# Traffic Operations

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## INTRODUCTION

Traffic operations are affected by many things in the specialized areas of highway design, traffic engineering and road maintenance. The basic elements can be summarized simply by stating that traffic operations consist of providing a network of roads and streets over which the motorist can reach his destination conveniently and safely.

That phase of providing a road and street network whereby every motorist can reach his destination has been met. There already exists a network of roads and streets ranging from unimproved and graveled local roads through hard surfaced collector-feeder roads to the primary arterial roads of the state and federal system. These roads usually do not provide for the degree of convenience and safety expected under present day traffic conditions.

Much has been accomplished in recent years to provide motorists with highways of greater convenience and safety. The construction of 32,000 miles of interstate highways has been achieved during the past 12 years at a cost of over 33.3 billion dollars. Highway engineers have demonstrated their ability to provide highways that combine safety, convenience and asthetics where sufficient funds exist.

## TRAFFIC ENGINEERING ON THE SECONDARY SYSTEM

The problem still persists, however, of improving the secondary road and street system developed prior to the interstate highway system.

The importance of the secondary system is illustrated by the fact that it accounts for the vast majority of total road mileage, the total miles driven and the number of accidents per mile. This problem is one of providing safety for motorists on the often unglamorous and obsolete secondary roads—those roads which provide the only link between the motorist's garage and the interstate highway system.

One way of providing greater safety for motorists on the secondary road system would be to make available the necessary funds and

personnel for the improvement of these roads for today's traffic conditions.

It is very doubtful, however, that there ever will be enough funds and trained personnel to satisfy all the needs. Therefore, to provide a safer road system, highway engineers need to become more aggressive about eliminating the problem.

## TRAFFIC ENGINEERS MUST COMMUNICATE WITH DRIVERS

The following discussion will indicate one method the traffic engineer can utilize to provide motorists with a safer means of reaching their destination over this secondary road and street system.

Safety on the highway can be greatly improved by a continuous, realistic and reliable system of communications between the traffic engineer and the driver of the vehicle. In nearly all cases where accidents have occurred, it was not the driver's intention to contribute to the cause. The fact that the driver collided with a train in spite of flashing signals does indicate a driver error. It also indicates the need for better communication between the traffic engineer and the motorist. The driver may have been the victim of highway hypnosis which made the detection of flashing railroad signals beyond his power.

Traffic engineering is both an art and a science. The scientific principles including design criteria are well established. The art of traffic engineering provides the real test of one's ability to overcome obstacles of insufficient funds and personnel to provide a continuous, realistic and effective method of communication with the motorist. The ability of the engineer to place himself in the position of Mr. Average Driver is invaluable. It is only with this type of insight that real accomplishments can be made. Not accomplishments that are spectacular in terms of funds expended or construction, but in terms of reduction of accidents.

### *Use of Spot Accidents Map*

In 1966 the Tippecanoe County Highway Department, with the co-operation of the Lafayette Post of the Indiana State Police, began a spot accident map which showed the location of each accident in the county. The information was furnished monthly by the state police post. This information, when posted on a map of the county, provides a simple but dramatic means of identifying areas in which the highway department has failed to communicate effectively with the motorist.

The spot accident map of the Tippecanoe County highway system for 1966 revealed that one five-mile stretch of road on North 9th

