Research Paper   **Engineering**

Planning for Non-Motorized Transportation

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ABSTRACT

The urban traffic congestion has become a global phenomenon. Rapid urbanization and industrialization have caused drastically growth of vehicles all over the world. The problems like congestion, delay, energy consumption, environmental pollution etc. are observed due to growth of motorized vehicles. It is necessary to promote the non-motorized transport mode in the urban and rural area in order to reduce the congestion and environmental pollution. The environment surrounding our community provides many opportunities for outdoor activities. Commuter and recreational bicycling are among these opportunities and along with many other non-motorized forms of transportation have become increasingly popular over the years. To accommodate the increased use of alternative forms of transportation and to enhance the quality of life in our community needs to create a comprehensive, interconnected, well-maintained system of non-motorized transportation facilities. The aim of encouraging non-motorized transport mode is to provide a safe, efficient, easy to use, high quality network of non-motorized transportation routes, bicycle lanes and multi-use pathways throughout the community. This research paper covers the research work carried out by eminent personalities in the field of non-motorized transport.

Keywords : Transportation Planning, Pedestrian Safety, Cyclist, Non-Motorized Vehicle.

INTRODUCTION
A well functioning road infrastructure must fulfill the requirements of all road users. In the context of the present socio-economic realities of most developing countries, pedestrians, bicyclists and other slow moving vehicles cannot be eliminated from the urban landscape. Pedestrians, bicyclists and non-motorized rickshaws are the most critical elements in mixed traffic. If the infrastructure design does not meet the requirements of these elements all modes of transport operate conditions. The needs of pedestrians and slow moving vehicles like bicycles and rickshaws have been ignored in the conventional planning strategies. These have been assigned lower importance compared to other vehicles present on the road, however, the experience from environments where captive pedestrians and bicyclists' are present makes a very strong case for re-thinking conventional hierarchy of road users. It is clear that the present investment patterns focused at improving conditions for cars is not leading to desired results. Congestion continues to worst along with shift away from walking, bicycles and public transport the desirable modes from environment sustainability perspective. It is possible to create pedestrian, bicycle and public transport friendly urban roads without increasing the right of way of existing arterial roads in most cities.

This paper deals with planning of Non-Motorized Transport in Mehsana(Gujarat) . Mehsana is main city for Education,bussines,Industrials and Resident in North Gujarat . It lies between the parallels of latitude 23.2' and 24.6' and the meridians of longitude 71.56' and 72.52'.Also it is situated along SH-41 which is major junction and also established as market hub. So particularly this location is selected for the design and planning for Non-Motorized Transport.

2.Problem:
Mehsana is one of the largest cities in North Gujarat; followed by Patan and Palanpur. A number of primary industries including dairy, oil and natural gas works are situated in or around the city .Mehsana is fast going industrial City in North Gujarat

Region has been consider for the present project. South West Zone, a well developed residential area has urban arterial road . It had a population of 1,837,892 of which 22.40% were urban as of 2001. Main market is Toranvalimata chowk, railway station ,bus station, agriculture market yard ,radhanpur cross road ,modhera cross road, shops and 15 Schools and colleges are located in the study area.so this area are highly congested by motorized vehicles, pedestrians and Non-Motorized vehicles. but not sufficient facility for Non-Motorized Vehicles.so more conflit between Motorized vehicles and Non-motorized vehicles, and create traffic congetion, accidents, delay traffic, loss of fuel, Noise pollution, air pollution.

2.1 OBJECTIVE OF WORK:
1) To improve the existing facilities of non- motorized transportation in Mehsana City.
2) To provide new facilities of non-motorized transportation in Mehsana city.
3) To design of non-motorized transportation system.

3.METHODOLOGY:-
The field data sheets have been modified to suit the study area, the count at each arm of the traffic entering the intersection can be broken down into three categories, uiz., left turning, right turning and straight ahead traffic. The field data sheets have been modified to suit the requirement.

