Study on Effect of Mixed Traffic in Highways
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Abstract— Heterogeneous traffic composed of both motorized and non-motorized vehicles are a common feature of Indian roads. In India there are no separate lane of non-motorized vehicles and motorized vehicles, therefore the theoretical models fail to analyze the situation completely. This research mainly analyzes the impact of non-motorized vehicles on overall performance of traffic parameters. The use of non-motorized transportation such as cycling and walking is not only to reduce carbon but also healthy lifestyle and a physical activity. Non-Motorized Transportation includes all forms of travel that do not rely on an engine or motor for movement. This includes walking and bicycle, and using small-wheeled transport and wheelchair. These modes of transport can provide both recreation and transportation. For example, some people will choose to walk or bicycle rather than drive because they enjoy the activity. The importance of non-motorized transport can be summarized as In traffic engineering, speed is considered to be crucial part as it is directly or indirectly related with the geometric speed, traffic operations, congestion and capacity. If traffic is heterogeneous or mixed traffic, speed is affected as there is dependence of the variation and proportion of non-motorized vehicles like cycles, tricycles, cycle rickshaws, bullock carts and hand driven carts. ‘Non-Motorized Vehicles’ is refereed to different types of pedal powered vehicles used on the road. In developing countries like India, we generally can find heterogeneous or mixed traffic i.e. a traffic flow constituting of different types of vehicles like cycles, tricycles, cycle rickshaws, bullock carts and hand driven cars. ‘Non-Motorized Vehicles’ is refereed to different types of pedal powered vehicles used on the road. In developing countries like India, we generally can find heterogeneous or mixed traffic i.e. a traffic flow constituting of different types of vehicles like cycles, tricycles, cycle rickshaws, bullock carts and hand driven cars. This mixed flow of vehicles leads to many problems like conflicts at intersections when number of non-motorized vehicle increases, when number of non-motorized vehicles increases it affects the speed and flow of other vehicles. It significantly lowers or reduces the capacity also leads to various safety problems.

Keywords: motorized and non-motorized vehicles properties, Mixed Traffic in Highways

I. INTRODUCTION

In developing countries like India, we generally can find heterogeneous or mixed traffic i.e. a traffic flow constituting of different types of vehicles like cart, cycle, rickshaw, car, bus etc. In Indian cities the share of non-motorized traffic at peak hours is almost more than 50 per cent. This share is even higher in medium-sized and small-sized cities. Different cities have different patterns of NMT use. Every public transport mode of transport involves access trips by NMT at each end. Thus, mixed traffic plays a very important role in meeting travel demand in countries like India. The characteristics of sustainable transport are safe, comfortable and efficient in terms of economic and energy consumption and minimize environmental pollution. Today, transportation systems in most cities are no longer sustainable due to lack of natural materials such as oil reserves, increasing the number of deaths and injuries by motor vehicle accidents and traffic congestion. The carbon emissions into the atmosphere contribute to environmental pollution in terms of quality deficiencies that affects mobility of life in general. This study aimed is to design sustainable transport in terms of mixed vehicle for a city that promises a better world for future generations. It provides strategies to change the choice of transport modes to road users of motor vehicles to non-motor vehicles through integration of land use and transportation planning. By improving pedestrian path and cycling zone to increases non-motorized travel and reduce motor vehicles travel. The use of non-motorized transportation such as cycling and walking is not only to reduce carbon but also healthy lifestyle and a physical activity. Non motorized transportation includes all forms of travel that do not rely on an engine or motor for movement this includes walking, bicycle, using small-wheeled transport (skates, skateboards, push scooters and hand carts) and wheelchair. These modes of transport can provide both recreation and transportation. For example, some people will choose to walk or bicycle rather than drive because they enjoy the activity. The importance of mixed traffic can be summarized as in traffic engineering, speed is considered to be crucial part as it is directly or indirectly related with the geometric speed, traffic operations, congestion and capacity. If traffic is heterogeneous or mixed, speed is affected as there is dependence of the variation and proportion of non-motorized vehicles like cycles, tricycle, cycle rickshaw, bullock cart and hand driven cart. Non motorized vehicles are refereed to different types of pedal powered vehicles used on the road.

II. LITERATURE REVIEW

This work is based on motorized and non-motorized vehicles properties and its effect on highways hence a literature survey is done. So many studies done in this field and some of them are presented below:

1) C. Sarna., (1990) discussed the importance of non-motorized transport in India. According to her, cycle rickshaw is a popular para-transit mode that provides door-to-door service in congested parts of most Indian cities. According to the author, to improve the transport infrastructure, transportation studies should be conducted in Indian cities of all sizes so that more realistic transportation plans could be prepared in keeping with the prevalent socioeconomic environment. Greater attention was needed to be paid to non-motorized modes, pedestrians, and poorer sections of society, which formed a majority of the urban residents.
2) Minderhoud et al., (1997) made a research on “Assessment of Road Way Capacity Estimation Methods”. The estimation methods were classified into direct empirical and indirect empirical methods. They calculated methods for finding capacities using headways, traffic volumes and speeds, traffic volumes, speeds and headways. Only two approaches are used in calculating capacity estimation, they are using observed maxima or using a set of flow observations.

3) Tiwari, Fazio, and Pavitravas., (2000) developed “Passenger Car Units for Heterogeneous Traffic Using a Modified Density Method.” This method is very useful for Indian traffic conditions. At first all the traffic was divided into 8 groups and Indian roads into 6 groups. The camcorder recorded traffic on the video tape along with a time stand during peak hours and characteristics were obtained. This modified density method requires comparison of density for various traffic types at the same speed. One should ensure that the obtained density must be divided by the lane width to obtain the PCU values.

4) Md. Mizanur Rahman., (2003) examines macroscopic flow relationships of fundamental traffic parameters (speed-flow-density) for heterogeneous traffic flow based on cross-section basis. Furthermore passing/overtaking model for heterogeneous traffic flow will be developed. The results of macroscopic flow relationships show that non-motorized vehicles have adverse effect on fundamental traffic parameter relationships. The straight line relationship observed between passing/overtaking and total volume due to data range covered the uncongested flow region. There was no clear pattern for passing/overtaking and proportion of non-motorized vehicles.

III. METHODOLOGY
This study shall carried out two stations i.e. Civil Hospital Derabasi area A1 and A2, and Metro Shopping Mall area B1 and B2 in Zirakpur near fly over on NH-152. These locations are having high volume of traffic which includes motorized and non-motorized vehicles. At these two locations, there is divided road so data shall be collected separately for traffic movement in both directions. These sections were selected such that they have high traffic of mixed traffic i.e. motorized vehicles and non-motorized vehicles. The various locations of the study area are enlisted below:
Location A1 is on RHS of Civil Hospital Derabasi on National Highway 152,
Location A2 is on LHS of Civil Hospital Derabasi on National Highway 152,
Location B1 is on RHS of Metro shopping mall near fly over Zirakpur on NH-152,
Location B2 is on LHS of Metro shopping mall near fly over Zirakpur on NH-152.
At each location, data shall be collected for an interval of 30 minutes i.e. Section A1 time between 8:00AM to 8:30AM, Section A2 time between 8:30AM to 9:00AM, Section B1 time between 8:00AM to 8:30AM, Section B2 time between 8:30AM to 9:00AM of the day. The session is selected because they have highest volume of traffic.

REFERENCE