If these rates are applied to the X, Y, Z, and "Other" vehicle-miles above, the results are as shown in Table 12.

Since so little is known about the "Other" travel, and following the course of the original report, this "Other" travel is eliminated, and the final conclusion is expressed as follows:

(1) Taxed gasoline consumed by motor vehicles on public roads and streets in North Carolina on the average 24-hour day of 1949, was as shown in Table 13, within the limits of this study.

This compares with the following findings of the original report:

	Daily Thousand Gal.	Percent
All city-town streets	628.097	33 80
State highways (outside towns)	894 511	48.14
County roads (outside towns)	335.415	18.06
	1,858.023	100.00

(2) In spite of the many changes due to improved mileage and population data, it is apparent that the indications of the original report remain substantially the same in the final report, with very little change in the relationship of total travel on the three systems.

(3) There still remains a possibility of error due to the relatively small number of sample towns, and the lack of more extensive traffic data in the town of the smallest sizes, of which there are so many in North Carolina.

(4) It would appear, however, from a comparison of the two reports that the final results are generally corroborative, this report materially reducing the degree of probable error.

(5) The major value of this report lies in the availability of new, complete, certified, recent street mileage data in all towns, and more reliable computations as to vehicle-miles of travel in all towns, and corroboration of previously computed percentages.

TESTING A TRAFFIC CIRCLE FOR POSSIBLE CAPACITY

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SYNOPSIS

The Latham, New York, traffic circle has a 200-ft. diameter central island, with two 15-ft. lanes and four entering highways. These highways enter so as to give two 210-ft. and two 105-ft. weaving sections measured on the center line and from center-to-center of the entering highways.

A preliminary check of the volumes, from the annual August counts, showed less than 1,000 vph. This was not enough to load the circle for testing capacity. It was therefore decided to use 30 test cars on a 3-min. schedule, in addition to regular traffic. The plan scheduled the test cars with 50 to 50, 75 to 25, 90 to 10 percent weaving action with two separate test routings.

The circle was divided into four segments for studying the weaving actions in the shorter and the longer weaving sections. Three tests were taken for periods of 30 min. and two for 15 min. On the shorter Segments A and C with all cars weaving on a 50 to 50 ratio, the possible capacity was about 1,200 vph. and 1,300 vph. with 70 to 30 weaving ratio. The maximum speeds recorded in traveling through the shorter weaving sections ranged from 16 to 21 mph.—through lane movements, also were recorded. On the longer Segments B and D with all cars weaving on a 50 to 50 ratio, the possible capacity was found to be about 1,500 vph. with a one-lane operation and about 2,000 vph. for two-lane operation, (two-abreast). On a 70 to 30 ratio and above, with all cars weaving, the capacity of the weaving sections were increased to 1,700 vph. for one-lane operation and 2,200 vph. for two-lane operation.

The maximum speeds recorded at which vehicles passed through the longer weaving sections, during the test, varied from 17 to 24 mph.

● In 1949, the New York State Department of Public Works scheduled an annual highway-traffic-research program in coöperation with the Bureau of Public Roads. Several types of

projects were advanced for study. Among these was one to study the possible capacity of traffic circles with special attention being given to short weaving sections. The Latham Traffic Circle presented an ideal opportunity for this type of study.

Latham, New York, is known as "The Hub of the Capital District." Its landmark, Latham Traffic Circle, makes it the nominal crossroads for the area. US 9, the main north-south highway and New York 7, the east-west artery, converge at the circle and together produce a steady-flowing stream of traffic.

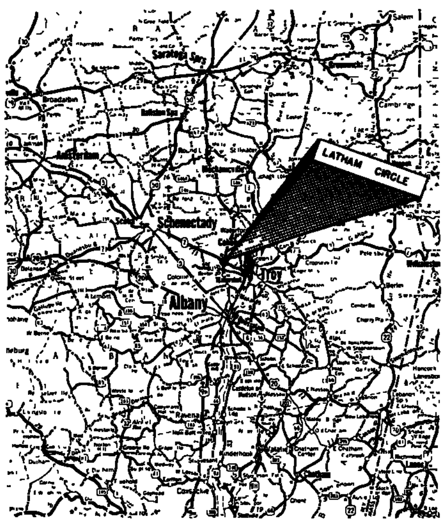


Figure 1. Location of Latham Circle.

That part of Latham on Routes 7 and 9 is a thriving commercial center. New stores and businesses are going up almost overnight to get away from the city parking problems and to serve the rapidly growing population.

The Latham Traffic Circle has a 200-ft.-diameter central island, a 30-ft. pavement and four entering highways. Route 9 is a three-lane and Route 7 a two-lane highway. These highways enter so as to give two 210-ft. and two 105-ft. weaving sections as measured on the centerline, from center to center of the entering highways.

Preparation for this test could not be made in sufficient time to take advantage of the heavy July and August travel at this location. The existing three-lane north-south highway, Route 9, is presently carrying summer volumes up to 14,000 vehicles and Route 7, the east-west route, up to 10,500 vehicles per 24 hr. In order to provide adequate traffic, it was decided to load certain segments of the circle by the use of test cars on a predetermined schedule. These were in addition to the prevailing traffic. The tests were run on November 9, 1949. The plan scheduled the test cars with 50 to 50, 75 to 25, and 90 to 10 percent weaving action with two separate test routings.

