

## UNIT-V TRAFFIC MANAGEMENT

## Transportation system management (TSM)

Transportation system management is a package of short term measures to make the most productive and cost effective use of existing transportation facilities. TSM also called as Travel Demand Management (TDM).

TDM techniques are aimed at reducing the traffic flows, especially during the peak hour. Some of the techniques commonly adopted are:

## (i) Peripheral parking schemes:-

Since the centre of the town is the worst hit by the parking problem, it is natural to think in terms of providing parking facilities at the periphery of the town and induce the motorists to park there and travel to the busy town centre by some other mode.

(i) Park and walk

(ii) Park and ride.

(i) Park and walk:-

Under this scheme the motorists are induced to park at the outskirts of the town and walk down to the town centre. The inducement is in the form of lower parking charges at the periphery than at the town centre (or) no parking charges at all. It is really attractive if the scheme has to succeed.

(ii) Park and ride:-

This scheme provides for peripheral parking facilities and public transport side to the destinations in the town centre. This is an attractive scheme. The total travel time including parking time, waiting time at the bus stop and travel time by bus should not be excessively high to make him look at it with

disfavour and decide to bring the car to the town centre. The cost of peripheral parking plus the charges for to and fro journey by bus should be less than the cost of travel by his car plus the charges for parking at the town centre.

### (ii) Parking restraint:-

Parking controls bring in a number of benefits:

- (i) Reduction in accidents
- (ii) Increase in road capacity

### (iii) Traffic restraint

As far as regular users who make short trips for business are concerned, the number of parking occasions may well correlate highly with road use. But this may not be the case with those who park vehicles for a long duration but less frequently.

### (ii) Road Pricing:-

Road pricing is a method of road user taxation, charging the users of congested roads according to the time spent. It is a different from taxing the road users in a general way such as by annual license charges (or) petrol charges. The principle behind road pricing is that those who cause congestion (or) use the road in the congested period should be charged, thus giving the road user the choice of whether to make a journey (or) not.

### (iv) Entry fee:-

A system of entry fee such as supplementary licensing, tolls and admission charges is one of the methods. Supplementary licences enable a vehicle to ply in a designated area. Admission charges by pre purchased tickets are designed to give access to a relatively small area through a number of controlled entry points during the morning peak period.



(V) staggering of office hours and flexible time of work:-

Staggering of office hours is a simple and effective way to spread the duration of the peak hour. School hours can be very conveniently planned to be sufficiently away from the office hours. Even the office and industrial working hours can be staggered without detriment to the general efficiency of the activities concerned.

(vi) Car pooling and other ride sharing programmes.

(vii) chartered buses (Institutional buses) to serve areas of trip origins to common work place.

(viii) Priority for buses in traffic.

(ix) Restrictions on entry of trucks during day time.

Traffic Regulatory measures:-

Many of the urban streets carry traffic volumes for which they were not simply designed. It results in delay, congestion and accidents. Imposing regulatory measures and enforcing management techniques so as to make the most economic use of the streets. It includes restriction on speed, parking, size of vehicles and so on.

(1) Restriction of turning movements:

At a junction, the turning traffic includes left turners and right turners. Left turning traffic doesn't usually obstruct traffic flows through junctions but right turning traffic can cause serious loss of capacity.

a) Prohibited right turning movement:-

It can be established only if the existing street system is capable of accommodating an alternative routing. Depending upon the existing layout of the street system three methods are available:

- (i) Diversion of the right turning traffic to an alternative intersection further along the road where there is more capacity for dealing with a right turn. It is known as T turn. It is useful for dealing with a difficult right from a minor road into a major road.
- (ii) Diversion of the right turning traffic to the left before the junction. It is known as U turn. It is useful for a right turn from a major road, since it is converted to a left turn from a major road and a straight over movement at the original junction.
- (iii) Diversion of the right turning traffic beyond the junction. It is known as Q turn. This entails three left turns and requires the driver to travel twice through the original junction, thus increasing the total volume of traffic handled by the junction.

It increases the saturation flow and the capacity of the junction.

#### b) Prohibited left turning movements:-

It is not obstructive to traffic and it's rare they are prohibited. However such prohibitions may be needed to provide a safe crossings for pedestrians, especially when the pedestrian traffic across the minor road is heavy.

#### (ii) One way streets:-

One way streets are those where traffic movement is permitted in only one direction. As a traffic management measure intended to improve traffic flow, increase the capacity and reduce the delays, one way streets are yield to beneficial results. It's most immediate and least expensive method of alternating traffic conditions in a busy area. In combination with other methods it's able to achieve great improvement in traffic conditions of congested areas.



