iJRASET
International Journal For Research in Applied Science and Engineering Technology

INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Volume: 5 **Issue:** IX **Month of publication:** September 2017

DOI: http://doi.org/10.22214/ijraset.2017.9035

www.ijraset.com

Call: 08813907089 | E-mail ID: ijraset@gmail.com

International Journal for Research in Applied Science & Engineering Technology (IJRASET)
ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor:6.887
Volume 5 Issue IX, September 2017- Available at www.ijraset.com

Identification of Accident Black Spots on Puttur to Ramagiri Road and Remedial Road Engineering & Traffic Calming Measures

K. Chandrasekhar Reddy[1]
[1,] *Professor of Civil Engineering and Principal, Siddharth Institute of Engineering & Technology, Puttur, AP, India.*

Abstract: ***An accident or mishap is an unforeseen, unplanned, unexpected and undesirable event, particularly one leading to harm or hurt and even death from time to time. Several victims feel that the accident is owing to his unwell fate. Just a couple can feel that life is meant to measure well and to not expect disasters, melancholy or unexpected losses. This study mainly deals with the identification of black spots (high risk accident locations accident-prone locations) on Puttur to Ramagiri major road and suggesting its preventive measures. The road is within the state of Andhra Pradesh in India. Accident data for a period of five consecutive years were collected from the concerned police stations. Accident data consists of time of incidence, kind of collision, type of vehicles, persons died, persons injured. Using the data ten black spots was identified. At all ten spots engineering surveys were conducted to know the road characteristics like width of the road, alignment of the road, number of aspect roads and traffic volume. After analyzing accident data and road characteristics various preventive measure were suggested.***

Key words: Accident data, Accident analysis, Black spots identification, Engineering surveys, remedial measures.

I. INTRODUCTION

A road may be a thoroughfare, route, or way on land between two places that has been made-up or otherwise improved to permit travel by foot or some form of conveyance, including a motor vehicle, cart, bicycle, etc. Roads that are available for use by the general public may be referred to as parkways, avenues, freeways, interstates, highways, or primary, secondary, and tertiary local roads. The Road work in India has street system of 3.3 million km consisting of National Highway (NH), State Highway (SH), Major District Roads (MDR), Other District Roads (ODR) and Village Roads (VR).

The street arrange in India is the second biggest on the earth and traverses more than 300,000 km. the foremost essential roadways interfacing states the nation over are the National Highways that are created and well-kept up by the administration of India. Although National Thruways represent somewhat over 2% of the street network, it's evaluated that they bear 40% of the street movement within the nation.

A. Reasons for the occurrence of road accidents

The probability of accidents taking place is influenced by several factors -the basic structure of the roads, vehicle characteristics, conditions of pavements, negligence of road safety rules, fast and drunken driving and weather conditions. Each of these factors contributes its own share within the occurrence of road accidents.

Road accidents could happen between vehicles, a vehicle and the pedestrian or a vehicle and immovable object like trees, unmarked bumpers on the road, or parked vehicles. The most important cause of accidents is the condition of roads and improper street lights and invisible instruction on sign boards and signal boards on either side of the road, etc. It's common that if the road is used for longtime it will be damaged and become dangerous to drive on, due to not paying more attention on the maintenance of the roads. More over the psychological condition of the drivers is not properly examined in a proper way. Overload for drivers, weather condition, improper central traffic control system, etc. play a major role in the happening of accidents. Subject on the Road Rules and Safe Driving in not included in the syllabus for the Primary and High school students is also one of the causes.

Due to the immense increase in number of vehicles on the road, drunken driving, and narrow and congested roads, physical condition of the vehicle, fast driving, not wearing helmets and seat belts, wearing ear phones and so on so forth and other factors cause's mishaps on the roads. It is time the central and State governments took some measures to prevent or at least reduce the accidents being taking place on the roads

One ought to be extremely watchful and fastidious in making one's life important and agreeable. However, the majority of the general population are confronting untimely and shocking passings in street incidents. Particularly the young are losing their

expensive lives in their middle of lives as a result of careless driving. It is pitiable to take a gander at the reports of mischances and occurrences being happened on everyday basis on the roads. So ample opportunity has already past to think about and take a considerable measure on the most proficient method to keep the street mishaps stopped altogether to spare the lives and protect the property as well.

