

DETERMINATION OF LEVEL OF SERVICE OF NH 76 (KOTA TO BARAN ROAD): A REVIEW

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Abstract: When we talk about developing countries like India, traffic being highly heterogeneous and traffic speed ranges of LOS categories of highways are not well defined (HCM2010). LOS is the method for analyzing traffic & geometrical characteristics of highway as it affects different aspects like planning, design, operation of roads. LOS determination of highways is much different from rural roads. This paper reviewed various parameters which will affect LOS of NH.

Key words: Level of Service, four lane highway, Peak Hour Volume, Speed, free flow speed, four lane highway.

I. INTRODUCTION

Roads and highways are a major part of the transportation infrastructure in India and has a substantial role in the country's economy and development of community. Quality of service of these facilities is essential for daily traffic operations with safety and economical cost.

The rapid growth in population of developing countries like India which led to increase of demand in every aspect of our lives;

Therefore the increase of all such demands is directly proportional to increase the use of vehicles and the highway capacity.

Four-lane highways are a very important element in the highway systems of all developing countries.

They are used to achieve a variety of functions, are located in all geographic areas, and serve a wide range of traffic.

Consideration of operating quality must account for these all disparate functions. A four-lane highway is a divided roadway with two lanes each side to the divider. Two lanes used by traffic in each direction. As traffic volumes and geometric restrictions increase, the ability to pass decreases which leads to jam and platoons formation.

In such conditions motorists are subject to delay because they are unable to pass with their usual speed with the growth number of vehicles led to decrease in the service quality of NH.

This makes necessary to study the reason as well as find the solutions for the current and future conditions. Highway Capacity Manual (HCM) is the pioneer in management and evaluation for capacity and quality of service of various highway facilities including freeways, highways, arterial roads, roundabouts, signalized and un signalized intersections, urban highways, and the effects of mass transit, pedestrians, and bicycles on the performance of these systems.

II. LEVEL OF SERVICE

A multilane highway is characterized by three performance measures:

Density, in terms of passenger cars per kilometer per lane;

Speed, in terms of mean passenger car speed and

Volume to capacity ratio.

Density is the assigned primary performance measure for estimating LOS.

LOS A describes completely free-flow conditions. The operation of vehicles is Each of these measures indicates how well the highway accommodates traffic flow measures of speed. Density, and flow or volume are interrelated. If the values of two of these measures are known, the remaining measure can be computed virtually unaffected by the presence of other vehicles, and operations are constrained only by the geometric features of the highway and by driver preferences. Maneuverability within the traffic stream is good. Minor disruption to flow are easily absorbed without a change in travel speed.

LOS B also indicates free flow, although the presence of other vehicles becomes noticeable. Average travel speeds are the same as in LOS A. but drivers have slight less freedom to maneuver. Minor disruptions are still easily absorbed, although local deterioration in LOS will be more obvious.

LOS C, the influence of traffic density on operations becomes marked. The ability to maneuver within the traffic stream is clearly affected by other vehicles. On multilane highways with an FFS above 80 km/h, the travel speeds reduce somewhat. Minor disruptions can cause serious local deterioration in service, and queues will form behind any significant traffic disruption.

LOS D, the ability to maneuver is severely restricted due to traffic congestion. Travel speed is reduced by the increasing volume, Only minor disruptions can be absorbed without extensive queues forming and the service deteriorating.

LOS E represents operations at or near capacity, an unstable level. The density vary, depending on the FFS. Vehicles are operating with the minimum spacing for maintaining uniform flow. Disruptions cannot be dissipated readily, often causing queues to form and service to deteriorate to LOS F. For the majority of multilane highways with FFS between 70 and 100 km/h, passenger-car mean speeds at capacity range from 68 to 88 km/h but are highly variable and unpredictable.

LOS F represents forced or breakdown flow. It occurs either when vehicles arrive at a rate greater than the rate at which they are discharged or when the forecast demand exceeds the computed capacity of a planned facility. Although operations at these points -and on sections immediately downstream-appear to be at capacity, queues form behind these breakdowns. Operations within queues are highly unstable, with vehicles experiencing brief periods of movement followed by stoppages. Travel speeds within queues are generally less than 48 km/h. Note that the term LOS F may be used to characterize both the point of the breakdown and the operating condition within the queue.

III. Area of the Study

Traffic Study will be carried out to determine the level of service of the stretch identified on NH-76 'Kota to Baran road, Rajasthan, India'. It is a four-lane highway. A four-lane highway is a divided roadway with total four lanes of which two lanes are used by traffic in each direction.

Multilane highways (here four lane highway) range from the uninterrupted flow of freeways to the flow conditions on urban streets, which are frequently interrupted by signals.

The capacity of four lane highway is the maximum sustained hourly flowrate at which vehicles can be expected to traverse a uniform segment under prevailing roadway and traffic conditions

According to (H.C.M,2010) L.O.S. is a quality measure describing operational conditions within a split, slow moving vehicles, pavement surface conditions and further proposed Adjustment Factor was applied.

The selected highway has an economical and cultural importance, where it connects the major agricultural, commercial, recreational and religious areas to the capital city. The reasons behind selecting this major highway were because of the military, agricultural, commercial and recreational importance as well as the service provided by some segments of this highway to the Madhya Pradesh state of India, where all these reasons reflect an economical importance.