In order that a permanent record of test could be made for analysis, two movie cameras

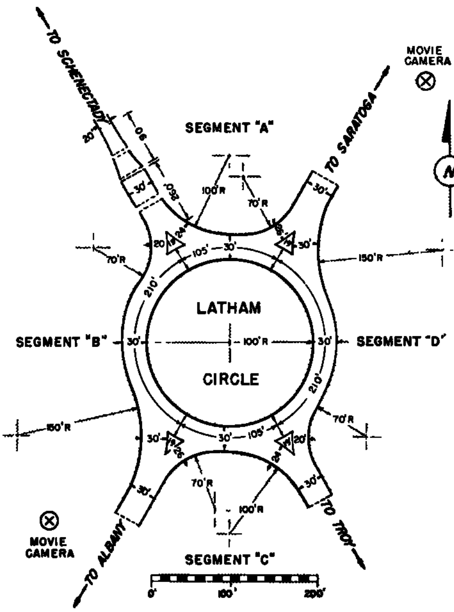


Figure 2. Dimensional plan of circle.

were used at different locations. Definite markings were located on the ground so the speed of the cars could be estimated.

Figure 1 shows the location of Latham Circle and the crossing of the two main arteries Route 9, north-south extending from New York, through Albany to Saratoga and north to Montreal and Route 7 from Vermont through Troy to Schenectady and southwest to Binghamton and into Pennsylvania.

Figure 2 shows the dimensions of the circle. Weaving Sections A and C are 105 ft. long and B and D are 210 ft. long, measured center to center of the entering highways. It also shows the approximate location of the movie cameras. The one to the north was located on the roof of a schoolhouse and the one to the south was

operated from the raised platform of a traffic-signal repair truck.

Figure 3 shows some of the traffic on the circle from different angles.

A study of the normal traffic that could be expected at the time of the tests indicated that the maximum volume would be approximately 1,000 vehicles per hr. in a segment of the circle. It was estimated that this volume might have to be increased to an equivalent of 3,000 vph. to reach the possible capacity of the circle and to introduce two-lane action. On the basis of adding the equivalent of 2,000 vph. to a segment, the number of test cars required was calculated. With a test car speed of 20 mph. and a traveled path of 1,800 ft., 30 test cars operating continuously for a 3-min. period were required.

It was planned to run each test for 27 min., in nine separate 3-min. periods, feeding the test cars into the normal traffic in these 3-min. periods from an initial total volume of about the equivalent of 350 vph. to the 2,000 vph. Working within this range the number of test cars to be added to the normal traffic during each 3-min. period from 0 to 27 was calculated (see Fig. 4). The total number of test cars required for each 3-min. period was then allotted between two groups according to the percentage of weaving for each test. One group was identified by letters and the other by numbers.

Two routings for test cars were planned as shown in Figure 5. Routing 1 was planned to produce through and weaving actions in each of the four segments under study. Routing 2 was planned to eliminate slow-ups in traffic in the longer segments by scheduling all test cars as through traffic on the shorter segments. This controlled, as far as possible, the effects of any slow-ups in the longer segments, caused by weaving in the shorter segments and tended to produce two-lane action with accompanying maximum capacity loadings.

In order to cover a varied range of weaving movements, it was then decided to schedule three tests on each routing, hereafter referred to as 1 and 2, with ratios of 50 to 50 (A), 75 to 25 (B), and 90 to 10 (C) crossing or weaving movements. The numbers in these ratios represent the percentages of the total vehicles to cross the crownline of the weaving sections. The first number represents the percentage to cross from the outside lane and the second number the percentage to cross from the inside lane.

It must be remembered that this scheduling of the test cars was in addition to the normal flow of vehicles.

Table 1 shows the basic planning data for controlling the dispatch of the test cars during each test. For example, on the 50 × 50 ratio on both Routings 1 and 2, the addition of test cars, for the equivalent of 350 to 2,000 vph., at the beginning of each 3-min. period were 3, 4, 5, 7, 8, 10, 12, 14, 15 respectively for both lettered and numbered cars. Thus all of the 30 test cars were added to the normal traffic for the last 3-min. period of the test to attain maximum volumes.

To ease identification and study, all test cars had a large number or letter painted or

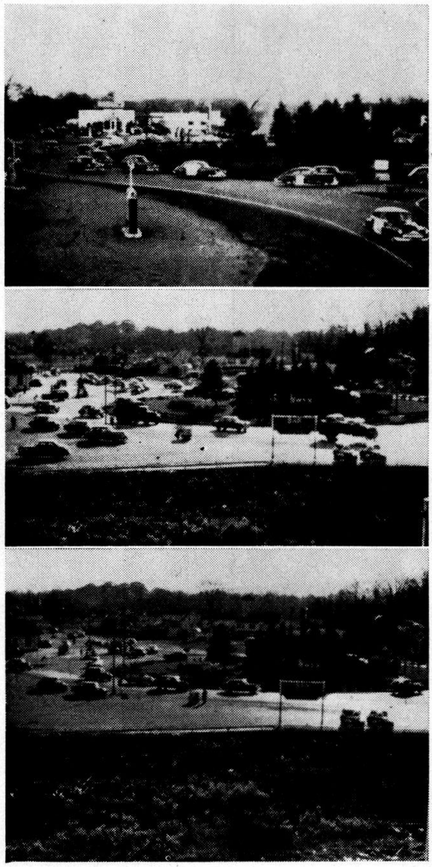


Figure 3.

