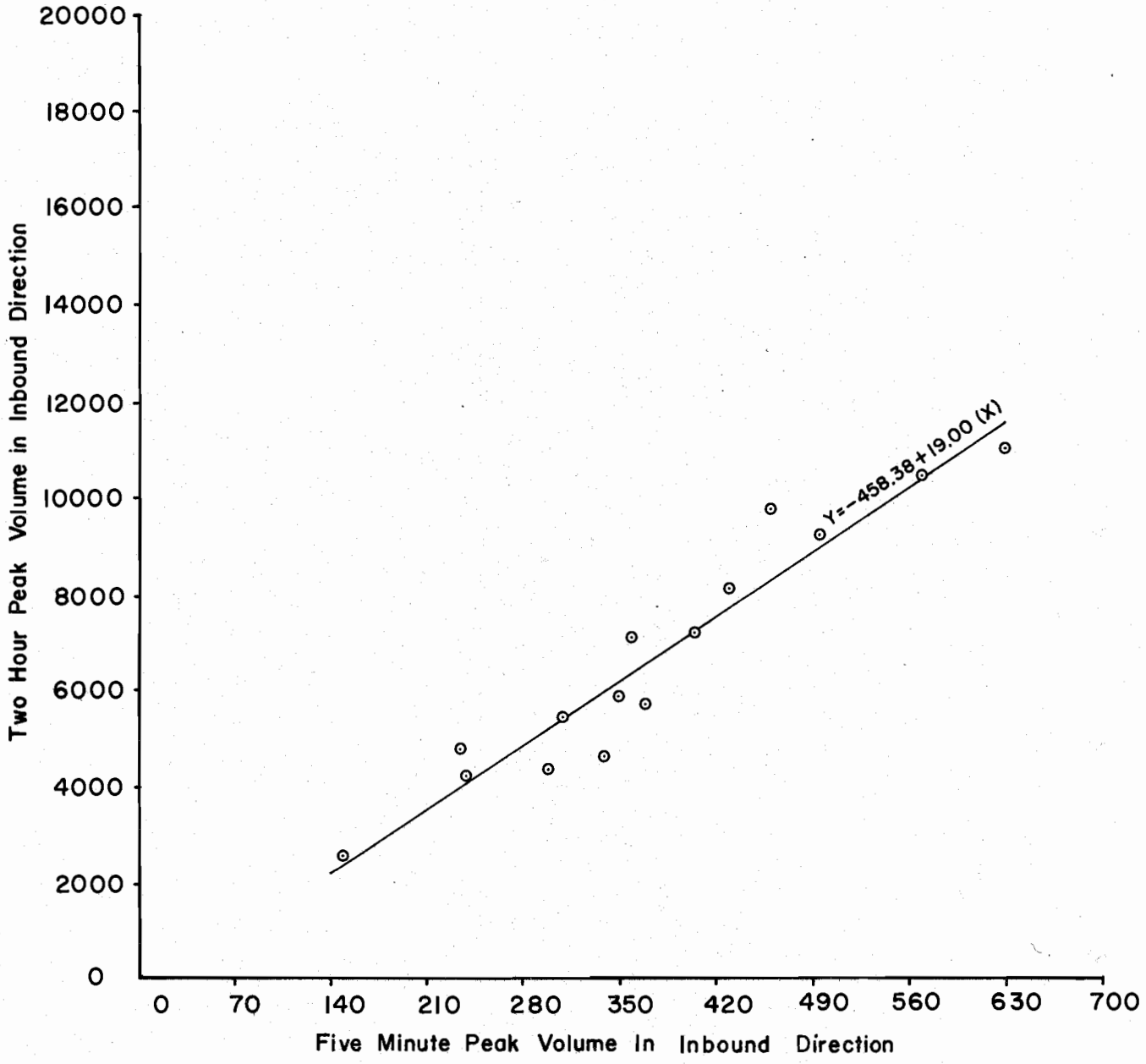
VOLUME CORRELATION BY DIRECTION

FIGURE 33. C



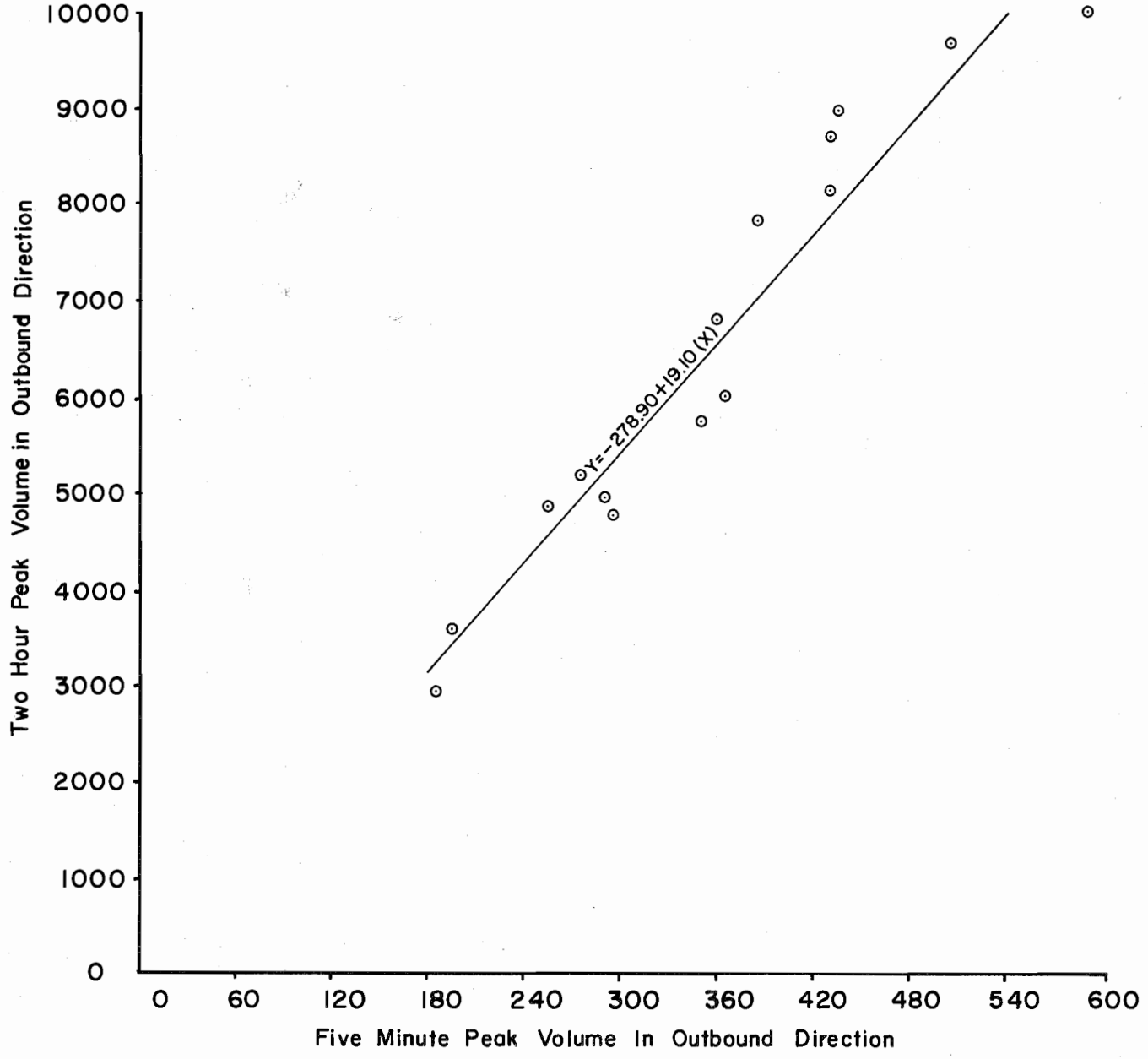
VOLUME CORRELATION BY DIRECTION

FIGURE 33. D



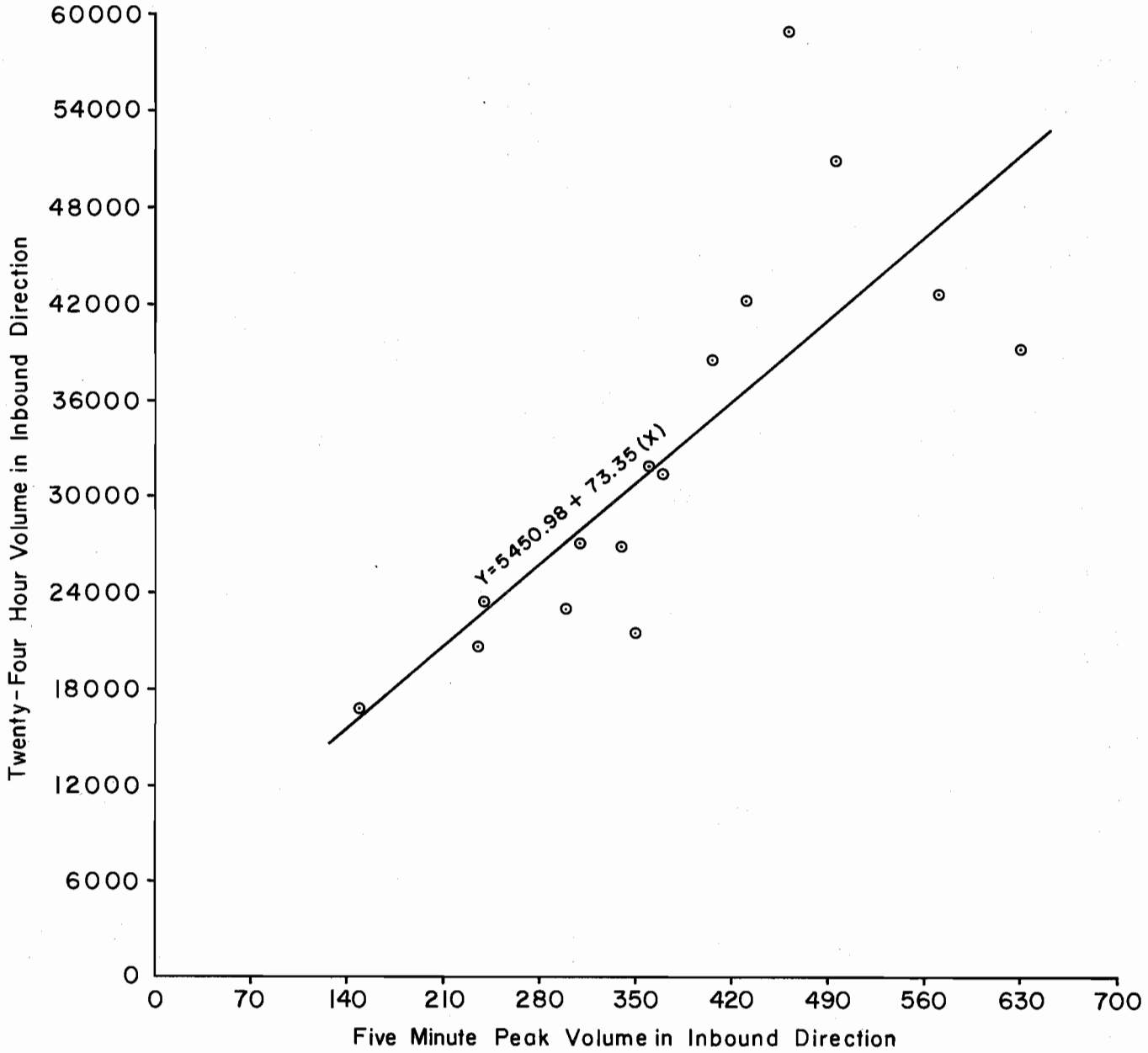
VOLUME CORRELATION BY DIRECTION

FIGURE 33. E



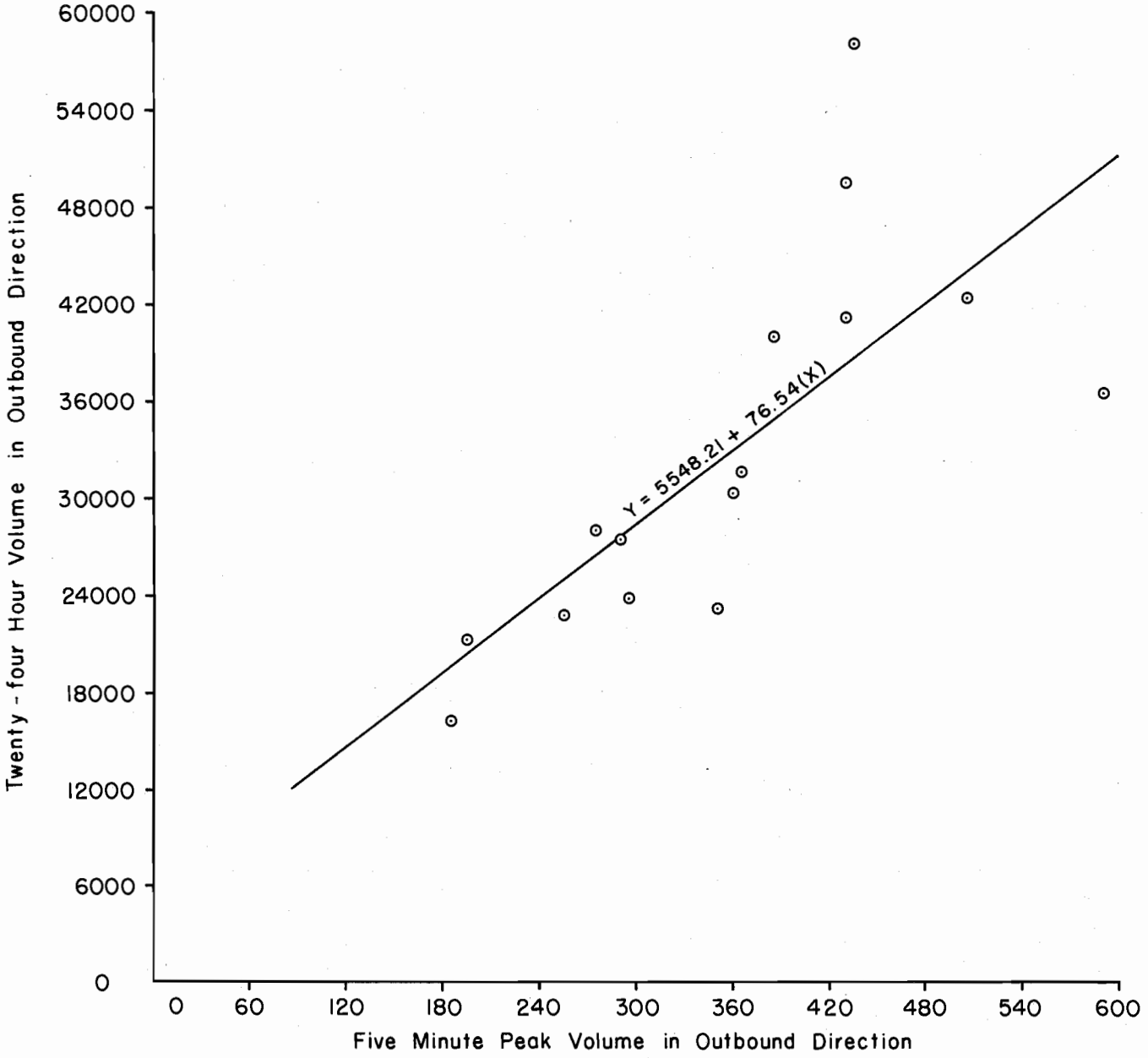
VOLUME CORRELATION BY DIRECTION

FIGURE 33.F



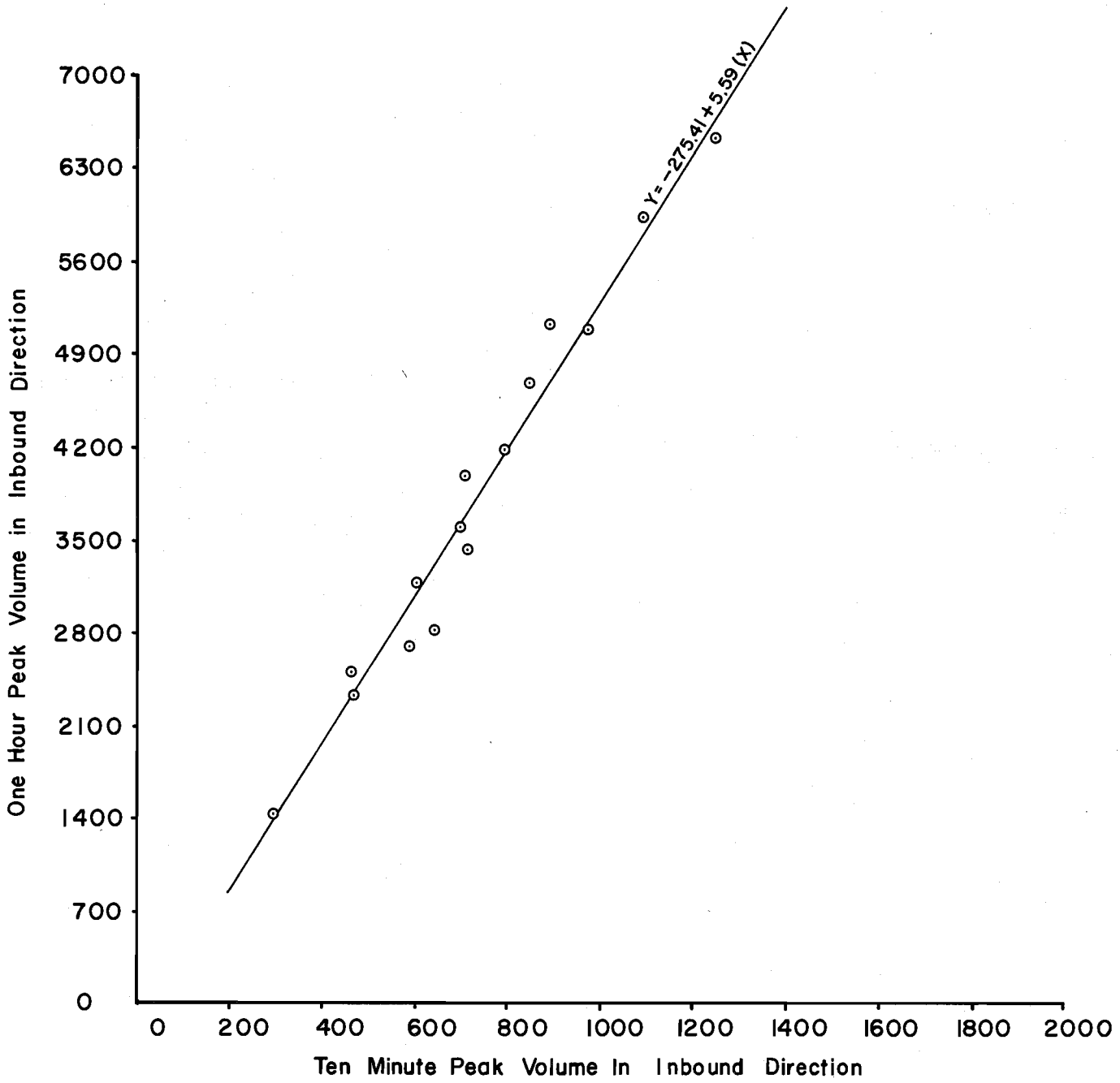
VOLUME CORRELATION BY DIRECTION

FIGURE 33.G



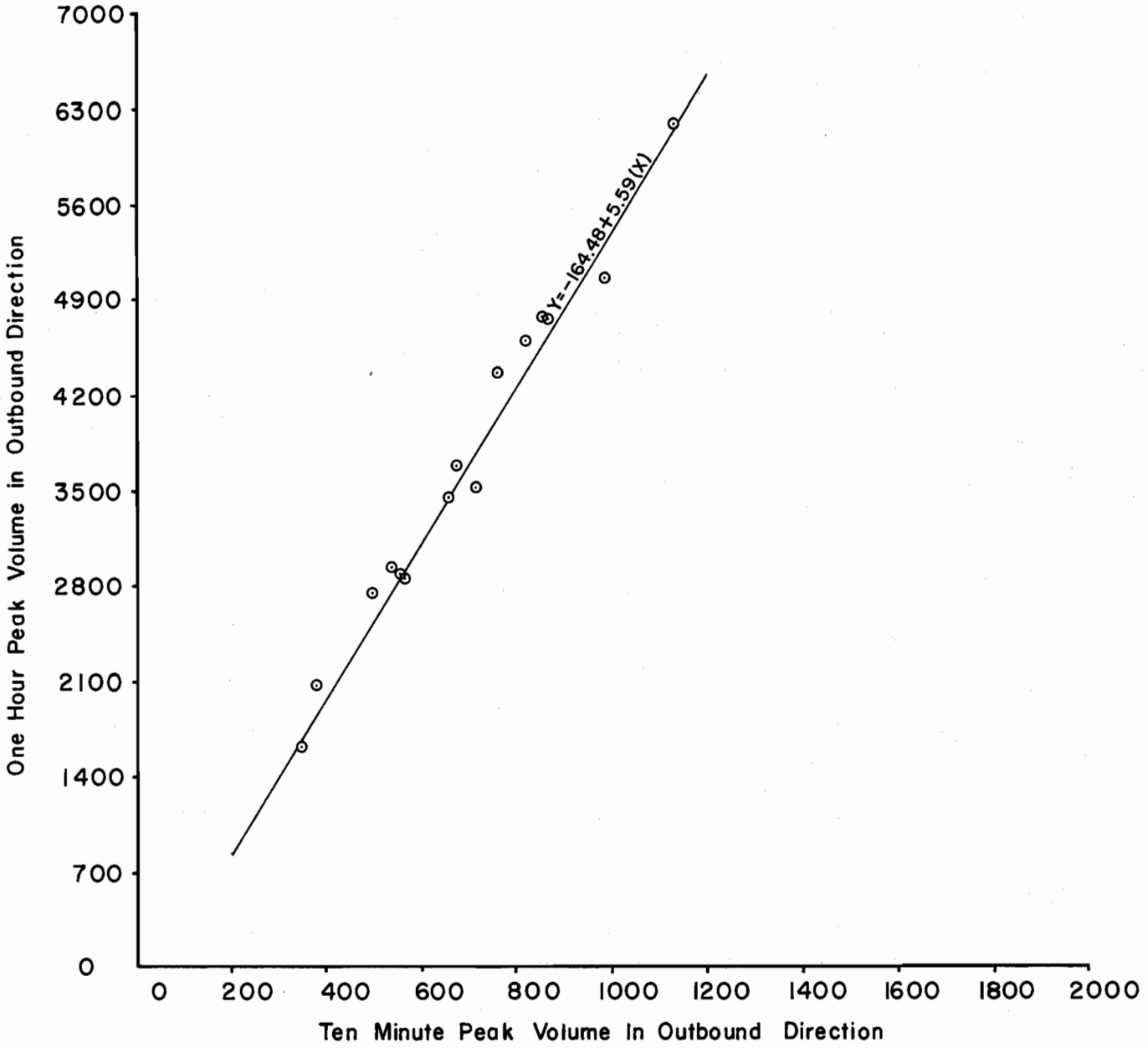
VOLUME CORRELATION BY DIRECTION

FIGURE 33. H



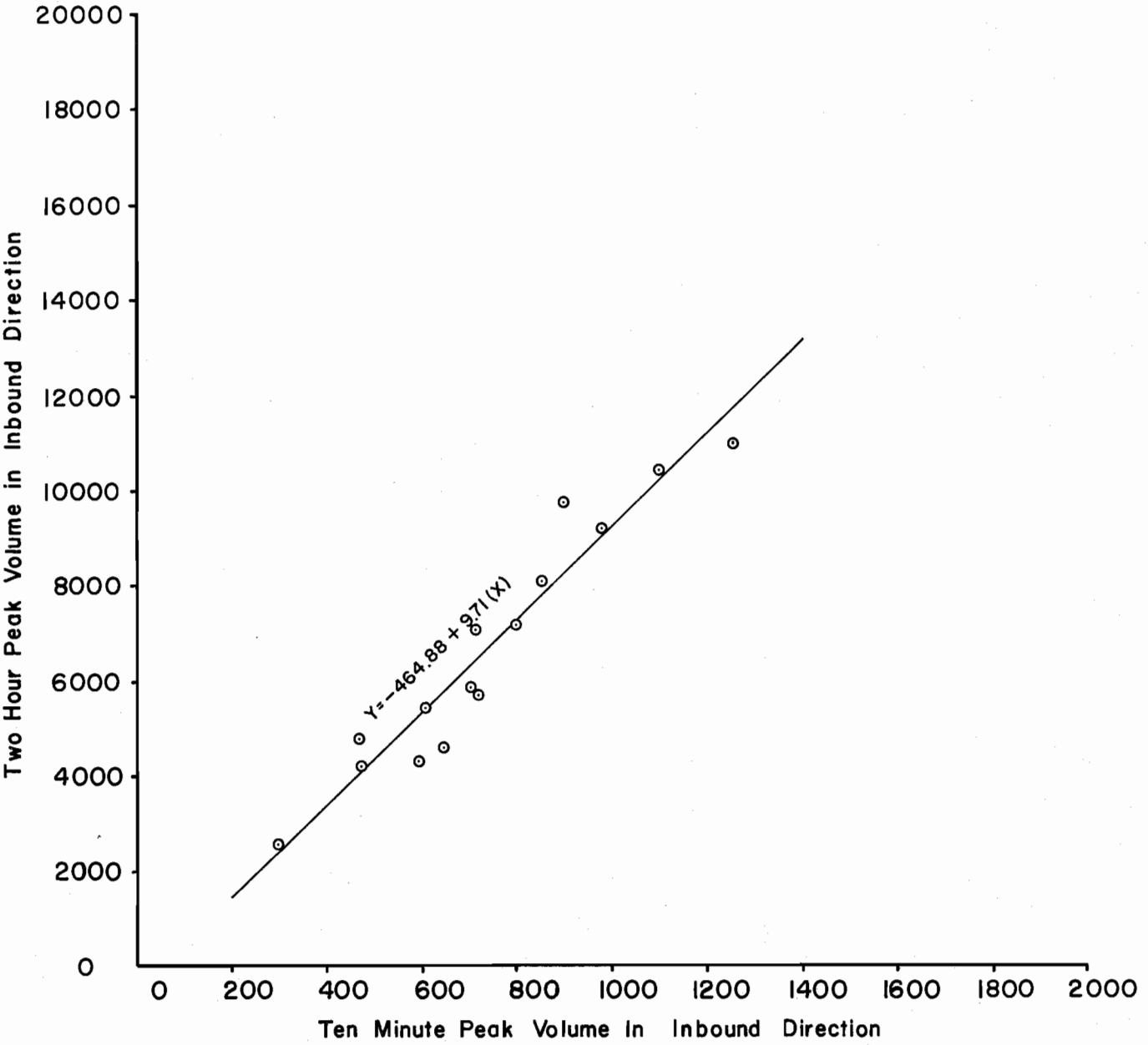
VOLUME CORRELATION BY DIRECTION

FIGURE 33. I



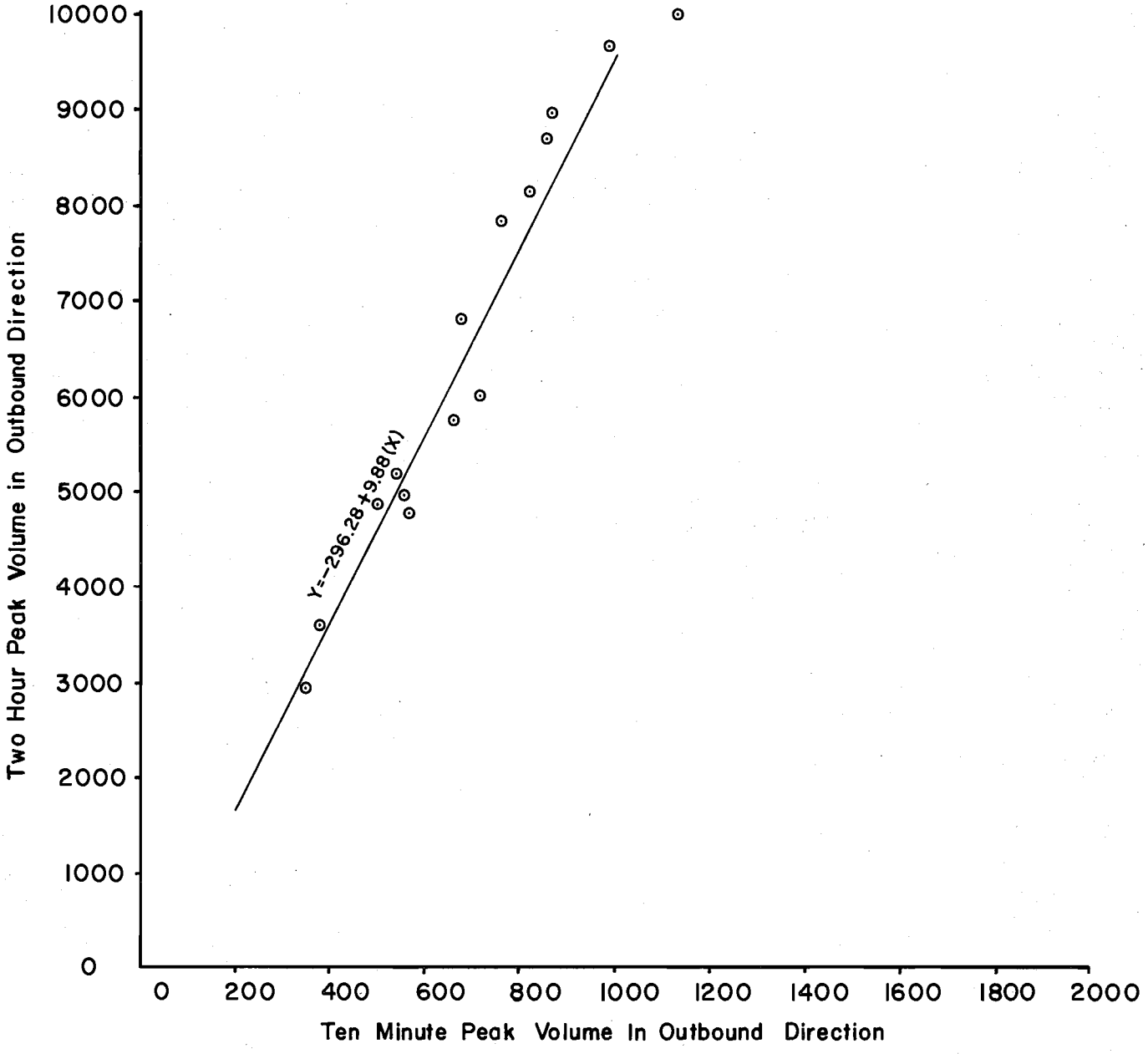
VOLUME CORRELATION BY DIRECTION

FIGURE 33.J



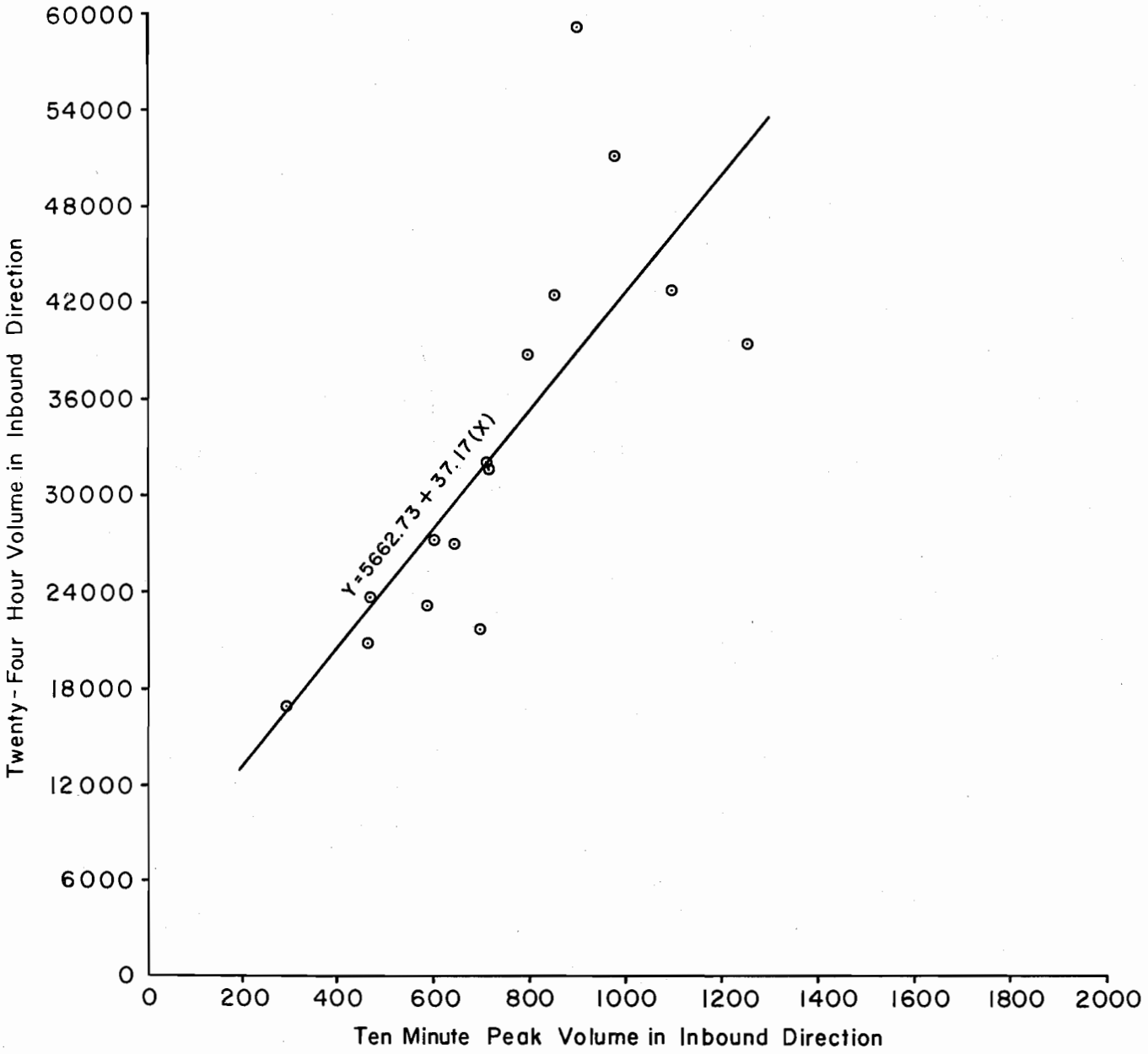
VOLUME CORRELATION BY DIRECTION

FIGURE 33.K



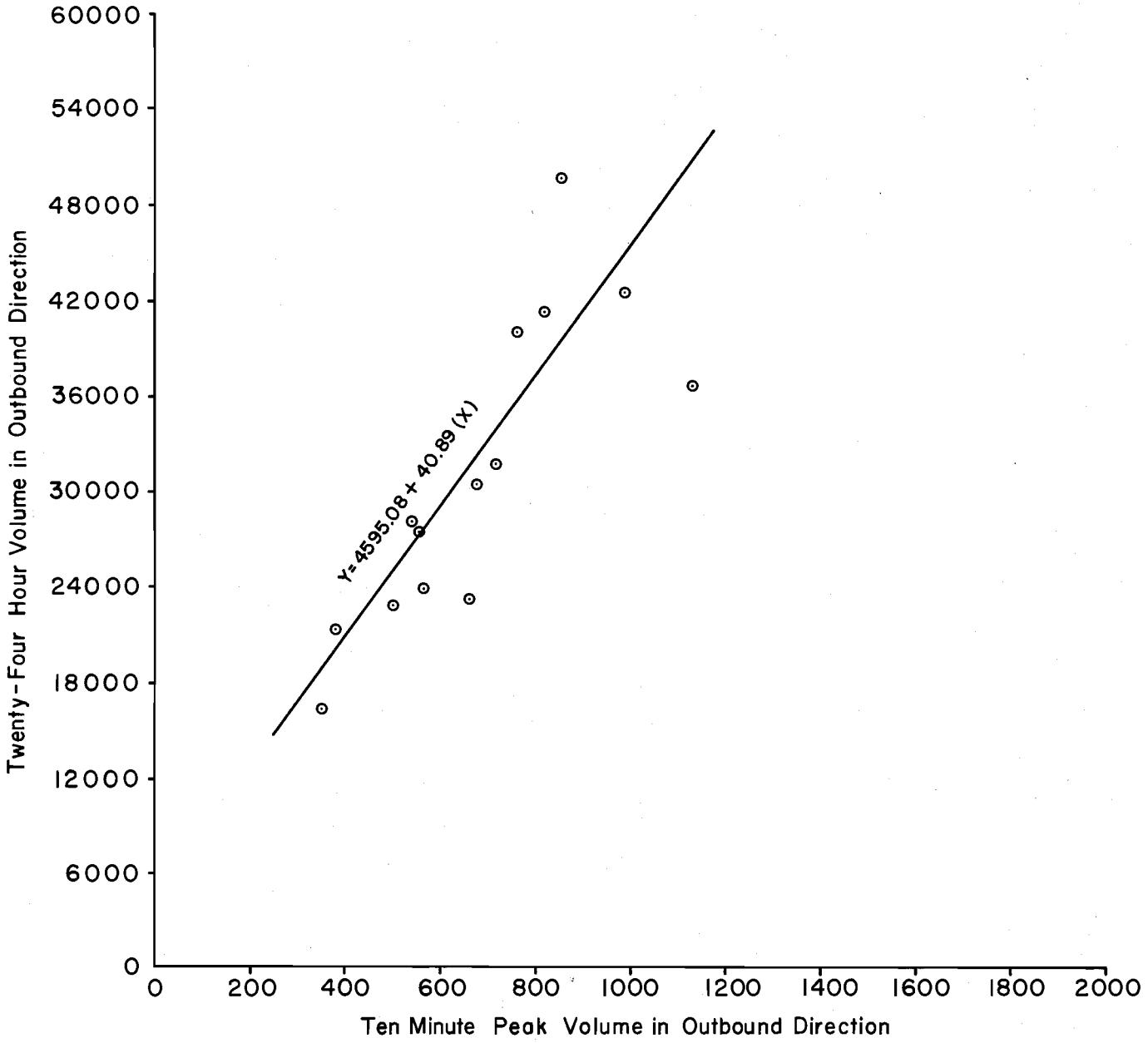
VOLUME CORRELATION BY DIRECTION

FIGURE 33.L



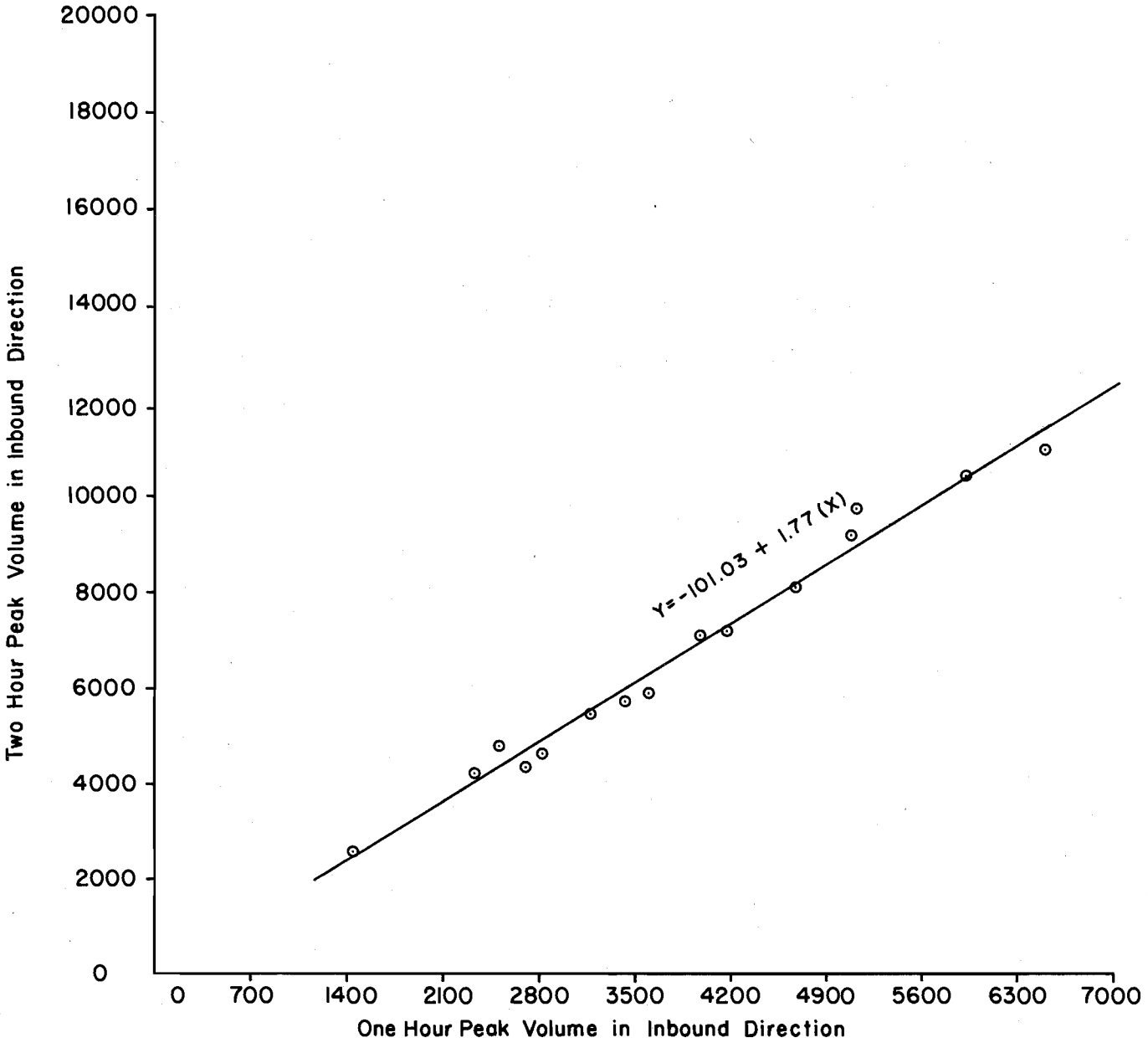
VOLUME CORRELATION BY DIRECTION

FIGURE 33.M



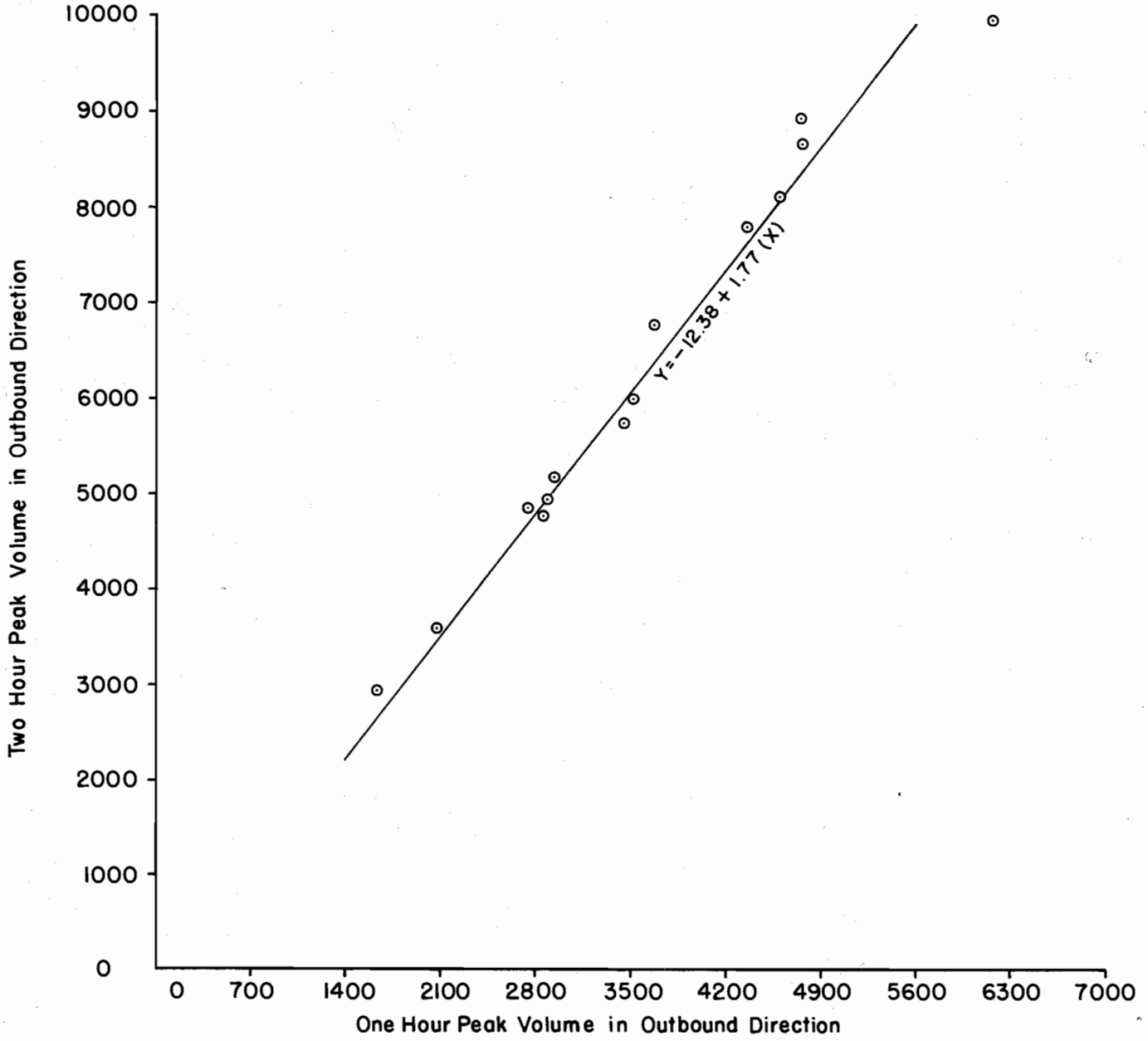
VOLUME CORRELATION BY DIRECTION

FIGURE 33.N



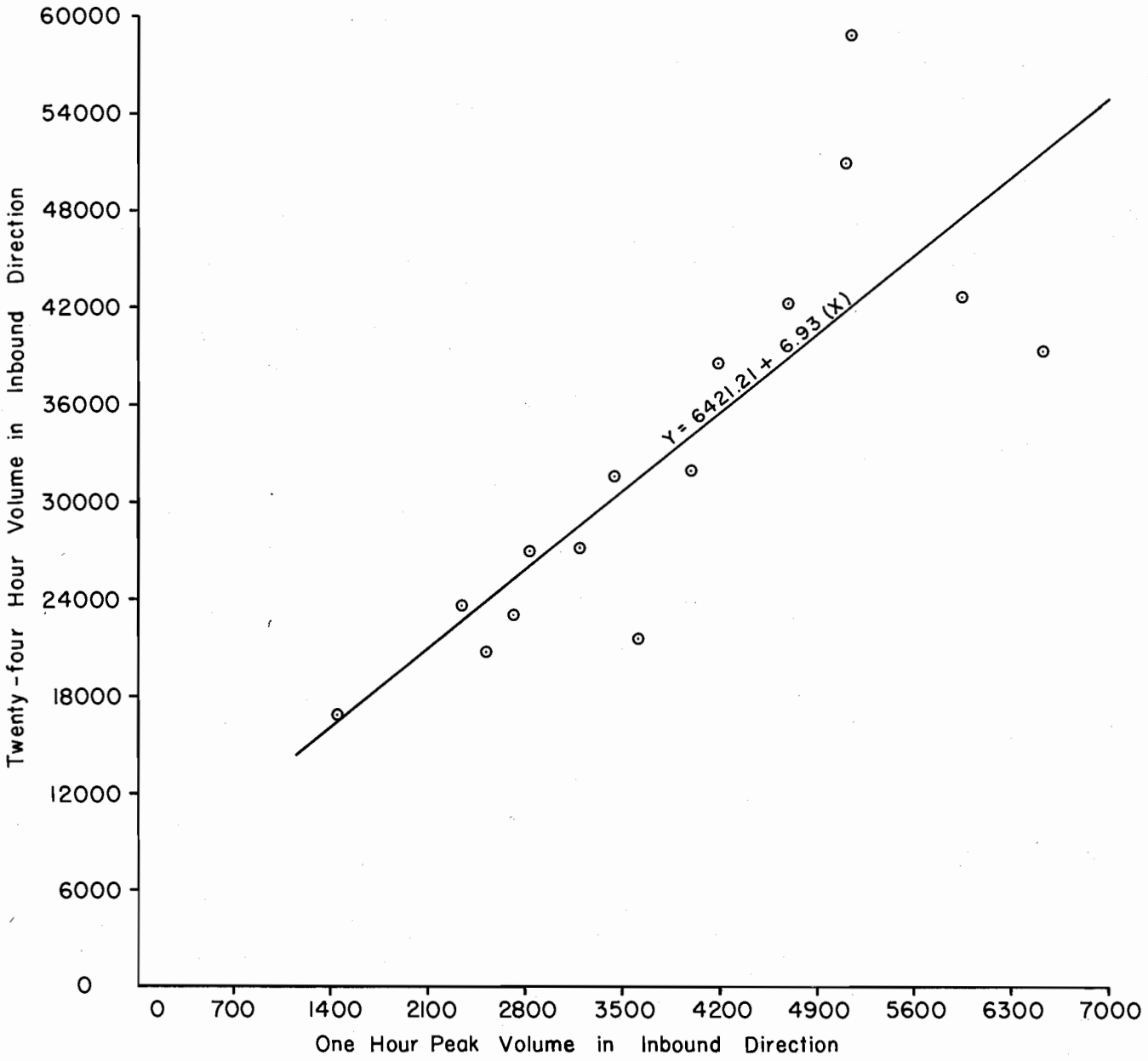
VOLUME CORRELATION BY DIRECTION

FIGURE 33.0



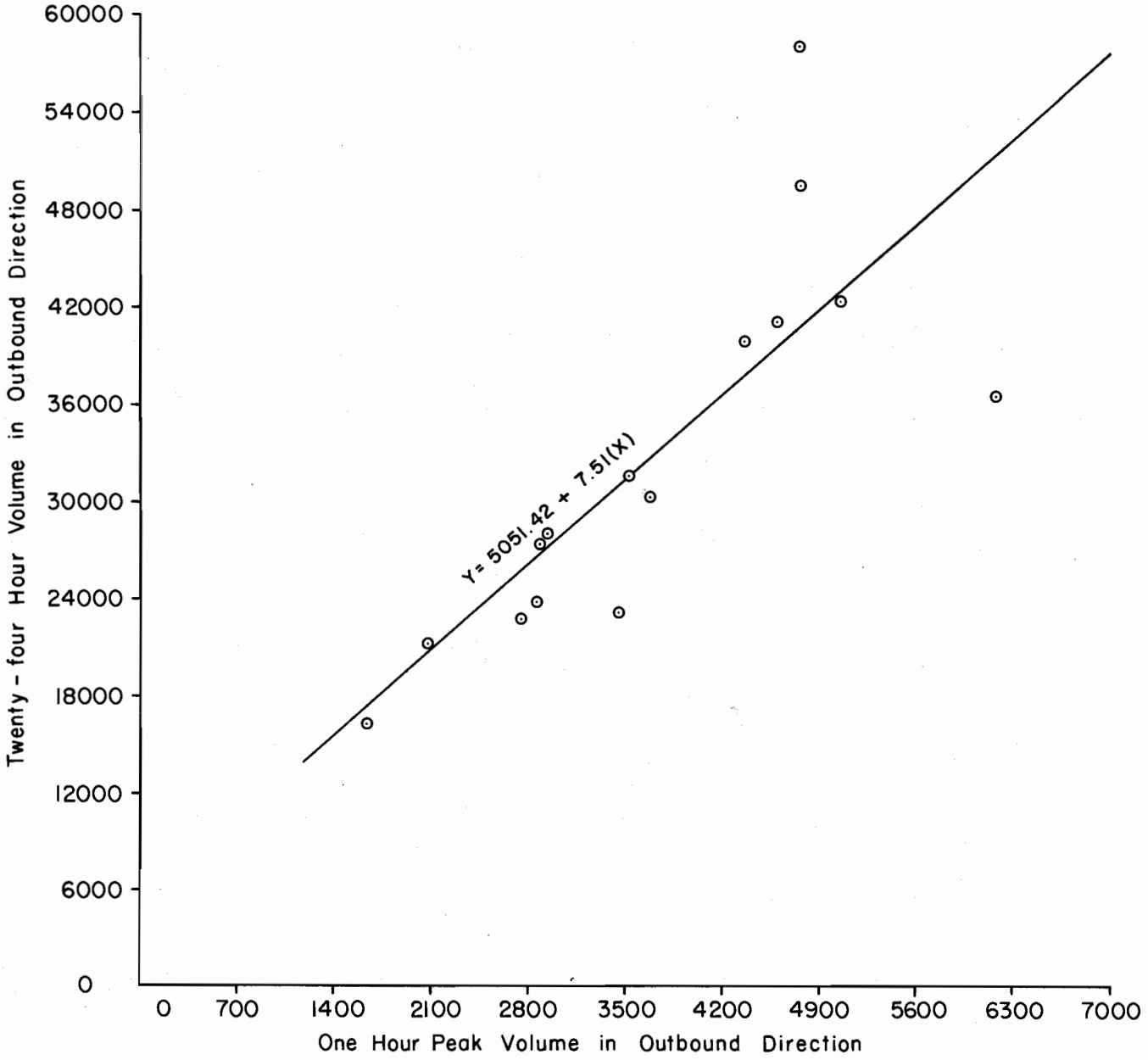
VOLUME CORRELATION BY DIRECTION

FIGURE 33.P



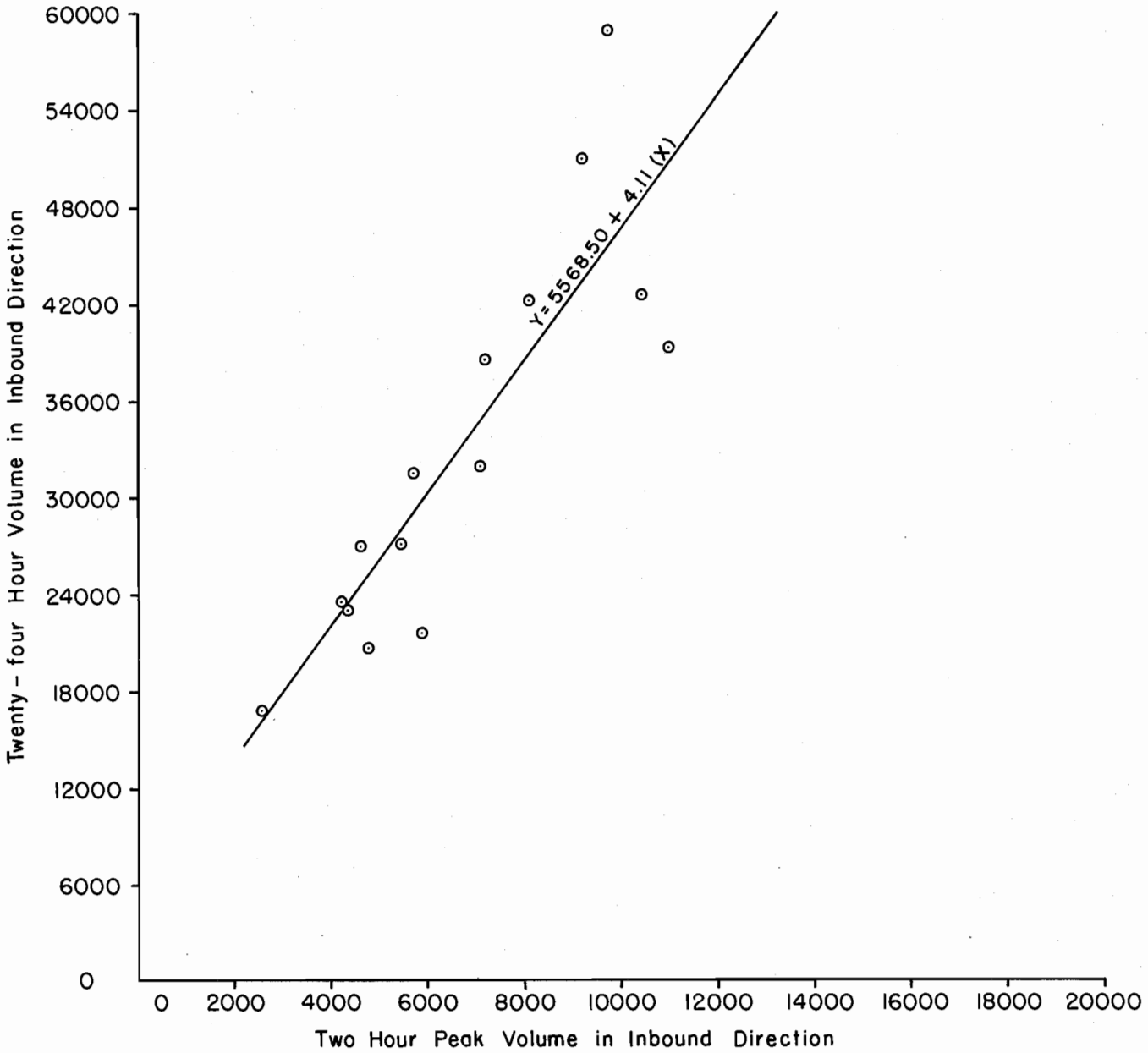
VOLUME CORRELATION BY DIRECTION

FIGURE 33.Q



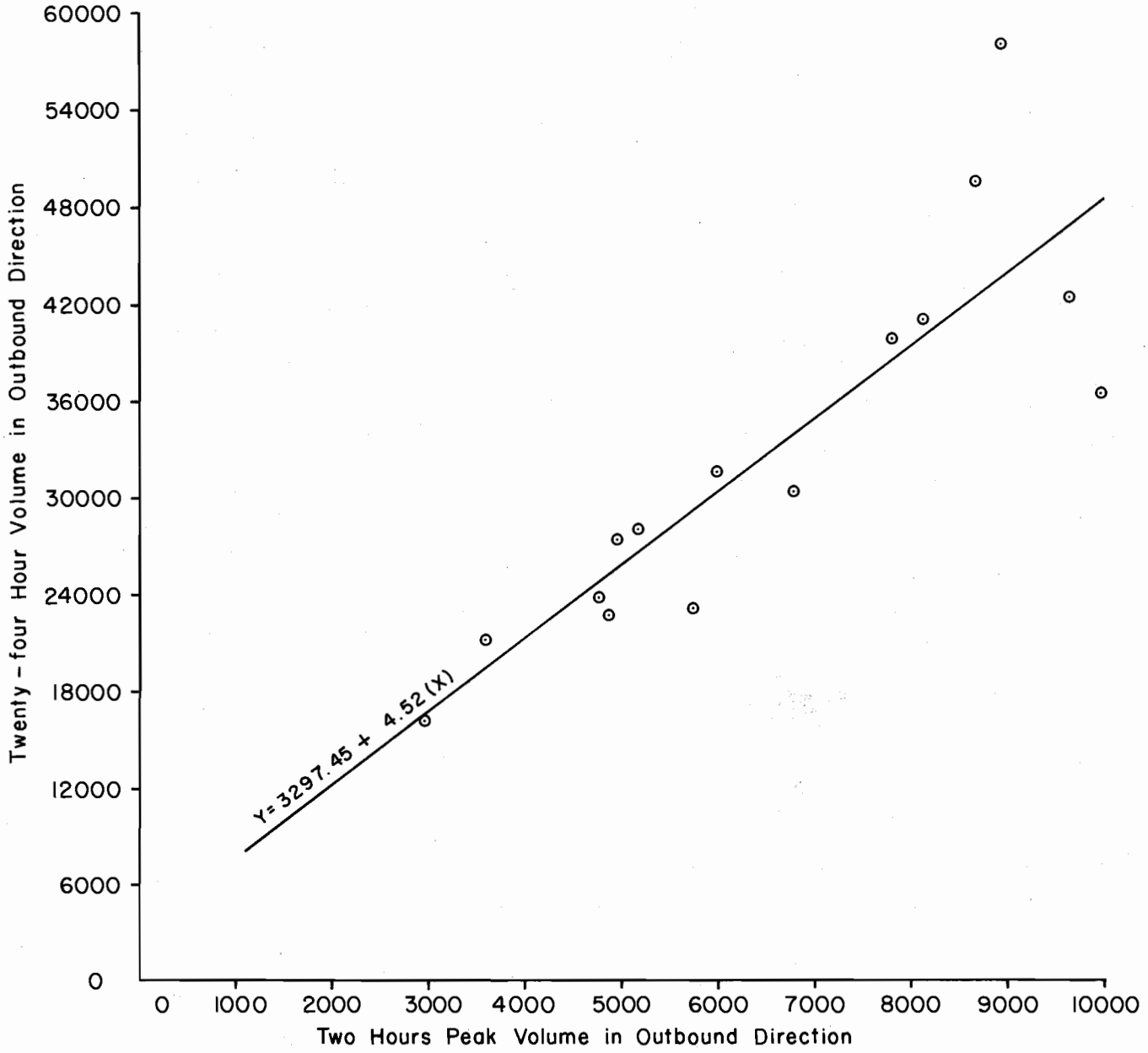
VOLUME CORRELATION BY DIRECTION

FIGURE 33. R



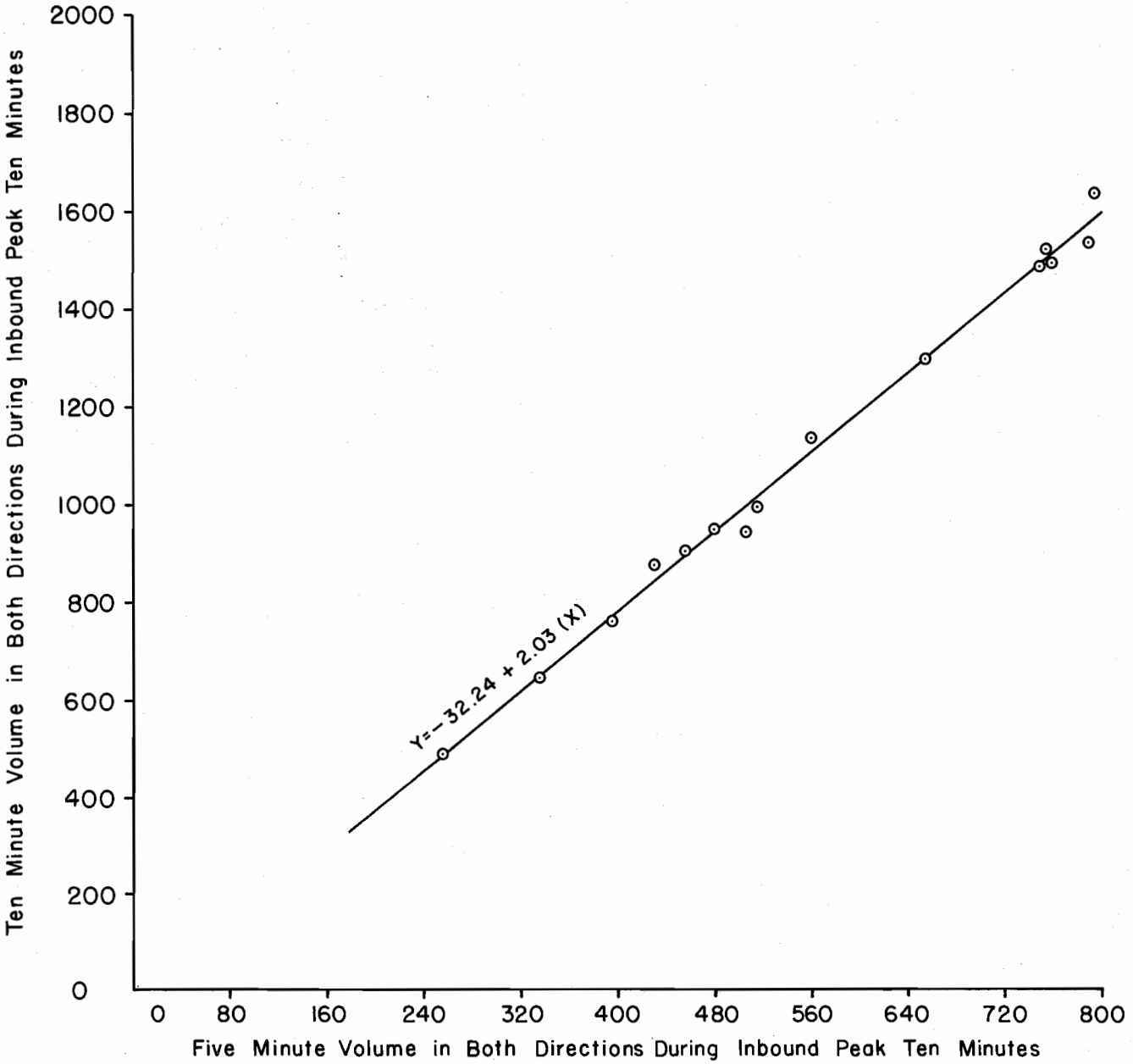