For all-day counts, work in three shifts of 8 hours each could be organized. Keeping above guidelines in view, the well-trained post graduate scholars from the discipline of Transportation Engineering and Urban Planning were engaged as enumerators. On each leg of the intersection 5 enumerators were given the duty of traffic count, two each for slow moving and two for fast moving traffic and one for specified turning and straight ahead movement of traffic. One co-coordinator and one reliever for each approach of the intersection have been deployed extra for smooth conduct of survey. The Details of the Traffic Volume Survey and Inventory existing condition of Non-Motorized Transpoet system .

4.STUDY AREA:-
Radhanpur Cross Road is heavily congested area and Pedestrian and Cyclists movements are very high because of various areas like residential, commercial buildings, schools, terminal, recreational centers, G.S.R.T.C. stands, private vehicle stands, offices, etc.


Modhera Cross Road GSRTC Bus terminal is located at Modhera circle and due to which pedestrian movements are high. People approach bus terminals from near-by locations. And also many schools, G.I.D.C and commercial buildings are located. Hence it needs proper Non-Motorized Transport planning facility at intersection.

5.Data collection
5.1Data of Traffic:-
5.1.1 Modhera cross road :- Traffic volume count survey conducted at morning 9:30-12:00 and evening 4:30-6:30 PM,total 4:30 hours survey carried out by supporter .below table following different components of traffic.

Sr. no	Types of vehicles	No. of vehicles	Percentage of vehicles
1	2 wheelers	12959	18.43
2	3 wheelers	8789	12.50
3	Cars	10206	14.51
4	Bus/ trucks	3610	5.13
5	Cycles	3023	4.29
6	Pedestrians	31620	44.97
7	Carts	100	.017
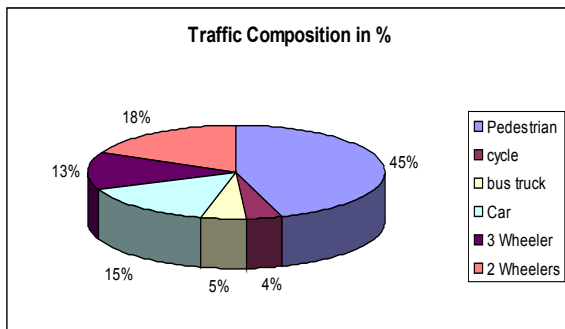
5.1.2 Radhanpur cross road: Traffic volume count survey conducted at morning 9:30-12:00 and evening 4:30-6:30 PM,total 4:30 hours survey carried out by supporter .below table following different components of traffic.
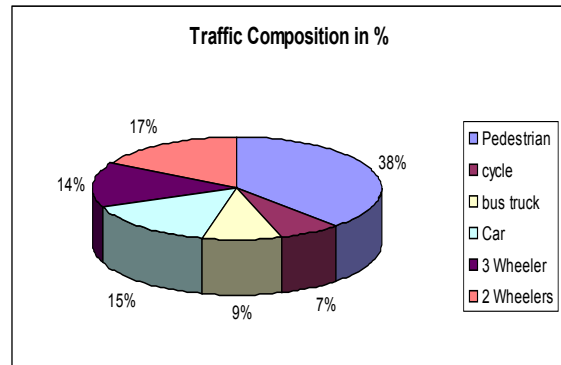
Sr. no	Types of vehicles	No. of vehicles	Percentage of vehicles
1	2 wheelers	9990	17.34
2	3 wheelers	8096	14.06
3	4 wheelers	8964	15.56
4	Bus/ trucks	4671	8.11

5	Cycles	3905	6.78
6	Pedetrians	21865	37.97
7	Carts	89	0.015

5.2 School survey:
5.2.1 Toranvali mata area: I have carried out the school survey and collected the data of no.of students and travel mode of students.below table show the no. of students of different schools.
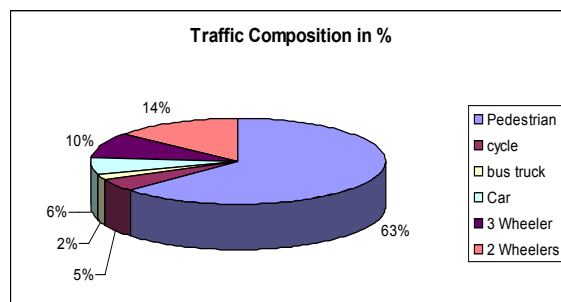
Sr.no	Name of school	Number of student
1	Vardhaman school	1800
2	Sarvajanik school	1200
3	Vardhaman school(KG)	250
4	Farmacy college	1000
5	PTC college	100
6	Sarvajanik college	1100
7	Sarvajanik mahila school	1100
8	New progressive school	1200
9	T.J school	1000
10	Karve kelavali mandal school	1300
11	Homeopathy college	500
		Total:-11550