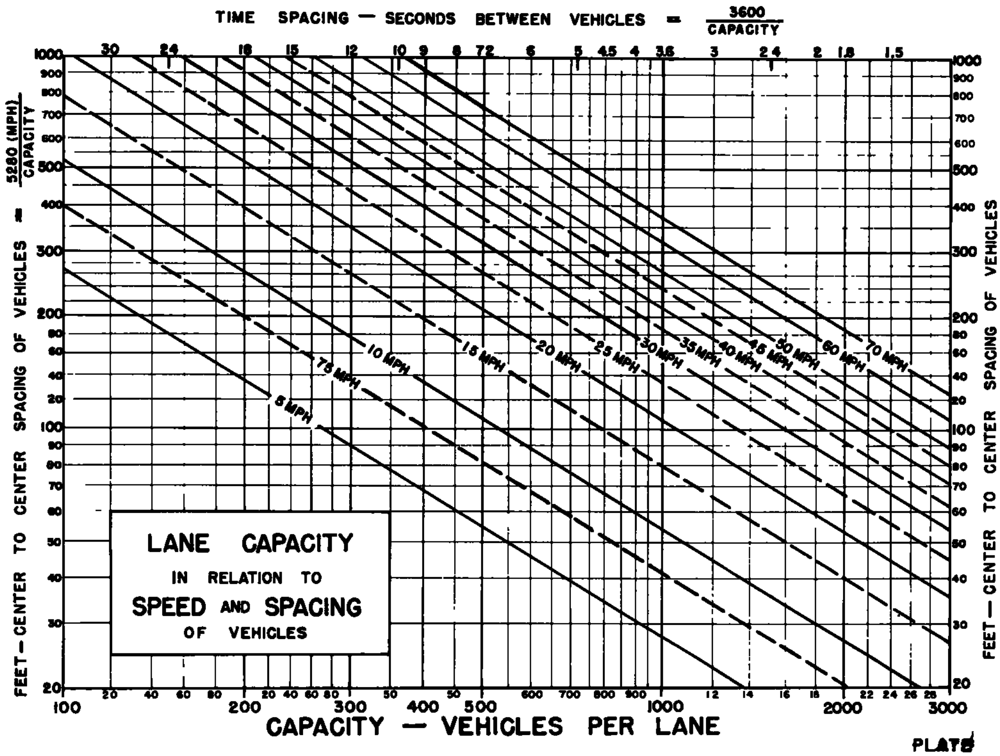


Figure 4. Lane capacity in relation to speed and spacing.

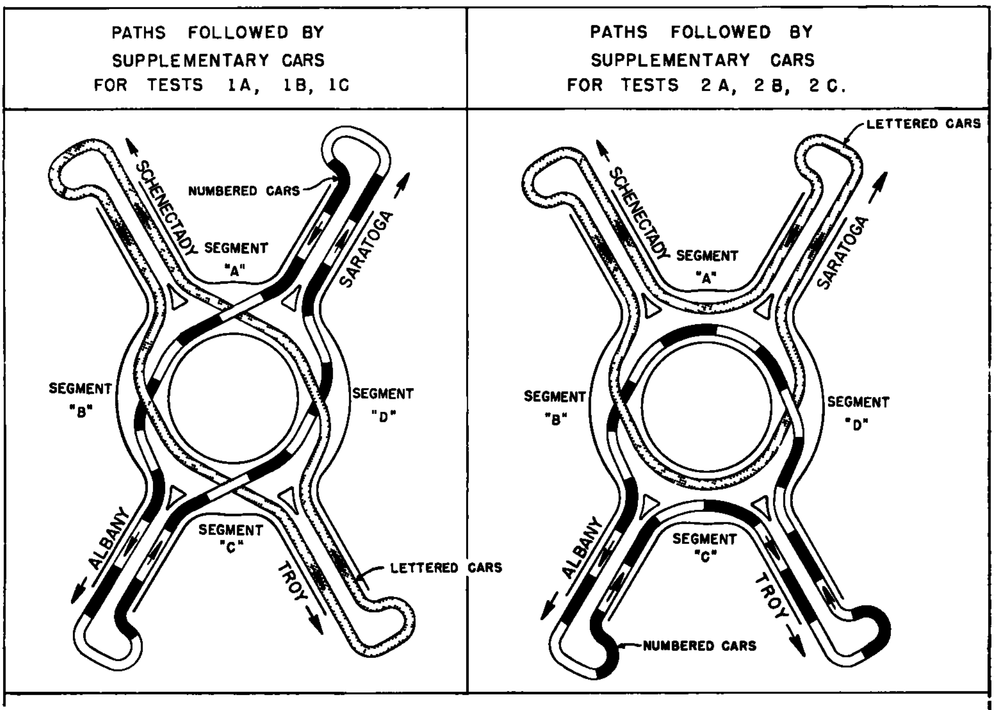


Figure 5. Routing of test cars.