IV. RESEARCH METHODOLOGY:

Following steps are referred to conduct the study, analyze and collect the data in order to determine the level of service.

Study of Geometric data

Study of traffic data

Study of Geometric data: Geometric data study includes determination of highway class, lane width, and shoulder width and access points density which are described below.

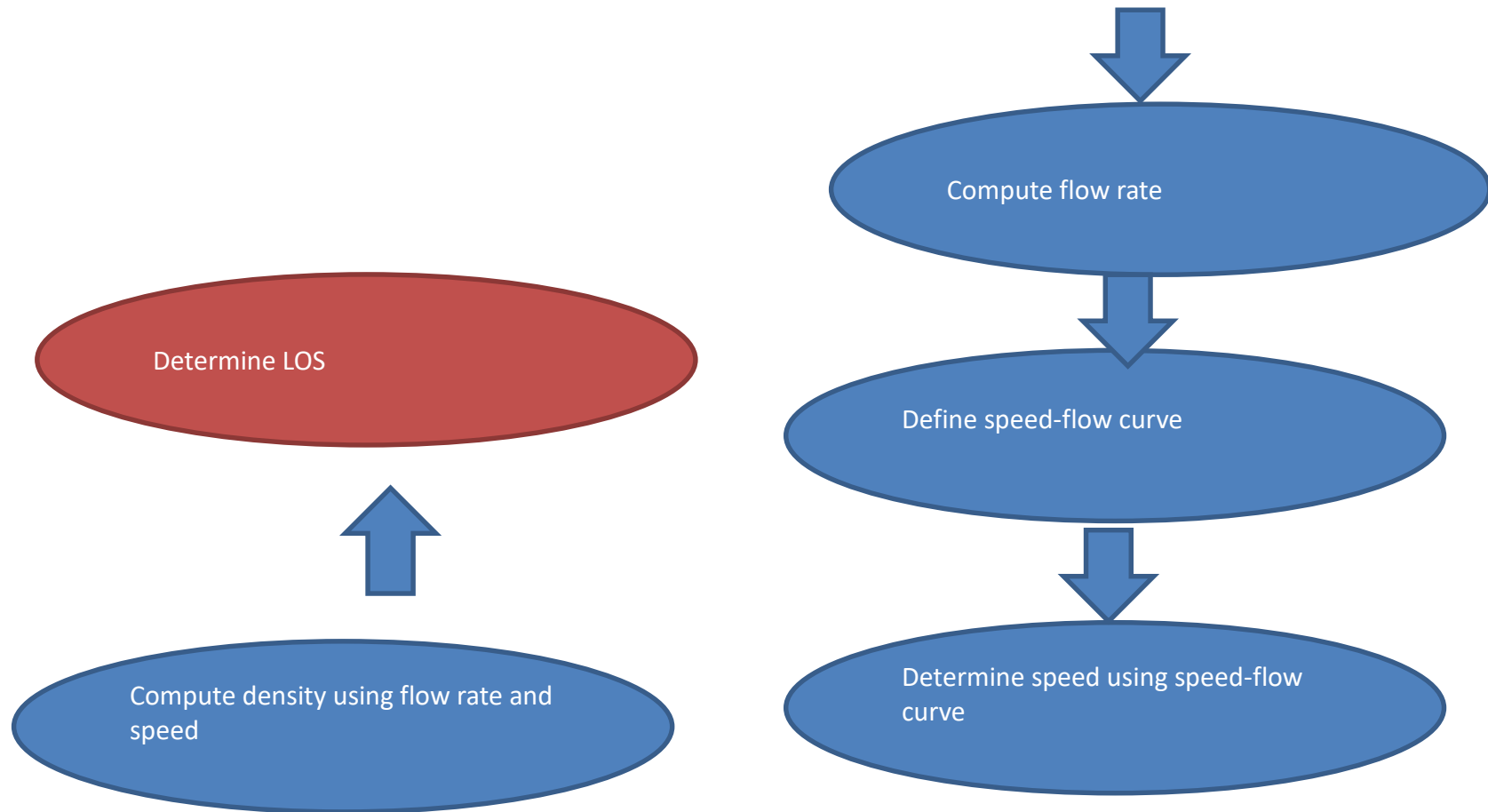
Study of traffic data: The study of traffic data includes traffic volume count, free flow speed, base free flow speed, average travel speed, peak hour factor, traffic volume, traffic density and percentage of heavy vehicles. The flow chart below depicts the steps to determine LOS of NH

Input

- Geometric data
- Free-flow speed (FFS) field measured, or base free-flow speed (BFFS)
- Volume

Volume adjustment

- Peak-hour factor
- Number of lanes
- Driver population
- Heavy vehicles



V. CONCLUSION

A service volume or service flow rate for NH is the maximum number of vehicles, passengers, or the like, which can be accommodated by a given facility or system under given conditions at a given LOS. Most of the studies conducted have taken Minimum of 3km street into account for LOS analysis. Capacity of the highway depends upon various characteristics and parameters like road geometry, and composition of traffic on that particular segment. LOS of four lane national highway mainly depends upon volume to capacity ratio. LOS of four lane highway is influenced by base conditions, geometry, roadway conditions; traffic conditions control conditions, median type, lateral clearance and number of access points.

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