### Advantages of one way streets:-

#### (i) Reduction in the points of conflict:-

Traffic movements at junctions involve a number of points of conflict. These generate delay, congestion and accident hazards. By using one way streets the number of conflict points will be reduced so we can achieve safety and less delay.

#### (ii) Increased capacity:-

The removal of opposing traffic and the reduction in the points of conflicts, the capacity of one way street is increase.

#### (iii) Increased speeds:-

Since the opposing traffic is eliminated, drivers can operate at higher speeds. With increased speeds, delays and journey times get reduced. In London streets 20% of journey time is reduce when applied one way system.

#### (iv) Facilitating the operation of a progressive signal system:-

One way street system offers advantage in designing a system of signals. Progressive system design is easy, through this flow becomes smoother and the safety is increased.

#### (v) Improvement in parking facilities:-

#### (vi) Elimination of head on collision

The elimination of head on collision results in reduction in accident severity.

### Disadvantages of one way streets:-

#### (i) The actual distance covered by drivers can be increase.

(ii) Due to implement of one way street bus stops will be relocated ~~due to~~ so the distance passengers can walk extra distances to reach the bus stop.

(iii) While the number of accidents may decrease, the severity will increase.

(iii) Closing side streets:-

A main street may have a number of side street where the traffic is very light. In such case, it may be possible to close some of these side streets without affecting the traffic.

Advantages:-

- (i) Traffic from side street is eliminated, the speed increases and journey time reduces.
- (ii) Accident rates get reduced.
- (iii) Closed side streets are used for parking ~~space~~ of vehicles.
- (iv) If the side streets at close interval, it is difficult to operate progressive system of signals.
- (v) Closed side streets are used for pedestrians and it gives safety, comfort and convenience of pedestrians.

Disadvantages:-

- (i) Due to close of side streets the flow from bus to other streets has been increased. It may need additional signal control.
- (ii) When closing of side streets it is an increase in the parking of vehicles in the main street. It may create congested conditions and lead to delays and lower speed.

(iv) Exclusive Bus lanes:-

Exclusive bus lanes means to reserve a lane of the carriageway exclusively for bus traffic. It is only possible in situations where the carriageway is of adequate width. There should be at least 3 lanes in each direction. It is running against heavy one-way flow. It also reduce the journey time nearly halves. In present conditions, increase in car ownership and the need to use public transport, this is a welcome strategy. The capacity of the exclusive bus lanes may be computed by assigning a pcv of



1.6 to each bus. The width of the bus lane should be a minimum of 2.8m and if possible 3.5m. It can be established, prohibiting all traffic except buses. It is usually enforced in shopping areas to facility for pedestrians to reach the buses within short walking distances.

#### (v) Tidal flow operation:-

Traffic flow on any street leading to the city centre is the imbalance ~~is~~ during peak hours. In the morning peak hours heavy traffic flow towards the city centre and in the evening peak hour heavy traffic flow towards the city outer. This phenomenon is commonly termed as 'tidal flow'. To dealing this problem is to allot more than half the lanes for one ~~direction~~ during peak hours. This system is known as 'tidal flow operation' or 'reverse flow operation'.

#### Methods:-

- (i) A greater number of lanes in a multi lane street to the in-bound traffic during the morning peak and similarly during evening peak.
- (ii) The existence of two separate streets parallel to each other and close to each other, so that the wider of the two can be set apart for the heavier traffic both during morning and evening peak.

Favourable conditions for operation:-  
For undivided streets, tidal flow operation is best done with the no of traffic lanes allocated to the two directions. It is justified where 65% (or) more of traffic moves in one direction during peak periods.

With a three lane street, two lanes can be reserved for heavier flow and one lane for the smaller flow.

Special measures needed:-

In tidal flow operation, special signing and additional control devices are needed. The assignment of traffic to proper lanes can be achieved by placing overhead signs.

Restricted parking on the side of the major flow during the peak periods. Traffic cones are desirable to separate the opposing traffic. No right turn and 'Keep Left' signs on pedestals are necessary.

Intelligent Transport systems (ITS):-

ITS also known as Transport telematics, are transport systems that apply modern information technologies to improve the operation of transport networks. It acquires vast volume of data on various aspects of transport operation, process them and apply the results to guide traffic, improve operations safety and transport costs.

Application of ITS:-

ITS can cover a wide variety of application such as:

- (i) Monitoring traffic flow, it provide information to drivers on the congestion on the road, road closures, alternative routes, weather conditions and speeds to be observed.
- (ii) Monitoring incidents on the road, such as vehicle break down and collisions.
- (iii) Electronic collection of toll.
- (iv) Traffic control on urban streets by using information on traffic flows and adjusting the signal operations to reduce congestion and delay.
- (v) Electronic Road pricing system to decongest the city centres.