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A study on necessity of Fly-Over Bridge:

A Case Study of Rajkot-Morbi Road

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Abstract

Railway Crossing No: 119 is situated on Rajkot - Morbi Road, about 1 km from Octroi Naka. This road is directly connected to Morbi, Kutch, Radhanpur, Mehasana and Rajasthan with a daily traffic movement of more than 10000 vehicles. The railway crossing provided at this place closes for 49 times for an average period of 8 minutes, resulting in a heavy traffic jam, which takes normally 20 to 35 minutes to get cleared. This ensures a definite production of air and noise pollution and unnecessary waste of fuel, resulting in loss of national resources. In this paper, study on 'Requirement of Fly-Over over Railway Crossing No.119 is done to reach the solution of the problem.

Keywords: Fly-Over, National Standard Growth Rate, Passenger Car Unit (PCU), Railway Crossing, Topographic survey, Traffic forecasting

1. Introduction

Today the boundaries of urban development are getting wider day by day. To control the traffic and transportation of the rural street require a well-designed over bridge to provide better transportation.

This project is based on some problem. This railway crossing is on Morbi road connecting to Morbi city. To solve the problem of transportation with increased population resulting in traffic problem, since last 5 year terribly increasing traffic problem proves requirement of a rail bridge. This road is single lane. Breadth of Morbi road is 30 feet so traffic problems are created.

1.1 Problem definition

1. The survey location is 3 km. away from Rajkot boundary on Morbi highway. On Rajkot to Morbi highway on the railway gate no 119 is located. This railway Gate is close 49 times in per day. During this time very much traffic is produced. 23750 vehicles passed from there per day. The traffic problem is creating because industries are developed and his carries vehicles are passing when railway crossing is close therefore traffic is to long. Then traffic problem were solving to use a over bridge.

2. This road is only one way to reach in Rajkot from Kachchh, Banaskhatha, and Morbi district. This road is single lane. This road is connected Rajkot to Banaskattha, Kachchhand Morbi etc. district. This is only one road which is connected to Morbi, Banaskattha, Mundra port and Kachchh from Rajkot. Many people daily travel from Rajkot to Morbi. So many education institutes are connected with this road.

3. The breadth of Morbi road is 30 feet so traffic problem are created. Births of Morbi road is very short .so traffic are created between 7 to10 a.m. and 6 to 9 p.m. till up more traffic. 9 to 12 p.m. and 10 to 2 a.m. then traffic is general. The 2 to 5 p.m. and 1 to 5 a.m. traffic is less during this timing. The heavy traffics made minor and major accident on this way.

2. Traffic Survey and Analysis

This project includes the survey of railway junction which includes. Traffic survey and analysis, topography survey, traffic forecasting, Type of road junctions and their suitability, selection of suitable junction, preparing drawings etc. It is purely academic in nature though attempts have been made to incorporate factual data available from government agencies, Journals, books and other sources. The analysis is concluded with the identification of peak hour traffic in Vehicles per hour and also in PCUs per hour.

2.1 Traffic survey schedule

Traffic survey locations were selected after detailed reconnaissance survey.

Table 1: Traffic Survey Schedule

Sr. no.	Type of traffic survey	Location of survey	Duration of survey	Time and date of survey
1	Railway crossing section volume count	At west end of railway crossing	5 normal days	24 hours on 21-09-2011 to 25-09-2011

The locations for the various surveys were so selected that all vehicles can be viewed and intercepted easily without endangering the safety. The survey data were recorded in specifically prepared formats for each type of survey. All the above traffic surveys were carried out as per the same schedule format.

