2.3 SPEED AND DELAY STUDY

The speed and delay studies give the running speeds, overall speeds, fluctuations in speeds and the delay between two stations of a road spaced far apart. They also give the information such as amount, location, duration frequency and causes of the delay in traffic stream. **The results of the speed and delay studies are useful in detecting the spots of congestion, the causes and in arriving at a suitable remedial measure. The studies are also utilized in finding the travel time and benefit cost analysis.**

The delay or the time lost by traffic during the travel time period may be either due to **fixed delays and operational delays**. Fixed delay occurs primarily at intersections due to traffic signals and at level crossings. Operational delays are caused by interference of traffic movements, such as turning vehicles, parking and imparking vehicles, pedestrians etc., and by internal friction in the traffic stream due to high traffic volume, insufficient capacity and by accidents.

They are various methods of carrying out speed and delay study,namely:

1. **Moving observer method or Floating car method**
2. **License plate or vehicle number method**
3. **Interview method**
4. **Elevated observations, and**
5. **Photographic technique**

Moving observer method

In the floating car methods a test vehicle is driven over a given course of travel at approximately the average speed of the stream, thus trying to float the traffic stream. A number of test runs are made along the study stretch and a group of observers record the various details.

One observer is seated in the floating or moving car with two stop watches. One of the stop watches is used to record the time at various control points like intersections, bridges or any other fixed points in each trip.

The other stop watch is used to find the duration of individual delays.

The time, location and causes of these delays are recorded by using suitable tabular forms or by voice recording equipment.

The number of vehicle overtaking the test vehicle and that overtaken by test vehicles are noted in each trip by third observer.

The number of vehicles travelling in the opposite direction in each trip is noted by the a fourth observer. However in mixed traffic flow, more number of observers will be required to count the vehicles of different classes.

The average journey time t(minute) for all the vehicles in a traffic stream in the direction of flow q is given by:

$$t = t_w - n_y/q \quad q = (n_a+n_y)/(t_a+t_w)$$

where,

q= flow of vehicles (volume per minute),in one direction of the stream

n_a = avg number of vehicles counted in the direction of the stream when the testvehicle in the opposite direction

n_y = avg number of vehicles overtaking the test vehicle minus the number of vehiclesovertaken when the test vehicle in the direction of q

t_w = avg journey time, in minute when the test vehicle travelling is travelling withstream q

t_a= avg journey time, in minute when the test vehicle is running against the stream.

License Plate Method

In license plate method, synchronized **stop watches** or voice recording equipment are used. Observers are stationed at the **entrance and exit of a test section** where information of travel time is required. The timings and the vehicle numbers are noted by the observers of the selected samples. From the office computations travel time of each vehicles could be found. But the method **does not give** important details such as

causes of delays and the duration and number of delays within the test section.

Interview method

In the Interview technique, the work completed in a short time by interviewing and collecting details from the road users on the spot. However data collected may not provide with all details correctly.

Elevated Observation and Photographic Technique

In this method, the observers stationed on the top of an elevated building select vehicles at random and follow their course along the road, noting the time of entering the test section, duration and nature of delays suffered and time of leaving. This method useful for studying short test sections like intersection etc.