Traffic Patterns at Intersections

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A study was made of intersections of main thoroughfares in regard to flow patterns, lateral positions of vehicles on the pavement, and speed of vehicles as they enter and leave the intersection.

The study was directed specifically toward the determination of lateral position and speed of vehicles as they approach and leave an intersection before, and after, making a right turn onto a through or main highway.

To determine the lateral position of a vehicle on a pavement, it is necessary to know the position of only one part of the vehicle on the pavement. In this study the right edge of the right front, or rear, wheel

Figure 1
View showing lateral placement tubes across U. S. Business No. 52. The vehicle shown is not using the sleeper lane, but did turn right onto U. S. No. 52.

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was taken as the point to which the distance of the vehicle from the edge of the pavement was measured. If the front wheel was closer to the edge, that distance was used, and if the rear wheel was closer to the edge, its distance was used.

To determine the deceleration and acceleration pattern of a vehicle entering and leaving the intersection it is necessary to know its velocity at a number of points in its lineal path. The speed of the vehicle was recorded at seven consecutive positions, 50 feet apart in its path as it approached and as it left the intersection.

**Apparatus and Equipment**

The distance of the wheel from the edge of the pavement was measured by use of a lateral placement machine developed in the laboratories.
of the Joint Highway Research Project by Mr. F. H. Green, Research Engineer.

This machine utilizes eight air tubes which are stretched completely across the highway and are connected to air-activated switches which in turn are connected to light bulbs on a panel board. One six-volt battery is the power supply. When an automobile crosses the first tube, it closes the first switch, which closes the circuit and turns on bulb No. 1 on the panel board. When the vehicle crosses tube No. 2, bulb No. 2 goes on, and so on until all eight bulbs are lighted. If these tubes are tied off at different lengths from the edge of the pavement, then the vehicles will trip only those lights which are connected to tubes which are tied off inside the path of their right wheels. Then by noting the highest light that was tripped by each vehicle, their distance from the edge of the pavement can be obtained.

In order to plot the path of a moving vehicle, it is necessary to know its position on the pavement at more than one point in its lineal path. It was decided to determine the lateral position in three different lineal positions of the vehicle, and plot its path from these determinations. Consequently the lateral placement machine had to be set up at three chosen positions on the approach to the intersection. These positions were chosen arbitrarily after consideration of such factors as the length of the sleeper lane, signs, and the radius of turn that the vehicles had to make. Thus, the distances of measurement from the beginning of the sleeper lane, or from the intersection, vary as the conditions varied.

The deceleration and acceleration patterns were determined by the use of the Photo-Velaxometer designed by Mr. A. J. Branham and built in the laboratories of the Joint Highway Research Project. This machine utilizes eight rubber tubes, stretched across the highway, which are attached to air-activated switches which operate the clock and lights on the machine. Attached to the machine is a camera which automatically takes a picture of the clock each time a vehicle crosses any of the tubes. This gives a permanent record of the time it takes for the vehicle to traverse the consecutive speed traps. For this investigation seven speed traps were used, each 50 feet long, which enabled the operator to determine seven speeds over a distance of 350 feet.

**Method of Procuring Data**

*Lateral Placement.* The method of collecting data entailed setting up the lateral placement machine in three different positions along the approach to the intersection. The machine was first set up near the tapering end of the sleeper lane, or at the farthest point from the inter-
section at which data were desired. After the tubes were tied off at the desired distances and all tubes, switches, and lights were tested, the time was recorded on the data sheet, and the count was begun. On the data sheet, the type of vehicle, the highest light that it tripped, and whether it turned right or left, or went straight ahead was recorded. The time was recorded every half hour in the time column to get some measure of the volume of traffic, and all other pertinent data were recorded at the top of the sheet.

After data had been obtained from a sufficient number of vehicles, usually 300, but never more than those recorded in any consecutive eight-hour period, the machine was moved approximately 50 feet closer to the intersection and the entire process was repeated.