VOLUME CORRELATION BY DIRECTION

FIGURE 33. S



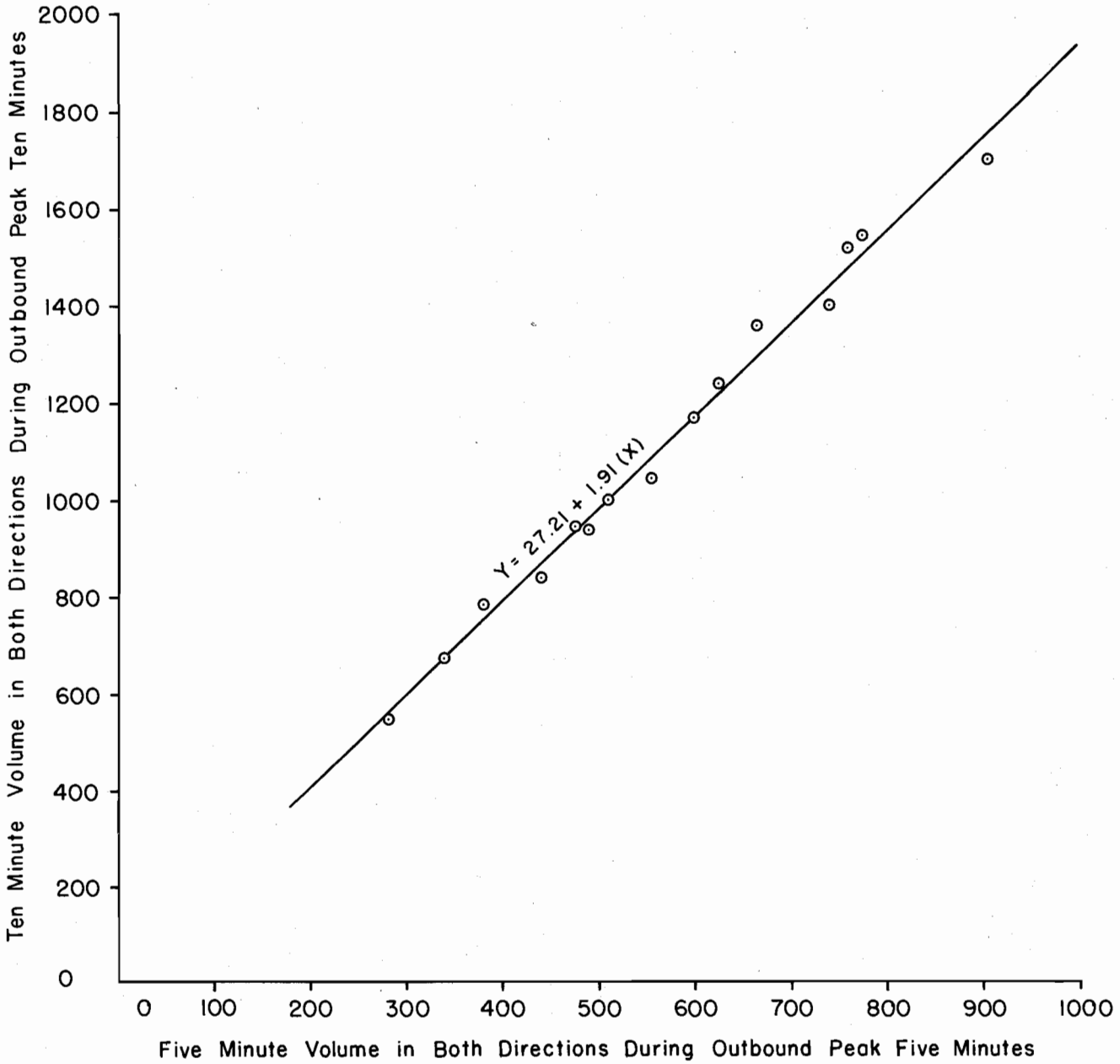
VOLUME CORRELATION BY DIRECTION

FIGURE 33. T



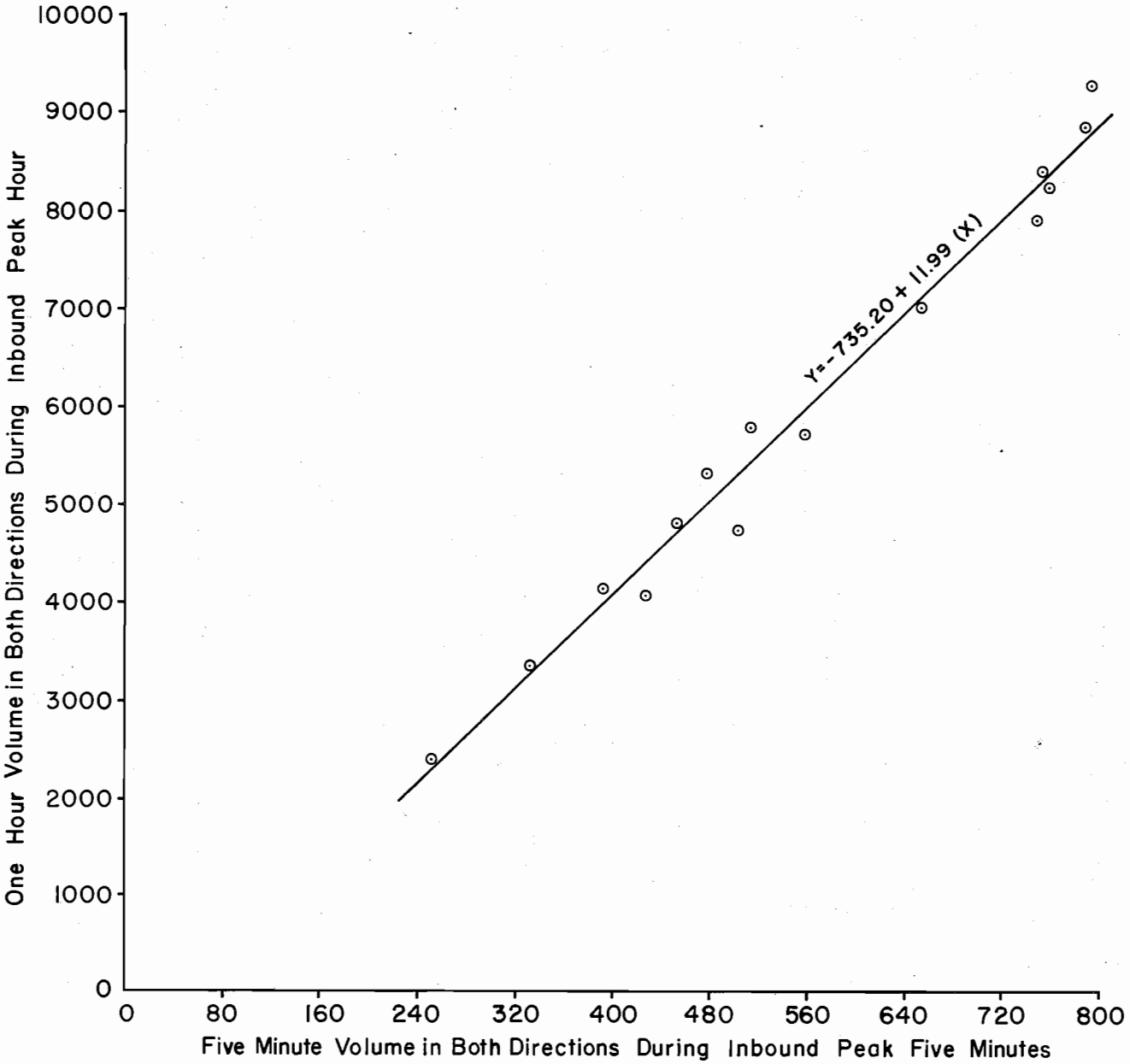
TOTAL VOLUME CORRELATION

FIGURE 34. A



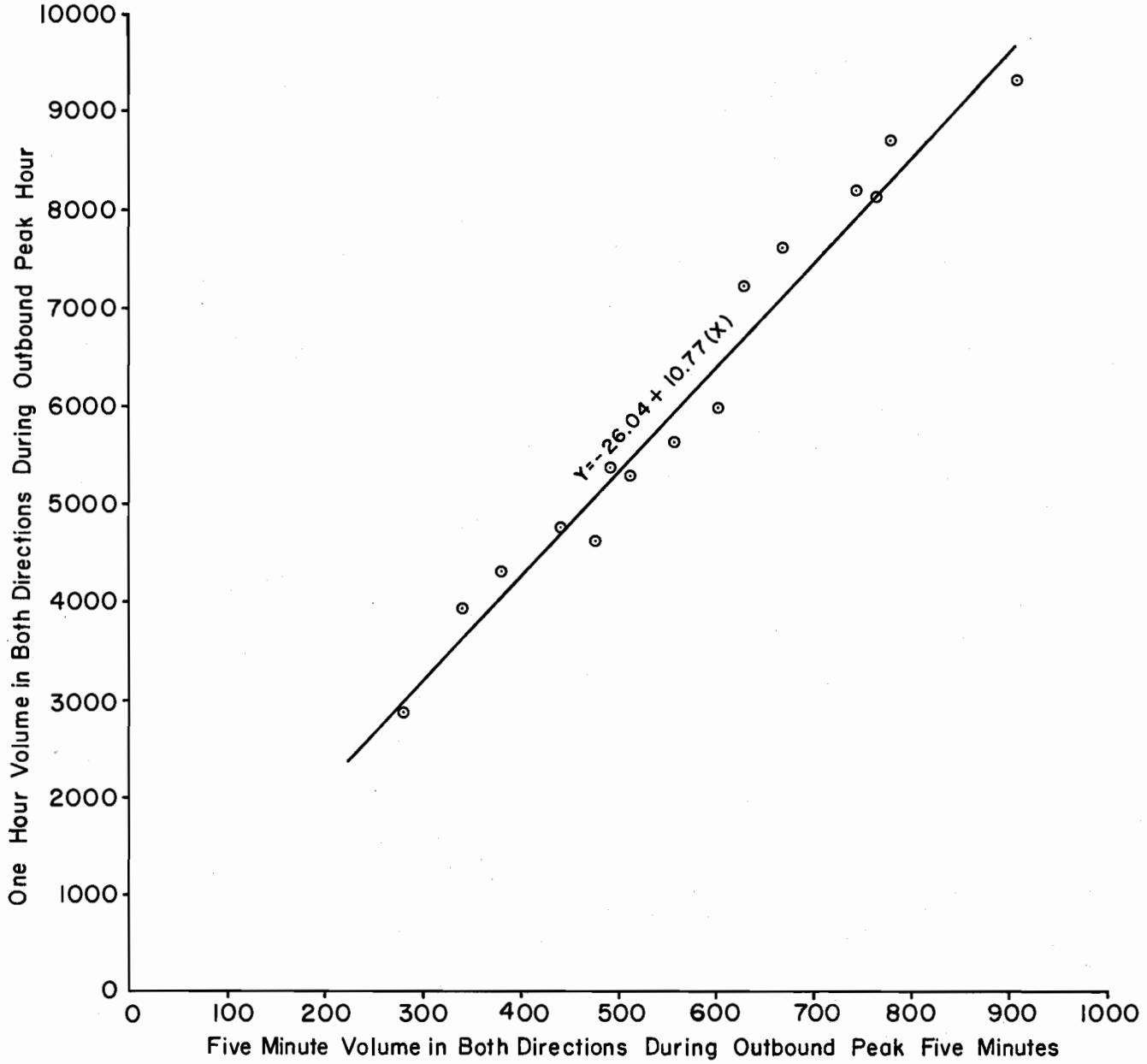
TOTAL VOLUME CORRELATION

FIGURE 34.B



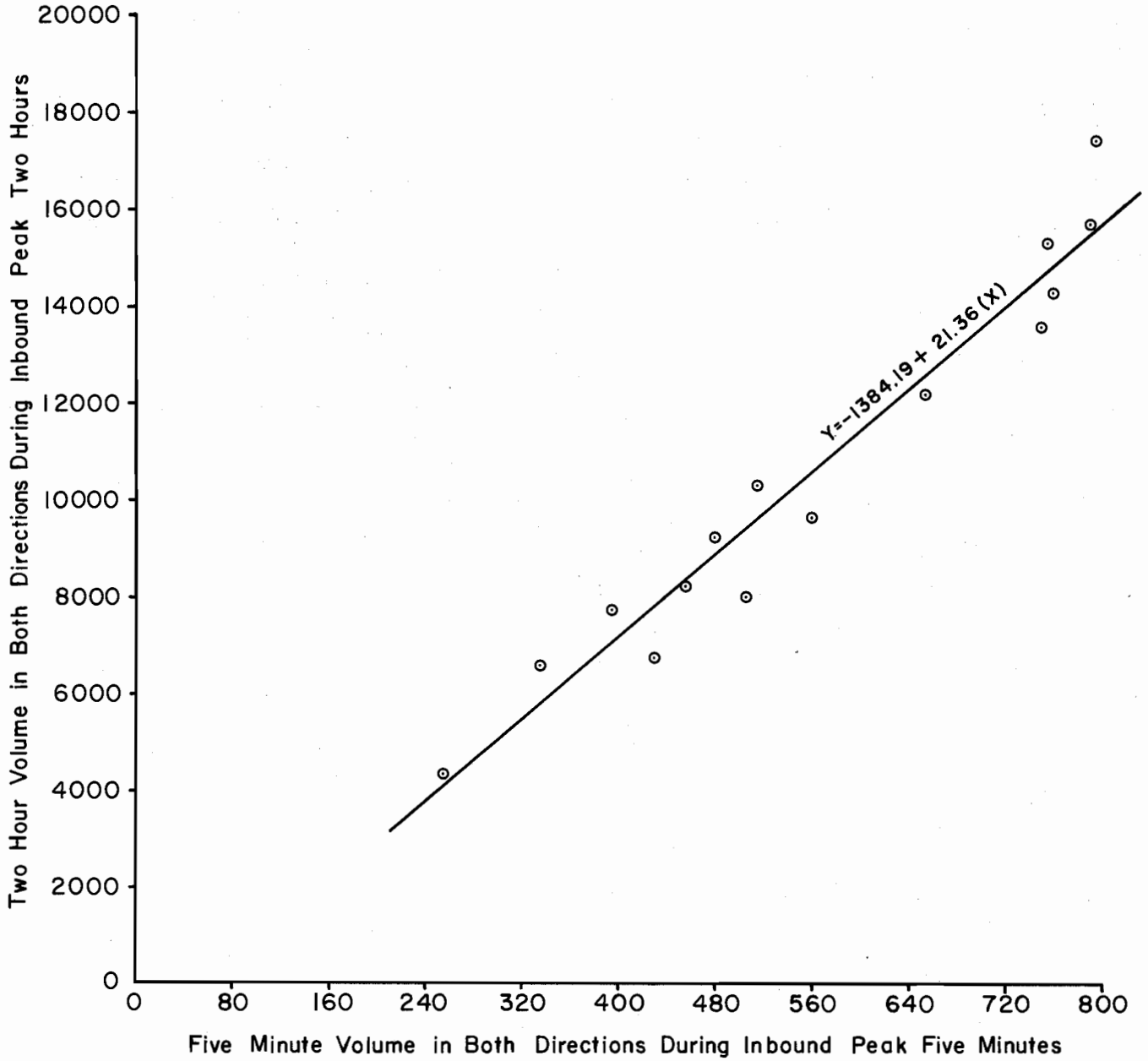
TOTAL VOLUME CORRELATION

FIGURE 34.C



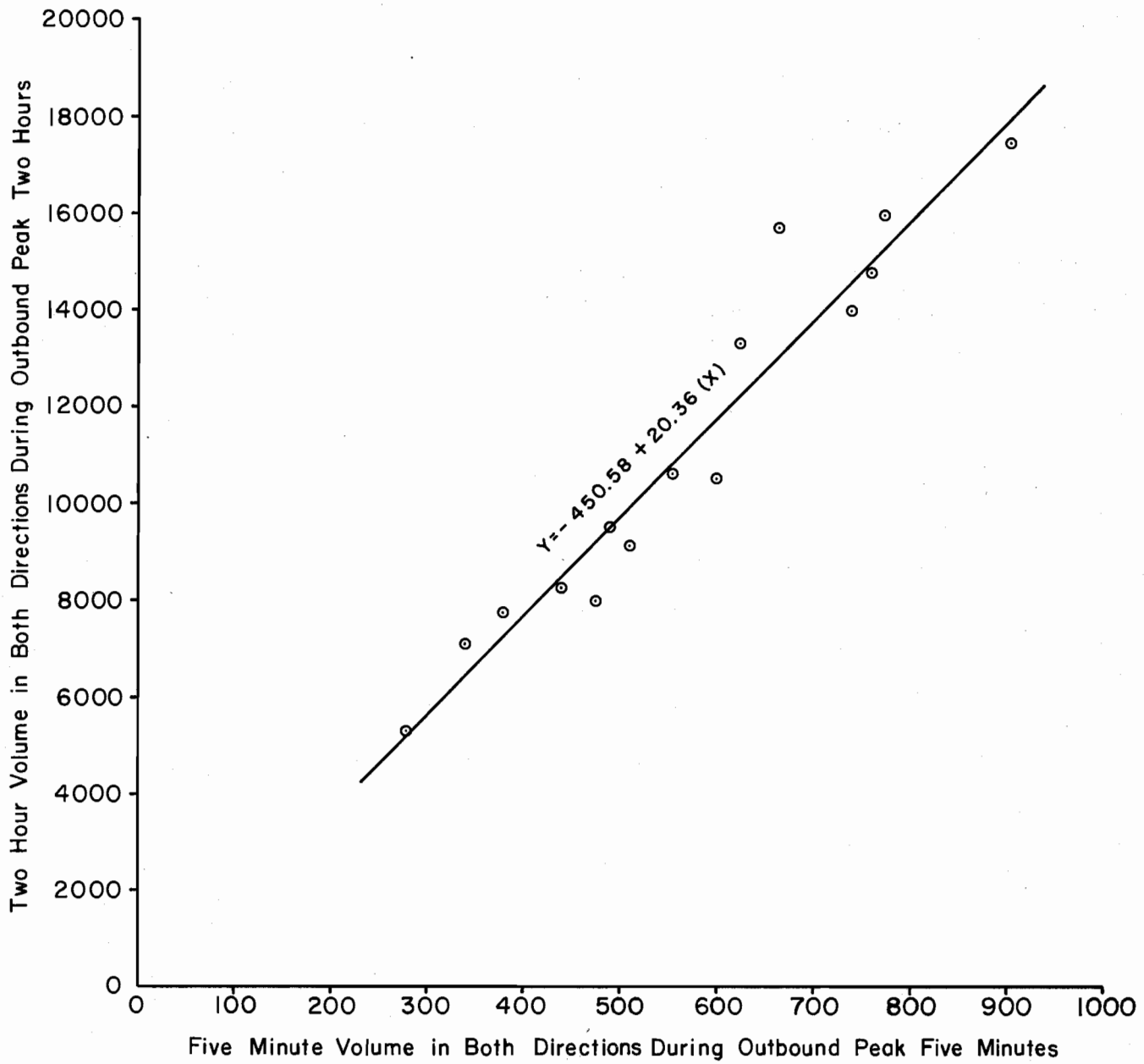
TOTAL VOLUME CORRELATION

FIGURE 34.D



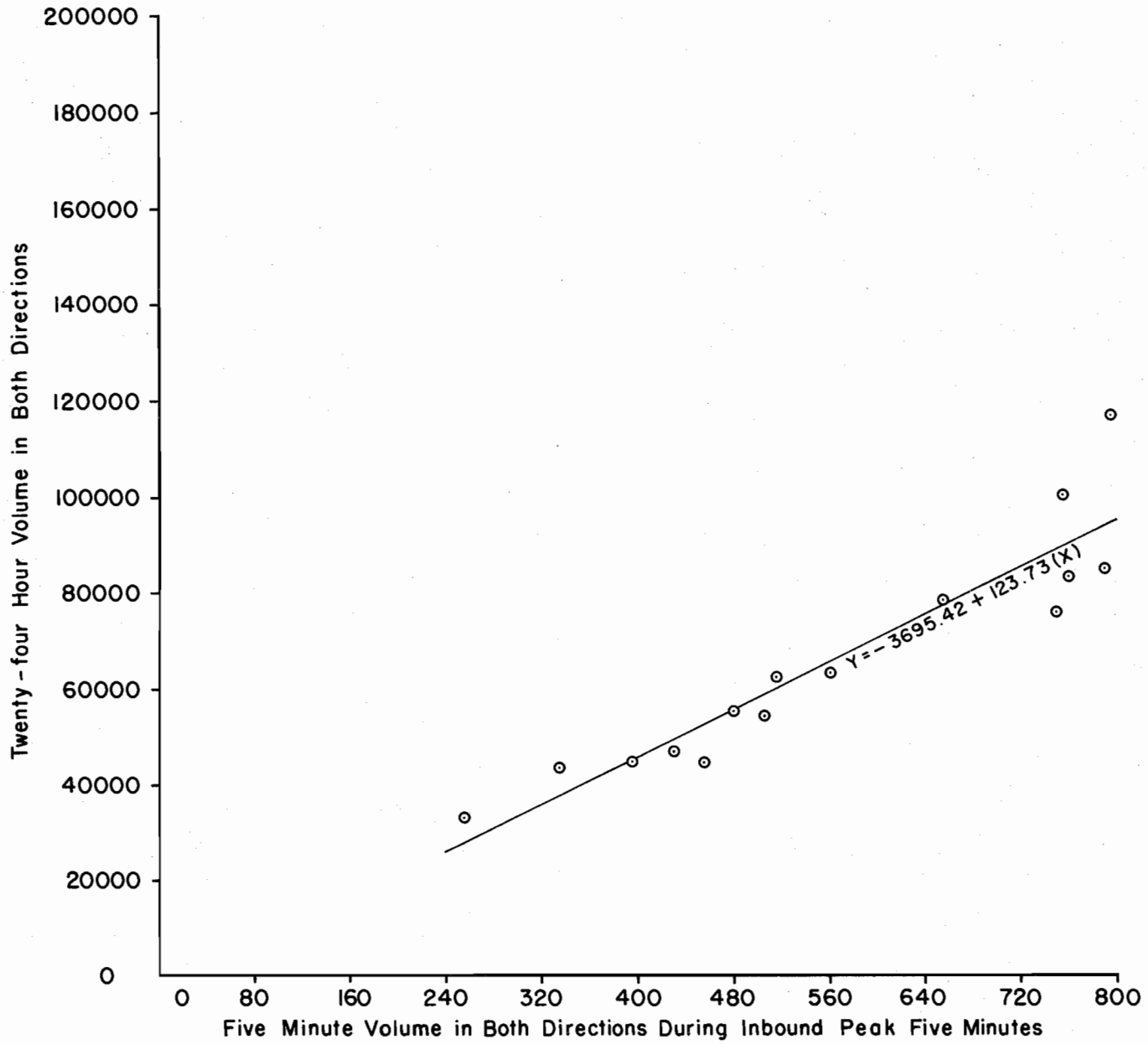
TOTAL VOLUME CORRELATION

FIGURE 34.E



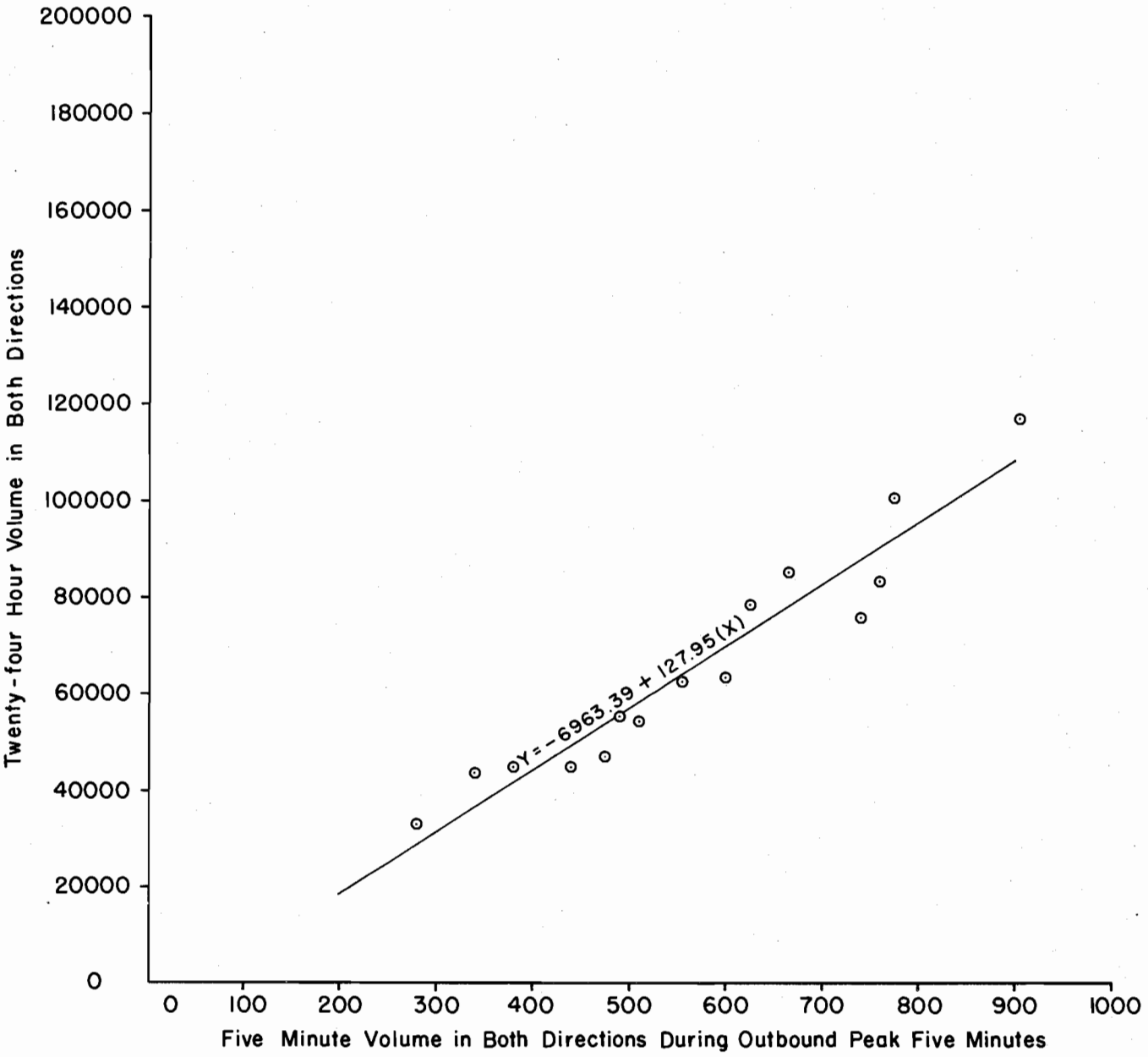
TOTAL VOLUME CORRELATION

FIGURE 34.F



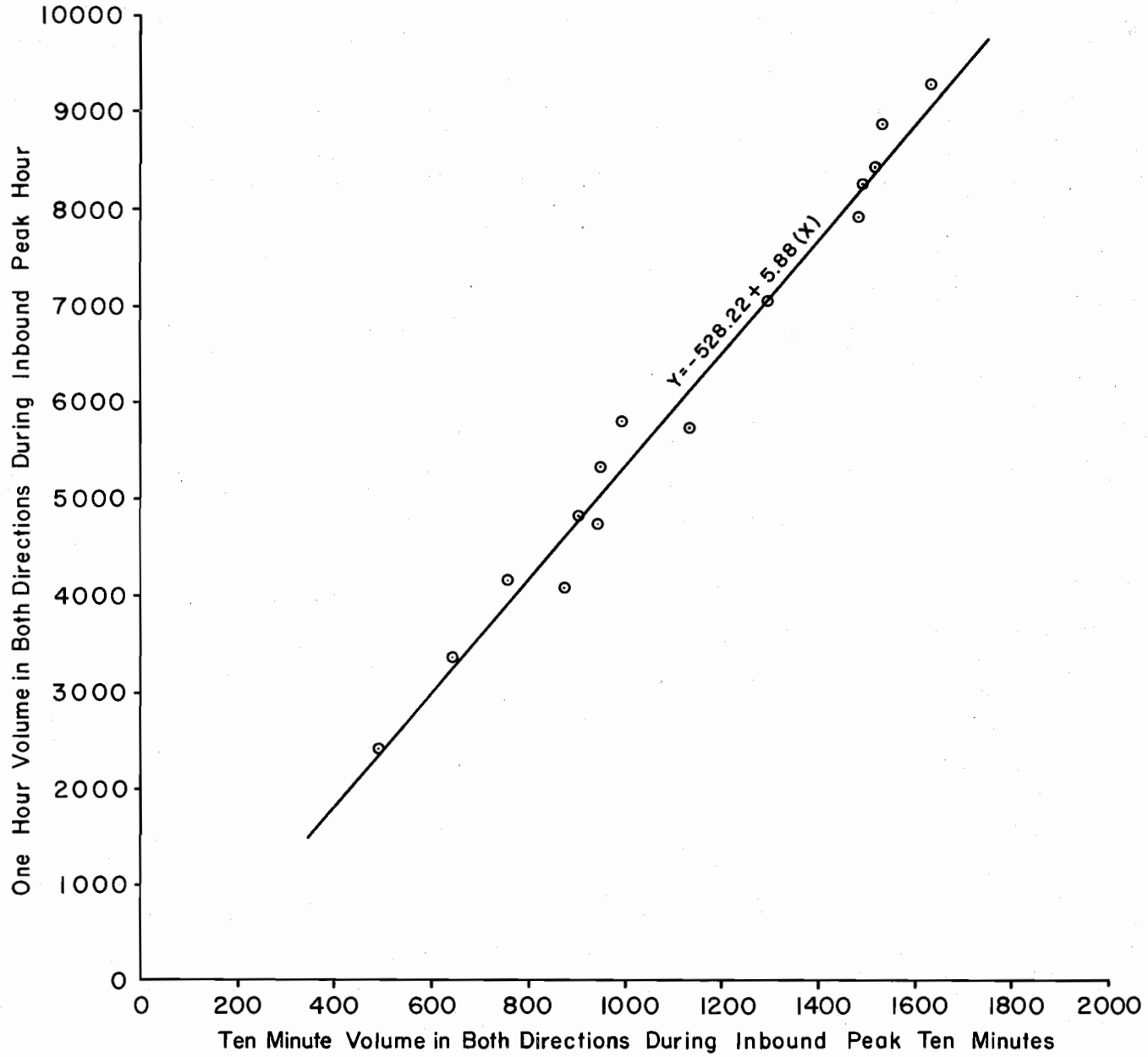
TOTAL VOLUME CORRELATION

FIGURE 34.G



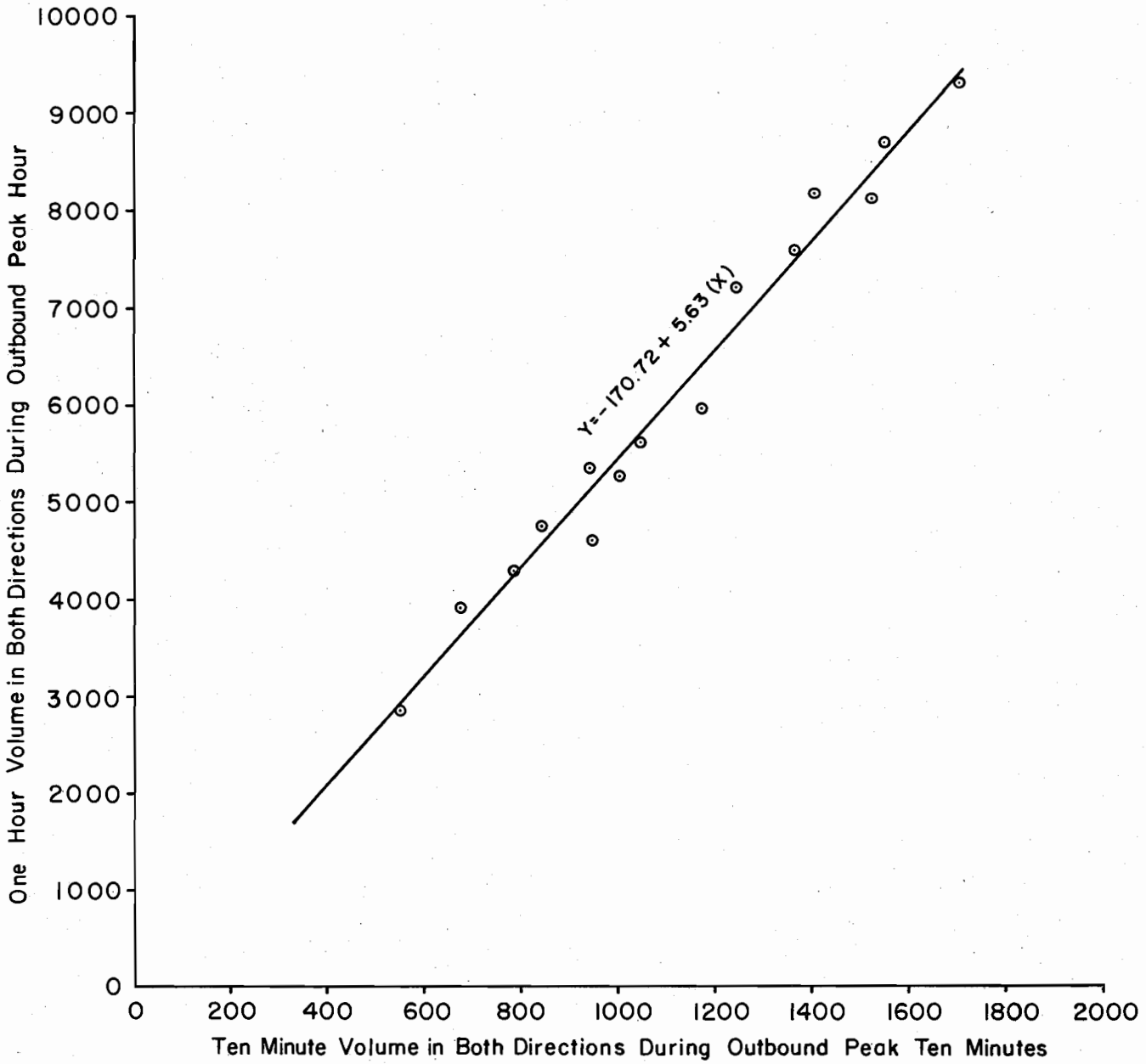
TOTAL VOLUME CORRELATION

FIGURE 34.H



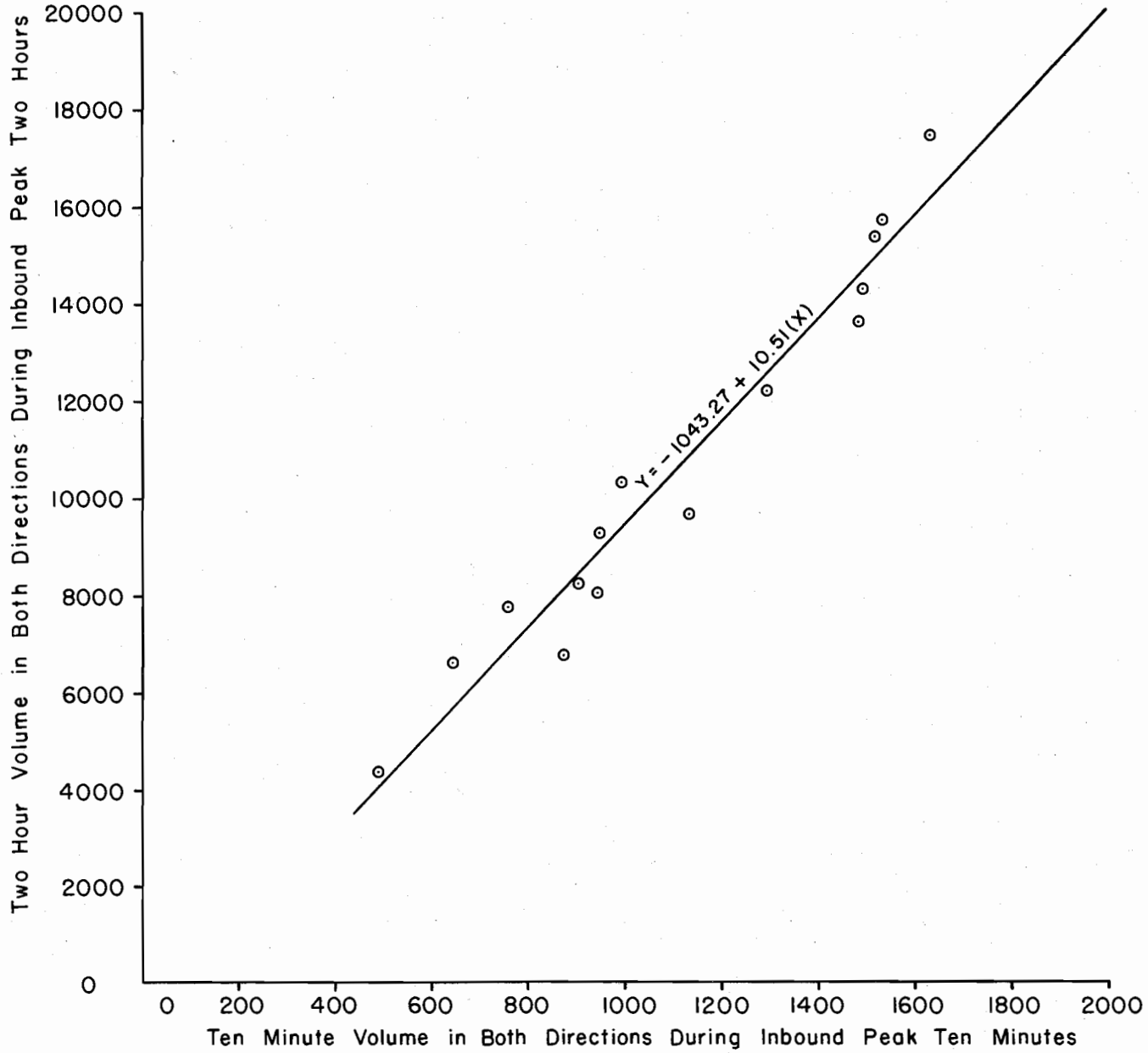
TOTAL VOLUME CORRELATION

FIGURE 34. I



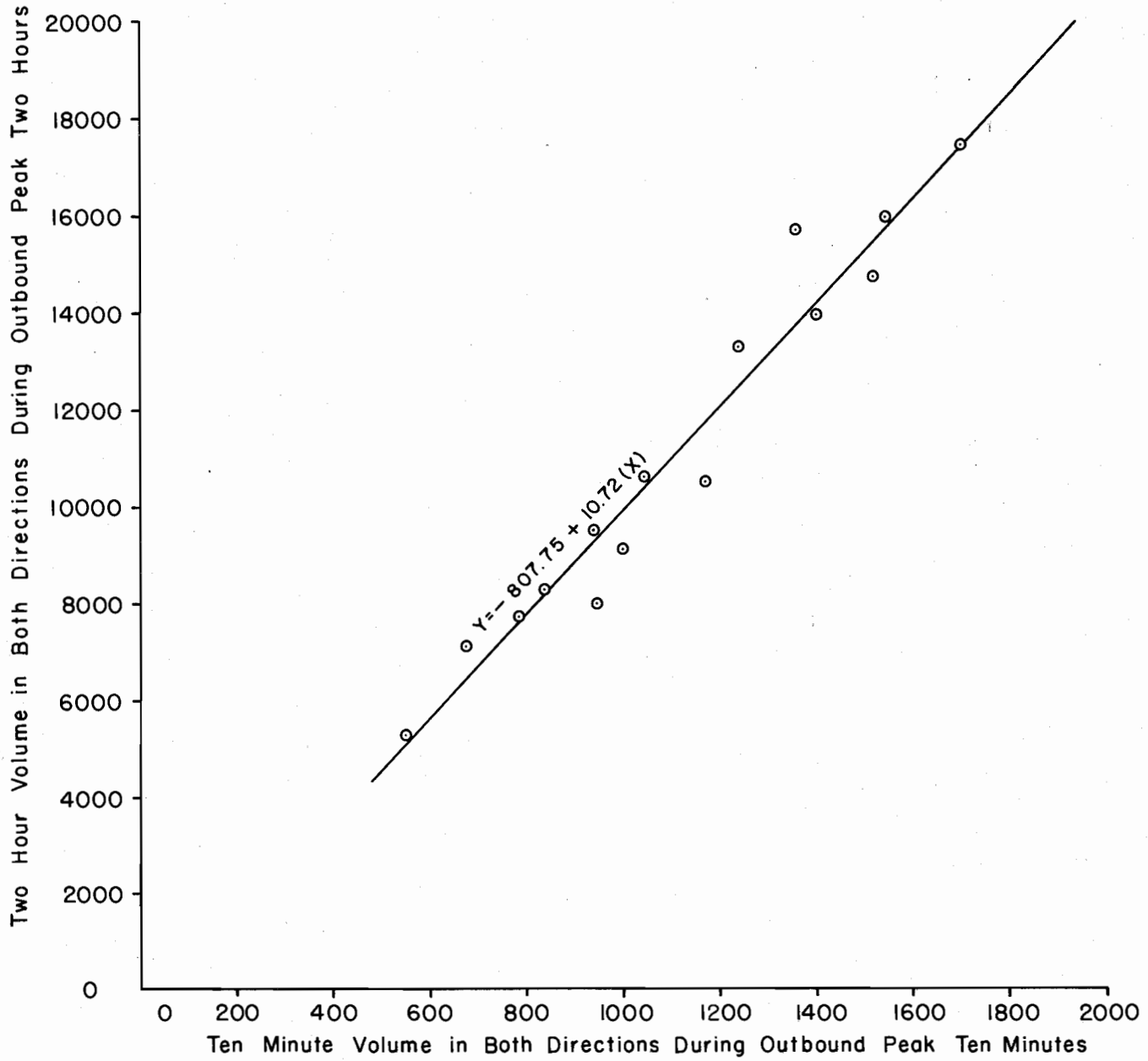
TOTAL VOLUME CORRELATION

FIGURE 34. J



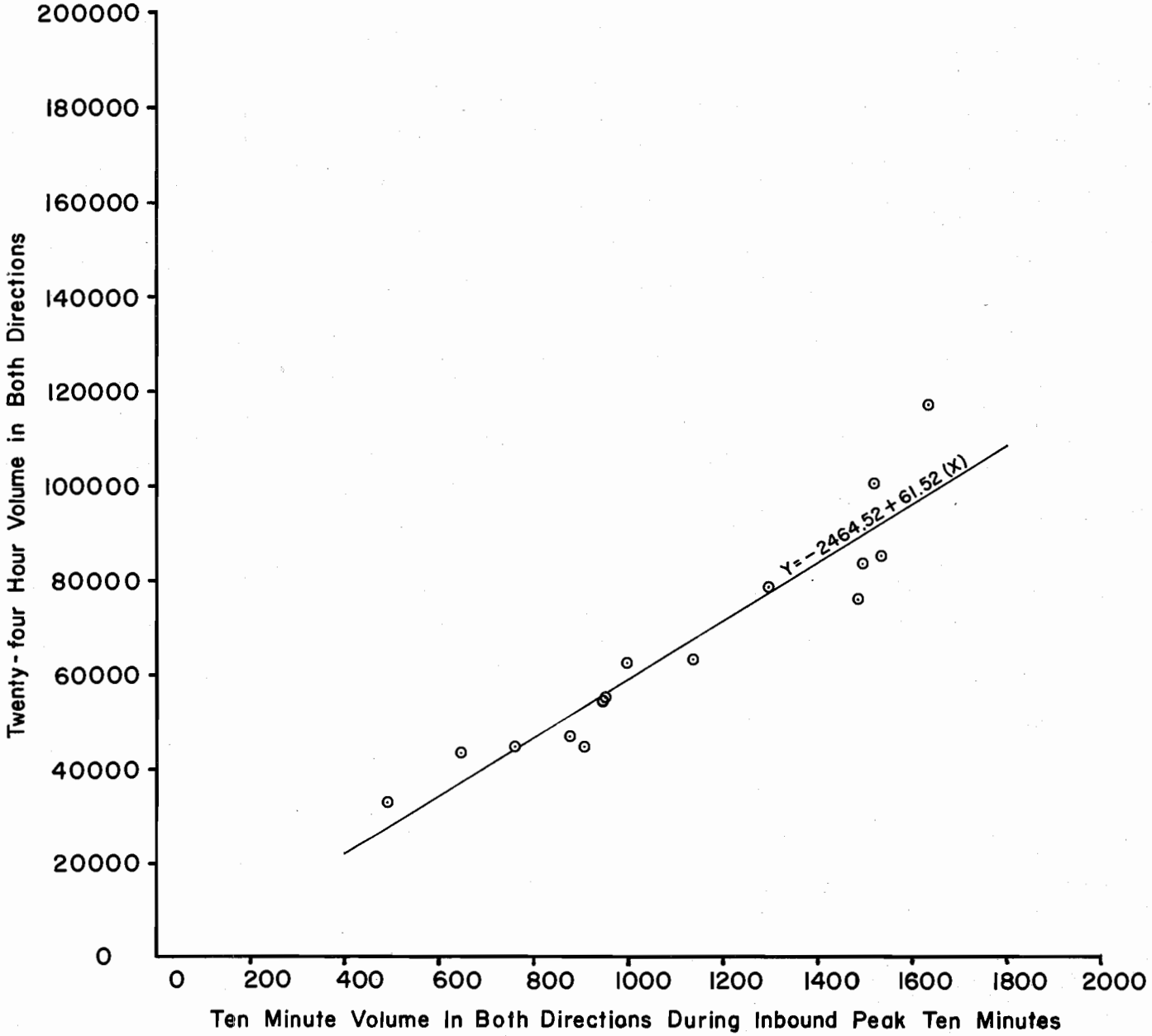
TOTAL VOLUME CORRELATION

FIGURE 34.K



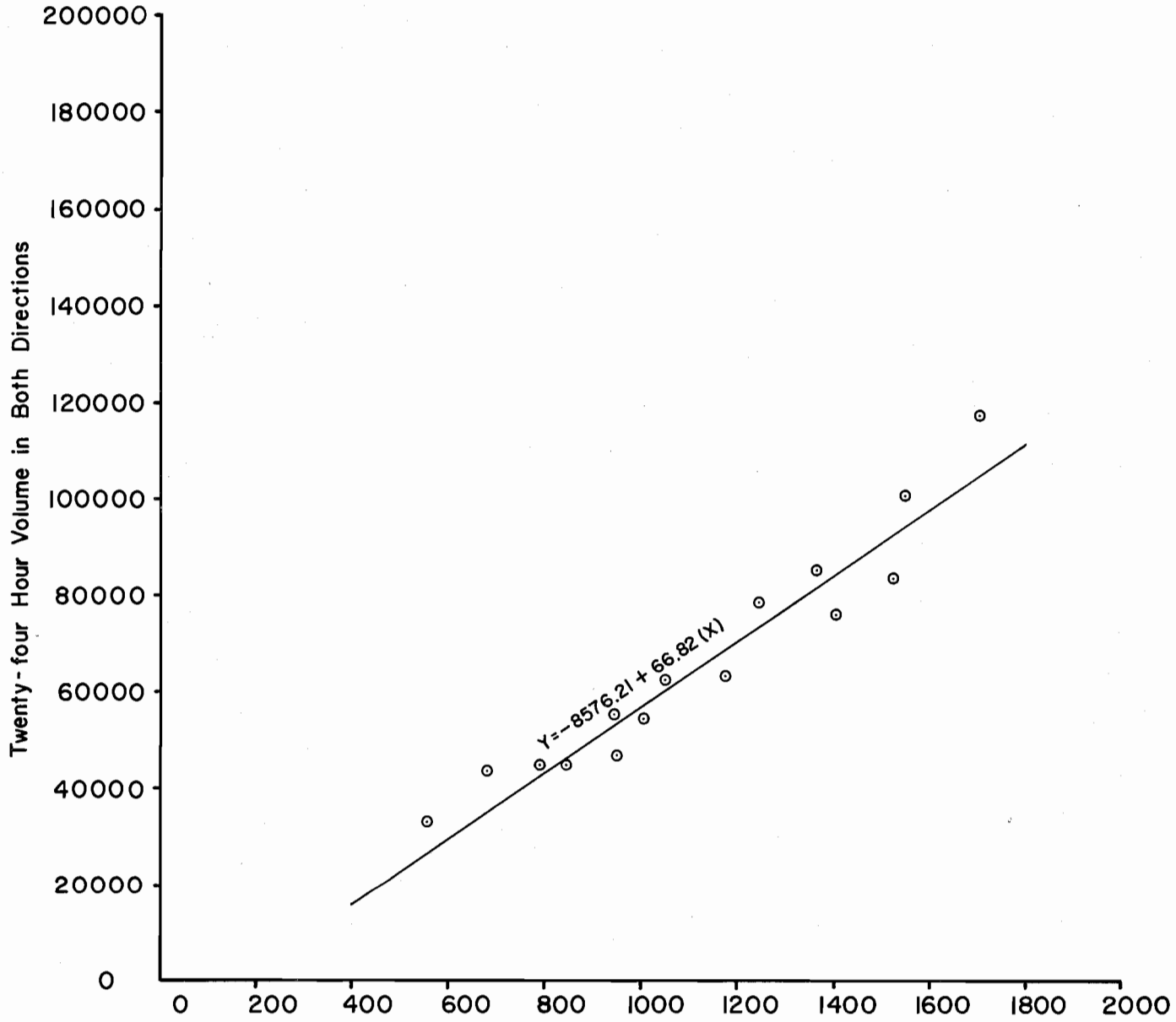
TOTAL VOLUME CORRELATION

FIGURE 34.L



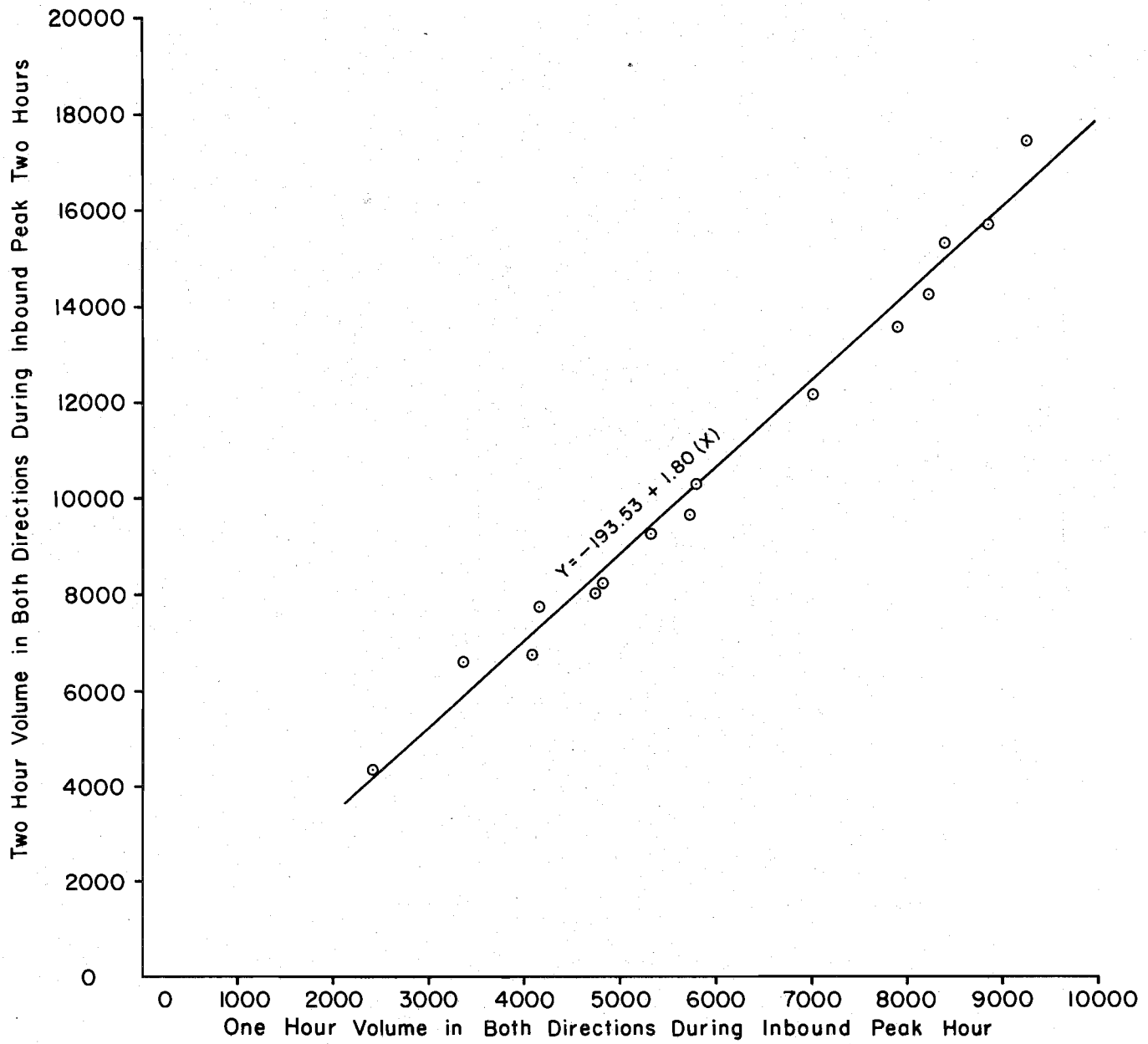
TOTAL VOLUME CORRELATION

FIGURE 34.M



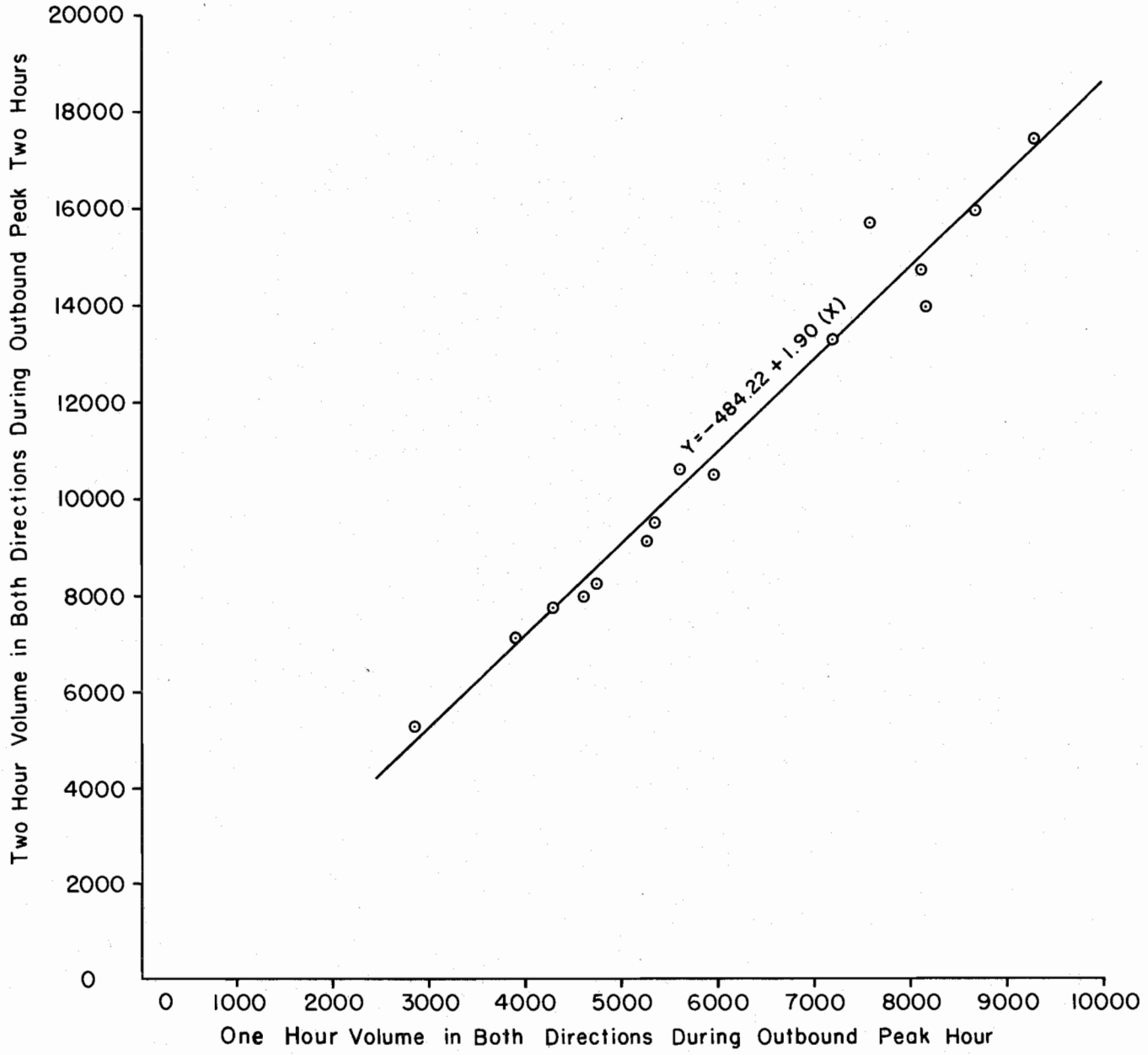
TOTAL VOLUME CORRELATION

FIGURE 34. N



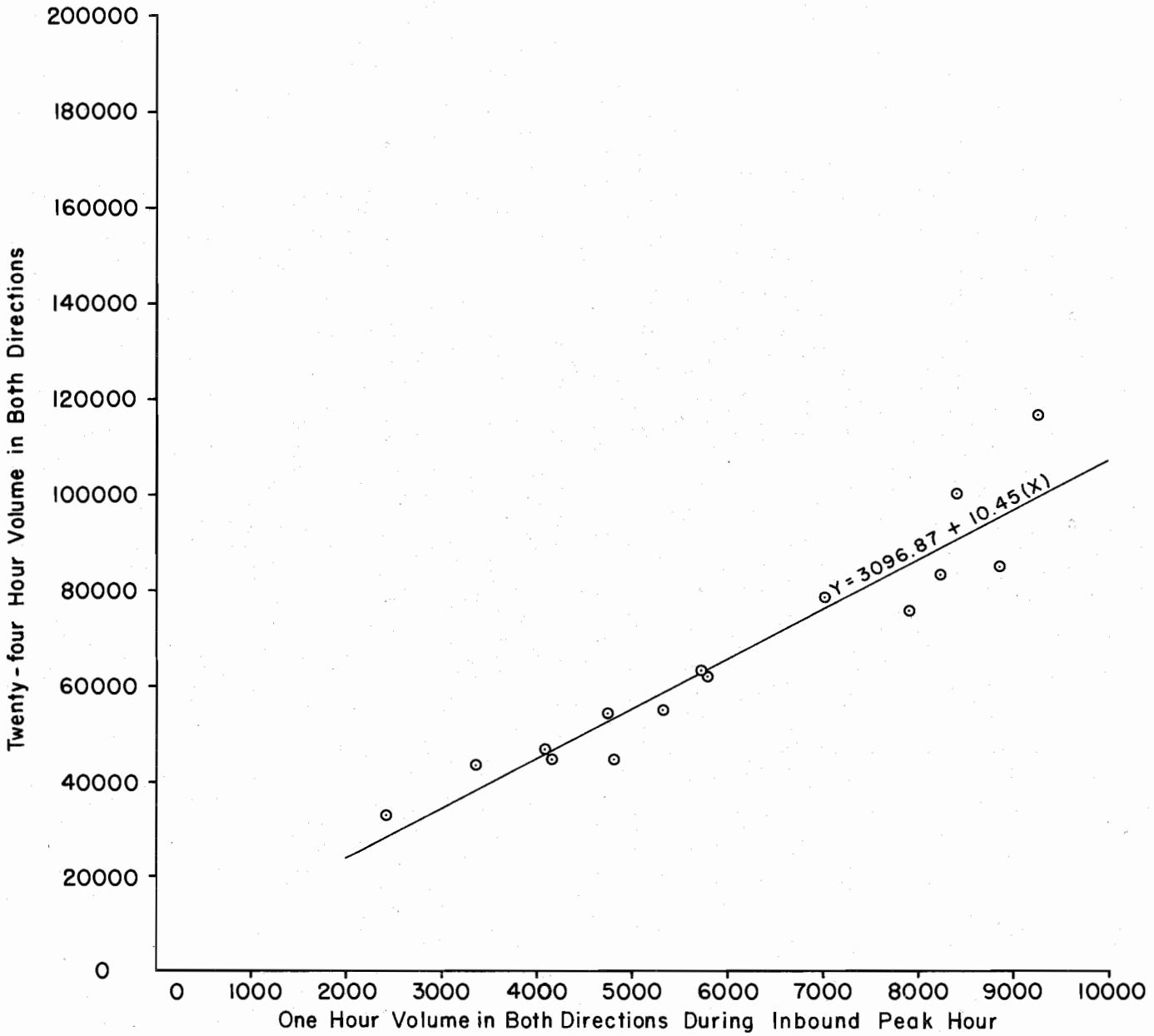
TOTAL VOLUME CORRELATION

FIGURE 34.0



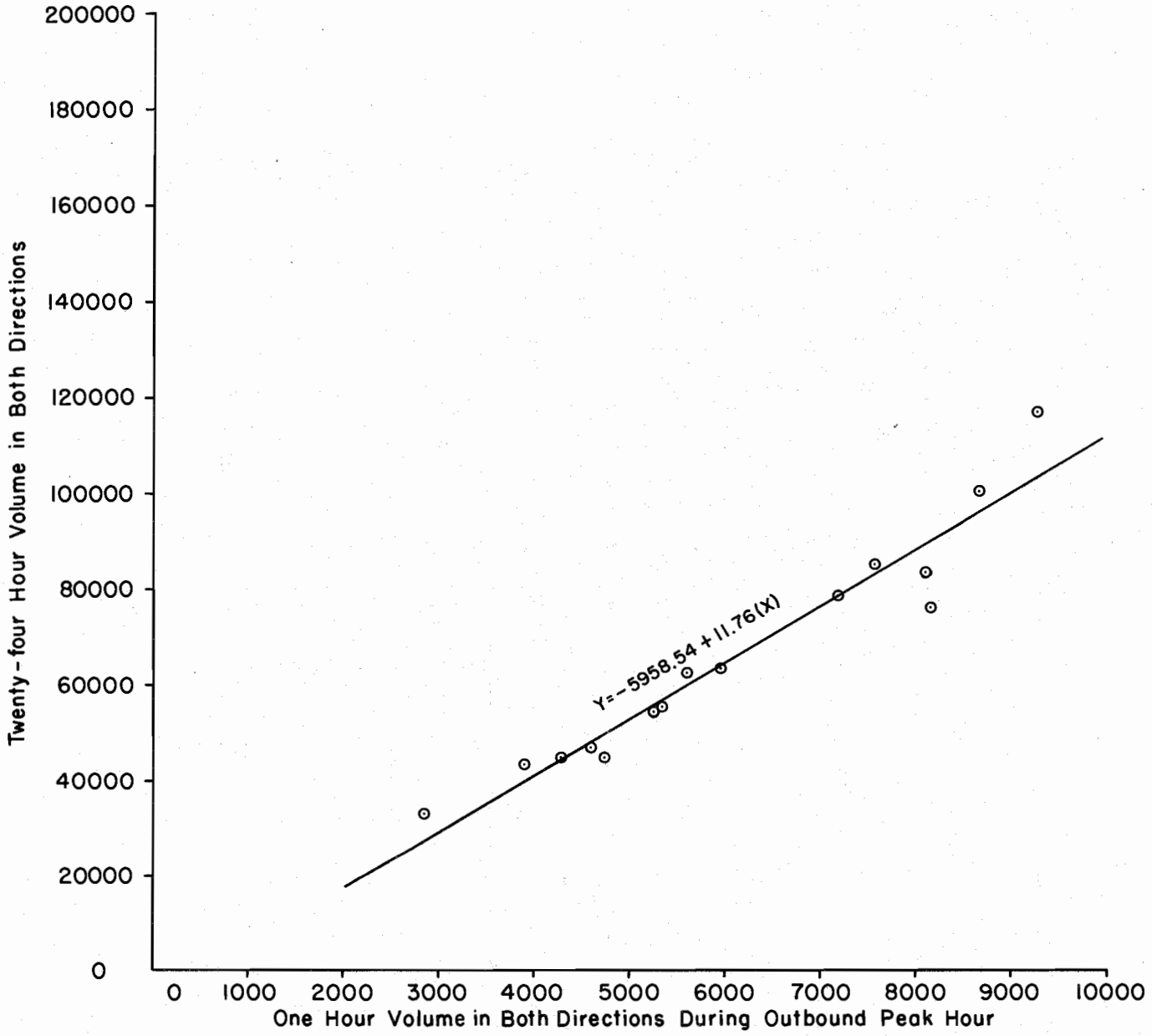
TOTAL VOLUME CORRELATION

FIGURE 34. P



