

Study of Pedestrian Safety and Accident Analysis on Chennai City

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Abstract--Each year, more than 270 000 pedestrians lose their lives on the roads. Globally, pedestrians constitute 22% of all road traffic fatalities, and in some countries this proportion is as high as two thirds of all road traffic deaths. Millions of pedestrians are non-fatally injured – some of whom are left with permanent disabilities. These incidents cause much suffering and grief as well as economic hardship. The capacity to respond to pedestrian safety is an important component of efforts to prevent road traffic injuries. Pedestrian collisions, like other road traffic crashes, should not be accepted as inevitable because they are both predictable and preventable. Aims to analysis the pedestrian safety at Thiruvanmiyur to sriuseri –sipcot for a stretch of 22km, OMR, Chennai through accident analysis. The data such as severity ,location, date & time of accident and type of vehicle involved in the accident were collected and analyzed and proper safety measure is suggested .The key risks to pedestrians were well documented and they included issues related to a broad range of factors like driver behavior particularly in terms of speeding and infrastructure in terms of a lack of dedicated facilities for pedestrians such as sidewalks, raised crosswalks the accident analysis is carried out in order to determine the cause of an accident or series of accidents so as to prevent further incidents of a similar kind.

Keywords- Pedestrian collisions, Road traffic injuries, Accident analysis, Pedestrian safety

I. INTRODUCTION

A. General

India has one of the largest highway and road networks on the planet, second only to the road network of the United States. The total length of the road in India exceeds 3.01 million kilometers. The road network consist of 34,608 km of national highways 128,622 km of state highways, an informal network running to an as rounding 2.737,080 km. Road traffic accident is complicated to analyze as it crosses the boundaries of engineering, geography and human behavior. The total length of Chennai road is 2847km and the study area OMR road occupies the 15% of national road length. The accident situation is more serious here because of rapid growth of motor vehicles in the past few year. The inadequacy road infrastructure and street to cope up with this traffic, necessitating search for methods or alternatives that ensure efficient, safe, feasible and faster means of Transport. The number of accidents occurring on OMR, NH49A was found to be increasing constantly at higher rate compared to the total number of accidents occurred on the other roads.

B. Description of Study Area

Old Mahabalipuram Road (OMR) is a major road in suburban; Chennai beginning at the Madhya Kailash in Adyar and continuing south till Mahabalipuram ultimately merging with the East Coast Road. This is popularly called as the 'IT Corridor' because this stretch has become home to many IT/ITES companies. The study area is 22 km stretch (Thiruvanmiyur Bus Depot to siruseri at NH-49 Rajivi Gandhi Salai (OMR ROAD)).

Latitude:12.879017(to)12.473197

Longitude:80.080295(to)79.855998

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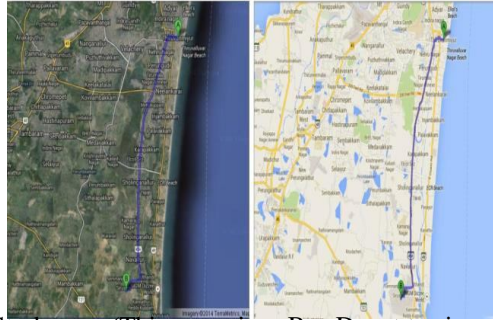


Figure 1.1 Study area (Thiruvananthapuram Bus Depot to Siruseri toll plaza)

C. Scope for Study

The purpose of study is pedestrian safety & accident analysis on OMR road in NH49 A over a particular stretch from Thiruvananthapuram Bus Depot to Siruseri toll plaza (22 km) and to find the major reasons for accidents and the remedial measures and suggestion are given based on Arc GIS 9.3 Analysis.

D. Geographic Information System (GIS)

A Geographic information system (GIS) is a system designed to capture, store, analyze, manage, and present all types of geographical data. The GIS is sometimes used for Geographic information science geospatial information studies to refer to the academic discipline career of working with Geographic information system. In the simplest terms, GIS is the merging of cartography, statistical analysis, and database technology.

