

Highway Capacity: Definition, Importance, Factors and Formula

<https://www.engineeringenotes.com/transportation-engineering/traffic-engineering/highway-capacity-definition-importance-factors-and-formula/48457>

In this article we will discuss: 1. Definition of Highway Capacity 2. Importance of the Concept of Highway Capacity 3. Factors Affecting Capacity and Level of Service 4. Traffic Capacity Formula.

Definition of Highway Capacity: Highway capacity is associated with traffic volume and traffic density.

Traffic volume is the number of vehicles passing a given point on a roadway during a specified time period. This is usually expressed as vehicles per hour.

Traffic density is defined as the number of vehicles occupying a unit length of a lane of a roadway at a given instant of time. This is usually expressed in vehicles per kilometre.

It is easy to understand that traffic volume is the product of traffic density and speed.

Capacity is the maximum traffic flow that can be accommodated in a highway facility during a given time period under prevailing roadway, traffic and control conditions. (While traffic volume represents the actual rate of flow and responds to variations in traffic demand, capacity indicates the maximum rate of flow when exposed to a certain level of service characteristics or a number of prevailing roadway and traffic conditions).

The Highway Capacity Manual (1950) defined the following three types of highway capacity (O. K Normann):

Basic Capacity: Basic capacity is the maximum number of vehicles that can pass a given point on a lane or a roadway during one hour, under the ideal roadway and traffic conditions that can possibly be attained.

Possible Capacity: Possible capacity is the maximum number of vehicles that can pass a given point on a lane or roadway during one hour, under the prevailing roadway and traffic conditions.

Practical Capacity: Practical capacity is the maximum number of vehicles that can pass a given point in a lane or roadway during one hour, when traffic density is not so great as to cause unreasonable delay, hazard or restriction to the driver's freedom to manoeuvre under prevailing roadway and traffic conditions. This is usually considered to be the 'design capacity'.

PERSPECTIVE:FROM A PLANNER: It's interesting to note that speed is a factor. In particular, high-speed roadways require that vehicles have lots of space between them. As they get congested, the average speed slows down. This allows less space between cars and actually increases the roadway capacity. However, as more cars enter the roadway segment than are leaving it, congestion can get so bad that roadway capacity actually shrinks and gridlock ensues.

Congestion is actually a symptom of success. Cities with closed factories and stores don't suffer from congestion. Congestion is an indication that people are going places and doing things. Gridlock, however, can kill the goose that lays the golden egg. Therefore, the key is to manage congestion rather than to eliminate it.