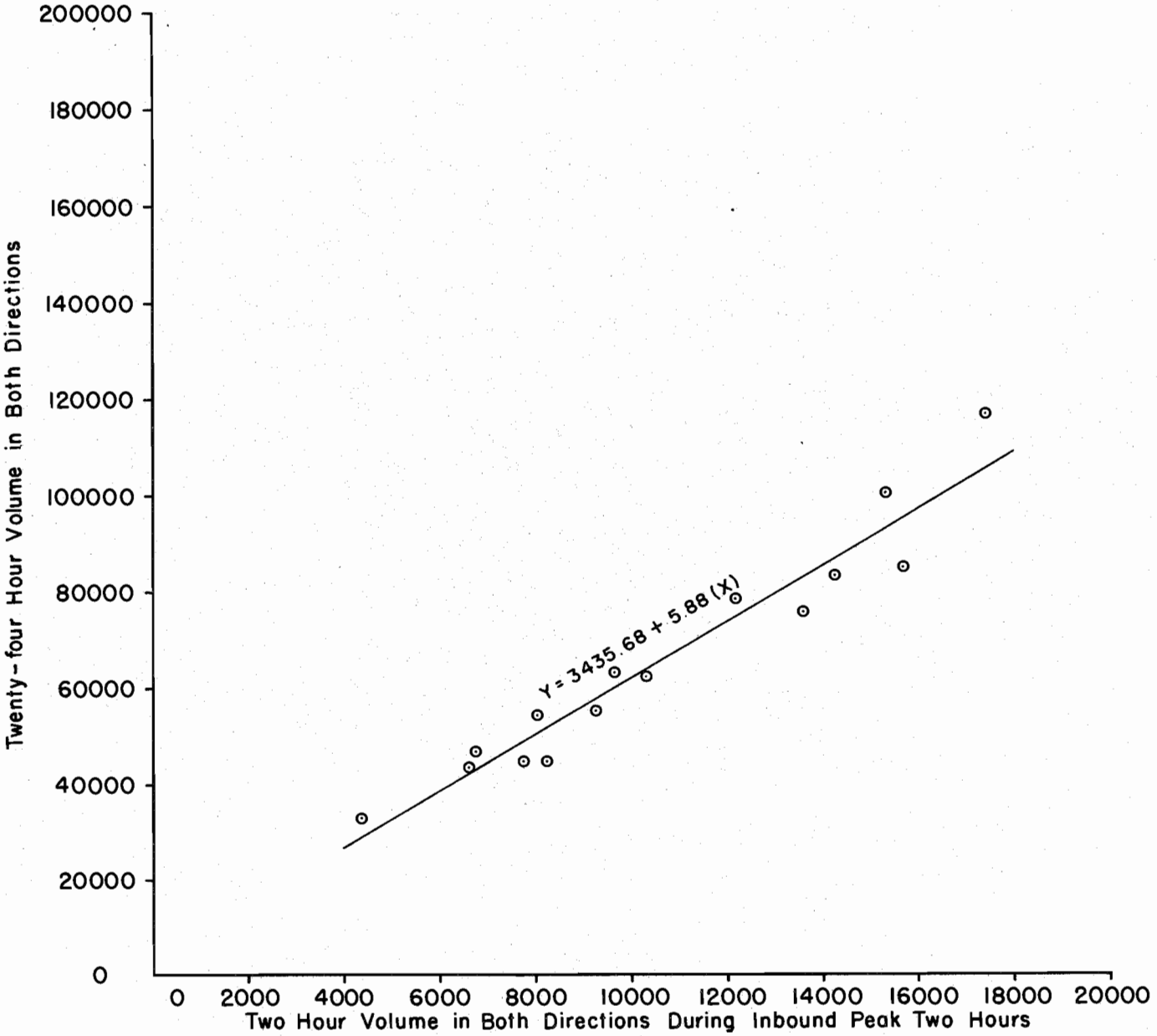
TOTAL VOLUME CORRELATION

FIGURE 34.Q



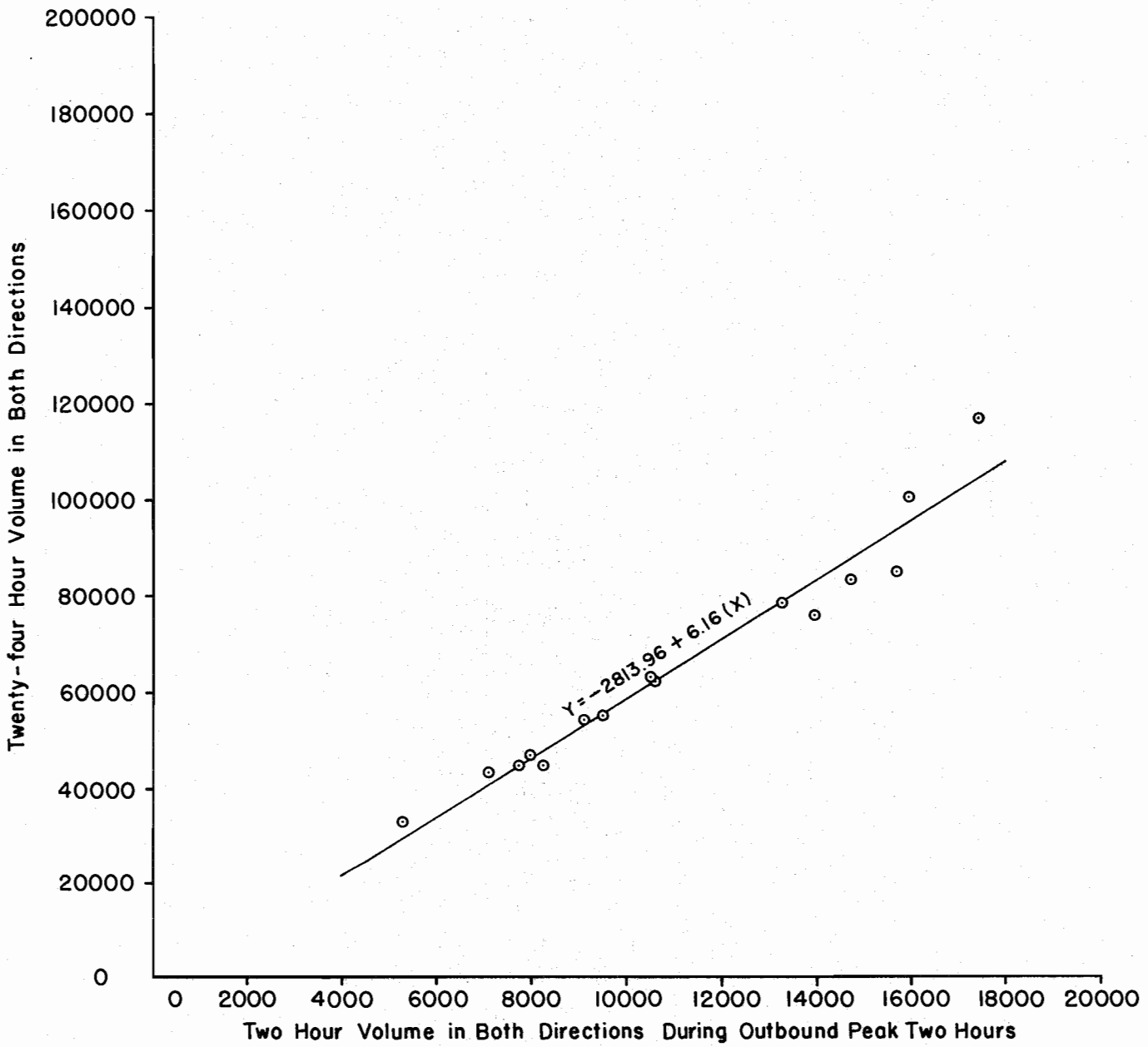
TOTAL VOLUME CORRELATION

FIGURE 34. R



TOTAL VOLUME CORRELATION

FIGURE 34. S



TOTAL VOLUME CORRELATION

FIGURE 34.T

TABLE 3

STATISTICAL RESULTS OF CORRELATION OF SHORT-TIME COUNTS TO LONG-TIME COUNTS FOR DIRECTIONAL VOLUMES

Figure Number	Coefficient of Determination		Coefficient of Correlation		Standard Error of the Estimate	
	1963	1965	1963	1965	1963	1965
33.A	*	.998	*	.999	*	11
33.B	*	.996	*	.998	*	14
33.C	.980	.963	.990	.981	190	263
33.D	.971	.972	.985	.986	223	200
33.E	*	.912	*	.955	*	726
33.F	*	.926	*	.962	*	581
33.G	*	.572	*	.756	*	7637
33.H	*	.509	*	.713	*	7864
33.I	.985	.969	.992	.984	168	243
33.J	.972	.980	.986	.990	221	170
33.K	*	.916	*	.957	*	711
33.L	*	.945	*	.972	*	502
33.M	*	.563	*	.751	*	7714
33.N	*	.559	*	.747	*	7453
33.O	.984	.981	.992	.991	306	336
33.P	.993	.967	.997	.983	201	390
33.Q	.934	.639	.966	.799	3105	7013
33.R	.940	.607	.969	.779	2884	7030
33.S	.960	.723	.980	.850	2408	6145
33.T	.953	.724	.976	.851	2556	5893

* Not Calculated for 1963 Data

TABLE 4

STATISTICAL RESULTS OF CORRELATION OF SHORT-TIME COUNTS TO LONG-TIME COUNTS FOR VOLUMES IN BOTH DIRECTIONS

Figure Number	Coefficient of Determination		Coefficient of Correlation		Standard Error of the Estimate	
	1963	1965	1963	1965	1963	1965
34.A	*	.994	*	.997	*	27
34.B	*	.989	*	.995	*	34
34.C	.974	.981	.987	.990	364	289
34.D	.983	.968	.992	.984	293	336