E. Aim

To Study the Pedestrian Safety and to Analysis the Road Accident analysis on OMR Road

F. Objective

- To find out the causes of accident at OMR road
- To suggest necessary preventive measure
- To identify the black spots on OMR from the accident record

II. LITERATURE REVIEW

A. General

In 2014, the Tamilnadu (State) police give researchers permission to carry out a traffic accident research project on a section of OMR road between Thiruvananthapuram Bus Depot to Siruseri toll plaza (22 km) with the help of the Chennai city police, the project involved collecting in depth accident data on accidents occurring in the period starting from 1 year and practical implications. Various studies have been carried out considering different aspects of Pedestrian safety & accident analysis. The following describes some of the most appropriate references:

Toshiyuki Asai (2002) aim of this paper is to various issues involved in pedestrian protection testing methods are steadily being resolved through discussions at international conferences concerning pedestrian biomechanics and dummies with human like features. This paper describes the pedestrian protection technologies incorporated in the Nissan ASV advanced safety vehicle and their effectiveness.

William J. Horreyb, RuifengYuc (2002) aim of this paper is to presents a survey investigating the effects of age, gender and conformity tendency on Chinese pedestrians' intention to cross the road in potentially dangerous situations. The results have a number of theoretical and practical implications. In particular, interventions should focus on perceptions of risk that inform road users that crossing with other pedestrians against the signal is also unsafe and prohibited, and may lead to negative outcomes. All, respondents reported that they would be much more likely to cross the road when some other pedestrians crossed.

III. METHODOLOGY

Accident intimation for this study, an accident intimation network was established between researches and all the police station and highway patrol's located in the study area. OMR road between Thiruvananthapuram Bus Depot to Siruseri toll plaza (22 km). With the

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help of the Chennai city police, with respect to the road infrastructure and surrounding environment. Infrastructure assessment involves recording the road infrastructure and surrounding environment details such as road type, surface condition, road quality, flow of traffic, presence of a divider or median, junction type, weather, lighting, etc.

A. Steps Involved

The methodology details collection of data and analysis are made, aim to identified and finding pedestrian safety & accident analysis on OMR road in Chennai. The detailed methodology can be explained as follows

- Reconnaissance survey
- Data collection
- Data analysis
- Interpretations

IV. RESEARCH METHODOLOGY

In order to determine the accident prone locations in Kanchipuram district, following data were collected and used. Police stations obtained from the office of Superintendent of police, Guindy. Accident reports for the years 2010, 2011, 2012 and 2013. Also the stimulation for the data has been done using SPSS software.

V. RESEARCH ANALYSIS

A. Collected Data

The accident details of National Highway (NH49A) for the Chennai city in the year of 2010, 2011, 2012 and 2013 are collected from the commissioner of Police Department, Guindy. The collected Hard Copy details are attached in the following pages.

The Details of collected data,

- Name of the place of accident Police station limit
- Classification of people killed
- Travellers (under section 279)
- Riders(under section 337)
- Pedestrian(under section 304 (A))
- Type of vehicle collided
- Reasons for the accidents.

B. According To Number of Accident in Theyear (2010 To 2013)

The number of accidents occurring on NH49A was found to be increasing constantly at higher rate compared to the total number of accidents occurred on the other roads in the district. The percentage was found to 23% in 2010, 28% in 2011, 30.2% in 2012, 34% in 2013