-9-

fastened on the top and sides of the car. Thus, they could be followed through the weaving area by observers. For the normal traffic, colored cards were handed out as the cars entered the circle and collected as they left. This gave a complete record of the routings through the circle for both normal and test traffic.

In order that a complete record could be had for future study and comparisons, the hand record taken at census stations on the routes entering the circle and at the weaving areas, was augmented by the use of two movie cameras. Thus a major portion of these tests are recorded on movie films.

In addition to the two fixed cameras, approximately 1,600 ft. of movies were taken from a helicopter circling over the site for three of the five tests.

At each segment men were stationed to record the passage of the numbered and lettered test cars and to handle the colored cards for normal traffic. From this record the total volume on each segment and the amount of weaving was known. Table 2 shows the results of the tests. As each section of this test ran for three min., the volume multiplied by 20 gave the vehicles per hour. These are the figures shown. Thus, Column 3 shows the total vph. through the segment for each 3-min. period; Column 4 the trucks; Column 5 the weaving or crossing volume; Column 6 the actual percentages of the total vehicles (Column 5) crossing the crownline of the weaving sections for each 3-min. period, the first number representing the percentage crossing from the outside lane and the second number the percentage crossing from the inside lane; and Column 7 the volume of through traffic.

The heaviest volume recorded during the test occurred during Test 2-A in Segment B when vehicles passed through the weaving area at the rate of 1,900 vph. during the 3-min. period from 12 to 15 min. Of this total of 1,900 vph. there were 100 trucks, 1,820 vehicles crossed one another at 50 to 50 ratio and 80 vehicles went through the area without crossing.

Column 6 shows the percent crossing ratios recorded for the total volume of crossing traffic in the respective segments. Obviously this varies, in most instances, from the crossing ratios planned for the test cars.

Because of the sharpness of the entering approaches (radius = 70 ft.) all drivers tended to slow up before making the turn from the highway into the circle and fed into the circle in a single lane of traffic.

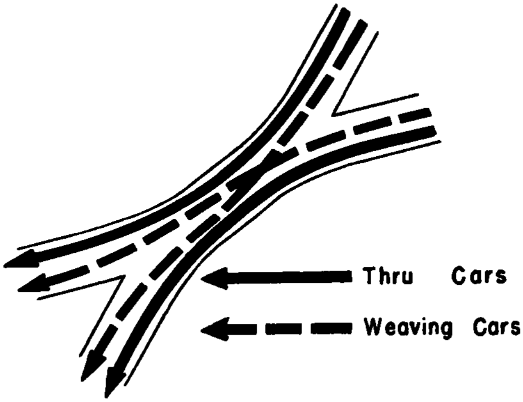
Figure 6 shows percentages of slow-ups and stops on the short Segment C as compared to the volume. Of the vehicles entering the weaving area, the number of vehicles which slowed-up or stopped were counted for each of the 3-min. periods. These were combined and the percent of the total volume computed. Curve 1 represents the graph formed by plotting the combined percentages of cars which slowed-up and those which stopped on the short segment when vehicles were crossing on the test 50 to 50 ratio. Curve 2 is similar for the ratio of 70 to 30. Curve 3 was plotted from values taken from Tests 2-A and 2-B, when approximately 50 per cent of the cars were performing a crossing operation and the balance were operating as through vehicles, in which no cross motion was executed.

From Curve 1, with all cars crossing on 50 to

TABLE 1

PLANNED TEST PROGRAM
SUPPLEMENTARY CARS

Time period (minutes)	Number of "lettered cars"	Vph. equivalent	Number of "numbered cars"	Vph. equivalent	Approx. total vph.
Test 1A and 2A (50 × 50)					
0–3	3	175	3	175	350
3–6	4	250	4	250	500
6–9	5	300	5	300	600
9–12	7	400	7	400	800
12–15	8	450	8	450	900
15–18	10	600	10	600	1200
18–21	12	700	12	700	1400
21–24	14	800	14	800	1600
24–27	15	900	15	900	1800
Test 1B and 2B (75 × 25)					
0–3	4	250	1	50	300
3–6	6	350	2	100	450
6–9	8	450	3	200	650
9–12	10	600	4	250	850
12–15	12	700	5	300	1000
15–18	15	900	6	350	1250
18–21	16	950	7	400	1350
21–24	18	1050	8	450	1500
24–27	19	1100	9	500	1600
Test 1C and 2C (90 × 10)					
0–3	5	300	1	50	350
3–6	7	400	1	50	450
6–9	10	600	1	50	650
9–12	12	700	2	100	800
12–15	15	900	2	100	1000
15–18	17	1000	2	100	1100
18–21	19	1100	2	100	1200
21–24	22	1300	2	100	1400
24–27	24	1400	3	200	1600