34.E	*	.944	*	.971	*	893
34.F	*	.926	*	.962	*	987
34.G	*	.852	*	.923	*	8792
34.H	*	.916	*	.957	*	6607
34.I	.984	.981	.992	.990	283	287
34.J	.977	.976	.988	.988	348	292
34.K	*	.949	*	.974	*	852
34.L	*	.947	*	.973	*	831
34.M	*	.877	*	.937	*	8004
34.N	*	.921	*	.960	*	6425
34.O	.985	.986	.992	.993	491	452
34.P	.991	.971	.995	.986	409	614
34.Q	.950	.893	.975	.945	5310	7463
34.R	.973	.927	.986	.963	3919	6160
34.S	.975	.932	.987	.965	3748	5973
34.T	.984	.950	.992	.975	2961	5095

* Not Calculated for 1963 Data

TABLE 5

Average Values of Factors to Expand Short-Time Counts
To Long-Time Counts for Directional Volumes

	Percent	
	1963	1965
5-minute peak volume is of 10-minute peak volume		
inbound	*	51.0
outbound	*	51.3
5-minute peak volume is of peak hour volume		
inbound	9.9	9.2
outbound	9.0	9.2
5-minute peak volume is of 2-hour peak volume		
inbound	*	5.3
outbound	*	5.2
5-minute peak volume is of 24-hour volume		
inbound	*	1.4
outbound	*	1.3
10-minute peak volume is of 1-hour peak volume		
inbound	19.2	17.9
outbound	17.3	17.9
10-minute peak volume is of 2-hour peak volume		
inbound	*	10.3
outbound	*	10.1
10-minute peak volume is of 24-hour volume		
inbound	*	2.7
outbound	*	2.4
Peak hour volume is of 2-hour peak volume		
inbound	55.2	56.5
outbound	54.3	56.5
Peak hour volume is of 24-hour volume		
inbound	11.0	14.4
outbound	11.3	13.3
2-hour peak volume is of 24-hour volume		
inbound	19.9	24.3
outbound	20.7	22.1

* Not Calculated for 1963 Data

TABLE 6