5.2.2 Market Area:

Sr.no	Name of school	Number of student
1	Sarvajanik school	1300

5.1.3 Toranvali area:- Traffic volume count survey conducted at morning 10:30-12:30 and evening 5:00-6:00 PM,total 3:30 hours survey carried out by supporter .below table following different components of traffic.

Sr. no	Types of vehicles	No. of vehicles	Percentage of vehicles
1	2 wheelers	3891	14.21
2	3 wheelers	2824	10.31
3	4 wheelers	1663	6.07
4	Bus/ trucks	473	1.7
5	Cycles	1350	4.93
6	Pedetrians	17100	62.47
7	Carts	70	.025

5.2.3 Modhera cross road area:-

Sr.no	Name of school	Number of student
1	Arban school	1450

2	Nalanda school	1200
3	Gayatri school	1000
		Total:-4650

5.4 Travel mode of student:-
5.4.1Toranvali mata area school:
Number of student in area=11550

Sr.no	Travel mode	No. of student	Traffic composition in%
1	Sharing autorickshow	2310	20
2	Scooty/bike	2235	20
3	Bicycle	6447	56
4	Public transport	558	4

5.4.2Modhera cross road and market area:-
Number of student in area:-4950

Sr.no	Travel mode	No. of student	Traffic composition in%
1	Sharing autorickshow	1238	25
2	Scooty/bike	1500	30
3	Bicycle	1612	32
4	Public transport	600	13

6. Inventory of Existing Facilities:-
To establish an efficient interconnected non-motorized transportation system, it is necessary to obtain an accurate account of existing facilities. This chapter contains an inventory of existing non-motorized transportation facilities throughout the borough. The main thoroughfares are listed with accompanying shoulders, bicycle lanes and/or multi-use pathways.

Area	Total length	Road width	Shoulder width	Foot path	Cycle track
Modhera cross road to radhanpur cross road	1.5 km	14.6 m	1.00 m	1.8 m	No
Radhanpur cross road to toranvali	1.00 km	15 m (One way)	1.00 m	1.00 m(on one road)	No
Toranvali to market	1.2 km	10 m	0.90 m	no	No
Market to modhera cross road	1.5 km	10 m	1.00 m	1.0	No

7. Design of Proposed Cross section for NMTs:-
It Includes the design of Non-motorized Transport Facility such as footpath, subway ,foot over bridge, guard rails, separate cycle track for cycle users as per IRC:103-1988 for pedestrian and IRC: 11-1962 for cycle track design

7.1 Radhanpur Cross Road To Modhera Cross Road

7.2 Radhanpur cross road to Toran wali(ONE WAY ROAD):-

8.5 m 1.0 m 1.5 m
7.3 Toranvali to Market area:-

1.2 m 1.0 m 5.0 m 5.0 m 1.0 m 1.2 m

7.4 Market area to Modhera cross road:-

1.2 m 1.0 m 5.0 m 5.0 m 1.0 m 1.2

7. Conclusion:-
From the conducted study we can easily know from Volume counts and existing condition, therefore, need to improve the transport facilities.so improve the Non-Motorized Transport System and design, Reduced crash rates, Reduced severity of injuries (due to slower speeds), Reduced costs (compared to traffic signals, which require electrical power),Reduced liability by transportation agencies (there are no signals to fail),increase the fast operating of Traffic at intersection, save fuel and save environment, decrease noise pollution.

REFERENCES

[1]IRC: 11-1962 for cycle track design [2]IRC:-103-1988 for pedestrians [3]Traffic Engineering and Transport Planning by Dr L.R.Kadiyali [4]Mehsana Nagar Palika,Mehsana [5]Niels Jensen, Copenhagen Traffic Department