The probability of a mischance occurring is influenced various components like roadway geometric attributes, ill-condition of the moving vehicles, neglecting road rules and safety measures, bad condition and improper maintenance of the roads, lack of road signals and instructions, drunken driving, fast driving and climate conditions each of these variables contribute its own offer towards occurrence of mishaps. The mishap happened could bring about numerous wounds or harm to the property. Driver's hindrance and vehicle outline which can cause genuine and most risky sorts of mishaps. Above all the road rule breakers are not punished appropriately that is the rules are not enforced strictly.

The issue is fundamentally little which is to be dealt with deliberately by the administration; they have taken many measures to stop these tremendous mishaps, but not fertile. Though the people are taking care of their vehicle's condition, following the road rules and safe driving yet accidents are taking place why the answer is yet to evolve. At whatever point a road\street mishap happens there are different sorts of harm which happens which could be as individuals which is likewise a casualty, foundation which is harm to the legislature and other organization harms which happens amid mischance. There is substantial cost to every above sort of harms which must be paid amid mischance which increment the entanglement if consistently there will several mishaps the nation over which would specifically influence the economy of the nation, for example, UAE.

There is a cost which must be paid by the casualty's family which causes incredible issue monetarily; the property is harmed because of the mischance which likewise influences government fiscally by implication. There is additionally some organization cost which will experience because of the mischance. In the USA if anyone causes accidents on the road by reckless driving, ignoring the road\traffic signals and sign boards the Police official catch him or her and a ticket will be issued if the same driver\person continues the same his\her license will be seized.

B. Accident black spot

An accident black spot is a place where there are frequent occurrence of road traffic accidents due to a variety of reasons, such as a sharp drop or corner in a straight road, so oncoming traffic is concealed, a hidden junction on a fast road, absence of traffic lights, poor or concealed warning signs at a cross-roads, high speed merging traffic and other factors.

II. LITERATURE REVIEW

Shenjun, YAO., and Becky, P. Y. LOO. (2012) used hot zone methodology to identify dangerous road locations for pedestrians in Kwun Tong District of Hong Kong.

Two types of negative binomial regression models developed to determine the threshold values. Both the base-model and full-model pedestrian hot zones are addressing road safety problems.

R.R.Sorate et al.(2015) identified Accident Black Spots on National Highway 4 (New Katraj Tunnel to Chandani Chowk). Method of Ranking, Accident Density Method and Weighted Severity Index Method used in the analysis. Locations appearing in all the three methods were termed as black spots. Corrective measures were also suggested.

Vivek and Rakesh Saini (2015) identified accident black spots on N.H.- 3 District Una, Himachal Pradesh using Weighted Severity Index (WSI) method to rank the accident locations and selected top five spots as black spots as per the WSI value and suggested some possible alternative measures to improve the transportation system.

Pranav Dholiya and Praful Shinkar(2016) identified accident-prone stretches in urban area a case study of Rajkot city using Accident Severity Index(ASI) method the top most three accident prone stretches are identified.

Shah Dhruvit and Shah Pranay M.(2016) carried road out on accident analysis and identified the black spot location on State Highway-5 (Halol-Godhra Section), 2 years (2013 and 2014) of accident data used for analysis. They suggested improvements at the location.

Mahmoudreza Keymanesh et al. (2017) attempted to identify and prioritize the accident- prone points (black spots) in "Iraanshahr-Sarbaaz-Chabahar" road located in Baluchistan, Iran, without use of accident data.

Potentially hazardous locations were identified and some questionnaires were prepared and the collected data were analyzed by Analytical Hierarchy Process (AHP) using Expert Choice Software. Finally, these black spots were compared with the black spots that had been obtained by traffic police based on accident data.

III. MATERIALS AND METHODOLOGY USED

A. *Study area*

Puttur to Ramagiri road is a stretch of the road on Tirupati to Chennai via Puttur and Uthukkottai in the state of Andhra Pradesh in India was chosen for the current study. It has a total length of 26.10 km. The study area is shown in Fig.1.