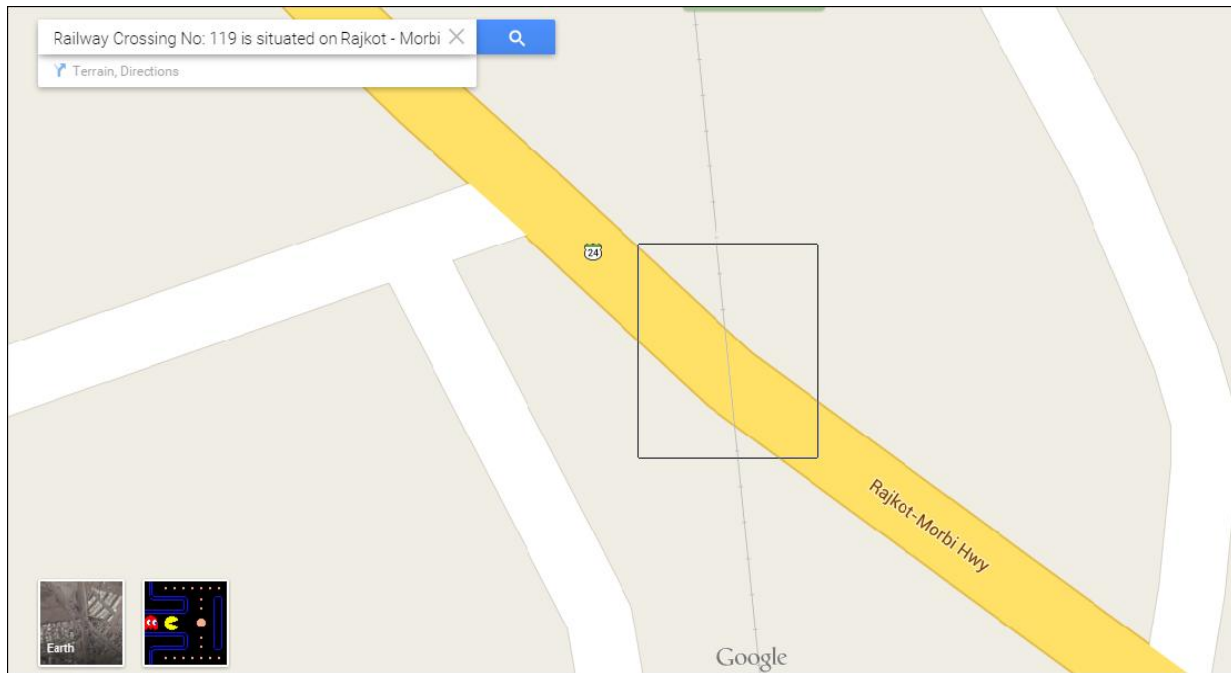


Fig.1 Survey Location

2.2 PCU Equivalentents

In order to convert recorded vehicles into a common scale, the passenger car units (PCU) equivalent factor as per IRC: 64-1990 has adopted. The equivalentents factor adopted for this study as over.

Table 2. PCU Values of Fast moving Vehicles

Sr. No.	Vehicle Type	PCU Value For Urban Area as per IRC;64-1990
1	Cars/jeeps/vans/3 wheelers	1.0
2	2 wheelers	0.5
3	LCV/mini bus	1.5
4	Bus	3.0
5	Two axel truck/Tanker	3.0
6	Multi axel truck/Trailer	4.5
7	Agriculture tractor with trailer	4.5
8	HCM/EME	8.0

2.3 Traffic demand forecasting

2.3.1 Project life:

For evaluating the benefits as well as costs incurred by the project, it is obvious that a certain period has to be considered for the overall project life, though project once implemented has a long life. If a proper maintenance is carried out time to time, the project will continue to benefit the society even after the expiry of the project life. For the present project, a period of 100 years is considered.

2.3.2 Traffic projection:

Traffic volume in annual form has been projected up to project life of 100 years based on national standard growth rate. This has been used for deriving optimum requirement of project railway crossing bridge.

2.3.3 Traffic Growth Rate And Forecasting:

The proposed railway crossing has to be utilized by the future traffic. Therefore it is a necessary it qualify the requirement of the propose improvement in order to meet the future traffic. At the same time, the traffic projection requires serious thought in order to have realistic and authentic growth of traffic.