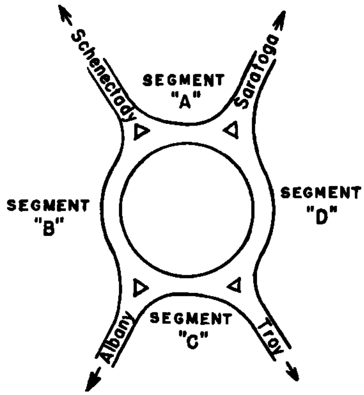
TAB

LATHAM CIRCLE

VOLUMES RECORDED

NOTE—Figures shown indicate vph. rate at

1	2	3	4	5	6	7	3	4	5	6	7
	Min.	Segment "A"					Segment "B"				
		Total	(Trucks)	×	% × %	Thru	Total	(Trucks)	×	% × %	Thru
Test 1-A (50-50)	0-3	540	(120)	400	30 × 70	140	400	(60)	400	20 × 80	0
	3-6	920	(120)	720	45 × 55	200	760	(120)	680	42 × 58	80
	6-9	580	(120)	460	44 × 56	120	620	(80)	540	52 × 48	80
	9-12	960	(100)	900	53 × 47	60	1040	(140)	920	46 × 54	120
	12-15	1000	(160)	880	43 × 57	120	800	(180)	760	53 × 47	40
	15-18	940	(40)	820	44 × 56	120	1060	(60)	980	39 × 61	80
	18-21	1040	(180)	980	45 × 55	60	860	(80)	800	45 × 55	60
	21-24	1280	(120)	1100	44 × 56	180	1240	(260)	1100	53 × 47	140
	24-27	1240	(200)	1100	51 × 49	140	1180	(180)	1100	36 × 64	80
Test 1-B (75-25)	0-3	680	(120)	320	19 × 81	360	560	(60)	560	50 × 50	0
	3-6	740	(100)	660	30 × 70	80	600	(100)	560	68 × 32	40
	6-9	960	(160)	820	32 × 68	140	560	(140)	500	48 × 52	60
	9-12	1040	(160)	820	32 × 68	220	920	(140)	800	68 × 32	120
	12-15	960	(120)	860	33 × 77	100	840	(160)	780	62 × 38	60
	15-18	1020	(100)	920	20 × 80	100	1060	(120)	1060	70 × 30	0
	18-21	1260	(160)	1100	29 × 71	160	900	(80)	840	69 × 31	60
	21-24	1320	(140)	1240	31 × 69	80	1200	(120)	1180	56 × 44	20
	24-27	1240	(180)	1060	38 × 62	180	1140	(140)	1060	53 × 47	80
	27-30						1220	(160)	1060	73 × 27	160
Test 1-C (90-10)	0-3	760	(160)	620	10 × 90	140	560	(40)	560	89 × 11	0
	3-6	940	(100)	840	36 × 64	100	660	(60)	640	56 × 44	20
	6-9	960	(100)	860	19 × 81	100	1020	(140)	960	69 × 31	60
	9-12	1280	(160)	1140	32 × 68	140	920	(120)	840	67 × 33	80
	12-15	1140	(160)	960	25 × 75	180	1160	(180)	1060	60 × 40	100
	15-18	1060	(80)	1000	30 × 70	60	980	(100)	900	69 × 31	80
	18-21	1160	(140)	1060	17 × 83	100	1200	(160)	1160	78 × 22	40
	21-24	1320	(80)	1140	37 × 63	180	1300	(120)	1160	72 × 28	140
	24-27	1320	(140)	1260	28 × 72	60	1340	(40)	1280	78 × 22	60
Test 2-A (50-50)	0-3	800	(160)	400	40 × 60	400	960	(140)	880	50 × 50	80
	3-6	960	(80)	380	63 × 37	580	1000	(100)	940	49 × 51	60
	6-9	1280	(120)	600	53 × 47	680	1360	(180)	1280	45 × 55	80
	9-12	1320	(120)	460	44 × 56	860	1580	(180)	1540	53 × 47	40
	12-15	1500	(60)	480	63 × 37	1020	1900	(100)	1820	50 × 50	80
	15-0						1620		1300	60 × 40	320
Test 2-B (75-25)	0-3	860	(140)	520	42 × 58	340	1120	(180)	1000	66 × 34	120
	3-6	1300	(100)	820	44 × 56	480	1300	(140)	1260	64 × 36	40
	6-9	1180	(60)	500	60 × 40	680	1540	(180)	1500	67 × 33	40
	9-12	1520	(100)	680	77 × 23	8'0	1500	(60)	1420	52 × 48	80
	12-15	1340	(120)	560	46 × 54	780	1720	(180)	1600	68 × 32	120



LE 2

TRAFFIC TEST

NOVEMBER 9, 1949

which cars came through in the three minute periods.

