

A REVIEW PAPER ON STUDY OF PEDESTRIAN AND SLOW MOVING TRAFFIC IN URBAN AREAS

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Abstract— When consideration takes place about the traffic of one the most advances cities Chandigarh, India, no one thinks about the issue related to slow-moving traffic such as pedestrians, cyclists and other slow moving traffic. Although motor vehicles have revolutionized the road transport, but in recent years the rapid increase in traffic in Chandigarh has increased the traffic congestion and the rate of accidents. According to Black Book 2013 compiled by the Road Accident Analysis by Chandigarh Traffic Police, Chandigarh's geographical area is 114 sq km. The total population of Chandigarh is more than 11 lakh. The city's vehicle population is more than 8.8 lakh, which is the highest of the per capita vehicle population in the country. U.T. More than 100 vehicles have been added in Chandigarh. Total road length of Chandigarh is 1536 km. More than 130 people are losing every year in Chandigarh.

Walking is an important means of transport. A significant proportion of the journey to 1-2 km in length in the areas of the field is done on the foot. Apart from this, every journey begins as a necessary journey and ends. Since pedestrians are more sensitive to involvement in accidents, it is important that adequate protection should be given to their safety through the provision of facilities like guard rail, safe crossing area, pavement and grade separation. Pedestrian amenities should be planned in an integrated way to ensure a continuous pedestrian flow. That's why it should be useful to see pedestrian needs in the entire area and to prepare the overall strategic plan. The basic purpose should be to minimize pedestrian conflict with at least vehicle traffic. Efforts should be made to make such conditions that pedestrians are not forced to run under unsafe conditions and the motorist respects the pedestrian status. While planning a convenient pedestrian, there should be paramount consideration. Other facilities provided otherwise will not be fully used. Suggestions prepared as traffic management plans to protect pedestrians by reducing conflict between vehicle movement and pedestrians.

Index Terms— Sidewalks, pedestrian level of service, pedestrian environment, and unit flow rate, cycle track.

I. INTRODUCTION

A significant proportion of every trip or journey, through any of the modes of transportation, is made by walking. Therefore the design of pedestrian facilities needs to be done with equal preference and efforts as that of the vehicular traffic in urban transportation planning. The considerable amount of efforts should be made for safe, accessible, and convenient mobility of pedestrians. The evaluation the facilities available for the pedestrians is more cumbersome than vehicular traffic because the pedestrians are exposed to diverse environmental conditions while in comparison the occupants of vehicles are detached in their cloistered environment.

Pedestrian level of service is the qualitative estimate of the travel conditions of a pedestrian on a footpath, crossing or a walking facility. In this dissertation present-day practices for providing pedestrian facilities and methodologies for assessing level of service for pedestrians are discussed. Their strengths and flaws are studied and recommendations are made to work out more acceptable service level of pedestrian facilities. By complete understanding the flaws in the existing service level methodologies, the transportation planners can contemplate a more efficient methodology that can satisfactorily evaluate the service level for pedestrians.

There is a mixed traffic condition in India consisting of the motorized vehicles like buses, trucks, cars etc. and non-motorized vehicles or slow moving vehicles like cycles, cycle rickshaws and so on. The proportion of the slow moving vehicles is quite significant in most of the urban areas of India and play a very substantial role in meeting the travel demands of an area. Therefore, the evaluation of the effect of these vehicles in the heterogeneous condition is very essential for the traffic planning of a city. When the number of slow moving vehicles increases in a traffic stream, they considerably affect the flow characteristics of that traffic stream like the traffic density, traffic capacity and flow speed. Hence, in this study the effects of the slow moving vehicles on the performance of the traffic stream on a study stretch is taken into account.

The test location for studying the pedestrian and slow moving traffic in urban areas is selected as Chandigarh in this dissertation. Chandigarh is a capital to two states Haryana and Punjab. The city is one of the cleanest and well planned cities of India and is also a union territory. The city is located at a distance of about 256km north of New Delhi. The Foothills of the Himalayas- the Shivalik range rises gradually towards North-East of the city forming a wonderful nature backdrop. The general ground level of the city has 1% gradient that provides adequate drainage. The city was planned and designed by late French Architect Le Corbusier. He was assisted by his cousin Pierre Jeanneret and English Couple E. Maxwell Fry and Jane B. Drew. Today Chandigarh is considered to be

one of the best planned cities in the world. The fundamental planning unit of the city is the sector enclosed by roads for moving traffic. Each sector has its own shopping Centre, schools and other community facilities.

As a city, Chandigarh is providing a high quality of life to citizens and therefore has grown very rapidly. Because of the facilities available in the city and good quality living conditions the city is attracting not only the families but also the workmen skilled and unskilled both. Due to which the city is growing at an intense rate. There is a huge increase in population of city itself and rapid growth of satellite town like Panchkula and Mohali that resulted in great increase in number of trip making.

Improvement in living standards has resulted in an unprecedented boom in motor-vehicle ownership in recent year, encouraging even more number of trip makings. As it is clear from motor-vehicle registration data available, the car ownership is increasing day by day and there is steep rise in traffic of the city. In the fatal accidents large no of cyclists and pedestrians were involved. The glaring defects, improper sidewalk facilities, insufficient intersection spacing and above all the arbitrary management of the existing important intersections are the major factors contributing to a large number of both serious and fatal accidents. The proportion of slow moving vehicles particularly the cycle traffic is three to six times the motor vehicular traffic. A large variation of speed between slow moving vehicles and fast moving motorized vehicles of different categories increases the severity of accidents and number of conflict with pedestrian.