Traffic forecasting is an approximation, which depends on verity of factors. Forecast of traffic therefore has to be depending on various factors such as population, gross domestic projects, vehicle ownership, and agriculture output, Fuel consumption etc. Projected Traffic in 2021 will be 23063.67 pcu on the basis of Historical traffic counts. Though future pattern of change in these factors can be estimated with only a limited degree of accuracy, Utmost care has been taken for the same. Some of the significant parameters are as follow.

2.3.4 Traffic Volume Count on Railway Crossing:

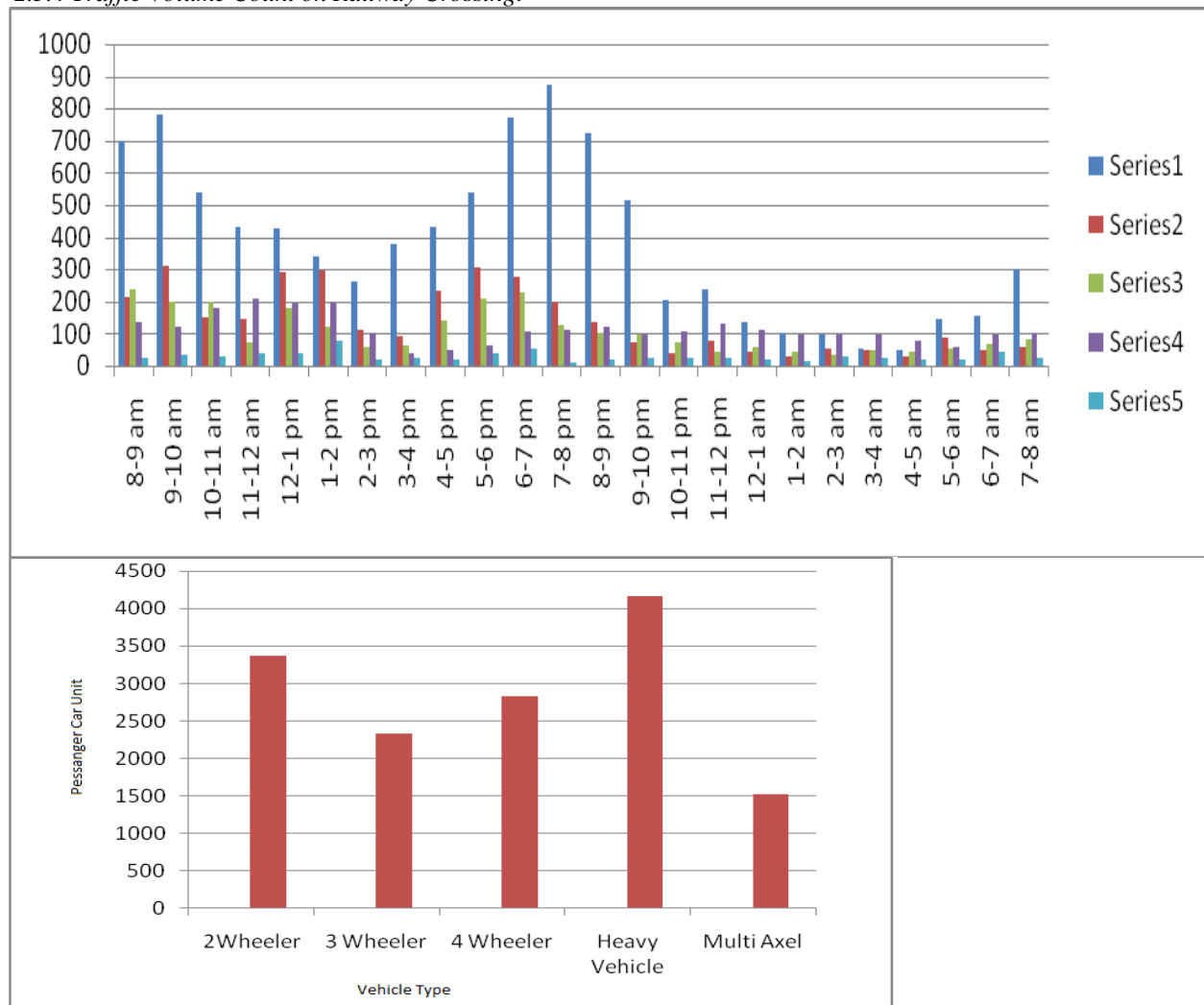


Fig.2 Traffic Volume Count dated 21-9-2011

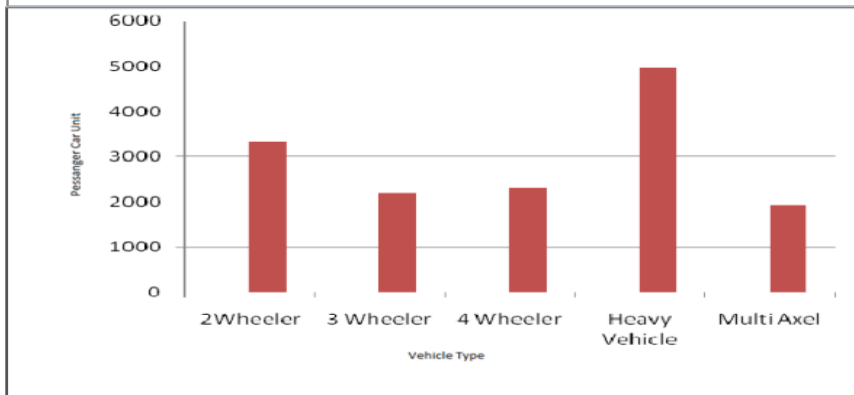
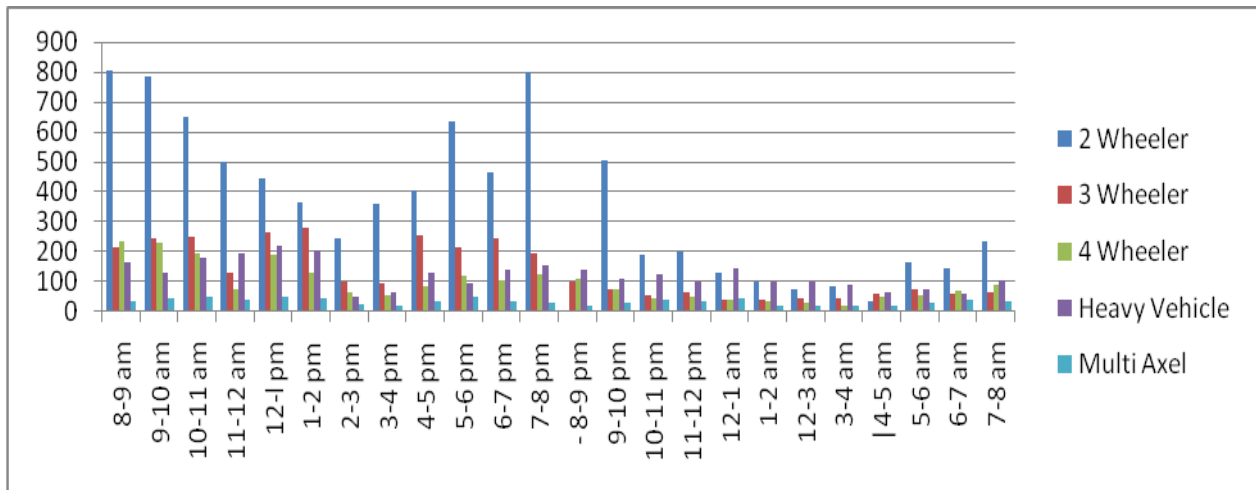