3	4	5	6	7	3	4	5	6	7	2	1
Segment "C"					Segment "D"					Min.	
Total	(Trucks)	×	% × %	Thru	Total	(Trucks)	×	% × %	Thru		
480	(60)	400	80 × 20	80	600	(80)	540	62 × 38	60	0–3	Test 1-A
680	(140)	620	39 × 61	60	720	(140)	620	71 × 29	100	3–6	(50–50)
820	(140)	780	59 × 41	40	740	(180)	680	44 × 56	60	6–9	
780	(100)	720	53 × 47	60	880	(120)	740	46 × 54	140	9–12	
1000	(200)	960	54 × 46	40	1220	(160)	1080	50 × 50	140	12–15	
1060	(140)	960	60 × 40	100	920	(80)	820	59 × 41	100	15–18	
940	(80)	860	60 × 40	80	1120	(180)	1040	48 × 52	80	18–21	
880	(40)	840	38 × 62	40	1200	(100)	1100	66 × 34	100	21–24	
1300	(240)	1200	70 × 30	100	1200	(180)	1120	48 × 52	80	24–27	
620	(20)	620	58 × 42	0	760	(60)	660	61 × 39	100	0–3	Test 1-B
620	(60)	540	44 × 56	80	620	(100)	580	48 × 52	40	3–6	(75–25)
660	(100)	580	59 × 41	80	980	(120)	960	69 × 31	20	6–9	
960	(280)	800	40 × 60	160	1080	(300)	1000	60 × 40	80	9–12	
1040	(100)	980	45 × 55	60	1080	(140)	1000	70 × 30	80	12–15	
1160	(160)	1100	40 × 60	60	1080	(120)	1020	65 × 35	60	15–18	
1080	(100)	920	41 × 59	160	1420	(100)	1300	66 × 34	120	18–21	
1200	(220)	1120	37 × 63	80	1100	(160)	1060	72 × 28	40	21–24	
1120	(140)	1040	50 × 50	80	1260	(180)	1100	55 × 45	160	24–27	
1100	(80)	1000	64 × 36	100	1300		1180	68 × 32	120	27–30	
640	(20)	580	38 × 62	60	880	(80)	780	61 × 39	100	0–3	Test 1-C
680	(80)	580	38 × 62	100	880	(60)	840	65 × 35	40	3–6	(90–10)
940	(80)	760	45 × 55	180	940	(120)	780	72 × 28	160	6–9	
960	(100)	900	40 × 60	60	1180	(140)	1000	68 × 32	180	9–12	
1200	(180)	1100	38 × 62	100	1140	(180)	920	87 × 13	220	12–15	
1140	(140)	980	33 × 67	160	1020	(40)	960	69 × 31	60	15–18	
1260	(180)	1060	30 × 70	200	1360	(180)	1240	73 × 27	120	18–21	
1040	(140)	960	21 × 79	80	1240	(100)	1160	71 × 29	80	21–24	
1200	(60)	1120	20 × 80	80	1140	(100)	1040	79 × 21	100	24–27	
720	(0)	440	64 × 36	280	820	(60)	700	43 × 57	120	0–3	Test 2-A
1060	(40)	520	61 × 39	540	1000	(20)	960	47 × 53	40	3–6	(50–50)
1140	(100)	440	45 × 55	700	1320	(100)	1240	48 × 52	80	6–9	
1520	(80)	700	55 × 45	820	1340	(20)	1200	50 × 50	140	9–12	
1600	(40)	660	39 × 61	940	1420	(20)	1340	48 × 52	80	12–15	
										15–0	
1260	(60)	700	66 × 34	560	1240	(120)	1100	29 × 71	140	0–3	Test 2-B
1440	(60)	800	58 × 42	640	1340	(60)	1240	37 × 63	100	3–6	(75–25)
1640	(100)	780	59 × 41	860	1460	(120)	1340	27 × 73	120	6–9	
1440	(60)	780	45 × 55	660	1500	(120)	1440	36 × 64	60	9–12	
1620	(100)	860	60 × 40	760	1560	(120)	1400	31 × 69	160	12–15	

50 ratio, the maximum volume for the short segment approached 1,200 vph. For Curve 2 the normal traffic changed the planned ratio of 75 to 25 to 70 to 30 and a study of the movie

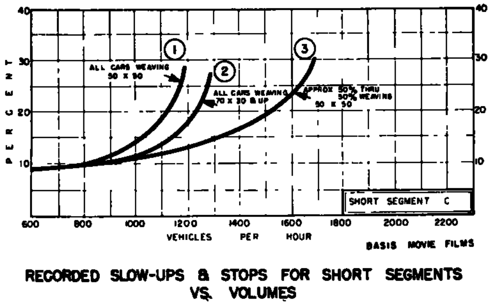


Figure 6. Recorded slow-ups and stops for short segments versus volumes.

film indicated that all cars executed a crossing movement. Here the volume approached 1,300 vph. Curve 3 indicates a much higher volume when 50 percent of the cars operate

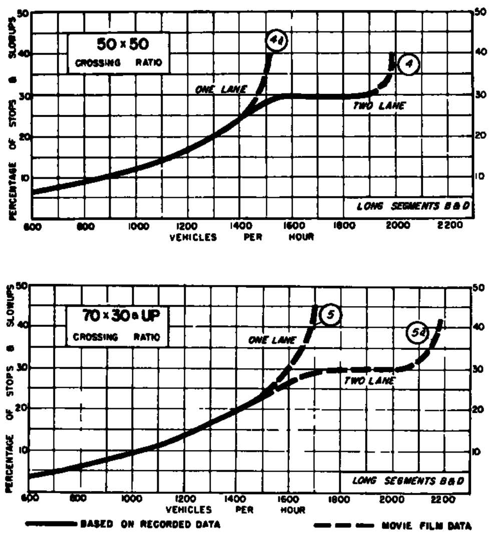


Figure 7. Recorded slow-ups and stops for long segments versus volumes.

as through vehicles and the others executed a 50 to 50 ratio of crossing. Here the volume approaches 1,700 vph.