Average Values of Factors to Expand Short-Time Counts
To Long Time Counts For Volumes In Both Directions

	Percent	
	1963	1965
5-minute peak volume is of 10-minute peak volume		
inbound	*	49.3
outbound	*	52.4
5-minute peak volume is of peak hour volume		
inbound	9.5	8.3
outbound	9.4	9.3
5-minute peak volume is of 2-hour peak volume		
inbound	*	4.7
outbound	*	4.9
5-minute peak volume is of 24-hour volume		
inbound	*	0.8
outbound	*	0.8
10-minute peak volume is of 1-hour peak volume		
inbound	18.5	17.0
outbound	17.9	17.8
10-minute peak volume is of 2-hour peak volume		
inbound	*	9.5
outbound	*	9.3
10-minute peak volume is of 24-hour volume		
inbound	*	1.6
outbound	*	1.5
Peak hour volume is of 2-hour peak volume		
inbound	55.2	55.6
outbound	53.8	52.6
Peak hour volume is of 24-hour volume		
inbound	9.1	9.6
outbound	9.4	8.5
2-hour peak volume is of 24-hour volume		
inbound	16.4	17.0
outbound	17.5	16.2

* Not Calculated for 1963 Data

CHAPTER VII

ESTIMATING PEAK PERIOD VOLUMES

In estimating traffic volumes for design purposes, frequently a 24-hour volume in both directions will be projected into the future by various methods. From this projected 24-hour volume, a peak hourly volume or peak 2-hour volume will be estimated. This study of urban freeways in Texas is designed to show the relationship of short-time count volumes to volumes of longer time intervals. From this study an evaluation of present methods of estimating peaking characteristics can be made.