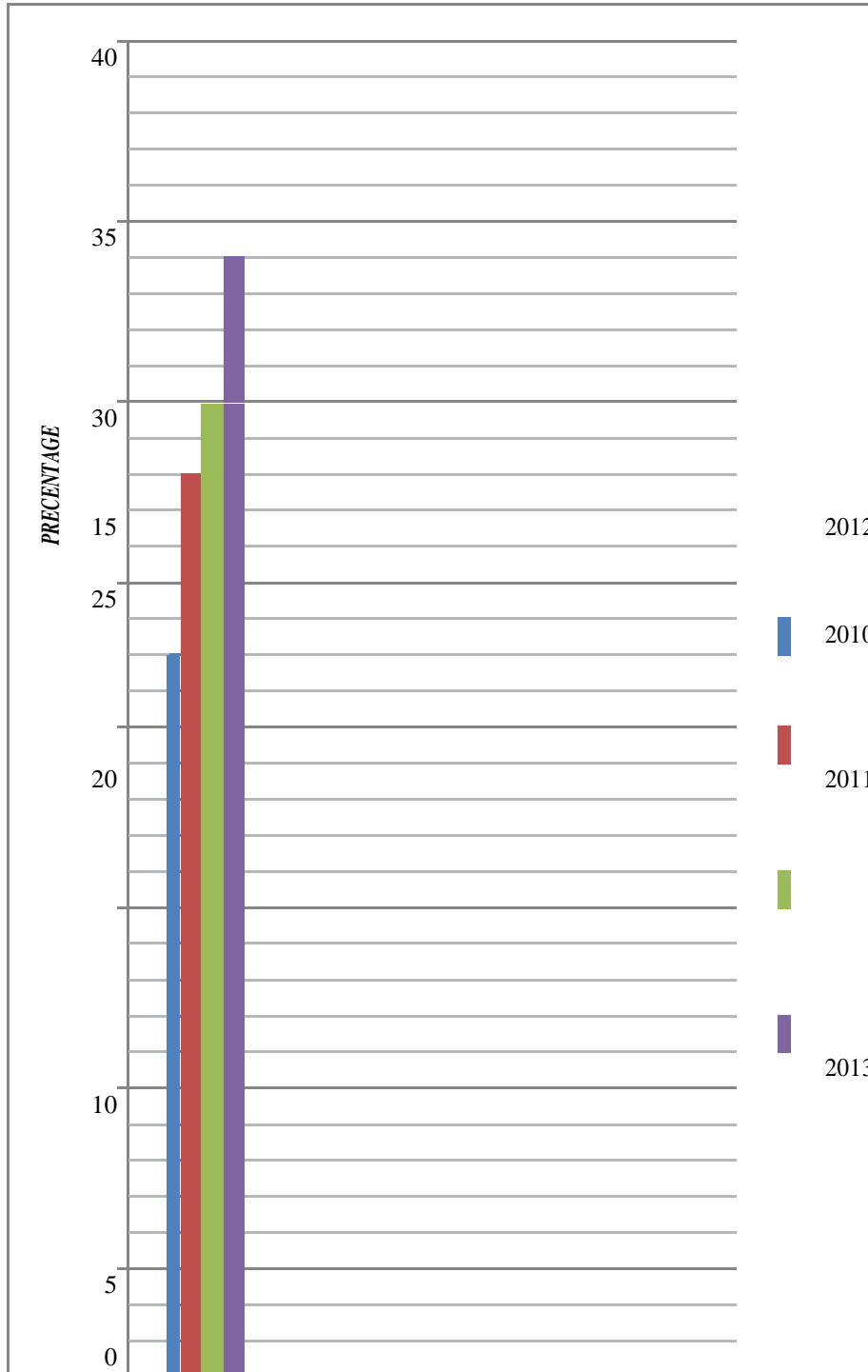
Table.4.1 No of Accident in the Year (2010 to 2013)

S.NO	Name of the road	Year of accident	Total no. of accident	Fatal accidents	Grievous injury	Minor accidents	Non-Injury
1	OMR road(RG Salai)	2010	189	54	83	37	15
2	OMR road(RG Salai)	2011	219	75	91	36	17
3	OMR road(RG Salai)	2012	237	97	139	51	30

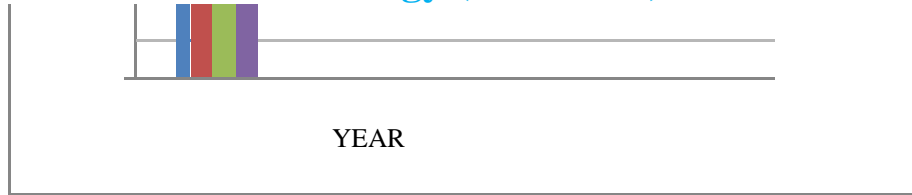
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4	OMR road(RG Salai)	2013	271	95	108	42	26
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Figure 4.1 Percentage of Accident in Year (2010 To 2013)



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The present study of pedestrian safety & accident analysis will be highly helpful in charting out frame work for highways and police patrol for planning, preventive and remedial measures and to increase their awareness of pedestrian safety & accident analysis