Figure 7 shows similar curves for the long Segments B and D. Note that Curve 4 is similar to the others to about 1,400 vph. A study of the films showed that at this point a two-lane action started with vehicles traveling two abreast. Under this condition the volume increased to slightly over 1,900 vph. with the crossing ratio of 50 to 50. On the 70 to 30 cross-

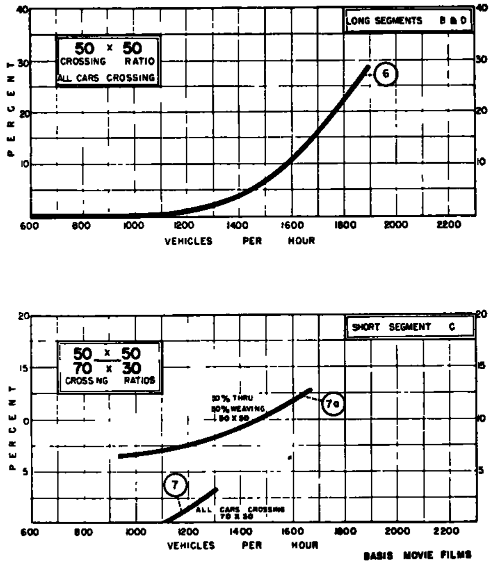


Figure 8. Recorded vehicles traveling two abreast versus volumes.

ing ratio, Curves 5 and 5a, the recorded data showed a volume of about 1,500 vph. with

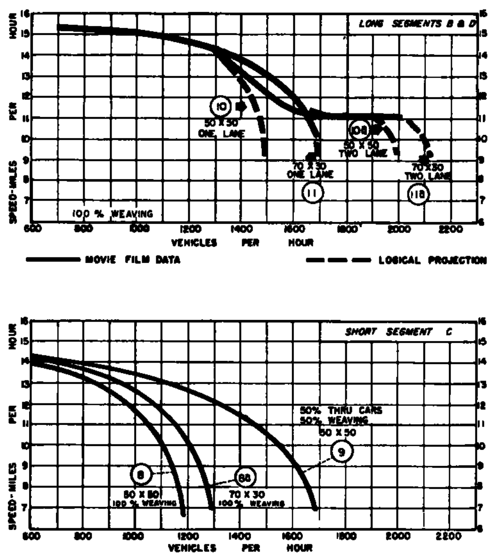


Figure 9. Recorded average speeds versus volumes.

single-lane action. Here again, a study of the films related to stops and slow-ups indicated that a two-lane action started at about 1,500

vph. and increased to around 2,000 vph. or more when traveling two abreast.

The number of cars which traveled abreast of another car in passing through the segments were counted and their percentage is plotted against total volumes (Fig. 8).

In the short segments, the curves indicate that very few cars traveled two abreast. Curve 7 shows about 3 percent traveling two abreast with a volume of 1,300 vph. when there was a 70 to 30 crossing operation.

Curve 6, plotted from data on the long segments, shows that the percentage of cars traveling two abreast is very small up to about 1,400 vph. Here, the curve bends sharply upward. Nearly 30 percent of the cars traveled two abreast on the 50 to 50 ratio.

Curve 7a was plotted from Tests 2-A and 2-B when 50 per cent of the cars were operating as through vehicles. Here the percentage of cars traveling two abreast was about 12 per cent, and it was noted that these cars were practically all through vehicles and therefore were not required to merge or cross vehicles entering the circle.

Through the use of landmarks with known distances, the speeds of cars were recorded from the film. The speeds recorded included the time lost at the points of mergings. From this data, Figure 9 was developed. The solid lines indicate average speeds obtained from actual readings. The dotted lines represent the estimated curves as determined from studies of the film.

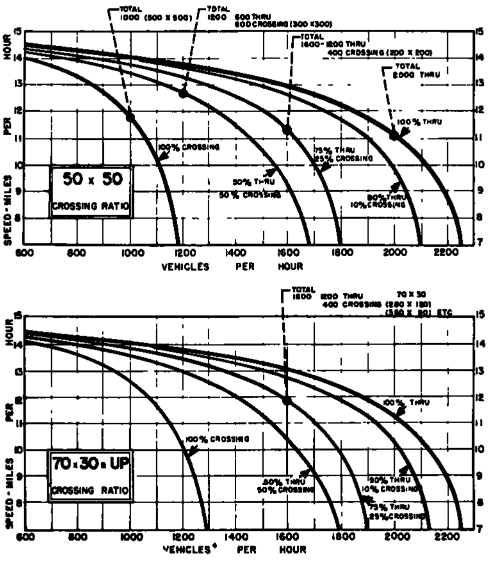


Figure 10. Average speeds versus volumes for short segments.

