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Program : **B.E**

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## Unit –II

**Traffic Studies: (i) Spot Speed Studies and Volume Studies. (ii) Speed and Delay Studies purpose, causes of delay, methods of conducting speed and delay studies. (iii) Origin and Destination Studies (O & D): Various methods, collection and interpretation of data, planning and sampling. (iv) Traffic Capacity Studies: Volume, density, basic practical and possible capacities, level of service. (v) Parking Studies: Methods of parking studies cordon counts, space inventories, parking practices.**

### SPOT SPEED STUDIES

Speed is an important transportation consideration because it relates to safety, time, comfort, convenience, and economics. Spot speed studies are used to determine the speed distribution of a traffic stream at a specific location. The data gathered in spot speed studies are used to determine vehicle speed percentiles, which are useful in making many speed-related decisions. Spot speed data have a number of safety applications.

**Determining existing traffic operations and evaluation of traffic control devices**

**a. Evaluating and determining proper speed limit**

**b. Evaluating and determining proper advisory speeds**

**d. Establishing the limits of no-passing zones**

**e. Determining the proper placements of traffic control signs and markings f. Setting appropriate traffic signal timing**

**Speed, speed limits and stopping distances**



### Key facts

- Breaking the speed limit or travelling too fast for conditions was recorded (by police at crash scenes) as a contributory factor of 24% of fatal crashes in 2016 [1];
- Drivers with one speeding violation annually are twice as likely to crash as those with none [2];
- A Brake and Direct Line survey found that four in 10 (40%) of drivers admitted that they sometimes driver at 30mph in a 20mph zones [3];
- More than a quarter of drivers surveyed (26%) admitted to 'regularly' speeding in areas designed to keep children and other road users safe. [4]

### (b) Speed and delay studies-

The speed and delay studies gives the running speeds, overall speeds, fluctuations in speed and delay between two stations of a road spaced far apart. They also give the information such as the 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 cause and in arriving at suitable remedial measures. The studies are also utilized in finding the travel time and in benefit cost analysis.

### Methods-

- Floating car or riding check method
- License plate or vehicle number method
- Interview observations
- Photographic technique

**ORIGIN AND DESTINATION STUDIES** - Origin Destination survey methods for data collection includes:

- Roadside Interview
- License plate Mail-out surveys
- Telephone survey
- Internet surveys
- Mail surveys

Various Origin Destination survey methods are described below:

#### a) Roadside Interview

This interview includes directing vehicles into a designated area and asking a series of sort questions. This technique is widely used and has a very high response rate but sometimes implementation is difficult due to disruption of traffic. In this method investment cost is low but requires high labour and personnel requirements. This method has a broad geographical coverage as it includes vehicles from outside the study area also, but implementation can be for limited locations and hence sampling may be biased.

#### b) License plate Mail-out surveys

The license plate mail-out survey involves recording license plate numbers of vehicles on a selected roadway, tracing vehicle ownership, and mailing a survey to owners. There are different methods for tracing the license plate number: taking a photo/video or manually recording the tag on vehicles. Photo/video are often used for high volume highways. Labour requirements are more for tracing the ownership of vehicles and also may be less accurate but no disruption of traffic occurs.

#### c) Telephone survey

In this type of survey, appropriate vehicle owners are contacted on phone and are interviewed through a series of short questions. No disruption of traffic occurs but has high personnel requirements as compared to mail surveys. Some other advantages are low investments. This method has many disadvantages also like: appropriate sampling is difficult, low responses may create biased data, there is poor coverage of vehicles licensed in other states and areas.

#### d) Mail surveys



In this type of survey there is no disruption of traffic and also low investments are required. But obtaining trip details is difficult and also response rates are low which may create a biased data. Sampling is also difficult.

#### e) GPS Receiver

Cell phone tracking provides data on phone (owner's) movements as cell phone transitions from one cell tower to another. But widespread utilization of GPS receivers for O-D data collection is currently cost prohibitive, especially for large rural and urban areas. Though there is no disruption of traffic, it requires very high equipment cost. This method is limited to samples only in the study area and also information regarding trip purpose is limited.

#### f) Online survey

Web-based surveys as compared to other surveys provide more valuable information less expensively. Response rate of these surveys can be very high if proper incentives are provided, as the money saved for data input and validation can be used to boost up the response. Out of all Origin Destination survey methods these surveys provide ideal solution for information gathering because of their fast turnaround and can cover very large sample size. Sampling is difficult in this method though the response rate is very high and no disruption of traffic occurs.