Table.4.2 COMPARING OF OTHER ROAD CAUSES ACCIDENT ZONE

S.No	Name of the road	Total no. Of accident	Fatal accidents	Grievous injury	Minor accidents	Non-Injury
1	J Nehru road	129	56	76	41	22
2	Anna Salai	111	42	41	30	2
3	Vela cherry	72	34	30	3	3
4	OMR road(RG Salai)	271	97	139	51	30
5	ECR	58	17	9	5	4
	Total	641	200	280	130	60

Total of the accidents 641-30.2% fatal injuries -41.6%grievous injuries- OMR ROAD (RG Salai) road is the most accident zone

Table.4.3.Monthly Distribution of Accident

S.NO	MONTHS	No.of ACCIDENT
1	January	63
2	February	62
3	March	65
4	April	64
5	May	74
6	June	78
7	July	58
8	August	47

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9	September	60
10	October	48
11	November	48
12	December	52

Table 4.3 No of accident monthly distribution show on bar chart MAX. No Of Accident Months Is June

C. Accident Data Analysis

Figure 4.3 shows the type and number of road users involved in the 271 accident investigated. Car\jeep\van form the majority vehicle type.

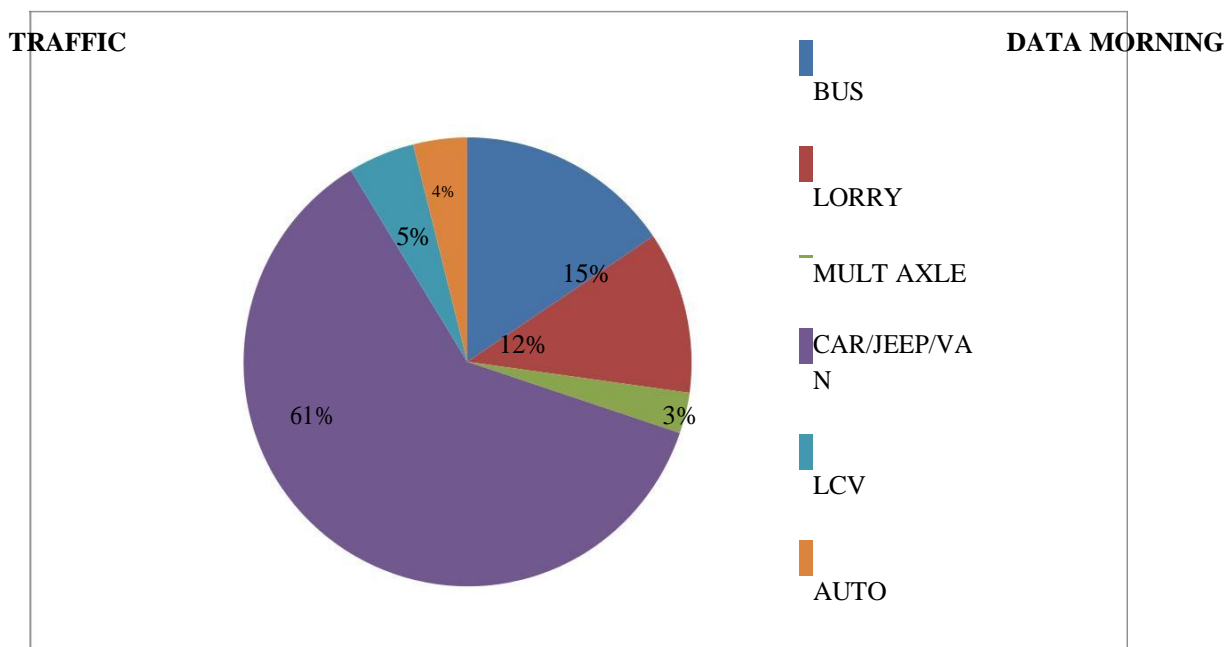


Figure4.3 ACCIDENT DITRIBUTION BY ROAD USER TYPE

OMR Road (RG Salai) Morning Peak Hour9.00 am TO 10.00 am

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Figure 4.4 shows the type and number of road users involved in the 271 accident investigated. Car\jeep\van form the majority vehicle type 32%.