A method was developed for estimating the peak hour volume in the inbound direction from the 24-hour volume in both directions. Figure 35 shows the relationship of the peak hour volume in the inbound direction to the 24-hour volume in both directions. It is seen from Figure 35 that the logarithm of the 24-hour volume in both directions is plotted as the abscissa while the square root of the inbound peak hour volume divided by an age factor is plotted as the ordinate. All of the data taken in 1963 and 1965 appear in Figure 35.

The age factor was determined for each location from the length of time the facility had been opened to traffic to the time the 5-minute counts were made. The selection of age factors were chosen from those that resulted in the highest coefficient of determination and lowest standard error of the estimate. The facilities under study were given an age factor as follows:

1. 0-5 Years in Operation = 1.35
2. 6-15 Years in Operation = 1.00
3. 16 and Over years in Operation = 0.90

The coefficient of determination, coefficient of correlation, and the

standard error of the estimate for the relationship shown in Figure 35 is 0.928, 0.963, and 3.32 respectively. The coefficient of determination and the standard error of the estimate when using an age factor of 1.0 for any length of time that the freeway has been opened to traffic is 0.853 and 4.85 respectively. Therefore, the age factor is not as critical as might be thought. The regression equation is:

$$Y = -217.82 + 57.79\ (X)$$

Where:

$$Y = \left(\frac{\text{Inbound Peak Hour Volume}}{\text{Age Factor}}\right)^{\frac{1}{2}}$$

$$X = \text{Log}_{10}\ (\text{24-Hour Volume in Both Directions})$$

Rearranging the equation to solve for the inbound peak hour volume let:

IPHV = Inbound Peak Hour Volume

AF = Age Factor

V = Log_{10} (24-Hour Volume in Both Directions)

Thus

$$\left(\frac{IPHV}{AF}\right)^{\frac{1}{2}} = -217.82 + 57.79\ (V)$$

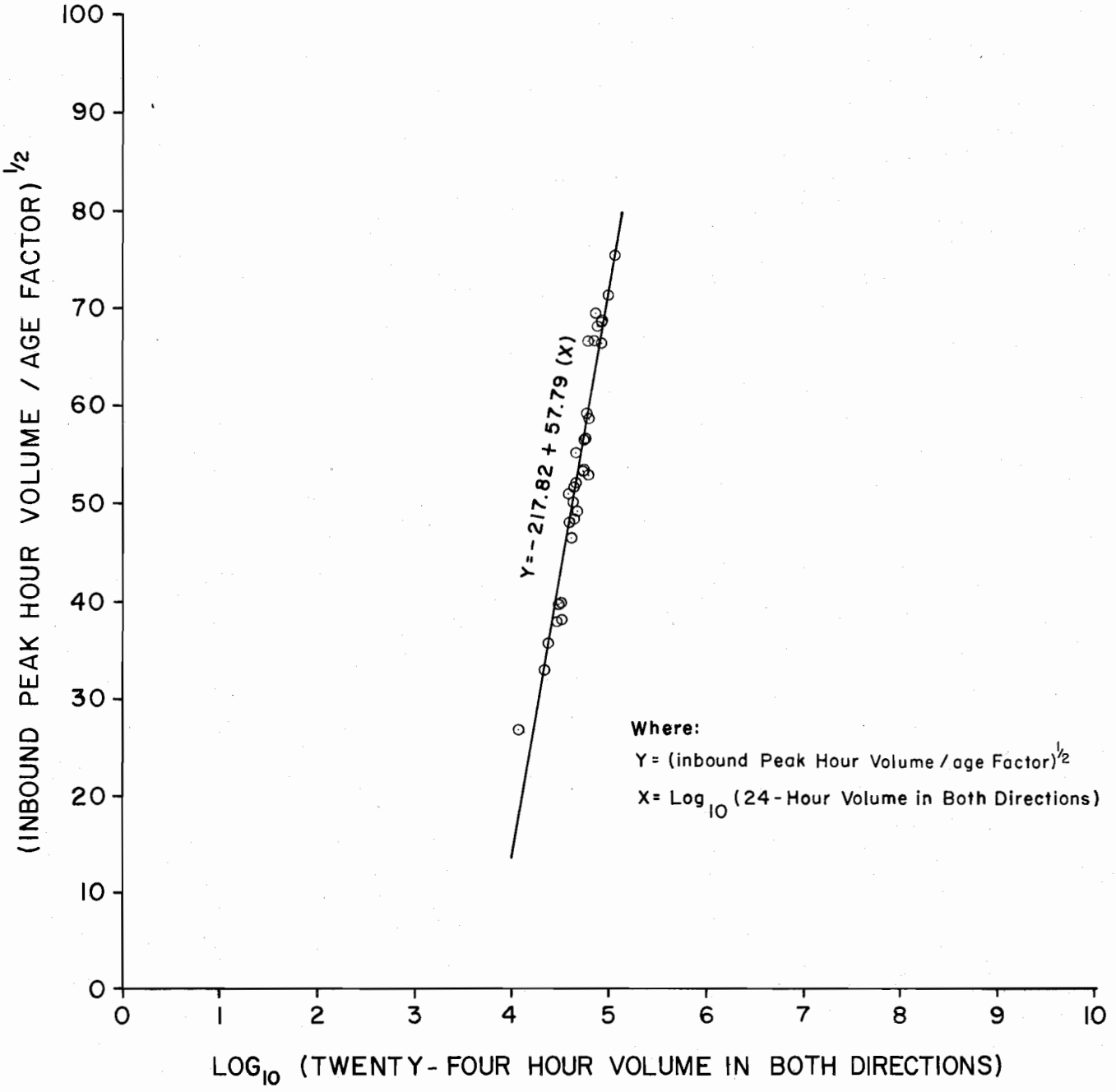
Which simplifies to:

$$IPHV = 47445.55\ (AF) - 25175.64\ (AF)\ (V) + 339.68\ (AF)\ (V)^2$$

or

$$IPHV = AF\ (47445.55 - 25175.64\ (V) + 3339.68\ (V)^2)$$

Thus an acceptable estimate of the inbound peak hour volume can be made from the 24 - hour volume in both directions.



ESTIMATING INBOUND PEAK HOUR VOLUME

Figure 35

CHAPTER VIII

CONCLUSION

It is evident from the data presented that traffic counts of short duration can be used to estimate the traffic volumes for longer time intervals, the resulting volumes being well within the limits necessary for design purposes. Also peak period volumes of short duration can be estimated from longer time intervals such as the 24-hour daily volume. This can be a very valuable tool when selecting a Design Hourly Volume.

In the design of urban freeways in Texas, peak period volumes can be estimated along the guide lines in this report. The peak hour volume in the inbound direction can be estimated by:

$$IPHV = AF\ (47445.55 - 25175.64(V) + 3339.68\ (V^2))$$

Where:

IPHV = Inbound Peak Hour Volume

AF = Age Factor

V = Log_{10} (24-Hour Volume in Both Directions)

The inbound peak hour volume calculated from this equation is not intended to be used as the Design Hourly Volume, but is to be used as a comparison with the DHV. Using a DHV comparable to the volume given in this equation would generally result in more congestion over a longer period of time than would be desirable. Estimating a short-time volume from a 24-hour volume simply gives the designer a reference from which to work. The peak period volumes estimated from long-time count volumes are those volumes that these facilities are actually experiencing. A DHV should incorporate a margin of safety related to the length of time of congestion that will be tolerated.

Other peak periods of shorter duration than one hour can be estimated

from the linear regression equations given in this report. Peak period volumes of short duration will be approximately related to volumes of longer duration by the percentage factors shown in Tables 5 and 6. These volumes listed in Tables 5 and 6 should be used as approximations for quick estimates. The appropriate regression equation can be used to caculate the final volumes.

Additional data should be collected to study the distribution of volumes by lanes. Geometric characteristics of the freeway at the location of any 5-minute count location should be observed and related to any traffic volume distribution. A coordinated system of 5-minute count stations systematically and statiscally located and operated in urban locations throughout the State of Texas would provide the needed information. These should include 5-minute count stations operating in some of the smaller cities --- possibly down to 10,000 population.

An analysis of 5-minute count data should be made to determine any variance in directional distribution between a radial or circumferential facility. The location of the 5-minute count stations should be carefully selected to reflect any differences that may exist.

There are many additional avenues of investigation of the basic data still unexplored. There are many additional factors which may have an influence on the peak period characteristics. These include the relative location of entrance ramps, exit ramps, the number of lanes, capacity, the width of median, the height of curb, progression to high-speed lanes, the population of urban areas, the distance from the CBD, etc. These variables should be investigated to determine their influence in the expansion of short-time count.

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APPENDIX 1

TRAFFIC VOLUME ANALYSIS

STATION 89 IN HOUSTON ON GULF FREEWAY NORTHEAST OF BRILEY STREET SIX LANES

		DATA				DAILY			HOURLY		VOLUME/ TOT VOL DURING PEAK HR	VOLUME/ TOT VOL DURING PEAK HR
	TIME (1)	VOLUME (2)	OPPOS. VOLUME (3)	TOTAL VOLUME (4)	SPLIT (5)	VOLUME/ TOTAL IN VOL (6)	VOLUME/ TOTAL OUT VOL (7)	VOLUME/ TOTAL VOLUME (8)	VOLUME/ PEAK HR IN (9)	VOLUME/ PEAK HR OUT (10)	IN (11)	OUT (12)
FIVE MINUTE PEAKS												
INBOUND	16 50	470	435	905	51.93	.80	.81	.40	9.15	9.89	5.08	5.06
OUTBOUND	16 50	435	470	905	48.07	.74	.75	.37	8.47	9.16	4.70	4.68
INBOUND A.M.	7 40	460	335	795	57.86	.78	.79	.39	8.96	9.68	4.97	4.95
OUTBOUND A.M.	7 20	385	440	825	46.67	.65	.66	.33	7.50	8.11	4.16	4.14
INBOUND P.M.	16 50	470	435	905	51.93	.80	.81	.40	9.15	9.89	5.08	5.06
OUTBOUND P.M.	16 50	435	470	905	48.07	.74	.75	.37	8.47	9.16	4.70	4.68
TEN MINUTE PEAKS												
INBOUND	7 15	895	740	1635	54.74	1.52	1.54	.77	17.43	18.84	9.67	9.63
OUTBOUND	16 50	865	835	1700	50.88	1.47	1.49	.74	16.85	18.21	9.34	9.31
INBOUND A.M.	7 15	895	740	1635	54.74	1.52	1.54	.77	17.43	18.84	9.67	9.63
OUTBOUND A.M.	7 15	740	895	1635	45.26	1.26	1.27	.63	14.41	15.58	7.99	7.97
INBOUND P.M.	16 45	855	855	1710	50.00	1.45	1.47	.73	16.65	18.00	9.23	9.20
OUTBOUND P.M.	16 50	865	835	1700	50.88	1.47	1.49	.74	16.85	18.21	9.34	9.31
ONE HOUR PEAKS												
INBOUND	7 0	5135	4125	9260	55.45	8.73	8.84	4.39	100.00	108.11	55.45	55.27
OUTBOUND	16 10	4750	4540	9290	51.13	8.07	8.18	4.06	92.50	100.00	51.30	51.13
INBOUND A.M.	7 0	5135	4125	9260	55.45	8.73	8.84	4.39	100.00	108.11	55.45	55.27
OUTBOUND A.M.	6 55	4150	5125	9275	44.74	7.05	7.15	3.55	80.82	87.37	44.82	44.67
INBOUND P.M.	16 30	4540	4660	9200	49.35	7.72	7.82	3.88	88.41	95.58	49.03	48.87
OUTBOUND P.M.	16 10	4750	4540	9290	51.13	8.07	8.18	4.06	92.50	100.00	51.30	51.13
TWO HOUR PEAKS												
INBOUND	6 45	9750	7685	17435	55.92	16.57	16.79	8.34	189.87	205.26	105.29	104.95
OUTBOUND	16 5	8935	8490	17425	51.28	15.19	15.38	7.64	174.00	188.11	96.49	96.18
INBOUND A.M.	6 45	9750	7685	17435	55.92	16.57	16.79	8.34	189.87	205.26	105.29	104.95
OUTBOUND A.M.	6 35	7780	9690	17470	44.53	13.22	13.40	6.65	151.51	163.79	84.02	83.75
INBOUND P.M.	15 55	8590	8855	17445	49.24	14.60	14.79	7.35	167.28	180.84	92.76	92.47
OUTBOUND P.M.	16 5	8935	8490	17425	51.28	15.19	15.38	7.64	174.00	188.11	96.49	96.18
TOTAL DAILY VOLUMES												
INBOUND	0 0	58840	58080	116920	50.33	100.00	101.31	50.33	1145.86	1238.74	635.42	633.37
OUTBOUND	0 0	58080	58840	116920	49.67	98.71	100.00	49.67	1131.06	1222.74	627.21	625.19
INBOUND A.M.	0 0	24185	22725	46910	51.56	41.10	41.64	20.69	470.98	509.16	261.18	260.33
OUTBOUND A.M.	0 0	22725	24185	46910	48.44	38.62	39.13	19.44	442.55	478.42	245.41	244.62
INBOUND P.M.	12 0	34655	35355	70010	49.50	58.90	59.67	29.64	674.88	729.58	374.24	373.04
OUTBOUND P.M.	12 0	35355	34655	70010	50.50	60.09	60.87	30.24	688.51	744.32	381.80	380.57

TOTAL TRAFFIC = 116920

TRAFFIC VOLUME ANALYSIS

STATION 93 IN DALLAS ON CENTRAL EXPRESSWAY NORTH OF ROSS AVENUE SIX LANES

		DATA				DAILY			HOURLY		VOLUME/ TOT VOL DURING PEAK HR	VOLUME/ TOT VOL DURING PEAK HR
	TIME (1)	VOLUME (2)	OPPOS. VOLUME (3)	TOTAL VOLUME (4)	SPLIT (5)	VOLUME/ TOTAL IN VOL (6)	VOLUME/ TOTAL OUT VOL (7)	VOLUME/ TOTAL VOLUME (8)	VOLUME/ PEAK HR IN (9)	VOLUME/ PEAK HR OUT (10)	IN (11)	OUT (12)
FIVE MINUTE PEAKS												
INBOUND	7 30	405	250	655	61.83	1.05	1.01	.52	9.69	9.30	5.77	5.63
OUTBOUND	17 10	385	240	625	61.60	1.00	.96	.49	9.21	8.84	5.48	5.35
INBOUND A.M.	7 30	405	250	655	61.83	1.05	1.01	.52	9.69	9.30	5.77	5.63
OUTBOUND A.M.	7 10	300	330	630	47.62	.78	.75	.38	7.18	6.89	4.27	4.17
INBOUND P.M.	16 20	300	280	580	51.72	.78	.75	.38	7.18	6.89	4.27	4.17
OUTBOUND P.M.	17 10	385	240	625	61.60	1.00	.96	.49	9.21	8.84	5.48	5.35
TEN MINUTE PEAKS												
INBOUND	7 25	795	500	1295	61.39	2.06	1.99	1.01	19.02	18.25	11.32	11.05
OUTBOUND	17 5	760	480	1240	61.29	1.97	1.90	.97	18.18	17.45	10.83	10.56
INBOUND A.M.	7 25	795	500	1295	61.39	2.06	1.99	1.01	19.02	18.25	11.32	11.05
OUTBOUND A.M.	7 5	560	630	1190	47.06	1.45	1.40	.71	13.40	12.86	7.98	7.78
INBOUND P.M.	16 20	570	580	1150	49.57	1.48	1.43	.73	13.64	13.09	8.12	7.92
OUTBOUND P.M.	17 5	760	480	1240	61.29	1.97	1.90	.97	18.18	17.45	10.83	10.56
ONE HOUR PEAKS												
INBOUND	7 0	4180	2840	7020	59.54	10.84	10.47	5.33	100.00	95.98	59.54	58.10
OUTBOUND	16 35	4355	2840	7195	60.53	11.29	10.91	5.55	104.19	100.00	62.04	60.53
INBOUND A.M.	7 0	4180	2840	7020	59.54	10.84	10.47	5.33	100.00	95.98	59.54	58.10
OUTBOUND A.M.	6 40	2935	3540	6475	45.33	7.61	7.35	3.74	70.22	67.39	41.81	40.79
INBOUND P.M.	16 15	3045	4090	7135	42.68	7.90	7.63	3.88	72.85	69.92	43.38	42.32
OUTBOUND P.M.	16 35	4355	2840	7195	60.53	11.29	10.91	5.55	104.19	100.00	62.04	60.53
TWO HOUR PEAKS												
INBOUND	7 0	7190	4990	12180	59.03	18.64	18.01	9.16	172.01	165.10	102.42	99.93
OUTBOUND	16 10	7805	5480	13285	58.75	20.24	19.55	9.94	186.72	179.22	111.18	108.48
INBOUND A.M.	7 0	7190	4990	12180	59.03	18.64	18.01	9.16	172.01	165.10	102.42	99.93
OUTBOUND A.M.	6 35	5270	6615	11885	44.34	13.67	13.20	6.71	126.08	121.01	75.07	73.25
INBOUND P.M.	16 0	5590	7775	13365	41.83	14.50	14.00	7.12	133.73	128.36	79.63	77.69
OUTBOUND P.M.	16 10	7805	5480	13285	58.75	20.24	19.55	9.94	186.72	179.22	111.18	108.48
TOTAL DAILY VOLUMES												
INBOUND	0 0	38565	39925	78490	49.13	100.00	96.59	49.13	922.61	885.53	549.36	536.00
OUTBOUND	0 0	39925	38565	78490	50.87	103.53	100.00	50.87	955.14	916.76	568.73	554.90
INBOUND A.M.	0 0	17405	14395	31800	54.73	45.13	43.59	22.17	416.39	399.66	247.93	241.90
OUTBOUND A.M.	0 0	14395	17405	31800	45.27	37.33	36.06	18.34	344.38	330.54	205.06	200.07
INBOUND P.M.	12 0	21160	25530	46690	45.32	54.87	53.00	26.96	506.22	485.88	301.42	294.09
OUTBOUND P.M.	12 0	25530	21160	46690	54.68	66.20	63.94	32.53	610.77	586.22	363.68	354.83

TOTAL TRAFFIC = 78490

TRAFFIC VOLUME ANALYSIS

STATION 94 IN SAN ANTONIO ON IH 10 NORTH OF COLORADO STREET FOUR LANES

		DATA				DAILY			HOURLY		VOLUME/ TOT VOL DURING PEAK HR	VOLUME/ TOT VOL DURING PEAK HR
	TIME (1)	VOLUME (2)	OPPOS. VOLUME (3)	TOTAL VOLUME (4)	SPLIT (5)	VOLUME/ TOTAL IN VOL (6)	VOLUME/ TOTAL OUT VOL (7)	VOLUME/ TOTAL VOLUME (8)	VOLUME/ PEAK HR IN (9)	VOLUME/ PEAK HR OUT (10)	IN (11)	OUT (12)
FIVE MINUTE PEAKS												
INBOUND	7 50	360	155	515	69.90	1.13	1.19	.58	9.02	9.80	6.21	6.42
OUTBOUND	17 15	360	195	555	64.86	1.13	1.19	.58	9.02	9.80	6.21	6.42
INBOUND A.M.	7 50	360	155	515	69.90	1.13	1.19	.58	9.02	9.80	6.21	6.42
OUTBOUND A.M.	7 15	175	310	485	36.08	.55	.58	.28	4.39	4.76	3.02	3.12
INBOUND P.M.	16 45	215	300	515	41.75	.67	.71	.35	5.39	5.85	3.71	3.83
OUTBOUND P.M.	17 15	360	195	555	64.86	1.13	1.19	.58	9.02	9.80	6.21	6.42
TEN MINUTE PEAKS												
INBOUND	7 50	710	285	995	71.36	2.22	2.34	1.14	17.79	19.32	12.25	12.66
OUTBOUND	17 15	675	370	1045	64.59	2.11	2.22	1.08	16.92	18.37	11.65	12.03
INBOUND A.M.	7 50	710	285	995	71.36	2.22	2.34	1.14	17.79	19.32	12.25	12.66
OUTBOUND A.M.	7 10	350	625	975	35.90	1.10	1.15	.56	8.77	9.52	6.04	6.24
INBOUND P.M.	16 45	415	580	995	41.71	1.30	1.37	.67	10.40	11.29	7.16	7.40
OUTBOUND P.M.	17 15	675	370	1045	64.59	2.11	2.22	1.08	16.92	18.37	11.65	12.03
ONE HOUR PEAKS												
INBOUND	7 10	3990	1805	5795	68.85	12.49	13.15	6.41	100.00	108.57	68.85	71.12
OUTBOUND	16 55	3675	1935	5610	65.51	11.50	12.11	5.90	92.11	100.00	63.42	65.51
INBOUND A.M.	7 10	3990	1805	5795	68.85	12.49	13.15	6.41	100.00	108.57	68.85	71.12
OUTBOUND A.M.	7 5	1825	3990	5815	31.38	5.71	6.02	2.93	45.74	49.66	31.49	32.53
INBOUND P.M.	16 30	2160	3595	5755	37.53	6.76	7.12	3.47	54.14	58.78	37.27	38.50
OUTBOUND P.M.	16 55	3675	1935	5610	65.51	11.50	12.11	5.90	92.11	100.00	63.42	65.51
TWO HOUR PEAKS												
INBOUND	6 45	7105	3205	10310	68.91	22.24	23.42	11.41	178.07	193.33	122.61	126.65
OUTBOUND	16 15	6780	3830	10610	63.90	21.22	22.35	10.88	169.92	184.49	117.00	120.86
INBOUND A.M.	6 45	7105	3205	10310	68.91	22.24	23.42	11.41	178.07	193.33	122.61	126.65
OUTBOUND A.M.	6 40	3220	7095	10315	31.22	10.08	10.61	5.17	80.70	87.62	55.57	57.40
INBOUND P.M.	16 10	3875	6755	10630	36.45	12.13	12.77	6.22	97.12	105.44	66.87	69.07
OUTBOUND P.M.	16 15	6780	3830	10610	63.90	21.22	22.35	10.88	169.92	184.49	117.00	120.86
TOTAL DAILY VOLUMES												
INBOUND	0 0	31950	30340	62290	51.29	100.00	105.31	51.29	800.75	869.39	551.34	569.52
OUTBOUND	0 0	30340	31950	62290	48.71	94.96	100.00	48.71	760.40	825.58	523.55	540.82
INBOUND A.M.	0 0	14975	9190	24165	61.97	46.87	49.36	24.04	375.31	407.48	258.41	266.93
OUTBOUND A.M.	0 0	9190	14975	24165	38.03	28.76	30.29	14.75	230.33	250.07	158.58	163.81
INBOUND P.M.	12 0	16975	21150	38125	44.52	53.13	55.95	27.25	425.44	461.90	292.92	302.58
OUTBOUND P.M.	12 0	21150	16975	38125	55.48	66.20	69.71	33.95	530.08	575.51	364.97	377.01