**TRAFFIC CAPACITY STUDIES** - Traffic capacity is expressed as the maximum number of vehicle in a lane or a road that can pass a given point in unit time, usually an hour, i.e., vehicles per hour per lane or roadway.

Traffic capacity and traffic volume has same units, difference between the two is that traffic volume represents the actual rate of flow of the traffic and responds to the variation in the traffic demand, while capacity indicates a capability or maximum rate of flow with a certain level of service characteristics that can be carried by the road.

Traffic capacity of a roadway depends upon a number of prevailing roadway and traffic conditions.

**Basic capacity** is the maximum number of vehicles (PCU) that can pass a given point on a lane or roadway during one hour under the most nearly ideal roadway and traffic conditions which can possibly be attained. Two roads have same physical features will have same basic capacities irrespective of the traffic conditions.

**Possible Capacity** is the maximum number of vehicles which can pass a given point on a lane or highway during one hour under the prevailing roadway and traffic conditions. This means that the possible capacity of a highway will always be lower than the basic capacity unless the prevailing conditions of the traffic, approach the ideal conditions. Therefore the possible capacity may vary from 0 to the maximum, i.e., Basic capacity.

**Practical Capacity** is the maximum number of vehicle that can pass a given point on a lane or roadway during one hour, without traffic density being so great as to cause unreasonable delay, hazard or restriction to the driver's freedom to man-oeuvre under the prevailing roadway and traffic conditions

**CORDON COUNTS**-In planning, a count of vehicles and people across a designated (cordon) line to determine 1. The total flow (people and vehicles by mode and time period) into and out of the study area and 2. The accumulation (people and vehicles) within the cordon area by time of day.

**Space inventories**-The area under the study is fully surveyed and a map is prepared showing all places where kerb parking and off-street parking facilities can be provided to meet the parking demands. The traffic engineer has to strike a balance between capacity and parking demands and to design proper facilities for parking.

**Parking practices** –The study is directed to note the present parking practices prevalent in the area under considerations and the general problems in parking. In case of kerb parking, it is also necessary to smooth flow of traffic and the accidents involved during parking and un parking operations.

### **Parking Studies**

Studies must be conducted to collect the required information about the capacity and use of existing parking facilities. In addition, information about the demand for parking is needed. Parking studies may be restricted to a particular traffic producer or attractor, such as a store, or they may encompass an entire region, such as a central business district.

Before parking studies can be initiated, the study area must be defined. A cordon line is drawn to delineate the study area. It should include traffic generators and a periphery, including all points within an appropriate walking distance. The survey area should also include any area that might be impacted by the parking modifications. The boundary should be drawn to facilitate cordon counts by minimizing the number of entrance and exit points.

Once the study area has been defined, there are several different types of parking studies that may be required. These study types are listed below and discussed in detail in the remaining paragraphs.

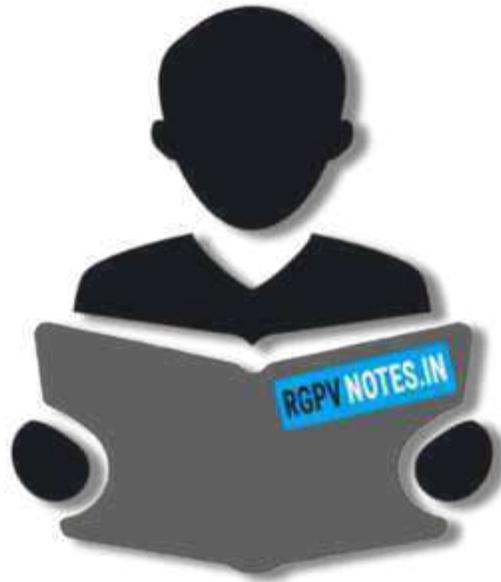
- **Inventory of Parking Facilities**
- **Accumulation Counts**
- **Duration and Turnover Surveys**
- **User Information Surveys**
- **Land Use Method of Determining Demand**

#### **Inventory of Parking Facilities:**

Information is collected on the current condition of parking facilities. This includes:

- **The location, condition, type, and number of parking spaces.**
- **Parking rates if appropriate. These are often related to trip generation or other land use considerations.**
- **Time limits, hours of availability and any other restrictions.**
- **Layout of spaces: geometry and other features such as crosswalks and city services.**
- **Ownership of the off-street facilities.**





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