Fig.3 Traffic Volume Count dated 22-9-2011

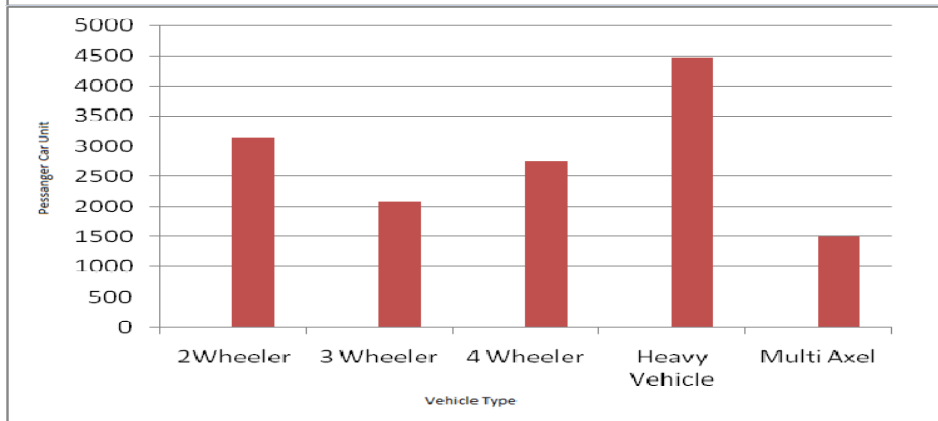
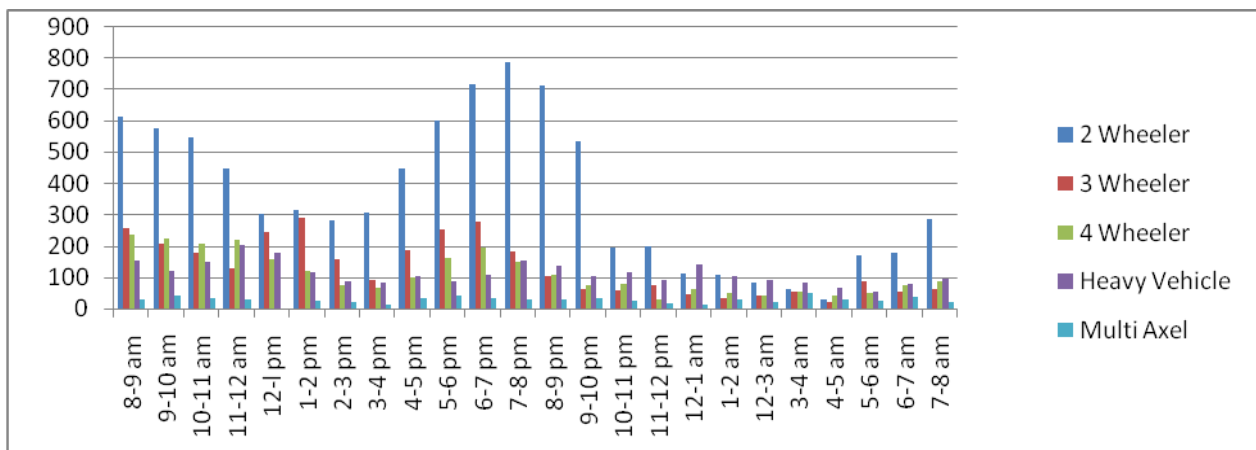