After complete data at the approach were recorded, the machine was moved to the main highway to record “through” vehicles and vehicles which had made right turns onto the main highway. Three set-ups were required here, also, in order to plot a path of the vehicles.

After the study of lateral position at one intersection was complete, the data were recorded on cards, since this was a convenient method of compiling the data for calculation of all averages and percentages.

Deceleration and Acceleration. In procuring the data for the deceleration patterns, the eight road tubes were spaced at 50-foot intervals with the last tube at the point where the vehicle began turning onto the main thoroughfare. This made the first tube 350 feet back onto the secondary road. This distance enabled the observer to procure the speed of a vehicle along the entire length of the sleeper lane. After the tubes were in place and all equipment had been checked, the operator began the collection of data. The reading of the counter on the outside of the recorder was written on the data sheet so that this reading could be correlated with that of the counter on the inside, of which a picture was being taken. Pertinent data, such as the type of vehicle, whether it came to a complete stop or not, and whether it turned right or not, were recorded. Also, the time was recorded every half hour to obtain some measure of the volume of traffic. The data were recorded for a consecutive eight-hour period, or longer, when the volume of traffic was small.

After sufficient data were recorded for the deceleration pattern, the apparatus was set up on the main thoroughfare to record acceleration patterns. The first tube was placed so that the vehicle tripped it just as it was completing its turning movement. The other tubes were placed at 50-foot intervals until the last, or eighth, tube was 350 feet ahead, in the path of the accelerating vehicle. In reading the acceleration data, the same information was obtained as for the deceleration
study except that the speeds of enough through vehicles were recorded to obtain an average speed for through vehicles.

RESULTS AND DISCUSSION

Intersection of U. S. No. 52 and U. S. Business No. 52.

Lateral Placement. U. S. Business No. 52 is a 22-foot concrete pavement with an 11-foot sleeper lane, 450 feet long, added on the right as it approaches U. S. No. 52. U. S. No. 52 is a 22-foot lane dual highway with 22-foot islands separating the lanes at this particular location. A red flasher and stop sign halt traffic approaching U. S. No. 52 on U. S. Business No. 52, and a yellow flasher warns vehicles on U. S. No. 52 of the intersection.

Any automobile approaching U. S. No. 52 on U. S. Business No. 52 must stop before entering U. S. No. 52, but a vehicle that wishes to turn right from U. S. Business No. 52 onto U. S. No. 52 should pull into the sleeper lane on the right and make his right turn from the extreme right side of the road. Then the vehicle making the right turn has only to watch for vehicles approaching on his left and can complete his turning movement when the lane is clear. If he does not use the sleeper lane, however, he may be held up by a vehicle waiting to cross both lanes of traffic, and he must also watch the sleeper lane on his right to be sure it is clear.
This particular situation not only decreases the efficiency of the intersection, but creates a safety hazard or possibility of an accident when the driver of the vehicle making a right turn from the center lane has to blend in with traffic using the sleeper lane. On the basis of data collected at this intersection, 14.7 percent of the total traffic is guilty of making right turns in this manner. This situation can be corrected by getting vehicles making right turns from the center lane into the sleeper lane. The problem, then, is how to get these vehicles, and only these vehicles, into this sleeper lane.

Another glaring mistake that drivers are making at this intersection is that of pulling over into the sleeper lane, traversing its length and then going straight across the intersection. This situation, coupled with the one above, presents a safety hazard. A vehicle using the center lane to turn right or a vehicle using the sleeper lane to go straight ahead may pull out in the direct path of the other. Although only 5.2 percent of the total vehicles used this sleeper lane to go straight ahead, it is a hazard which should command attention.