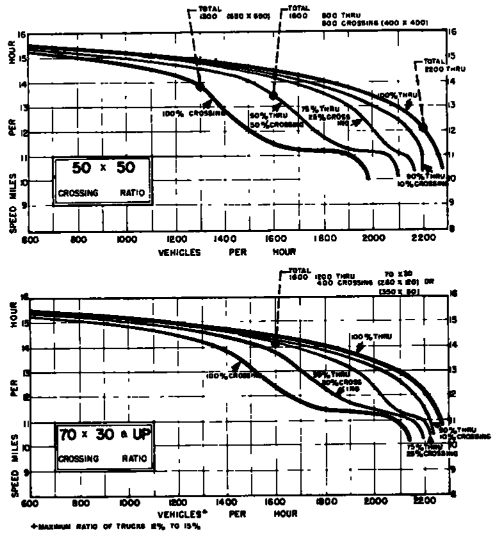


Figure 11. Average speeds versus volumes for long segments.

SHORT SEGMENTS

From Curves 8 and 8a, Figure 9, for the short segment C, it will be noted that a maximum capacity of about 1,200 vph., when all cars crossed on a 50 to 50 ratio and 1,300 vph. with all cars crossing on a 70 to 30 ratio and above, is indicated. Note the low speeds at these capacities.

Curve 9 represents average speeds recorded for Tests 2-A and 2-B when approximately 50 percent of the total vehicles passing the section are noncrossing, or through, cars. A maximum capacity of about 1,700 vph. is indicated under these conditions.

The maximum speeds recorded in traveling through the short weaving area ranged from 16 to 21 mph.

LONG SEGMENTS

Curves similar to those drawn for the short segments previously mentioned are shown in Figure 9 for the two long segments.

The average speeds dropped rapidly to between 11 and 12 mph. at volumes of from

1,400 to 1,600 vph. after which the speeds remained almost constant up to about 1,900 vph. As mentioned previously this was brought about by the double-lane action which occurred at volumes of about 1,400 vph.

Curves 10 and 10a indicate that the maximum capacity with all cars crossweaving on a 50 to 50 basis is about 1,500 vph. for single-lane action and 2,000 vph. for double-lane.

Similarly Curves 11 and 11a indicate that the maximum capacity with all cars crossweaving on a 70 to 30 basis is, for single-lane action, about 1,700 vph., and for double-lane action, approximately 2,100 vph. Again, note the low speeds of these maximum volumes.

The maximum speeds recorded at which vehicles passed through the long-weaving areas during the test varied from 17 to 24 mph.

The curves shown in Figures 6 through 9 represent relationships obtained from plotted points scattered over a fairly wide range. It was noted in the films that some drivers were unusually cautious in merging while others entered the segments with little or no hesitation. Those indications of individual driver characteristics were considered in plotting these curves, thus reflecting the delays which occurred under average driver behavior.

Figure 10 and 11 were plotted from the collected field data in combination with data obtained from a study and analysis of the traffic action portrayed in the motion picture film. Data needed to extend the curves, as plotted from the recorded data, was obtained by correlating higher volumes of through traffic with higher volumes of crossing traffic for the ratios of crossings shown under conditions of identical speeds for both types of traffic.

Figure 10 portrays the ratio of speeds to volumes for the short segments while Figure 11 indicates a similar relationship for the long segments.

In plotting the curves, the ratio of crossing cars was divided into two groups, those crossing at about 50 to 50 ratio and those crossing at 70 to 30 ratio and above. This latter group includes cars which crossed through at ratios up to about 90 to 10 and is believed to be satisfactory for all ratios ranging above 70 to 30, such as 80 to 20, 90 to 10, etc.

The maximum volumes are indicated for different crossing ratios and various combinations. These vary from 1,200 vph. for the short segments with all cars crossing on a 50 to 50 ratio to a maximum of about 2,300 vph. when all cars are acting as through vehicles.

A few examples of total volumes separated into their component parts of through and crossing vehicles have been marked on the figures so as to facilitate their use.

CONCLUSIONS

It is believed that the analyses presented in this report of the detailed field observations of delays, slow-ups, and stops; vehicles traveling two abreast; and operating speeds; provide a logical means for portraying the possible capacity and operating characteristics of this traffic circle and accurately reflect the effects on capacity of different proportions of crossing movements for the weaving sections studied.

It is also believed that by proper recognition of the limitations and variations of these tests and by the use of the developed curves, Figures 10 and 11, it is possible to predict operating characteristics and capacities of circles, intersections, or interchanges having weaving sections similar to those tested.

The Vehicle Operation Section of the Bureau of Highway Planning of the New York State Department of Public Works carried on this traffic survey and study at Latham. The procedure for this study was developed, under the direction of Fred W. Fisch, who was then director of the Bureau of Highway Planning, by E. B. Shrope, in coöperation with O. K. Normann, of the Bureau of Public Roads. It was progressed under Shrope's direction, utilizing personnel and equipment of the public works department and the Bureau of Public Roads.