II. LITERATURE REVIEW

Polus et al. (1983) [1] analyzed properties and characteristics of pedestrian flow on footpaths, in Haifa Israel and observed that gender and density plays pivotal part in defining walking speed of pedestrians.

Lam et al. (1995) [2] through a study tried to find out the pedestrian flow characteristics in Hong Kong and saw that the speed-flow-density models developed for Hong Kong were similar to those developed for Singapore for similar facilities.

Dý'az (2002) [3] concluded that male pedestrians are more willing to violate regulations and make unsafe crossing decisions. However they are less likely to perceive risk when crossing a roadway in the presence of motor vehicles.

Holland and Hill (2010) [4] collected adult pedestrian accident data which demonstrated that the risk of being killed or seriously injured varies with age and gender. A range of factors affecting road crossing choices of 218 adults aged 17- 90 were examined. It was observed with increasing age, women were seen to make more unsafe crossing decisions, leave small safety margins and become poorer at estimating their walking speed. However, men differed from women as the age was not a major factor in predicting unsafe crossing decisions.

Granie, M A., Brenac T., et al. (2014) [5] pedestrian behavior is strongly dependent on biological gender, as shown in past researches. It has also been found to depend on the psychological masculinity of an individual. Pedestrian speeds are also significantly related to pedestrian age, and the speeds of pedestrians are slower as they get older.

Satish Chandra, Rajat Rastogi et al. (2014) [6] Three types of crossings were observed in field; single stage, two stages and rolling gap. Single stage gap acceptance was found to have less deviation from critical gap. Two stage crossings were less in number and people preferred rolling gap crossing as compared to the other two types of crossing. The average gap accepted was found to be the lowest for young and the highest for old pedestrians. It was found that the older pedestrians exhibit a higher level of deviation in their accepted gap from critical gap than the other two categories.

Ronid Doshi (2015) [7] conducted the study to determine the influence of slow moving vehicle composition on traffic density in Ahmedabad city and observed that the traffic density goes on increasing with increase in slow moving vehicle composition due to change in velocity along the stretch.

Yash Pratab Singh (2018) [8] conducted the study on slow moving vehicles in Azadpur Delhi and concluded that the slow moving vehicles are the major concerns in every parameter related to environment, social issues, physical structures, transportation demand and supply of goods and services and travel pattern of the road users and therefore the need to provide the separate facilities for these types of vehicles is essential.

III. METHODOLOGY

A methodology has been drawn starting from the identification of study locations for data collection to the final result that can be achieved:

- Identification of Test Location: The selection of the location based on the area to study where the problems with pedestrian and slow moving vehicle have been seen. The road sections and footpaths have been selected in sector 26, Chandigarh.
- Design for Pedestrian facilities: For safety of pedestrians, separate footways should be provided alongside the carriageway of urban streets. They should be provided on the either side of the road and should preferably be raised above the general carriageway level. To attract full use pedestrian, they should be properly surfaced or paved. They should be sloped adequately to drain away the rain water. In this study all these parameters related to pedestrian facility will be analyzed in the test location and various methods will be adopted accordingly to design better pedestrian facilities.

- Design Criteria for Separate cycle Tracks: Segregation of cycle track promotes safety. In view of the large number of cycles on the streets of Indian towns and cities, it is desirable that separate cycle track be provided wherever feasible. The design criteria for cycle track are laid down by the Indian Road congress.
- Impact of Slow Moving Traffic: The slow moving traffic in India consists of cycle, cycle rickshaw etc. An understanding of some of the characteristics of these vehicle types is essential for traffic engineer. The impact of these slow moving vehicles on traffic characteristics like density etc will be studied.
- Highway Capacity Manual Methodology: The methodology provides the framework for pedestrian facility evaluation. The analyst will be able to investigate the effects that bicycles and traffic signals have on the pedestrian facility as well as the effect of pedestrian volume on flow and level of service for pedestrians, cyclists and other slow moving vehicles.

IV. OBJECTIVES

The current study has the following objectives:

- To establish a relation between the volume of slow moving vehicles on the section and the width of the section. By using this, we can predict the Level of Service (LOS) of slow moving vehicles.
- As IRC recommended that if the pedestrian capacity is less than 800 pedestrian than the minimum width of footpath is 1.50 m. We can check if the footpaths of study area are following the IRC guidelines.
- Besides the width of the foot path, the condition of footpath surface can also be checked which could be used to ascertain whether the footpath is desirable for pedestrians or not.
- To study the effect of slow moving or non-motorized vehicles on the traffic flow parameters like the traffic speed, density and capacity.
- To recommend the ways of eliminating the ill effects of non-motorized vehicles on the traffic performance of the city.
- To analyze the pedestrian safety measures in the study area and identifying the faults in the current methods of pedestrian safety measures so as to arrive at a more satisfactory solution.

V. FUTURE SCOPE

There is a tremendous increase in the number of trip makings in the recent years due to the improvement in living standards and extraordinary boom in motor-vehicle ownership in recent years. A very good proportion of these trips are made by walking and slow moving vehicles. Therefore the present study is carried to evaluate the various parameters related to pedestrian and slow moving traffic. The study can be used at other intersections of city and thus can help transport planners and officials to assure safety of pedestrians and formulate the means to make effective use of the slow moving vehicles. The strategies and policies can be formulated to incorporate the demands of the pedestrians and slow moving vehicles in urban areas which will help to provide a momentum to transform Indian cities, encouraging pedestrian and slow moving vehicle movements.

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