TOTAL TRAFFIC = 62290

TRAFFIC VOLUME ANALYSIS

STATION 99 IN HOUSTON ON GULF FREEWAY AT WOODRIDGE STREET OVERPASS SIX LANES

	TIME (1)	DATA VOLUME (2)	DATA OPPOS. VOLUME (3)	DATA TOTAL VOLUME (4)	SPLIT (5)	DAILY VOLUME/ TOTAL IN VOL (6)	DAILY VOLUME/ TOTAL OUT VOL (7)	DAILY VOLUME/ TOTAL VOLUME (8)	HOURLY VOLUME/ PEAK HR IN (9)	HOURLY VOLUME/ PEAK HR OUT (10)	VOLUME/ TOT VOL DURING PEAK HR IN (11)	VOLUME/ TOT VOL DURING PEAK HR OUT (12)
FIVE MINUTE PEAKS												
INBOUND	6 50	495	260	755	65.56	.97	1.00	.49	9.71	10.40	5.89	5.70
OUTBOUND	16 45	430	345	775	55.48	.84	.87	.43	8.43	9.03	5.11	4.95
INBOUND A.M.	6 50	495	260	755	65.56	.97	1.00	.49	9.71	10.40	5.89	5.70
OUTBOUND A.M.	7 15	305	410	715	42.66	.60	.62	.30	5.98	6.41	3.63	3.51
INBOUND P.M.	16 40	355	405	760	46.71	.70	.72	.35	6.96	7.46	4.22	4.09
OUTBOUND P.M.	16 45	430	345	775	55.48	.84	.87	.43	8.43	9.03	5.11	4.95
TEN MINUTE PEAKS												
INBOUND	6 50	975	545	1520	64.14	1.91	1.97	.97	19.12	20.48	11.59	11.23
OUTBOUND	16 45	855	690	1545	55.34	1.68	1.73	.85	16.76	17.96	10.17	9.85
INBOUND A.M.	6 50	975	545	1520	64.14	1.91	1.97	.97	19.12	20.48	11.59	11.23
OUTBOUND A.M.	7 10	605	830	1435	42.16	1.19	1.22	.60	11.86	12.71	7.19	6.97
INBOUND P.M.	16 40	700	835	1535	45.60	1.37	1.41	.70	13.73	14.71	8.32	8.06
OUTBOUND P.M.	16 45	855	690	1545	55.34	1.68	1.73	.85	16.76	17.96	10.17	9.85
ONE HOUR PEAKS												
INBOUND	6 35	5100	3310	8410	60.64	10.01	10.29	5.07	100.00	107.14	60.64	58.76
OUTBOUND	16 25	4760	3920	8680	54.84	9.34	9.61	4.74	93.33	100.00	56.60	54.84
INBOUND A.M.	6 35	5100	3310	8410	60.64	10.01	10.29	5.07	100.00	107.14	60.64	58.76
OUTBOUND A.M.	6 40	3385	5005	8390	40.35	6.64	6.83	3.37	66.37	71.11	40.25	39.00
INBOUND P.M.	16 5	4005	4340	8345	47.99	7.86	8.08	3.98	78.53	84.14	47.62	46.14
OUTBOUND P.M.	16 25	4760	3920	8680	54.84	9.34	9.61	4.74	93.33	100.00	56.60	54.84
TWO HOUR PEAKS												
INBOUND	6 25	9205	6120	15325	60.07	18.06	18.58	9.16	180.49	193.38	109.45	106.05
OUTBOUND	16 10	8670	7285	15955	54.34	17.01	17.50	8.63	170.00	182.14	103.09	99.88
INBOUND A.M.	6 25	9205	6120	15325	60.07	18.06	18.58	9.16	180.49	193.38	109.45	106.05
OUTBOUND A.M.	6 25	6120	9205	15325	39.93	12.01	12.35	6.09	120.00	128.57	72.77	70.51
INBOUND P.M.	15 40	7535	8380	15915	47.35	14.78	15.21	7.50	147.75	158.30	89.60	86.81
OUTBOUND P.M.	16 10	8670	7285	15955	54.34	17.01	17.50	8.63	170.00	182.14	103.09	99.88
TOTAL DAILY VOLUMES												
INBOUND	0 0	50965	49550	100515	50.70	100.00	102.86	50.70	999.31	1070.69	606.00	587.15
OUTBOUND	0 0	49550	50965	100515	49.30	97.22	100.00	49.30	971.57	1040.97	589.18	570.85
INBOUND A.M.	0 0	21915	18210	40125	54.62	43.00	44.23	21.80	429.71	460.40	260.58	252.48
OUTBOUND A.M.	0 0	18210	21915	40125	45.38	35.73	36.75	18.12	357.06	382.56	216.53	209.79
INBOUND P.M.	12 0	29050	31340	60390	48.10	57.00	58.63	28.90	569.61	610.29	345.42	334.68
OUTBOUND P.M.	12 0	31340	29050	60390	51.90	61.49	63.25	31.18	614.51	658.40	372.65	361.06

TOTAL TRAFFIC = 100515

TRAFFIC VOLUME ANALYSIS

STATION 105 IN AUSTIN ON IH 35 EXPRESSWAY NORTH OF MANOR ROAD FOUR LANES

		DATA				DAILY			HOURLY		VOLUME/ TOT VOL DURING PEAK HR	VOLUME/ TOT VOL DURING PEAK HR
	TIME (1)	VOLUME (2)	OPPOS. VOLUME (3)	TOTAL VOLUME (4)	SPLIT (5)	VOLUME/ TOTAL IN VOL (6)	VOLUME/ TOTAL OUT VOL (7)	VOLUME/ TOTAL VOLUME (8)	VOLUME/ PEAK HR IN (9)	VOLUME/ PEAK HR OUT (10)	IN (11)	OUT (12)
FIVE MINUTE PEAKS												
INBOUND	7 45	300	130	430	69.77	1.30	1.26	.64	11.07	10.49	7.34	6.51
OUTBOUND	17 15	295	180	475	62.11	1.28	1.24	.63	10.89	10.31	7.22	6.41
INBOUND A.M.	7 45	300	130	430	69.77	1.30	1.26	.64	11.07	10.49	7.34	6.51
OUTBOUND A.M.	7 40	155	290	445	34.83	.67	.65	.33	5.72	5.42	3.79	3.37
INBOUND P.M.	17 10	200	270	470	42.55	.87	.84	.43	7.38	6.99	4.90	4.34
OUTBOUND P.M.	17 15	295	180	475	62.11	1.28	1.24	.63	10.89	10.31	7.22	6.41
TEN MINUTE PEAKS												
INBOUND	7 40	590	285	875	67.43	2.56	2.48	1.26	21.77	20.63	14.44	12.81
OUTBOUND	17 10	565	380	945	59.79	2.45	2.37	1.21	20.85	19.76	13.83	12.27
INBOUND A.M.	7 40	590	285	875	67.43	2.56	2.48	1.26	21.77	20.63	14.44	12.81
OUTBOUND A.M.	7 35	300	550	850	35.29	1.30	1.26	.64	11.07	10.49	7.34	6.51
INBOUND P.M.	17 10	380	565	945	40.21	1.65	1.60	.81	14.02	13.29	9.30	8.25
OUTBOUND P.M.	17 10	565	380	945	59.79	2.45	2.37	1.21	20.85	19.76	13.83	12.27
ONE HOUR PEAKS												
INBOUND	7 15	2710	1375	4085	66.34	11.77	11.39	5.79	100.00	94.76	66.34	58.85
OUTBOUND	16 35	2860	1745	4605	62.11	12.42	12.02	6.11	105.54	100.00	70.01	62.11
INBOUND A.M.	7 15	2710	1375	4085	66.34	11.77	11.39	5.79	100.00	94.76	66.34	58.85
OUTBOUND A.M.	7 5	1400	2705	4105	34.10	6.08	5.88	2.99	51.66	48.95	34.27	30.40
INBOUND P.M.	16 20	1770	2680	4450	39.78	7.69	7.44	3.78	65.31	61.89	43.33	38.44
OUTBOUND P.M.	16 35	2860	1745	4605	62.11	12.42	12.02	6.11	105.54	100.00	70.01	62.11
TWO HOUR PEAKS												
INBOUND	6 40	4350	2400	6750	64.44	18.89	18.28	9.29	160.52	152.10	106.49	94.46
OUTBOUND	16 15	4770	3205	7975	59.81	20.72	20.04	10.19	176.01	166.78	116.77	103.58
INBOUND A.M.	6 40	4350	2400	6750	64.44	18.89	18.28	9.29	160.52	152.10	106.49	94.46
OUTBOUND A.M.	9 55	2515	2230	4745	53.00	10.92	10.57	5.37	92.80	87.94	61.57	54.61
INBOUND P.M.	16 15	3205	4770	7975	40.19	13.92	13.47	6.84	118.27	112.06	78.46	69.60
OUTBOUND P.M.	16 15	4770	3205	7975	59.81	20.72	20.04	10.19	176.01	166.78	116.77	103.58
TOTAL DAILY VOLUMES												
INBOUND	0 0	23025	23800	46825	49.17	100.00	96.74	49.17	849.63	805.07	563.65	500.00
OUTBOUND	0 0	23800	23025	46825	50.83	103.37	100.00	50.83	878.23	832.17	582.62	516.83
INBOUND A.M.	0 0	9520	7550	17070	55.77	41.35	40.00	20.33	351.29	332.87	233.05	206.73
OUTBOUND A.M.	0 0	7550	9520	17070	44.23	32.79	31.72	16.12	278.60	263.99	184.82	163.95
INBOUND P.M.	12 0	13505	16250	29755	45.39	58.65	56.74	28.84	498.34	472.20	330.60	293.27
OUTBOUND P.M.	12 0	16250	13505	29755	54.61	70.58	68.28	34.70	599.63	568.18	397.80	352.88

TOTAL TRAFFIC = 46825

TRAFFIC VOLUME ANALYSIS

STATION 106 IN SAN ANTONIO ON US 81 EXPRESSWAY SOUTH OF ALAMO STREET FOUR LANES

		DATA				DAILY			HOURLY		VOLUME/ TOT VOL DURING PEAK HR	VOLUME/ TOT VOL DURING PEAK HR
	TIME (1)	VOLUME (2)	OPPOS. VOLUME (3)	TOTAL VOLUME (4)	SPLIT (5)	VOLUME/ TOTAL IN VOL (6)	VOLUME/ TOTAL OUT VOL (7)	VOLUME/ TOTAL VOLUME (8)	VOLUME/ PEAK HR IN (9)	VOLUME/ PEAK HR OUT (10)	IN (11)	OUT (12)
FIVE MINUTE PEAKS												
INBOUND	7 35	310	170	480	64.58	1.14	1.11	.56	9.72	10.56	5.82	5.79
OUTBOUND	17 10	275	215	490	56.12	1.01	.98	.50	8.62	9.37	5.16	5.14
INBOUND A.M.	7 35	310	170	480	64.58	1.14	1.11	.56	9.72	10.56	5.82	5.79
OUTBOUND A.M.	7 15	220	290	510	43.14	.81	.78	.40	6.90	7.50	4.13	4.11
INBOUND P.M.	17 5	235	255	490	47.96	.87	.84	.43	7.37	8.01	4.41	4.39
OUTBOUND P.M.	17 10	275	215	490	56.12	1.01	.98	.50	8.62	9.37	5.16	5.14
TEN MINUTE PEAKS												
INBOUND	7 35	605	345	950	63.68	2.23	2.16	1.10	18.97	20.61	11.36	11.31
OUTBOUND	17 10	540	400	940	57.45	1.99	1.93	.98	16.93	18.40	10.14	10.09
INBOUND A.M.	7 35	605	345	950	63.68	2.23	2.16	1.10	18.97	20.61	11.36	11.31
OUTBOUND A.M.	7 10	390	540	930	41.94	1.44	1.39	.71	12.23	13.29	7.32	7.29
INBOUND P.M.	17 0	460	500	960	47.92	1.70	1.64	.83	14.42	15.67	8.64	8.60
OUTBOUND P.M.	17 10	540	400	940	57.45	1.99	1.93	.98	16.93	18.40	10.14	10.09
ONE HOUR PEAKS												
INBOUND	6 55	3190	2135	5325	59.91	11.76	11.38	5.78	100.00	108.69	59.91	59.63
OUTBOUND	16 35	2935	2415	5350	54.86	10.82	10.47	5.32	92.01	100.00	55.12	54.86
INBOUND A.M.	6 55	3190	2135	5325	59.91	11.76	11.38	5.78	100.00	108.69	59.91	59.63
OUTBOUND A.M.	6 45	2185	3125	5310	41.15	8.05	7.79	3.96	68.50	74.45	41.03	40.84
INBOUND P.M.	16 30	2450	2925	5375	45.58	9.03	8.74	4.44	76.80	83.48	46.01	45.79
OUTBOUND P.M.	16 35	2935	2415	5350	54.86	10.82	10.47	5.32	92.01	100.00	55.12	54.86
TWO HOUR PEAKS												
INBOUND	6 25	5450	3810	9260	58.86	20.08	19.44	9.88	170.85	185.69	102.35	101.87
OUTBOUND	16 5	5175	4335	9510	54.42	19.07	18.46	9.38	162.23	176.32	97.18	96.73
INBOUND A.M.	6 25	5450	3810	9260	58.86	20.08	19.44	9.88	170.85	185.69	102.35	101.87
OUTBOUND A.M.	6 25	3810	5450	9260	41.14	14.04	13.59	6.91	119.44	129.81	71.55	71.21
INBOUND P.M.	15 35	4375	4895	9270	47.20	16.12	15.61	7.93	137.15	149.06	82.16	81.78
OUTBOUND P.M.	16 5	5175	4335	9510	54.42	19.07	18.46	9.38	162.23	176.32	97.18	96.73
TOTAL DAILY VOLUMES												
INBOUND	0 0	27135	28035	55170	49.18	100.00	96.79	49.18	850.63	924.53	509.58	507.20
OUTBOUND	0 0	28035	27135	55170	50.82	103.32	100.00	50.82	878.84	955.20	526.48	524.02
INBOUND A.M.	0 0	11765	10260	22025	53.42	43.36	41.97	21.32	368.81	400.85	220.94	219.91
OUTBOUND A.M.	0 0	10260	11765	22025	46.58	37.81	36.60	18.60	321.63	349.57	192.68	191.78
INBOUND P.M.	12 0	15370	17775	33145	46.37	56.64	54.82	27.86	481.82	523.68	288.64	287.29
OUTBOUND P.M.	12 0	17775	15370	33145	53.63	65.51	63.40	32.22	557.21	605.62	333.80	332.24

TOTAL TRAFFIC = 55170

TRAFFIC VOLUME ANALYSIS

STATION 108 IN SAN ANTONIO ON US 81 EXPRESSWAY WEST OF NORTH ST MARYS FOUR LANES

		DATA				DAILY			HOURLY		VOLUME/ TOT VOL DURING PEAK HR IN (11)	VOLUME/ TOT VOL DURING PEAK HR OUT (12)
	TIME (1)	VOLUME (2)	OPPOS. VOLUME (3)	TOTAL VOLUME (4)	SPLIT (5)	VOLUME/ TOTAL IN VOL (6)	VOLUME/ TOTAL OUT VOL (7)	VOLUME/ TOTAL VOLUME (8)	VOLUME/ PEAK HR IN (9)	VOLUME/ PEAK HR OUT (10)		
FIVE MINUTE PEAKS												
INBOUND	16 10	240	155	395	60.76	1.02	1.13	.54	10.26	11.57	5.77	5.59
OUTBOUND	7 20	200	175	375	53.33	.85	.94	.45	8.55	9.64	4.81	4.66
INBOUND A.M.	7 40	215	170	385	55.84	.91	1.01	.48	9.19	10.36	5.17	5.01
OUTBOUND A.M.	7 20	200	175	375	53.33	.85	.94	.45	8.55	9.64	4.81	4.66
INBOUND P.M.	16 10	240	155	395	60.76	1.02	1.13	.54	10.26	11.57	5.77	5.59
OUTBOUND P.M.	17 5	195	185	380	51.32	.83	.92	.44	8.33	9.40	4.69	4.55
TEN MINUTE PEAKS												
INBOUND	16 5	470	290	760	61.84	1.99	2.21	1.05	20.09	22.65	11.30	10.96
OUTBOUND	7 20	395	375	770	51.30	1.68	1.86	.88	16.88	19.04	9.50	9.21
INBOUND A.M.	7 40	425	335	760	55.92	1.80	2.00	.95	18.16	20.48	10.22	9.91
OUTBOUND A.M.	7 20	395	375	770	51.30	1.68	1.86	.88	16.88	19.04	9.50	9.21
INBOUND P.M.	16 5	470	290	760	61.84	1.99	2.21	1.05	20.09	22.65	11.30	10.96
OUTBOUND P.M.	17 5	380	405	785	48.41	1.61	1.79	.85	16.24	18.31	9.13	8.86
ONE HOUR PEAKS												
INBOUND	16 5	2340	1820	4160	56.25	9.93	11.02	5.22	100.00	112.77	56.25	54.55
OUTBOUND	16 35	2075	2215	4290	48.37	8.80	9.77	4.63	88.68	100.00	49.88	48.37
INBOUND A.M.	7 5	2190	1985	4175	52.46	9.29	10.31	4.89	93.59	105.54	52.64	51.05
OUTBOUND A.M.	6 55	2075	2130	4205	49.35	8.80	9.77	4.63	88.68	100.00	49.88	48.37
INBOUND P.M.	16 5	2340	1820	4160	56.25	9.93	11.02	5.22	100.00	112.77	56.25	54.55
OUTBOUND P.M.	16 35	2075	2215	4290	48.37	8.80	9.77	4.63	88.68	100.00	49.88	48.37
TWO HOUR PEAKS												
INBOUND	15 40	4230	3520	7750	54.58	17.95	19.92	9.44	180.77	203.86	101.68	98.60
OUTBOUND	16 5	3590	4150	7740	46.38	15.23	16.91	8.01	153.42	173.01	86.30	83.68
INBOUND A.M.	6 40	3900	3440	7340	53.13	16.55	18.37	8.70	166.67	187.95	93.75	90.91
OUTBOUND A.M.	6 25	3555	3790	7345	48.40	15.08	16.74	7.93	151.92	171.33	85.46	82.87
INBOUND P.M.	15 40	4230	3520	7750	54.58	17.95	19.92	9.44	180.77	203.86	101.68	98.60
OUTBOUND P.M.	16 5	3590	4150	7740	46.38	15.23	16.91	8.01	153.42	173.01	86.30	83.68
TOTAL DAILY VOLUMES												
INBOUND	0 0	23570	21235	44805	52.61	100.00	111.00	52.61	1007.26	1135.90	566.59	549.42
OUTBOUND	0 0	21235	23570	44805	47.39	90.09	100.00	47.39	907.48	1023.37	510.46	494.99
INBOUND A.M.	0 0	9375	8620	17995	52.10	39.78	44.15	20.92	400.64	451.81	225.36	218.53
OUTBOUND A.M.	0 0	8620	9375	17995	47.90	36.57	40.59	19.24	368.38	415.42	207.21	200.93
INBOUND P.M.	12 0	14195	12615	26810	52.95	60.22	66.85	31.68	606.62	684.10	341.23	330.89
OUTBOUND P.M.	12 0	12615	14195	26810	47.05	53.52	59.41	28.16	539.10	607.95	303.25	294.06

TOTAL TRAFFIC = 44805

TRAFFIC VOLUME ANALYSIS

STATION 109 IN FORT WORTH ON US 81 FREEWAY SOUTH OF BROADWAY STREET SIX LANES

		DATA				DAILY			HOURLY		VOLUME/ TOT VOL DURING PEAK HR	VOLUME/ TOT VOL DURING PEAK HR
	TIME (1)	VOLUME (2)	OPPOS. VOLUME (3)	TOTAL VOLUME (4)	SPLIT (5)	VOLUME/ TOTAL IN VOL (6)	VOLUME/ TOTAL OUT VOL (7)	VOLUME/ TOTAL VOLUME (8)	VOLUME/ PEAK HR IN (9)	VOLUME/ PEAK HR OUT (10)	IN (11)	OUT (12)
FIVE MINUTE PEAKS												
INBOUND	7 50	370	190	560	66.07	1.17	1.17	.59	10.76	10.51	6.46	6.21
OUTBOUND	17 10	365	235	600	60.83	1.16	1.15	.58	10.61	10.37	6.37	6.12
INBOUND A.M.	7 50	370	190	560	66.07	1.17	1.17	.59	10.76	10.51	6.46	6.21
OUTBOUND A.M.	7 45	230	345	575	40.00	.73	.73	.36	6.69	6.53	4.01	3.86
INBOUND P.M.	16 45	250	310	560	44.64	.79	.79	.40	7.27	7.10	4.36	4.19
OUTBOUND P.M.	17 10	365	235	600	60.83	1.16	1.15	.58	10.61	10.37	6.37	6.12
TEN MINUTE PEAKS												
INBOUND	7 45	715	420	1135	63.00	2.27	2.26	1.13	20.78	20.31	12.48	12.00
OUTBOUND	17 5	715	455	1170	61.11	2.27	2.26	1.13	20.78	20.31	12.48	12.00
INBOUND A.M.	7 45	715	420	1135	63.00	2.27	2.26	1.13	20.78	20.31	12.48	12.00
OUTBOUND A.M.	7 40	460	690	1150	40.00	1.46	1.45	.73	13.37	13.07	8.03	7.72
INBOUND P.M.	16 40	485	595	1080	44.91	1.54	1.53	.77	14.10	13.78	8.46	8.14
OUTBOUND P.M.	17 5	715	455	1170	61.11	2.27	2.26	1.13	20.78	20.31	12.48	12.00
ONE HOUR PEAKS												
INBOUND	7 10	3440	2290	5730	60.03	10.91	10.87	5.44	100.00	97.73	60.03	57.72
OUTBOUND	16 40	3520	2440	5960	59.06	11.16	11.12	5.57	102.33	100.00	61.43	59.06
INBOUND A.M.	7 10	3440	2290	5730	60.03	10.91	10.87	5.44	100.00	97.73	60.03	57.72
OUTBOUND A.M.	7 15	2295	3395	5690	40.33	7.28	7.25	3.63	66.72	65.20	40.05	38.51
INBOUND P.M.	16 30	2460	3515	5975	41.17	7.80	7.77	3.89	71.51	69.89	42.93	41.28
OUTBOUND P.M.	16 40	3520	2440	5960	59.06	11.16	11.12	5.57	102.33	100.00	61.43	59.06
TWO HOUR PEAKS												
INBOUND	6 35	5730	3915	9645	59.41	18.17	18.10	9.07	166.57	162.78	100.00	96.14
OUTBOUND	16 5	5995	4510	10505	57.07	19.01	18.94	9.49	174.27	170.31	104.62	100.59
INBOUND A.M.	6 35	5730	3915	9645	59.41	18.17	18.10	9.07	166.57	162.78	100.00	96.14
OUTBOUND A.M.	7 10	3980	5495	9475	42.01	12.62	12.57	6.30	115.70	113.07	69.46	66.78
INBOUND P.M.	15 45	4575	5960	10535	43.43	14.51	14.45	7.24	132.99	129.97	79.84	76.76
OUTBOUND P.M.	16 5	5995	4510	10505	57.07	19.01	18.94	9.49	174.27	170.31	104.62	100.59
TOTAL DAILY VOLUMES												
INBOUND	0 0	31530	31655	63185	49.90	100.00	99.61	49.90	916.57	895.74	550.26	529.03
OUTBOUND	0 0	31655	31530	63185	50.10	100.40	100.00	50.10	920.20	899.29	552.44	531.12
INBOUND A.M.	0 0	13625	11490	25115	54.25	43.21	43.04	21.56	396.08	387.07	237.78	228.61
OUTBOUND A.M.	0 0	11490	13625	25115	45.75	36.44	36.30	18.18	334.01	326.42	200.52	192.79
INBOUND P.M.	12 0	17905	20165	38070	47.03	56.79	56.56	28.34	520.49	508.66	312.48	300.42
OUTBOUND P.M.	12 0	20165	17905	38070	52.97	63.95	63.70	31.91	586.19	572.87	351.92	338.34

TOTAL TRAFFIC = 63185

TRAFFIC VOLUME ANALYSIS

STATION 115 IN BEAUMONT ON IH 10 BETWEEN 7TH AND 8TH STREETS FOUR LANES

		DATA				DAILY			HOURLY		VOLUME/ TOT VOL DURING PEAK HR IN (11)	VOLUME/ TOT VOL DURING PEAK HR OUT (12)
	TIME (1)	VOLUME (2)	OPPOS. VOLUME (3)	TOTAL VOLUME (4)	SPLIT (5)	VOLUME/ TOTAL IN VOL (6)	VOLUME/ TOTAL OUT VOL (7)	VOLUME/ TOTAL VOLUME (8)	VOLUME/ PEAK HR IN (9)	VOLUME/ PEAK HR OUT (10)		
FIVE MINUTE PEAKS												
INBOUND	7 50	150	105	255	58.82	.89	.92	.45	10.34	9.20	6.20	5.26
OUTBOUND	17 10	185	95	280	66.07	1.10	1.14	.56	12.76	11.35	7.64	6.49
INBOUND A.M.	7 50	150	105	255	58.82	.89	.92	.45	10.34	9.20	6.20	5.26
OUTBOUND A.M.	7 50	105	150	255	41.18	.62	.65	.32	7.24	6.44	4.34	3.68
INBOUND P.M.	16 5	135	125	260	51.92	.80	.83	.41	9.31	8.28	5.58	4.74
OUTBOUND P.M.	17 10	185	95	280	66.07	1.10	1.14	.56	12.76	11.35	7.64	6.49
TEN MINUTE PEAKS												
INBOUND	7 45	295	195	490	60.20	1.75	1.81	.89	20.34	18.10	12.19	10.35
OUTBOUND	17 10	350	200	550	63.64	2.08	2.15	1.06	24.14	21.47	14.46	12.28
INBOUND A.M.	7 45	295	195	490	60.20	1.75	1.81	.89	20.34	18.10	12.19	10.35
OUTBOUND A.M.	7 50	205	270	475	43.16	1.22	1.26	.62	14.14	12.58	8.47	7.19
INBOUND P.M.	16 5	255	250	505	50.50	1.52	1.57	.77	17.59	15.64	10.54	8.95
OUTBOUND P.M.	17 10	350	200	550	63.64	2.08	2.15	1.06	24.14	21.47	14.46	12.28
ONE HOUR PEAKS												
INBOUND	7 15	1450	970	2420	59.92	8.62	8.92	4.38	100.00	88.96	59.92	50.88
OUTBOUND	16 20	1630	1220	2850	57.19	9.69	10.03	4.93	112.41	100.00	67.36	57.19
INBOUND A.M.	7 15	1450	970	2420	59.92	8.62	8.92	4.38	100.00	88.96	59.92	50.88
OUTBOUND A.M.	7 10	985	1445	2430	40.53	5.85	6.06	2.98	67.93	60.43	40.70	34.56
INBOUND P.M.	16 0	1285	1445	2730	47.07	7.64	7.91	3.88	88.62	78.83	53.10	45.09
OUTBOUND P.M.	16 20	1630	1220	2850	57.19	9.69	10.03	4.93	112.41	100.00	67.36	57.19
TWO HOUR PEAKS												
INBOUND	6 45	2580	1775	4355	59.24	15.33	15.87	7.80	177.93	158.28	106.61	90.53
OUTBOUND	15 50	2940	2345	5285	55.63	17.47	18.09	8.89	202.76	180.37	121.49	103.16
INBOUND A.M.	6 45	2580	1775	4355	59.24	15.33	15.87	7.80	177.93	158.28	106.61	90.53
OUTBOUND A.M.	9 55	1855	1940	3795	48.88	11.02	11.41	5.61	127.93	113.80	76.65	65.09
INBOUND P.M.	15 35	2390	2920	5310	45.01	14.20	14.70	7.22	164.83	146.63	98.76	83.86
OUTBOUND P.M.	15 50	2940	2345	5285	55.63	17.47	18.09	8.89	202.76	180.37	121.49	103.16
TOTAL DAILY VOLUMES												
INBOUND	0 0	16830	16255	33085	50.87	100.00	103.54	50.87	1160.69	1032.52	695.45	590.53
OUTBOUND	0 0	16255	16830	33085	49.13	96.58	100.00	49.13	1121.03	997.24	671.69	570.35
INBOUND A.M.	0 0	7050	6005	13055	54.00	41.89	43.37	21.31	486.21	432.52	291.32	247.37
OUTBOUND A.M.	0 0	6005	7050	13055	46.00	35.68	36.94	18.15	414.14	368.40	248.14	210.70
INBOUND P.M.	12 0	9780	10250	20030	48.83	58.11	60.17	29.56	674.48	600.00	404.13	343.16
OUTBOUND P.M.	12 0	10250	9780	20030	51.17	60.90	63.06	30.98	706.90	628.83	423.55	359.65