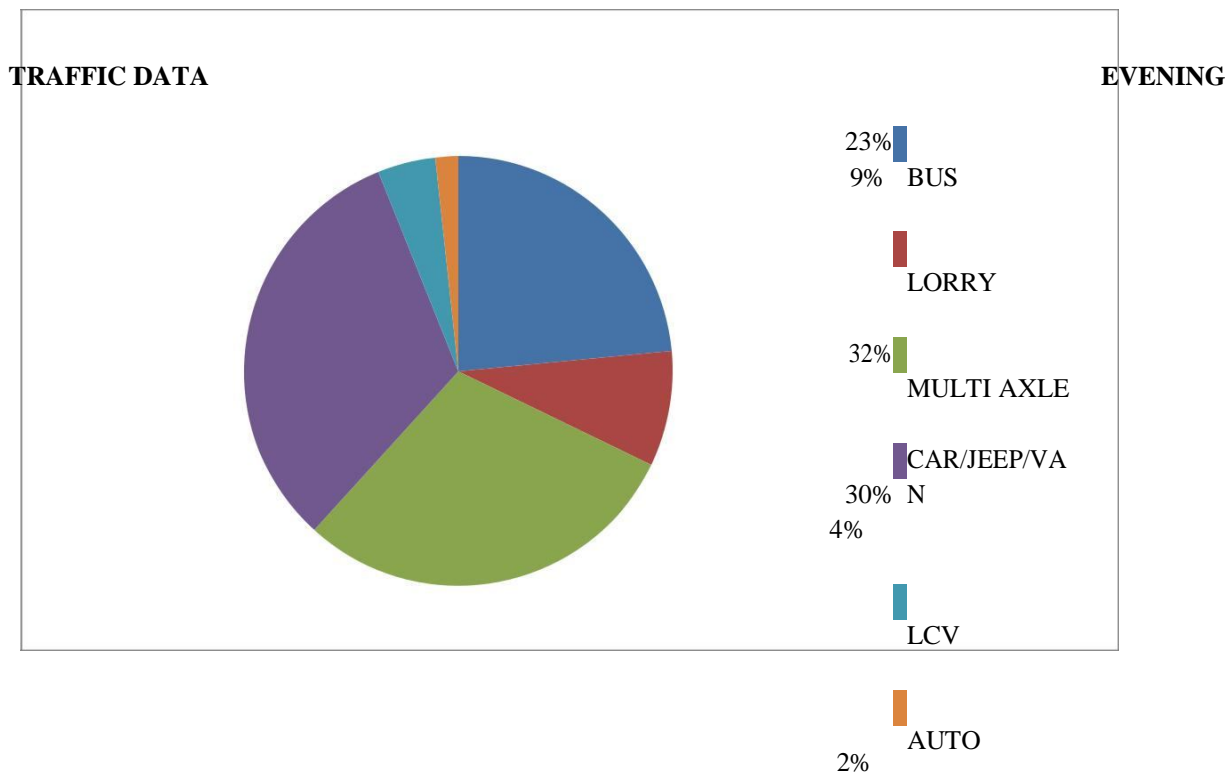


Figure.4.4 ACCIDENT DISTRIBUTION BY ROAD USER TYPE

OMR Road (RG Salai) Evening Peak Hour 5.00 AM TO 6.00 AM

From above chart we can find out that 9.00 A .m. to 10.00A.m. accident rate is more and 5.00p.m to 6.00p.m is also quite equal to it.

Table .4.4 .The Vehicle Type

S.NO	YEAR	HEAVY VEHICLES	MEDIUM VEHICLES	LIGHT VEHICLES	UNKNOWN VEHICLES
1	2010	34	72	48	3
2	2011	42	68	63	9
3	2012	52	81	62	7
4	2013	68	87	74	12
	TOTAL	196	338	247	34

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HEAVY VEHICLES- Truck, bus and tractor MEDIUM VEHICLES- car, jeep, van, taxi.
 LIGHT VEHICLES-motorcycle, scooter, cycle