Figure 4, which gives the average distance from the edge of the pavement of the right wheel of vehicles using the sleeper lane correctly, shows that even these vehicles are not utilizing the sleeper lane anywhere near its fullest extent. This sleeper lane is 11 feet wide, and assuming the average vehicle to be 4.9 feet wide between center line of wheels, the left wheels of these automobiles at 240 feet from the begin-
### Table 1
**Use of Sleeper Lane on U. S. Business No. 52**

<table>
<thead>
<tr>
<th>Distance of Vehicle from Beginning of Sleeper Lane*</th>
<th>Total Number of Vehicles</th>
<th>Vehicles Turning Right</th>
<th>Vehicles Turning Right and at Least within 10.0' of Edge of Pavement</th>
<th>Vehicles Using Lane Not Turning Right</th>
<th>Vehicles Turning Right and Not Using Lane</th>
<th>Average Distance from Edge of Pavement of Vehicles Using Sleeper Lane Correctly</th>
</tr>
</thead>
<tbody>
<tr>
<td>240'</td>
<td>300</td>
<td>182 60.7</td>
<td>138 75.8</td>
<td>19 6.3</td>
<td>44 24.2</td>
<td>6.2'</td>
</tr>
<tr>
<td>290'</td>
<td>268</td>
<td>149 55.6</td>
<td>126 84.6</td>
<td>20 7.5</td>
<td>23 15.4</td>
<td>5.8'</td>
</tr>
<tr>
<td>340'</td>
<td>300</td>
<td>180 60.0</td>
<td>120 66.7</td>
<td>6 2.0</td>
<td>60 33.3</td>
<td>4.8'</td>
</tr>
</tbody>
</table>

*Length of Sleeper Lane = 450 feet.

### Table 2
**Lateral Placement of Vehicles After Making Right Turn Onto U. S. No. 52**

<table>
<thead>
<tr>
<th>Distance of Vehicle from Intersection</th>
<th>Total Number of Vehicles Recorded</th>
<th>Vehicles Turning Right Recorded</th>
<th>Through Vehicles Recorded</th>
<th>Average Distance from Edge of Pavement of Vehicles That Had Made Right Turn</th>
<th>Average Distance from Edge of Pavement of Through Vehicles</th>
<th>Vehicles Turning Right and Traveling More Than 3.0' from Edge</th>
</tr>
</thead>
<tbody>
<tr>
<td>25'</td>
<td>129</td>
<td>92</td>
<td>37</td>
<td>3.5</td>
<td>4.0</td>
<td>49 (4.0' from edge)</td>
</tr>
<tr>
<td>75'</td>
<td>199</td>
<td>129</td>
<td>70</td>
<td>3.8</td>
<td>4.3</td>
<td>16</td>
</tr>
<tr>
<td>125'</td>
<td>199</td>
<td>129</td>
<td>70</td>
<td>3.8</td>
<td>4.4</td>
<td>16</td>
</tr>
</tbody>
</table>
ning of the sleeper lane are still an average of 0.1 foot inside the center lane. At 290 feet from the beginning of the sleeper lane, the left wheel is completely on the sleeper lane by 0.3 feet, and at 340 feet, the vehicle's left wheel is on the extra lane by 1.3 feet. It appears that even vehicles using the sleeper lane correctly are not utilizing the lane, except for its last 100 feet or 125 feet, to the fullest extent. This sleeper lane extends 450 feet back from the intersection. It reaches its maximum width, 11 feet, 150 feet from where it starts, which means that there are 300 feet of an 11-foot concrete lane available for use, while only 125 feet are being used efficiently. This does not mean that it is never used, because these figures show average use. It does mean that, if drivers can be educated to use this extra lane correctly, a more efficient flow of traffic will result at this intersection, with the probable elimination of some accidents.

Deceleration. The widespread construction of sleeper lanes in Indiana and some other states appears to have been justified. However, there does seem to be some controversy about the required length of these lanes, as evidenced by the fact that at some intersections these extra lanes are longer than at other junctions.

A part of this study was devoted to determining the deceleration pattern of vehicles using these lanes as they approached the junction with a main thoroughfare.

