Speed-Flow Characteristics of an Identified Stretch of SH-6

Pagidimarry Gopi,[1] Dasari Ravikanth[2], T Uma maheswara rao[3]

[1]Assistant Professor of civil Engineering, Nalanda Institute of Engineering &.technology, Kantepudi, Guntur, A.P. India,

E-mail: gopip@ngi.ac.in

ABSTRACT

In a mixed traffic condition of the type prevailing in India, Many changes and advances has occurred and got implemented in the current traffic condition which has been undergone from past 20-years. Speed of a vehicle is main concern in designing a road with all its geometrical elements; this led to determine the speed flow characteristics and the speed capacity of a highway. A study was conducted on SH-6 (Haryana). This paper presents the results of this study.

I.   INTRODUCTION

Regular traffic studies are the essential component of road research in a country. Traffic studies give information about the behavior of traffic stream and permits better road to be designed and built. Speed-flow relationships and highway capacity are the very important factors are considered in planning, design and operation of the roads. This provides the base in finding the roadway width, which can be provided at any point of time. It is a valuable tool for evaluating the investments needed for future road construction and improvements. With a view to know speed-flow characteristics of traffic stream and capacity of State Highway-6 (Haryana), the paper reveals the study area.

II.   SPEED-FLOWS STUDY

The speed-flow study was conducted on a four-lane section of SH-6, the road connecting Kurukshetra with Sharanpur. The carriageway of a road at the studied section of 6.5x2 mts. with 1 mts. wide raised median and about 1 mts. earthen shoulders on either side. Speed-flow observations are recorded for every two-minute interval for a period of two hour.

III.   STUDY RESULTS

3.1 Vehicular Flow Composition

The vehicular volume study indicated that directional split of vehicles was nearly 50% in each direction at the time of study. The flow composition at the site as shown in fig.1.
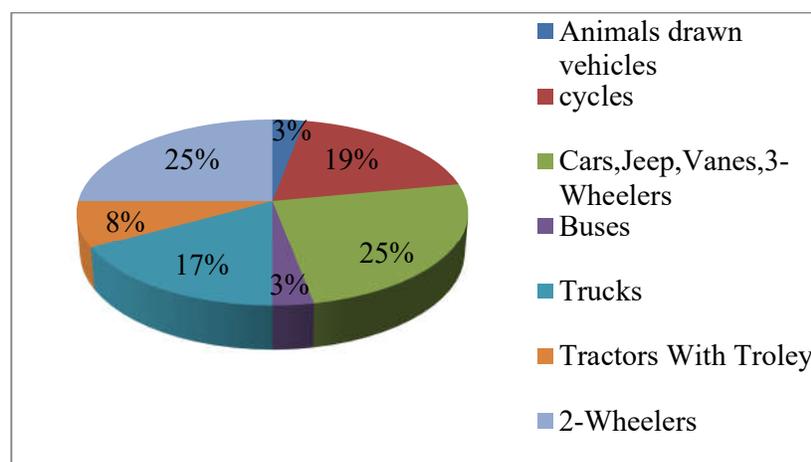

Fig.1 Vehicular flow composition at 4-lane road.

3.2 Speed-Flow Equations

The flow values in a two minute interval are converted into hourly volume of vehicles and as to generate speed-flow equations a technique called linear regression is used. It is noticed that because of wide scatter of data, the R^2 values (co-efficient of determination) of the regression using the individual speed and flow values are low. Table 1 gives the equations obtained in the current study.

Table 1 Speed flow equations for current study

Type of vehicle	Speed-flow Equation
Car	V=64.64-0.020Q
Buses	V=53.82-0.030Q
Trucks	V=52.96-0.019Q
2-Wheeler	V=48.82-0.015Q
3-Wheeler	V=38.05-0.012Q

V=Speed of vehicle type in Km/h, Q=Flow in PCU/ hour.

Table 2 Comparison of Free Speeds

Vehicle Type	Four-Lane Road		
	RUCS 1980	RUCS 1990	Current Study
Cars	51.84	68.73	64.64
Buses	46.35	74.48	53.82
Trucks	44.71	63.25	52.96
2-Wheelers	59.89	57.21	48.82
3-Wheelers			38.05

3.3 Road Capacity and Design Service Volume

Observed speed-flow values and the superimposed speed-flow of the curve studied section as shown in fig. 2. From this curve it is seen that:

i) The maximum flow (capacity) of the studied four-lane section of the road with earthen shoulders is 2100 PCU/hour/direction. With a peak hour factor of 10%, it comes out to be 21000 PCU/day in one direction and 42000 PCU/day in both directions. With a level of service C, the design service volume for a four-lane (2x6.5m) road is to be 3000PCU/hr and 30000 PCU/day in both the directions.

The proposed values of the service volume for a four-lane Arterial road in plain terrain by IRC: 106-1990 is 3600 PCU/hr. The volume for studied section is less than the volume suggested by IRC due to decreasing the width in carriageway. If there any changes in values PCU factor as given by IRC will also change the proposed values of the volume and DSV.
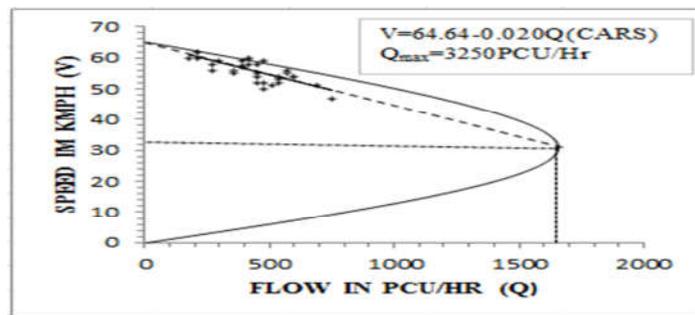

Fig 2.Speed-Flow Curve in one Direction of Four-Lane Road

IV.   CONCLUSIONS

1. As from the records of the 1980 the free speed of different type of vehicles has been increased and since 1990 it got decreased in four-lane road. Thus these capacity numerical standards recommended by IRC guidelines are achievable.
2. From this study it was found that, decrease in roadway width leads to decreases in the capacity and free speed of vehicles.
3. Level of service to this road is yet to be evaluated for present and future traffic by suitably projecting the present traffic volume to future date.

REFERENCES

1. Road User Cost Study, Final Report, Central Road Research Institute, New Delhi, (1980)
2. Road User Cost Study, Final Report, Central Road Research Institute, New Delhi, (1990)
3. Sachdeva, S.N., Chandra S. and Bansal R.K. (2001). "Speed-Flow Characteristics on a Rural Highway". Proceedings of National Seminar on Challenges for Road Transportation in 21st Century Leading to Fuel Economy CIRT 2001, Feb. 23-24,pp 159-165.
4. Guidelines for Capacity of Urban Roads in Plain Areas, IRC: 106-1990, Indian Roads Congress, New Delhi, 1990.