Fig.4 Traffic Volume Count dated 23-9-2011

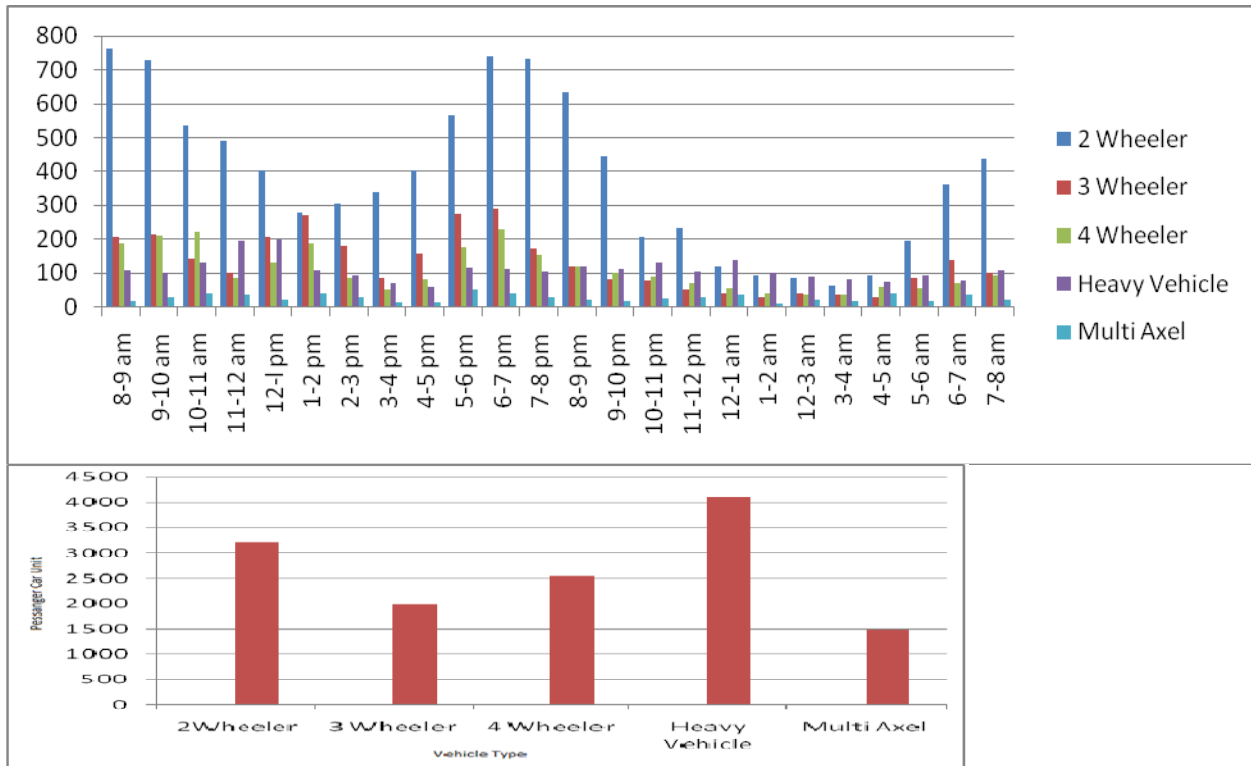


Fig.5 Traffic Volume Count dated 24- 9 – 2011

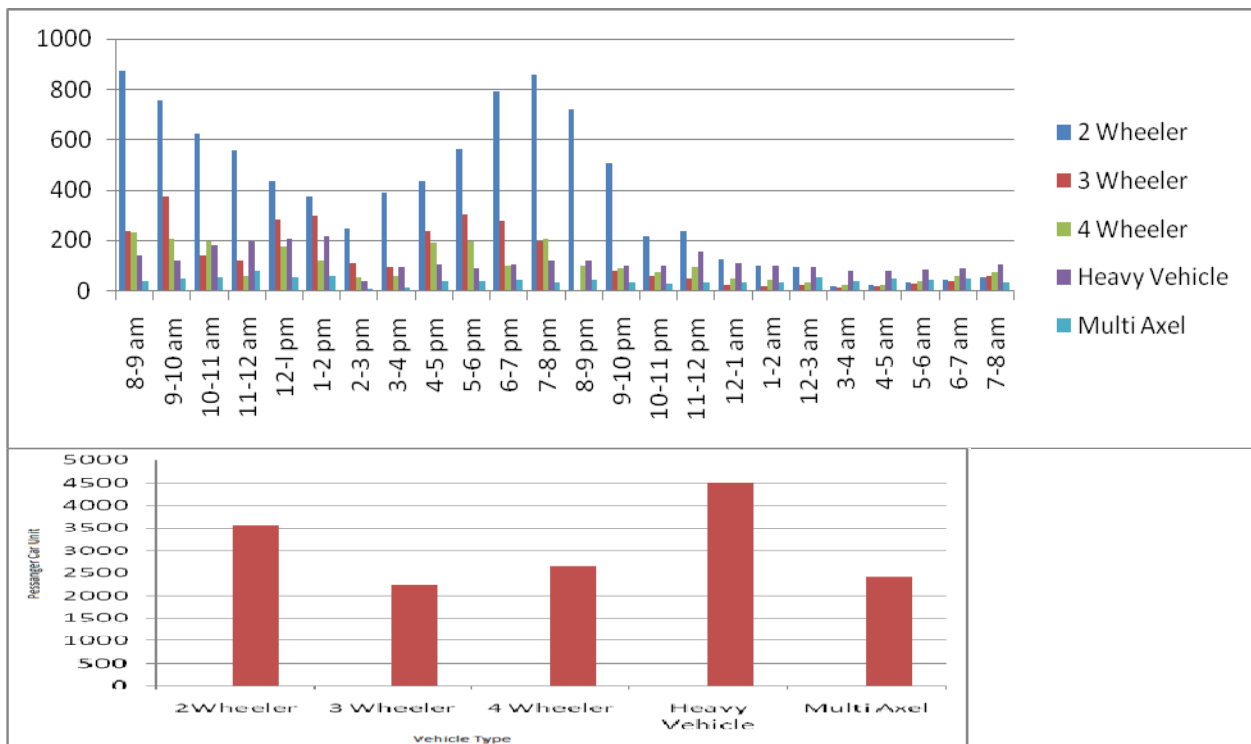


Fig.6 Traffic Volume Count dated 25-9-2011

2.3.5 Heavy traffic in peak period:-

Traffic survey was carried out for the period of 24 hours for 5 day. Based on the traffic survey carried out following analysis is done. Traffic passing in one - week something 100000 vehicles. And then we are analyzing heavy traffic in pick period. Peak hours taken to find out heavy traffic: 8am to 1pm in morning and 4pm to 10pm in evening.

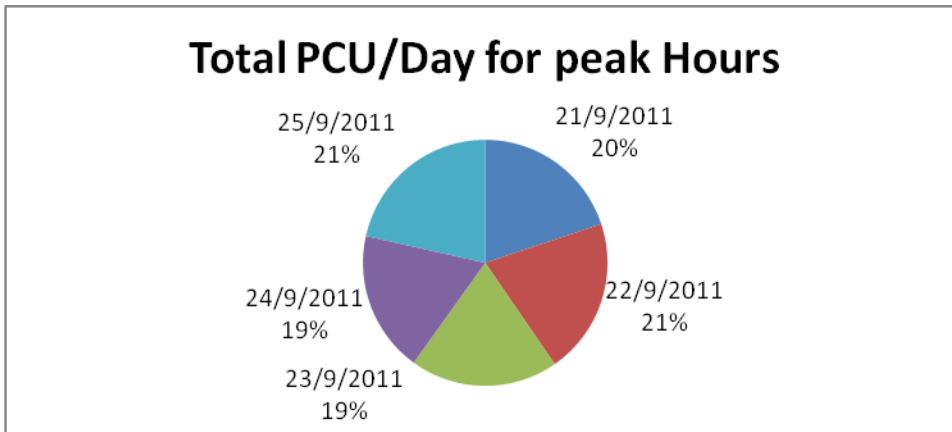


Fig.7 Total PCU/Day for Peak Hours

Conclusion:

- Traffic analysis is done in this project. The traffic analysis is done for the traffic passing through out in railway crossing and its calculation is useful in structure design for over bridge on railway crossing.
- As per IRC 090-2010, "Intersection traffic volumes nearing 10,000 PCU usually result in very inefficient and hazardous traffic conditions and it is at this level of traffic that provision of flyovers generally becomes necessary." In this project daily pcu is more than 10000, So, Fly over is the perfect solution to overcome the traffic conflicts.
- Estimated maximum Vehicle nos passing through Railway Crossing 119 is 18707 (Including 2 wheeler, 3 wheeler, 4 wheeler, Heavy vehicle and Multi axle)

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Annexure:

24 Hour PCU count for 5 Days					
Dates	21/9/2011	22/9/2011	23/9/2011	24/9/2011	25/9/2011
Total PCU	21777	22481.5	21354.5	21479.5	23559