The sleeper lane on U. S. Business No. 52 is 350 feet in length, and provides adequate facilities for the seven 50-foot traps. The average speed for 80 vehicles using this sleeper lane at a distance of 325 feet from the intersection was 34.77 miles per hour (in a 30 m. p. h. zone). This speed decreased throughout successive 50-foot intervals, to 17.63 miles per hour at a distance of 25 feet from the point of turning.

According to the National Bureau of Standards, 109 feet are required to bring an automobile with four-wheel brakes, traveling at a speed of 35 miles per hour on a favorable type of road surface, to a complete stop.

This shows that the sleeper lane under discussion is of ample length to bring a vehicle to a complete stop, at the speed at which it enters the lane. The vehicles may have decelerated somewhat before entering the lane, but being in a 30-mile-per-hour speed zone, it is doubtful whether they were ever greatly exceeding 34.77 miles per hour.

Under the condition of an average speed of 17.63 miles per hour, 25 feet is not an excessive length of pavement with respect to the required stopping distance. A vehicle traveling at this speed requires a distance of approximately 35 feet for stopping. This distance includes approximately 13 feet of reaction distance—that is, the distance the
vehicle will cover from the time the driver sees that he has to stop until he actually applies the brakes. Since the vehicle is already in the process of deceleration, the driver must be applying the brakes, or at least be aware of whether he must make a stop or not. Under these
conditions he does not require the reaction distance, and it would take the vehicle approximately 22 feet to come to a complete stop. Although there was ample room for stopping, only 60 percent of the vehicles recorded came to a complete stop before entering U. S. No. 52.

Acceleration. The acceleration pattern of vehicles after making a right turn onto through highways was included as a part of this study. When a vehicle turns right from U. S. Business No. 52 onto U. S. No. 52, it enters a through lane of traffic, since acceleration lanes are not provided in Indiana.
Looking south on U. S. No. 52, at intersection with U. S. Business No. 52, where acceleration data were obtained.

View showing vehicle using sleeper lane on U. S. Business No. 52 to facilitate a right turn. Deceleration data were obtained on this lane.
The average speed of 35 vehicles, 25 feet after turning into U. S. No. 52, was 17.90 miles per hour. This average speed increased until at the last point of measurement, 325 feet after turning, it was 28.03 miles per hour. The average velocity of 35 through vehicles on U. S. No. 52 for that day was 44.03 miles per hour.

This indicates that a vehicle that has made a right turn onto U. S. No. 52 has not accelerated enough, after attaining a distance of 325 feet from the point of turning, to reach a velocity equal to that of through vehicles.

**Intersection of U. S. No. 30 and State Route No. 55.**

Lateral Placement. As a comparable situation to the intersection of U. S. Business No. 52 and U. S. No. 52, the intersection of State Route No. 55 and U. S. No. 30 at Independence Hill, 17 miles west of Valparaiso, Indiana, was used. State Route No. 55 is a 20-foot con-

![Figure 9](image)

crete pavement with a 10-foot-wide sleeper lane, 240 feet long, added on the right side of the road at the intersection with U. S. No. 30. U. S. No. 30 is a dual-lane concrete pavement, each lane 22 feet wide, divided by islands and with 10-foot-wide sleeper lanes 330 feet long added at the intersection. There are a red flasher and a stop sign for the traffic on State Route No. 55, and a yellow flasher on U. S. No. 30 warning vehicles of the intersection.
At this intersection there seemed to be more usage of the sleeper lane on State Route No. 55 by vehicles making right turns onto U. S. No. 30, but still they did not utilize all of the lane, as evidenced by the position of their right wheels. Even though this lane extends 240 feet back from U. S. 30 and is 10 feet wide for 165 feet of this length, the vehicles using this lane correctly were still 0.2 feet inside the center lane, 150 feet from the beginning of the sleeper lane. By the time vehicles using this lane correctly had reached a point 200 feet from the beginning of the sleeper lane, they were entirely inside the sleeper lane by 2.1 feet.

