

THE NEED FOR FURTHER RESEARCH ON TRAFFIC ASSIGNMENT

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THE PROPER assignment of traffic to various proposed facilities has been the objective of highway planners for a number of years. The development of comprehensive traffic volume data by the highway-planning surveys in the 1930's was probably the spark that flamed to make this type of activity possible. Our basic traffic records, starting in the thirties and continued on the skeletonized basis since, provide a fund of information about traffic-volume changes. The origin-destination and economic studies undertaken in connection with major bridge or expressway plans have been most helpful in this work. How crude our first efforts in analyzing existing traffic and making assignments therefrom have been is easily determined by anyone who reviews the preliminary traffic estimates 10 years after the facility is in operation. The need for refinement is definitely in order. We must increase our knowledge of driver habits if we are to be able to make better, more-reliable predictions of the uses to be made of the facilities we propose.

Connecticut has tried to obtain information concerning factors relating to facility choice by the motorist. The South Meadows Expressway studies, undertaken in 1946, raised more questions than it answered. The variables were too numerous to isolate. Although a number of our technicians have tried, none were satisfied with the results.

At the 1947 meeting of the Highway Research Board, Roy E. Jorgensen presented a paper entitled "Influence of Expressways in Diverting Traffic from Alternate Routes and in Generating New Traffic." Since that time, Connecticut has begun little new research on the subject, but we have brought the data included in Jorgensen's paper up to date. In the Table below you will find a continuation, to 1951, of Table 4 in the earlier paper:

TABLE 1

<u>(Jorgensen's Table 4)</u>	<u>Hartford-Terminating Traffic Using Expressway</u>
	%
November 1945	23
March 1946	33
October 1946	37
April 1947	44
October 1947	50
April 1948	53
October 1948	52
April 1949	52
October 1949	52
April 1950	52
October 1950	51
April 1951	52

It is interesting to note that the maximum amount of divertible traffic did not move over to the expressway immediately upon its opening. It was almost 3 years before the percentage of traffic diverted reached the percentage at which it has stabilized. Similarly, we have extended below Table 5 and 6 of Jorgensen's paper. These give the traffic generated by the Merritt Parkway and the Wilbur Cross Parkway, both in vehicles per day and the percentage which these vehicles are of the quantity to be expected, had the state-wide trend in traffic been realized on these parkways.

TABLE 2

(Jorgensen's Table 5 - Traffic Generated by the Merritt Parkway in Greenwich)

<u>Year</u>	<u>Vehicles per Day</u>	<u>Over Trend</u> %
1938	5500	28
1939	5500	26
1940	5300	24
1941	6000	25
1946	2300	10
1947	2600	10
1948	3000	12
1949	5100	19
1950	6200	21
1951	6400	19

TABLE 3

(Jorgensen's Table 6 - Traffic Generated by the Wilbur Cross Parkway in Orange)

<u>Year</u>	<u>Vehicles per Day</u>	<u>Over Trend</u> %
1941 <sup>a/</sup>	3600	23
1942	2500	20
1946	2500	17
1947	3800	23
1948	4300	25
1949	5300	29
1950	6700	34
1951	8300	39

a/ - Before completion.

While Jorgensen's figures, ending in 1947, indicated a stabilizing of the percentage over the trend of 10 percent and 20 percent respectively at the two locations; the four additional annual figures indicate that the percentages achieved by 1947 were not stable, because the Merritt Parkway figures for the past 3 years have been about 20 percent and the Wilbur Cross Parkway (formerly about 20 percent) has, in the last year, risen to 39 percent.

It is our belief that the increase in this generated traffic, over and above the state-wide trend, is probably due to the additional lengths of limited-access parkways and highways which have been opened for use in

the years since Jorgensen's paper was presented. Route 15 has been assigned to the continuous route across Connecticut, which includes the Merritt and the Wilbur Cross Parkways.

Studies of this major east-west route east of the Connecticut River, where very great increases in traffic volumes have also been noted, raises the interesting question: "Where did the traffic come from?" In the north-eastern part of the state, Route 15 passes through typically rural areas and is little used by commuter or suburban traffic. On this section, which was opened in November 1941, we had expected traffic volumes to follow the normal state-wide trend. The prewar volume on this route prior to its reconstruction as a limited access highway was 4,000 cars a day, and by normal traffic growth should have reached some 5,700 this past year. We find, however, that the volume on Route 15 for the year 1951 is not the 5,700 anticipated, but 9,800! This is 72 percent over the trend, if the trend is based on the 1946 postwar traffic volume of 4,050 cars per day.