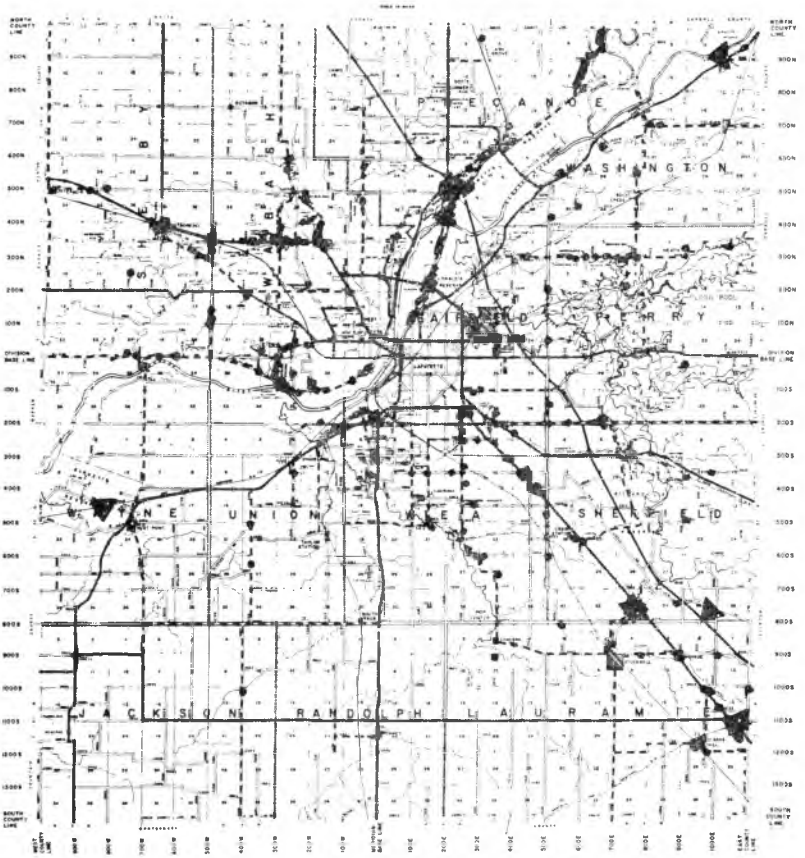


**Fig. 1. A spot accident map of Tippecanoe County, Indiana, for year 1968. Each black tack represents the location of an accident and each triangular-shaped flag represents one fatality.**

Street between Lafayette and Battle Ground had recorded 57 accidents which included two fatalities. This was 19 percent of all the recorded accidents on only 5.5 percent of the total county road system.

*Road Improvements at High Accident Sites*

A series of relatively simple and low-cost measures which included widening the road, improving curves, removing roadside obstacles, signing, striping and establishing speed limits reduced the number of accidents on the five-mile length of road by 52 percent in two years.

Less spectacular results have been achieved in other areas of the county after the department first identified the trouble areas with the spot map. The following chart summarizes the accident history of a

few locations in the Tippecanoe County highway system, since the spot map has been in use:

Accident Summary for Tippecanoe County Highway System

| | 1966 | 1967 | 1968 |
|---|---|---|---|
| Total Accidents | 304 | 274 | 262 |
| No. 9th St. to Battle Ground | 57 | 53 | 30 |
| So. River Road | 16 | 5 | 11 |
| Lilley-Shadeland Road | 14 | 5 | 6 |
| Total Fatalities | 7 | 4 | 3 |

## ACCIDENTS AT RAILROAD CROSSINGS

Revisions in our laws are necessary so as not to require certain vehicles to stop at railroad crossings protected with approved signal devices. Federal statistics indicate that in 1968 approximately 1800 people were killed, 15,000 injured and over $100 million worth of property destroyed at railroad crossings. Approximately one-fourth of these accidents involved vehicles required to stop before crossing and occurred when no train was present.

In Tippecanoe County, for the year 1968, nearly one-half of all fatalities occurred at railroad crossings, most of which were protected crossings. Something is very wrong when a driver proceeds directly into the path of an on-coming train. It indicates a definite lack of communication between the traffic engineer and the driver. It is quite possible that the problem of driver hypnosis is a factor in these accidents. If so, this problem might be improved by equipping advance railroad warning signs with caution flashers connected with the railroad flasher system to operate only during periods of danger. A series of rumble strips preceeding the advance warning signs should be standard at all railroad crossings on the state highway system to alert drivers to impending danger.

## CONCLUSION

This presentation has attempted to point out the urgent need for better communication between the traffic engineer and the motorist to assure greater safety on the secondary road and street system. Communication denotes an exchange of information between two or more people. This discussion so far has indicated a method whereby the traffic engineer can improve his line of communication to the motorist.

How then is the motorist to communicate with those responsible for traffic operations? Very simple—the signs of communication from the motorist will show up as: ruts along the edge of the highway where a vehicle has traveled off the road, scars on bridges and culverts,

holes or frequently repaired areas in fences, and skid marks on the pavement. The most sobering symbols of all are the small white crosses found at bridge abutments, intersections, railroad crossing, and other points where our line of communication with the driver has failed.