An interesting observation concerning the placement on this lane is that at a distance of 100 feet from the beginning of the lane, 24.1 percent of the vehicles turning right were not using the sleeper lane; at 150 feet from the beginning of the sleeper lane, 7.3 percent of the vehicles were not using the lane; but at a point 200 feet from the beginning of the sleeper lane, all vehicles intending to make a right turn were on the lane (see Table 3). This only bears out the above discussion, and shows that the vehicles turn onto the sleeper lanes rather late.

The vehicles using the sleeper lane and continuing straight were again prominent at this intersection. Analysis of the data shows that 15.1 percent of the total vehicles were guilty of this misuse of the sleeper lane, thus decreasing the efficiency of the intersection.
TABLE 3
USE OF SLEEPER LANE ON STATE ROUTE NO. 55

<table>
<thead>
<tr>
<th>Distance of Vehicle from Beginning of Sleeper Lane*</th>
<th>Total Number of Vehicles</th>
<th>Vehicles Turning Right</th>
<th>Vehicles Turning Right and at Least Within 10' of Edge of Pavement</th>
<th>Vehicles Using Lane Not Turning Right</th>
<th>Vehicles Turning Right and Not Using Lane</th>
<th>Average Distance from Edge of Pavement of Vehicles Using Sleeper Lane Correctly</th>
</tr>
</thead>
<tbody>
<tr>
<td>100</td>
<td>200</td>
<td>54</td>
<td>14</td>
<td>18</td>
<td>40</td>
<td>6.8</td>
</tr>
<tr>
<td>150</td>
<td>300</td>
<td>41</td>
<td>38</td>
<td>49</td>
<td>30</td>
<td>5.3</td>
</tr>
<tr>
<td>200</td>
<td>357</td>
<td>33</td>
<td>33</td>
<td>62</td>
<td>0</td>
<td>3.0</td>
</tr>
</tbody>
</table>

* Length of Sleeper Lane = 240 feet.

TABLE 4
LATERAL POSITION OF VEHICLES ON U. S. NO. 30
AFTER MAKING RIGHT TURN FROM STATE ROUTE NO. 55

<table>
<thead>
<tr>
<th>Distance of Vehicle from Intersection</th>
<th>Total Number of Vehicles Recorded</th>
<th>Number of Vehicles Turning Right Recorded</th>
<th>Through Vehicles Recorded</th>
<th>Vehcles Turning Right and Traveling over 6' from Pavement Edge</th>
<th>Average Distance from Edge of Pavement of Vehicles That Turned Right</th>
<th>Average Distance Through Vehicles</th>
</tr>
</thead>
<tbody>
<tr>
<td>25'</td>
<td>127</td>
<td>12</td>
<td>115</td>
<td>3</td>
<td>1.9</td>
<td>3.3</td>
</tr>
</tbody>
</table>
Deceleration. The situation at the intersection of State Route No. 55 and U. S. No. 30 is comparable to that at U. S. Business No. 52 and U. S. No. 52, except that the sleeper lane on State Route 55 is only 240 feet in length, and there is no restricted speed limit on State Route 55 except for the warning signs for the intersection.
Fig. 12
Deceleration and acceleration at intersection of State Road No. 55 and
U. S. No. 30.

The average speed of 119 vehicles on State Route No. 55, 325 feet
from the junction with U. S. No. 30, was 37.52 miles per hour. This
point was approximately 100 feet back of the beginning of the sleeper
lane. At a distance of 225 feet from the junction with U. S. No. 30,
the average speed was 31.72 miles per hour. This position is approxi­
mately the beginning of the sleeper lane, and the length of the lane pro­
vides ample distance for stopping, at this speed.

Comparing these speeds with those obtained at the same distances
from the intersection on U. S. Business No. 52, we see that they agree
Figure 13
General view of intersection of U. S. No. 30 and State Route No. 55, looking south on State Route No. 55.

Figure 14
View showing lateral placement tubes in place on sleeper lane of State Route No. 55.

rather closely. This would seem to indicate that a driver adjusts his speed to the existing conditions, without regard to the presence of a sleeper lane.