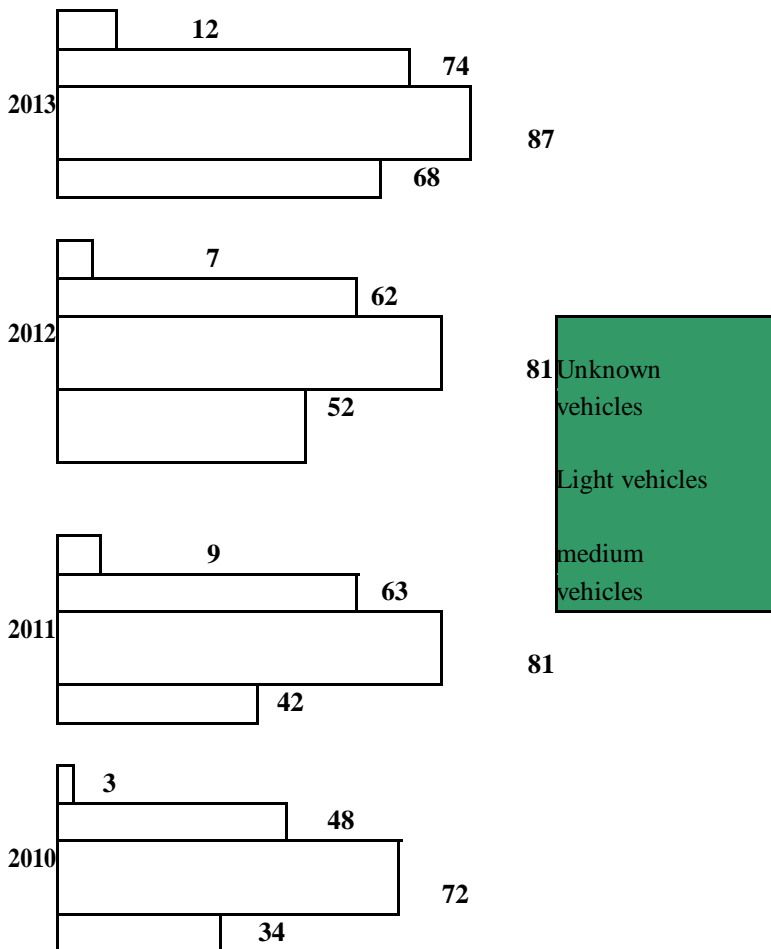


Figure 4.5 Accidents Rate According To the Vehicle Type

From above chart we can find out that most accidents are occurred by medium vehicles (Car, Jeep, Van, taxi)

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Fig. 4.6 Accidental areas map

According to the data collected most of the accidents are occurs in a particular place like Perungudi , Palavakkam , Shollinganallur Junction, this are some of the palaces where accidents are mostly occurs.

VI. RESULTS AND DISCUSSIONS

By physical observation made, it was found that the sholinganallur junction needed more space to turn vehicles at that junction. There is no platform or foot path near Semmancherry police station, There is a need of traffic signal along with guides for crossing the streets. Road condition is not good at Navallur road .Poor street light condition around 10 km near Sathyabama University. On OMR road opposite Infosys have more Stray animal crossing at road sholinganallur junction.

A. Remedial Measures In Each Location And Increase Pedestrian Safety

Where pedestrian traffic is very heavy at inter section separate pedestrian phases should be provided at signals on karapakkam bus stop.

If one way streets on Navallur Street are being planned as part of traffic management an incidental advantages is the reduction In the accident rate.

Near sholinganallur junction have more companies, Colleges & schools need special patrol or guides for crossing the streets provided traffic signals at that area.

Near sathyabama university road to Installation of speed barriers in both directions to reduce the speed of vehicles to 40kmph

VII. CONCLUSION

The number of accidents occurring on NH49A was found to be increasing constantly at higher rate compared to the total number of accidents occurred on the other roads in the district. The percentage was found to 23% IN 2010, 28% in 2011, 30.2% in 2012, 34% in 2013. The present study of pedestrian safety & accident analysis will be highly helpful in charting out frame work for highways and police patrol for planning, preventive and remedial measures and to increase their awareness of pedestrian safety & accident analysis.

A. Remedial Measures on OMR Road

Zebra crossing should be marked well.

Removal of petty shops and fruit vendors from the road corner.

Restriction of heavy moving vehicles during the peak hours.

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