TOTAL TRAFFIC = 33085

TRAFFIC VOLUME ANALYSIS

STATION 124 IN HOUSTON ON EAST TEX FREEWAY SOUTH OF BUFFALO BAYOU SIX LANES

	TIME (1)	DATA			SPLIT (5)	DAILY			HOURLY		VOLUME/ TOT VOL DURING PEAK HR IN (11)	VOLUME/ TOT VOL DURING PEAK HR OUT (12)
		VOLUME (2)	OPPOS. VOLUME (3)	TOTAL VOLUME (4)		VOLUME/ TOTAL IN VOL (6)	VOLUME/ TOTAL OUT VOL (7)	VOLUME/ TOTAL VOLUME (8)	VOLUME/ PEAK HR IN (9)	VOLUME/ PEAK HR OUT (10)		
FIVE MINUTE PEAKS												
INBOUND	7 40	235	125	360	65.28	1.13	1.03	.54	9.33	8.56	6.98	6.02
OUTBOUND	17 20	255	85	340	75.00	1.23	1.12	.59	10.12	9.29	7.58	6.53
INBOUND A.M.	7 40	235	125	360	65.28	1.13	1.03	.54	9.33	8.56	6.98	6.02
OUTBOUND A.M.	7 40	125	235	360	34.72	.60	.55	.29	4.96	4.55	3.71	3.20
INBOUND P.M.	17 40	125	200	325	38.46	.60	.55	.29	4.96	4.55	3.71	3.20
OUTBOUND P.M.	17 20	255	85	340	75.00	1.23	1.12	.59	10.12	9.29	7.58	6.53
TEN MINUTE PEAKS												
INBOUND	7 15	465	180	645	72.09	2.24	2.04	1.07	18.45	16.94	13.82	11.91
OUTBOUND	17 15	500	175	675	74.07	2.41	2.20	1.15	19.84	18.21	14.86	12.80
INBOUND A.M.	7 15	465	180	645	72.09	2.24	2.04	1.07	18.45	16.94	13.82	11.91
OUTBOUND A.M.	7 40	225	425	650	34.62	1.09	.99	.52	8.93	8.20	6.69	5.76
INBOUND P.M.	14 15	225	210	435	51.72	1.09	.99	.52	8.93	8.20	6.69	5.76
OUTBOUND P.M.	17 15	500	175	675	74.07	2.41	2.20	1.15	19.84	18.21	14.86	12.80
ONE HOUR PEAKS												
INBOUND	6 25	2520	845	3365	74.89	12.17	11.07	5.80	100.00	91.80	74.89	64.53
OUTBOUND	16 35	2745	1160	3905	70.29	13.25	12.06	6.31	108.93	100.00	81.58	70.29
INBOUND A.M.	6 25	2520	845	3365	74.89	12.17	11.07	5.80	100.00	91.80	74.89	64.53
OUTBOUND A.M.	7 30	1175	1995	3170	37.07	5.67	5.16	2.70	46.63	42.81	34.92	30.09
INBOUND P.M.	16 15	1190	2490	3680	32.34	5.74	5.23	2.74	47.22	43.35	35.36	30.47
OUTBOUND P.M.	16 35	2745	1160	3905	70.29	13.25	12.06	6.31	108.93	100.00	81.58	70.29
TWO HOUR PEAKS												
INBOUND	6 5	4785	1820	6605	72.45	23.10	21.02	11.01	189.88	174.32	142.20	122.54
OUTBOUND	16 10	4855	2260	7115	68.24	23.44	21.33	11.17	192.66	176.87	144.28	124.33
INBOUND A.M.	6 5	4785	1820	6605	72.45	23.10	21.02	11.01	189.88	174.32	142.20	122.54
OUTBOUND A.M.	7 15	2225	3595	5820	38.23	10.74	9.78	5.12	88.29	81.06	66.12	56.98
INBOUND P.M.	15 50	2345	4790	7135	32.87	11.32	10.30	5.39	93.06	85.43	69.69	60.05
OUTBOUND P.M.	16 10	4855	2260	7115	68.24	23.44	21.33	11.17	192.66	176.87	144.28	124.33
TOTAL DAILY VOLUMES												
INBOUND	0 0	20715	22760	43475	47.65	100.00	91.01	47.65	822.02	754.64	615.60	530.47
OUTBOUND	0 0	22760	20715	43475	52.35	109.87	100.00	52.35	903.17	829.14	676.37	582.84
INBOUND A.M.	0 0	10710	7175	17885	59.88	51.70	47.06	24.63	425.00	390.16	318.28	274.26
OUTBOUND A.M.	0 0	7175	10710	17885	40.12	34.64	31.52	16.50	284.72	261.38	213.22	183.74
INBOUND P.M.	12 0	10005	15585	25590	39.10	48.30	43.96	23.01	397.02	364.48	297.33	256.21
OUTBOUND P.M.	12 0	15585	10005	25590	60.90	75.24	68.48	35.85	618.45	567.76	463.15	399.10

TOTAL TRAFFIC = 43475

TRAFFIC VOLUME ANALYSIS

STATION 126 IN DALLAS ON STEMMONS FREEWAY NORTH OF WYCLIFF TEN LANES

	TIME (1)	DATA VOLUME (2)	DATA OPPOS. VOLUME (3)	DATA TOTAL VOLUME (4)	SPLIT (5)	DAILY VOLUME/ TOTAL IN VOL (6)	DAILY VOLUME/ TOTAL OUT VOL (7)	DAILY VOLUME/ TOTAL VOLUME (8)	HOURLY VOLUME/ PEAK HR IN (9)	HOURLY VOLUME/ PEAK HR OUT (10)	VOLUME/ TOT VOL DURING PEAK HR IN (11)	VOLUME/ TOT VOL DURING PEAK HR OUT (12)
FIVE MINUTE PEAKS												
INBOUND	7 35	430	330	760	56.58	1.02	1.04	.52	9.18	9.37	5.22	5.30
OUTBOUND	17 10	430	330	760	56.58	1.02	1.04	.52	9.18	9.37	5.22	5.30
INBOUND A.M.	7 35	430	330	760	56.58	1.02	1.04	.52	9.18	9.37	5.22	5.30
OUTBOUND A.M.	7 40	370	395	765	48.37	.88	.90	.44	7.90	8.06	4.49	4.56
INBOUND P.M.	16 35	400	335	735	54.42	.95	.97	.48	8.54	8.71	4.86	4.93
OUTBOUND P.M.	17 10	430	330	760	56.58	1.02	1.04	.52	9.18	9.37	5.22	5.30
TEN MINUTE PEAKS												
INBOUND	7 30	850	645	1495	56.86	2.01	2.07	1.02	18.14	18.52	10.32	10.47
OUTBOUND	17 5	820	700	1520	53.95	1.94	1.99	.98	17.50	17.86	9.96	10.10
INBOUND A.M.	7 30	850	645	1495	56.86	2.01	2.07	1.02	18.14	18.52	10.32	10.47
OUTBOUND A.M.	7 40	715	785	1500	47.67	1.69	1.74	.86	15.26	15.58	8.68	8.81
INBOUND P.M.	16 35	760	690	1450	52.41	1.80	1.85	.91	16.22	16.56	9.23	9.37
OUTBOUND P.M.	17 5	820	700	1520	53.95	1.94	1.99	.98	17.50	17.86	9.96	10.10
ONE HOUR PEAKS												
INBOUND	7 15	4685	3550	8235	56.89	11.09	11.38	5.62	100.00	102.07	56.89	57.73
OUTBOUND	16 45	4590	3525	8115	56.56	10.87	11.15	5.50	97.97	100.00	55.74	56.56
INBOUND A.M.	7 15	4685	3550	8235	56.89	11.09	11.38	5.62	100.00	102.07	56.89	57.73
OUTBOUND A.M.	7 5	3650	4625	8275	44.11	8.64	8.87	4.38	77.91	79.52	44.32	44.98
INBOUND P.M.	16 25	3770	4435	8205	45.95	8.93	9.16	4.52	80.47	82.14	45.78	46.46
OUTBOUND P.M.	16 45	4590	3525	8115	56.56	10.87	11.15	5.50	97.97	100.00	55.74	56.56
TWO HOUR PEAKS												
INBOUND	6 55	8105	6155	14260	56.84	19.19	19.69	9.72	173.00	176.58	98.42	99.88
OUTBOUND	16 10	8115	6610	14725	55.11	19.22	19.72	9.73	173.21	176.80	98.54	100.00
INBOUND A.M.	6 55	8105	6155	14260	56.84	19.19	19.69	9.72	173.00	176.58	98.42	99.88
OUTBOUND A.M.	6 25	6600	7560	14160	46.61	15.63	16.04	7.92	140.88	143.79	80.15	81.33
INBOUND P.M.	15 40	6790	7835	14625	46.43	16.08	16.50	8.14	144.93	147.93	82.45	83.67
OUTBOUND P.M.	16 10	8115	6610	14725	55.11	19.22	19.72	9.73	173.21	176.80	98.54	100.00
TOTAL DAILY VOLUMES												
INBOUND	0 0	42230	41155	83385	50.64	100.00	102.61	50.64	901.39	920.04	512.81	520.39
OUTBOUND	0 0	41155	42230	83385	49.36	97.45	100.00	49.36	878.44	896.62	499.76	507.15
INBOUND A.M.	0 0	18855	16325	35180	53.60	44.65	45.81	22.61	402.45	410.78	228.96	232.35
OUTBOUND A.M.	0 0	16325	18855	35180	46.40	38.66	39.67	19.58	348.45	355.66	198.24	201.17
INBOUND P.M.	12 0	23375	24830	48205	48.49	55.35	56.80	28.03	498.93	509.26	283.85	288.05
OUTBOUND P.M.	12 0	24830	23375	48205	51.51	58.80	60.33	29.78	529.99	540.96	301.52	305.98

TOTAL TRAFFIC = 83385

TRAFFIC VOLUME ANALYSIS

STATION 130 IN FORT WORTH ON EAST WEST FREEWAY MONTGOMERY ST OVERPASS FOUR LANES

	TIME (1)	DATA VOLUME (2)	DATA OPPOS. VOLUME (3)	DATA TOTAL VOLUME (4)	SPLIT (5)	DAILY VOLUME/ TOTAL IN VOL (6)	DAILY VOLUME/ TOTAL OUT VOL (7)	DAILY VOLUME/ TOTAL VOLUME (8)	HOURLY VOLUME/ PEAK HR IN (9)	HOURLY VOLUME/ PEAK HR OUT (10)	VOLUME/ TOT VOL DURING PEAK HR IN (11)	VOLUME/ TOT VOL DURING PEAK HR OUT (12)
FIVE MINUTE PEAKS												
INBOUND	7 45	340	165	505	67.33	1.26	1.24	.63	11.99	11.79	7.17	6.45
OUTBOUND	17 10	290	220	510	56.86	1.08	1.06	.53	10.23	10.05	6.11	5.50
INBOUND A.M.	7 45	340	165	505	67.33	1.26	1.24	.63	11.99	11.79	7.17	6.45
OUTBOUND A.M.	7 25	200	235	435	45.98	.74	.73	.37	7.05	6.93	4.21	3.80
INBOUND P.M.	16 45	260	215	475	54.74	.96	.95	.48	9.17	9.01	5.48	4.93
OUTBOUND P.M.	17 10	290	220	510	56.86	1.08	1.06	.53	10.23	10.05	6.11	5.50
TEN MINUTE PEAKS												
INBOUND	7 40	645	300	945	68.25	2.39	2.35	1.19	22.75	22.36	13.59	12.24
OUTBOUND	17 5	555	445	1000	55.50	2.06	2.02	1.02	19.58	19.24	11.70	10.53
INBOUND A.M.	7 40	645	300	945	68.25	2.39	2.35	1.19	22.75	22.36	13.59	12.24
OUTBOUND A.M.	7 25	390	470	860	45.35	1.45	1.42	.72	13.76	13.52	8.22	7.40
INBOUND P.M.	16 5	510	300	810	62.96	1.89	1.86	.94	17.99	17.68	10.75	9.68
OUTBOUND P.M.	17 5	555	445	1000	55.50	2.06	2.02	1.02	19.58	19.24	11.70	10.53
ONE HOUR PEAKS												
INBOUND	7 15	2835	1910	4745	59.75	10.52	10.34	5.21	100.00	98.27	59.75	53.80
OUTBOUND	16 40	2885	2385	5270	54.74	10.70	10.52	5.31	101.76	100.00	60.80	54.74
INBOUND A.M.	7 15	2835	1910	4745	59.75	10.52	10.34	5.21	100.00	98.27	59.75	53.80
OUTBOUND A.M.	7 5	1965	2795	4760	41.28	7.29	7.17	3.61	69.31	68.11	41.41	37.29
INBOUND P.M.	16 0	2645	2235	4880	54.20	9.81	9.65	4.86	93.30	91.68	55.74	50.19
OUTBOUND P.M.	16 40	2885	2385	5270	54.74	10.70	10.52	5.31	101.76	100.00	60.80	54.74
TWO HOUR PEAKS												
INBOUND	15 35	4715	4685	9400	50.16	17.49	17.20	8.67	166.31	163.43	99.37	89.47
OUTBOUND	16 15	4945	4175	9120	54.22	18.35	18.03	9.09	174.43	171.40	104.21	93.83
INBOUND A.M.	7 0	4625	3415	8040	57.52	17.16	16.87	8.51	163.14	160.31	97.47	87.76
OUTBOUND A.M.	6 30	3435	4425	7860	43.70	12.74	12.53	6.32	121.16	119.06	72.39	65.18
INBOUND P.M.	15 35	4715	4685	9400	50.16	17.49	17.20	8.67	166.31	163.43	99.37	89.47
OUTBOUND P.M.	16 15	4945	4175	9120	54.22	18.35	18.03	9.09	174.43	171.40	104.21	93.83
TOTAL DAILY VOLUMES												
INBOUND	0 0	26955	27420	54375	49.57	100.00	98.30	49.57	950.79	934.32	568.07	511.48
OUTBOUND	0 0	27420	26955	54375	50.43	101.73	100.00	50.43	967.20	950.43	577.87	520.30
INBOUND A.M.	0 0	11145	10085	21230	52.50	41.35	40.65	20.50	393.12	386.31	234.88	211.48
OUTBOUND A.M.	0 0	10085	11145	21230	47.50	37.41	36.78	18.55	355.73	349.57	212.54	191.37
INBOUND P.M.	12 0	15810	17335	33145	47.70	58.65	57.66	29.08	557.67	548.01	333.19	300.00
OUTBOUND P.M.	12 0	17335	15810	33145	52.30	64.31	63.22	31.88	611.46	600.87	365.33	328.94

TOTAL TRAFFIC = 54375

TRAFFIC VOLUME ANALYSIS

STATION 139 IN HOUSTON ON SOUTHWEST FREEWAY WEST OF GRAUSTARK STREET TEN LANES

	TIME (1)	DATA VOLUME (2)	DATA OPPOS. VOLUME (3)	DATA TOTAL VOLUME (4)	SPLIT (5)	DAILY VOLUME/ TOTAL IN VOL (6)	DAILY VOLUME/ TOTAL OUT VOL (7)	DAILY VOLUME/ TOTAL VOLUME (8)	HOURLY VOLUME/ PEAK HR IN (9)	HOURLY VOLUME/ PEAK HR OUT (10)	VOLUME/ TOT VOL DURING PEAK HR IN (11)	VOLUME/ TOT VOL DURING PEAK HR OUT (12)
FIVE MINUTE PEAKS												
INBOUND	7 25	570	220	790	72.15	1.34	1.34	.67	9.60	11.29	6.43	7.52
OUTBOUND	18 0	505	160	665	75.94	1.18	1.19	.59	8.51	10.00	5.70	6.66
INBOUND A.M.	7 25	570	220	790	72.15	1.34	1.34	.67	9.60	11.29	6.43	7.52
OUTBOUND A.M.	7 45	305	490	795	38.36	.72	.72	.36	5.14	6.04	3.44	4.02
INBOUND P.M.	16 35	405	370	775	52.26	.95	.95	.48	6.82	8.02	4.57	5.34
OUTBOUND P.M.	18 0	505	160	665	75.94	1.18	1.19	.59	8.51	10.00	5.70	6.66
TEN MINUTE PEAKS												
INBOUND	7 2[illegible]	1095	440	1535	71.34	2.57	2.58	1.29	18.45	21.68	12.36	14.45
OUTBOUND	17 55	985	375	1360	72.43	2.31	2.32	1.16	16.60	19.50	11.12	12.99
INBOUND A.M.	7 25	1095	440	1535	71.34	2.57	2.58	1.29	18.45	21.68	12.36	14.45
OUTBOUND A.M.	7 40	575	1000	1575	36.51	1.35	1.36	.68	9.69	11.39	6.49	7.59
INBOUND P.M.	16 35	780	760	1540	50.65	1.83	1.84	.92	13.14	15.45	8.80	10.29
OUTBOUND P.M.	17 55	985	375	1360	72.43	2.31	2.32	1.16	16.60	19.50	11.12	12.99
ONE HOUR PEAKS												
INBOUND	7 15	5935	2925	8860	66.99	13.93	13.99	6.98	100.00	117.52	66.99	78.30
OUTBOUND	17 20	5050	2530	7580	66.62	11.85	11.91	5.94	85.09	100.00	57.00	66.62
INBOUND A.M.	7 15	5935	2925	8860	66.99	13.93	13.99	6.98	100.00	117.52	66.99	78.30
OUTBOUND A.M.	7 10	2975	5915	8890	33.46	6.98	7.01	3.50	50.13	58.91	33.58	39.25
INBOUND P.M.	16 15	3580	4595	8175	43.79	8.40	8.44	4.21	60.32	70.89	40.41	47.23
OUTBOUND P.M.	17 20	5050	2530	7580	66.62	11.85	11.91	5.94	85.09	100.00	57.00	66.62
TWO HOUR PEAKS												
INBOUND	6 55	10430	5255	15685	66.50	24.47	24.59	12.27	175.74	206.53	117.72	137.60
OUTBOUND	16 20	9625	6070	15695	61.33	22.58	22.70	11.32	162.17	190.59	108.63	126.98
INBOUND A.M.	6 55	10430	5255	15685	66.50	24.47	24.59	12.27	175.74	206.53	117.72	137.60
OUTBOUND A.M.	6 35	5495	10125	15620	35.18	12.89	12.96	6.46	92.59	108.81	62.02	72.49
INBOUND P.M.	15 55	6300	8635	14935	42.18	14.78	14.85	7.41	106.15	124.75	71.11	83.11
OUTBOUND P.M.	16 20	9625	6070	15695	61.33	22.58	22.70	11.32	162.17	190.59	108.63	126.98
TOTAL DAILY VOLUMES												
INBOUND	0 0	42620	42410	85030	50.12	100.00	100.50	50.12	718.11	843.96	481.04	562.27
OUTBOUND	0 0	42410	42620	85030	49.88	99.51	100.00	49.88	714.57	839.80	478.67	559.50
INBOUND A.M.	0 0	20825	14305	35130	59.28	48.86	49.10	24.49	350.88	412.38	235.05	274.74
OUTBOUND A.M.	0 0	14305	20825	35130	40.72	33.56	33.73	16.82	241.03	283.27	161.46	188.72
INBOUND P.M.	12 0	21795	28105	49900	43.68	51.14	51.39	25.63	367.23	431.58	245.99	287.53
OUTBOUND P.M.	12 0	28105	21795	49900	56.32	65.94	66.27	33.05	473.55	556.53	317.21	370.78

TOTAL TRAFFIC = 85030

TRAFFIC VOLUME ANALYSIS

STATION 141 IN HOUSTON ON IH 10 EAST OF SILBER ROAD EIGHT LANES

	TIME (1)	DATA VOLUME (2)	DATA OPPOS. VOLUME (3)	DATA TOTAL VOLUME (4)	SPLIT (5)	DAILY VOLUME/ TOTAL IN VOL (6)	DAILY VOLUME/ TOTAL OUT VOL (7)	DAILY VOLUME/ TOTAL VOLUME (8)	HOURLY VOLUME/ PEAK HR IN (9)	HOURLY VOLUME/ PEAK HR OUT (10)	VOLUME/ TOT VOL DURING PEAK HR IN (11)	VOLUME/ TOT VOL DURING PEAK HR OUT (12)
FIVE MINUTE PEAKS												
INBOUND	7 30	350	105	455	76.92	1.62	1.51	.78	9.70	10.16	7.27	7.38
OUTBOUND	17 35	350	90	440	79.55	1.62	1.51	.78	9.70	10.16	7.27	7.38
INBOUND A.M.	7 30	350	105	455	76.92	1.62	1.51	.78	9.70	10.16	7.27	7.38
OUTBOUND A.M.	6 50	120	160	280	42.86	.56	.52	.27	3.32	3.48	2.49	2.53
INBOUND P.M.	16 45	135	210	345	39.13	.63	.58	.30	3.74	3.92	2.80	2.85
OUTBOUND P.M.	17 35	350	90	440	79.55	1.62	1.51	.78	9.70	10.16	7.27	7.38
TEN MINUTE PEAKS												
INBOUND	7 25	700	205	905	77.35	3.24	3.02	1.56	19.39	20.32	14.54	14.77
OUTBOUND	17 30	660	180	840	78.57	3.06	2.85	1.47	18.28	19.16	13.71	13.92
INBOUND A.M.	7 25	700	205	905	77.35	3.24	3.02	1.56	19.39	20.32	14.54	14.77
OUTBOUND A.M.	6 45	240	315	555	43.24	1.11	1.04	.54	6.65	6.97	4.98	5.06
INBOUND P.M.	16 40	270	420	690	39.13	1.25	1.16	.60	7.48	7.84	5.61	5.70
OUTBOUND P.M.	17 30	660	180	840	78.57	3.06	2.85	1.47	18.28	19.16	13.71	13.92
ONE HOUR PEAKS												
INBOUND	7 5	3610	1205	4815	74.97	16.72	15.57	8.06	100.00	104.79	74.97	76.16
OUTBOUND	16 50	3445	1295	4740	72.68	15.96	14.86	7.69	95.43	100.00	71.55	72.68
INBOUND A.M.	7 5	3610	1205	4815	74.97	16.72	15.57	8.06	100.00	104.79	74.97	76.16
OUTBOUND A.M.	6 40	1235	3090	4325	28.55	5.72	5.33	2.76	34.21	35.85	25.65	26.05
INBOUND P.M.	16 35	1390	3140	4530	30.68	6.44	6.00	3.10	38.50	40.35	28.87	29.32
OUTBOUND P.M.	16 50	3445	1295	4740	72.68	15.96	14.86	7.69	95.43	100.00	71.55	72.68
TWO HOUR PEAKS												
INBOUND	6 45	5875	2360	8235	71.34	27.21	25.35	13.12	162.74	170.54	122.01	123.95
OUTBOUND	16 30	5735	2515	8250	69.52	26.56	24.74	12.81	158.86	166.47	119.11	120.99
INBOUND A.M.	6 45	5875	2360	8235	71.34	27.21	25.35	13.12	162.74	170.54	122.01	123.95
OUTBOUND A.M.	6 35	2385	5865	8250	28.91	11.05	10.29	5.33	66.07	69.23	49.53	50.32
INBOUND P.M.	15 50	2635	5225	7860	33.52	12.20	11.37	5.89	72.99	76.49	54.72	55.59
OUTBOUND P.M.	16 30	5735	2515	8250	69.52	26.56	24.74	12.81	158.86	166.47	119.11	120.99
TOTAL DAILY VOLUMES												
INBOUND	0 0	21590	23180	44770	48.22	100.00	93.14	48.22	598.06	626.71	448.39	455.49
OUTBOUND	0 0	23180	21590	44770	51.78	107.36	100.00	51.78	642.11	672.86	481.41	489.03
INBOUND A.M.	0 0	11065	7165	18230	60.70	51.25	47.74	24.72	306.51	321.19	229.80	233.44
OUTBOUND A.M.	0 0	7165	11065	18230	39.30	33.19	30.91	16.00	198.48	207.98	148.81	151.16
INBOUND P.M.	12 0	10525	16015	26540	39.66	48.75	45.41	23.51	291.55	305.52	218.59	222.05
OUTBOUND P.M.	12 0	16015	10525	26540	60.34	74.18	69.09	35.77	443.63	464.88	332.61	337.87

TOTAL TRAFFIC = 44770

TRAFFIC VOLUME ANALYSIS

STATION 142 IN HOUSTON ON IH 45 NORTH OF LINK ROAD EIGHT LANES

		DATA				DAILY			HOURLY		VOLUME/ TOT VOL DURING PEAK HR	VOLUME/ TOT VOL DURING PEAK HR
	TIME (1)	VOLUME (2)	OPPOS. VOLUME (3)	TOTAL VOLUME (4)	SPLIT (5)	VOLUME/ TOTAL IN VOL (6)	VOLUME/ TOTAL OUT VOL (7)	VOLUME/ TOTAL VOLUME (8)	VOLUME/ PEAK HR IN (9)	VOLUME/ PEAK HR OUT (10)	IN (11)	OUT (12)
FIVE MINUTE PEAKS												
INBOUND	7 20	630	120	750	84.00	1.60	1.72	.83	9.67	10.22	7.96	7.72
OUTBOUND	17 10	590	150	740	79.73	1.50	1.61	.78	9.06	9.57	7.46	7.23
INBOUND A.M.	7 20	630	120	750	84.00	1.60	1.72	.83	9.67	10.22	7.96	7.72
OUTBOUND A.M.	10 35	155	135	290	53.45	.39	.42	.20	2.38	2.51	1.96	1.90
INBOUND P.M.	16 40	215	480	695	30.94	.55	.59	.28	3.30	3.49	2.72	2.63
OUTBOUND P.M.	17 10	590	150	740	79.73	1.50	1.61	.78	9.06	9.57	7.46	7.23
TEN MINUTE PEAKS												
INBOUND	7 15	1250	235	1485	84.18	3.18	3.42	1.65	19.19	20.28	15.80	15.31
OUTBOUND	17 10	1130	270	1400	80.71	2.87	3.09	1.49	17.34	18.33	14.29	13.84
INBOUND A.M.	7 15	1250	235	1485	84.18	3.18	3.42	1.65	19.19	20.28	15.80	15.31
OUTBOUND A.M.	10 30	280	295	575	48.70	.71	.77	.37	4.30	4.54	3.54	3.43
INBOUND P.M.	16 35	410	905	1315	31.18	1.04	1.12	.54	6.29	6.65	5.18	5.02
OUTBOUND P.M.	17 10	1130	270	1400	80.71	2.87	3.09	1.49	17.34	18.33	14.29	13.84
ONE HOUR PEAKS												
INBOUND	6 50	6515	1395	7910	82.36	16.56	17.82	8.59	100.00	105.68	82.36	79.79
OUTBOUND	16 35	6165	2000	8165	75.51	15.68	16.86	8.12	94.63	100.00	77.94	75.51
INBOUND A.M.	6 50	6515	1395	7910	82.36	16.56	17.82	8.59	100.00	105.68	82.36	79.79
OUTBOUND A.M.	10 35	1550	1675	3225	48.06	3.94	4.24	2.04	23.79	25.14	19.60	18.98
INBOUND P.M.	15 50	2155	3850	6005	35.89	5.48	5.90	2.84	33.08	34.96	27.24	26.39
OUTBOUND P.M.	16 35	6165	2000	8165	75.51	15.68	16.86	8.12	94.63	100.00	77.94	75.51
TWO HOUR PEAKS												
INBOUND	6 20	10990	2600	13590	80.87	27.94	30.06	14.48	168.69	178.26	138.94	134.60
OUTBOUND	16 5	9955	4000	13955	71.34	25.31	27.23	13.12	152.80	161.48	125.85	121.92
INBOUND A.M.	6 20	10990	2600	13590	80.87	27.94	30.06	14.48	168.69	178.26	138.94	134.60
OUTBOUND A.M.	9 55	3050	3365	6415	47.54	7.75	8.34	4.02	46.82	49.47	38.56	37.35
INBOUND P.M.	14 55	4100	6620	10720	38.25	10.42	11.22	5.40	62.93	66.50	51.83	50.21
OUTBOUND P.M.	16 5	9955	4000	13955	71.34	25.31	27.23	13.12	152.80	161.48	125.85	121.92
TOTAL DAILY VOLUMES												
INBOUND	0 0	39330	36555	75885	51.83	100.00	107.59	51.83	603.68	637.96	497.22	481.69
OUTBOUND	0 0	36555	39330	75885	48.17	92.94	100.00	48.17	561.09	592.94	462.14	447.70
INBOUND A.M.	0 0	21095	9860	30955	68.15	53.64	57.71	27.80	323.79	342.17	266.69	258.36
OUTBOUND A.M.	0 0	9860	21095	30955	31.85	25.07	26.97	12.99	151.34	159.94	124.65	120.76
INBOUND P.M.	12 0	18235	26695	44930	40.59	46.36	49.88	24.03	279.89	295.78	230.53	223.33
OUTBOUND P.M.	12 0	26695	18235	44930	59.41	67.87	73.03	35.18	409.75	433.01	337.48	326.94

TOTAL TRAFFIC = 75885