The average speed of the vehicles, 25 feet from the intersection, was 15.86 miles per hour. Again there is ample distance in which to bring the vehicle to a complete stop, although only 50 percent of the vehicles came to a complete stop before entering U. S. No. 30.
Acceleration. A record of the acceleration of 51 vehicles was obtained after they had made a right turn onto U. S. No. 30. These vehicles were averaging 18.53 miles per hour 25 feet after turning. This average increased until, at a point 325 feet after turning, these same vehicles were averaging 28.90 miles per hour. The average speed of 168 through vehicles at this intersection was 38.46 miles per hour.

Again, this indicates that vehicles making a turning movement onto U. S. No. 30, do not, within 325 feet after the point of turning, attain the average speed of through vehicles.

Intersection of State Route No. 57 and State Route No. 54.

Lateral Placement. For the study of an intersection with no sleeper lane, the intersection of State Route No. 54 and State Route No. 57 near Linton, Indiana, was selected. State Route No. 54 is an 18-foot concrete pavement running east and west and intersecting, at approximately right angles, State Route No. 57, which is a 20-foot concrete pavement running north and south. North and south traffic on route No. 57 is through traffic, warned of the intersection by a "slow" sign and a yellow flasher. Traffic on route No. 54 is warned by a red flasher and a "stop" sign.

A study of the data on vehicles approaching route No. 57, on route No. 54, shows that 99 percent of all vehicles were traveling within 3.5 feet of the edge of the pavement. This means that 99 percent of the...
vehicles were entirely within their lane, which is only 9.0 feet wide, by at least 0.6 feet. Vehicles turning right, vehicles turning left, and vehicles going straight through, at this intersection, averaged within 0.3 feet of each other in distance from the edge of the pavement at three different lineal positions. These averages varied from 1.7 feet to 2.0 feet, which means that they were all well within their own lane.

Deceleration. At the intersection of State Route No. 54 and State Route No. 57, sleeper lanes are not provided on either highway. However, for comparison purposes, the deceleration pattern on State Route No. 54 and the acceleration on State Route No. 57 were obtained.

The average speed of 108 vehicles on State Route No. 54, 325 feet before turning, was 35.15 miles per hour. This average decreased through consecutive speed traps until it reached 15.20 miles per hour, 25 feet from the turning point. The distances available for stopping are ample at both of these speeds, but here again only 42.6 percent of the vehicles came to a complete stop before entering State Route No. 57.

A comparison of the deceleration pattern on State Route No. 54 with those on U. S. Business No. 52 and State Route No. 55 shows no marked degree of difference. This seems to indicate that the operators of vehicles approaching different intersections judge their stopping distances, on the average, in a similar manner.

Acceleration. The average speed of 15 vehicles on State Route No. 57, 25 feet after turning from State Route No. 54, was 19.66
**TABLE 5**
LATERAL POSITION OF VEHICLES ON STATE ROUTE NO. 54

<table>
<thead>
<tr>
<th>Distance of Vehicles from Intersection</th>
<th>Total Number of Vehicles Recorded</th>
<th>Vehicles Turning Right</th>
<th>Vehicles Turning Left</th>
<th>Through Vehicles</th>
<th>Vehicles Turning Right and Within 3 1/2(^{\circ}) of Edge of Pavement</th>
<th>Through Vehicles Turning Left and Within 3 1/2(^{\circ}) of Edge of Pavement</th>
<th>Average Distance from Edge of Pavement Turning Right</th>
<th>Average Distance from Edge of Pavement Turning Left</th>
<th>Average Distance from Edge of Pavement of Through Vehicles Hitting Lights</th>
</tr>
</thead>
<tbody>
<tr>
<td>200</td>
<td>251</td>
<td>27 10.8</td>
<td>40 16.0</td>
<td>184 73.2</td>
<td>27 100.0</td>
<td>27 100.0</td>
<td>1.9</td>
<td>2.0</td>
<td>2.0</td>
</tr>
<tr>
<td>150</td>
<td>446</td>
<td>51 11.4</td>
<td>64 14.3</td>
<td>331 74.3</td>
<td>48 94.1</td>
<td>63 98.4</td>
<td>1.7</td>
<td>1.9</td>
<td>1.9</td>
</tr>
<tr>
<td>85</td>
<td>195</td>
<td>24 12.3</td>
<td>24 12.3</td>
<td>147 75.4</td>
<td>23 95.8</td>
<td>145 98.6</td>
<td>1.8</td>
<td>1.7</td>
<td>1.7</td>
</tr>
</tbody>
</table>