It was first thought by our analysts that the phenomenon was the result of diversion from other parallel routes. An investigation was made, therefore, of the four major east-west routes east of the Connecticut River. The Table below gives the detailed traffic volumes on each of these routes and also shows the gasoline consumed in the state for each of the years to compare with the traffic volumes. The second section of the Table develops the traffic volumes which would have been realized had these been matched with the gasoline-consumption trend for the year 1946.

TABLE 4

AVERAGE DAILY TRAFFIC IN THOUSANDS

On Major East-West Routes East of the Connecticut River

<u>Years</u>	<u>Gas Consumed</u> 100 Million Gallons	<u>US 44</u>	<u>US 6</u>	<u>US 1</u>	<u>Conn 15</u>	<u>Three</u> <u>US</u> <u>Routes</u>	<u>Four</u> <u>Route</u> <u>Total</u>
1939	337.6	1160	2020	3910	3560	7090	10650
1940	363.6	Data not available		4150	3940	—	—
1941	394.3	available		4880	4860	—	—
1946	367.9	1370	1820	4010	4050	7200	11250
1947	402.7	1240	2050	4350	4980	7640	12620
1948	422.1	1510	2220	4620	5420	8350	13770
1949	446.4	1520	2180	5060	6680	8760	15440
1950	482.2	2050	2890	4900	8070	9840	17910
1951	521 <sup>+</sup>	2100	3270	4700	9800	10070	19870
If 1946 volume is equated to the trend these volumes would have been realized:							
1947	1.09	1490	1980	4370	4410	7840	12250
1948	1.15	1580	2090	4610	4660	8280	12940
1949	1.21	1660	2200	4850	4900	8710	13610
1950	1.31	1790	2380	5250	5300	9420	14720
1951	1.41	1930	2570	5650	5710	10150	15860

TABLE 4 (continued)

	Percentage over Trend					
1947	-17	3	0	13	-3	3
1948	- 4	-2	0	16	1	6
1949	- 8	-1	4	36	1	13
1950	14	21	-7	52	4	21
1951	9	27	-17	72	-1	25

It will be noted in the foregoing table that in the column headed "Three US Routes" the traffic volume on the sum of these three parallel alternates has varied from the trend only between -3 and +4 percent and none of the separate US routes has lost more than 17 percent of its original traffic during this period. We have come to the realization, therefore, that the unpredicted traffic growth on Connecticut Route 15 (4,000 cars per day) equal to the total volume on the route as late as 1946, was not diverted from other routes. We must look elsewhere for the explanation.

Relating the increases in volumes of traffic on this route to the lengths of limited-access sections as they opened up indicates that the traffic growth is undoubtedly generated by the availability of considerable lengths of modern, limited-access highways. Listed below are the number of miles of limited access sections available for travel at the close of various years on Route 15.

TABLE 5

TOTAL LENGTHS OF LIMITED-ACCESS SECTIONS ON ROUTE 15  
OPEN FOR TRAFFIC AT THE CLOSE OF VARIOUS YEARS

<u>Year</u>	<u>Miles</u>
1941	42
1943	62
1947	77
1948	99
1949	106

In 1941, when the first 4 mi. of Route 15 in the northeastern part of the state were constructed, the only limited access section of Route 15 open to traffic was the 38-mi. section of parkways in the opposite corner of the state. It was not until 1948 that the northeastern section of Route 15 was connected directly by a limited-access highway to the parkway sections and the expressway sections in the Hartford area.

No origin-and-destination survey would have indicated the spectacular growth in traffic volumes that has been found on Route 15. No time and delay studies would have shown the superiority of this facility over that which it replaced. Some diversion from distant, parallel routes might have been expected, but as the table above indicates, such diversion as did take place must have been accompanied by generated traffic using the alternate routes, because their sum is shown to be very close to the trend of traffic based on state-wide gasoline consumption.

It is believed that we know too little about the factors affecting motor-vehicle operation. We should continue to search our records and to make new studies in order to add to the store of knowledge which we may later apply to these fundamental questions of traffic quantities so necessary for the design of highway facilities.