**TABLE 6**
LATERAL POSITION OF VEHICLES AFTER MAKING RIGHT TURN FROM STATE ROUTE NO. 54 ONTO STATE ROUTE NO. 57

<table>
<thead>
<tr>
<th>Distance of Vehicle from Intersection</th>
<th>Total Number of Vehicles Recorded</th>
<th>Vehicles Turning Right Recorded</th>
<th>Through Vehicles Recorded</th>
<th>Vehicles Turning Right and Within 4(^{\circ}) of Edge of Pavement</th>
<th>Through Vehicles Within 4(^{\circ}) of Edge of Pavement</th>
<th>Average Distance of Vehicles That Turned Right from Edge of Pavement</th>
<th>Average Distance of Through Vehicles from Edge of Pavement</th>
</tr>
</thead>
<tbody>
<tr>
<td>85</td>
<td>152</td>
<td>54</td>
<td>96</td>
<td>40 74.1</td>
<td>81 84.4</td>
<td>2.3</td>
<td>2.7</td>
</tr>
<tr>
<td>150</td>
<td>252</td>
<td>78</td>
<td>171</td>
<td>60 76.9</td>
<td>139 81.3</td>
<td>2.8</td>
<td>2.8</td>
</tr>
<tr>
<td>200</td>
<td>100</td>
<td>24</td>
<td>75</td>
<td>17 70.8</td>
<td>62 82.7</td>
<td>2.9</td>
<td>3.0</td>
</tr>
</tbody>
</table>
miles per hour. This average increased until, at a distance of 325 feet after turning, their speed averaged 27.66 miles per hour.

The average speed of 36 through vehicles at this intersection was 42.30 miles per hour. As was the case at the other two intersections, the vehicles which made a turning movement have not attained an
Deceleration and acceleration at intersection of State Road No. 54 and State Road No. 57 average speed, after traveling 325 feet, equal to that of through vehicles.

Conclusions

On the basis of the data obtained at three intersections, varying considerably in design, and located in widely separated sections of the State, the following conclusions are drawn:

1. For the specific facilities investigated at the intersections, the data indicate that the geometric design is adequate, but drivers do not use the existing facilities to their full advantage.
2. The data from these intersections, of varying design and locality, show that in different circumstances, influences, and localities, there is a variance in the drivers' reactions and habits.

3. A relatively high percentage of the drivers are using the sleeper lane and continuing straight through the intersection. In one location, an appreciable number of vehicles were not using the sleeper lane at all in making a right turn. These two obvious misuses of the approach to the intersection produce a situation which is a definite traffic hazard.

4. Most vehicles that are using the sleeper lane for making right turns are not utilizing the full length of the lane.

5. The average speeds of vehicles approaching a through highway are not excessive, and under normal conditions the drivers would have no difficulty in bringing their vehicles to a stop before entering the through highway.

6. A high percentage of vehicles were not stopping before entering the through highway.

7. Vehicles which make right turns onto a through highway have not attained a speed as great as that of through vehicles, at a distance of 325 feet from the point of turning.

8. The deceleration data collected at the three intersections indicated that the deceleration pattern is not affected by the length or the presence of the sleeper lane.

9. Inasmuch as the design features investigated appear to be adequate and inasmuch as a relatively high percentage of drivers are misusing these facilities, it follows that some educational or signing program is needed immediately.

Bibliography