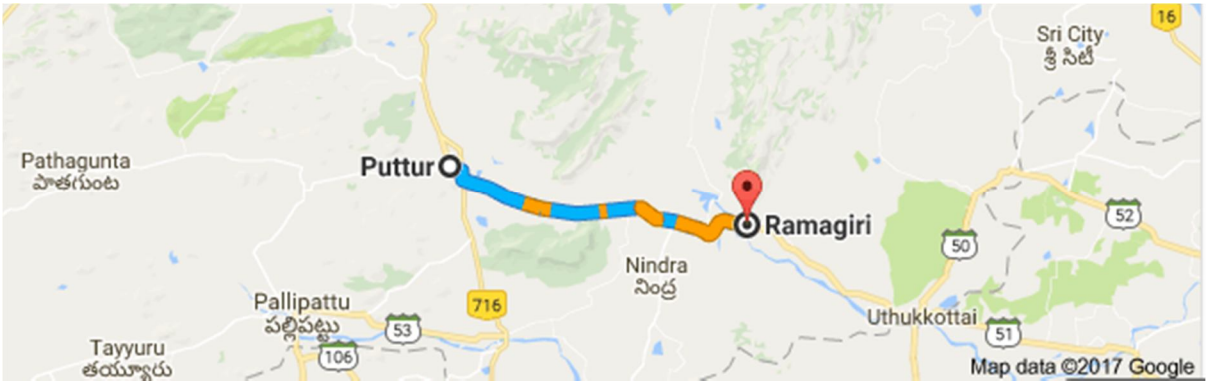


Fig.1 Study Area (Puttur to Ramagiri Road)

B. *Collection of accident data*

The accident data on the Puttur to Ramagiri road were collected from the Puttur, Narayanavanam and Pichatur police stations. The accident data collected for a period of five years from 2010 to 2014. The accident data like date and time of occurrence, place of occurrence, type of vehicle, type of collision, number of accidents, persons injured, persons died.

C. *Engineering Surveys*

After analyzing the accident data ten black spots were identified. At all the ten spots engineering surveys were conducted to know the road characteristics like width of the road, alignment of the road, number of side roads and traffic volume.

IV. ANALYSIS AND RESULTS

The analysis was carried out based on the accident data and engineering surveys. The details of total accidents per year for a study period were shown in Table 1 and the details of Auto Rickshaw, Car/Jeep/Van, Buses, Trucks/Lorry, Other Vehicles, Tractors, Two Wheelers and Non- Motorized vehicles involved in accidents were shown in Table 2. In a day hour wise accident analysis were shown in Table 3. Geometric and Traffic Characteristics Carriage Width, Alignment, No. of side roads and Volume (PCU/hr) of the black spots were shown in Table 4.

Table 1 Details of accidents on Puttur to Ramagiri Road

S.No.	Year	Total Number of Accidents
1	2010	78
2	2011	81
3	2012	80
4	2013	64
5	2014	49
Total		352

Table 2 Vehicular Distribution

Year	Auto Rickshaw	Car/Jeep/ Van	Buses	Trucks/ Lorries	Other Vehicles	Tractors	Two Wheelers	Non-Motorized
2010	36	16	5	21	1	6	10	0
2011	18	23	11	26	1	6	12	3
2012	15	20	6	29	2	9	11	2
2013	14	26	8	27	0	5	15	2
2014	16	9	5	20	0	6	7	1
Total	99	94	35	123	4	32	55	8

Table 3 Accident Distribution by time

S.No	Time	Total No. of Accidents	S.No	Time	Total No. of Accidents
1	0-1	9	13	12-13	12
2	1-2	7	14	13-14	9
3	2-3	8	15	14-15	18
4	3-4	7	16	15-16	24
5	4-5	10	17	16-17	27
6	5-6	12	18	17-18	19
7	6-7	13	19	18-19	15
8	7-8	18	20	19-20	21
9	8-9	16	21	20-21	16
10	9-10	22	22	21-22	17
11	10-11	10	23	22-23	18
12	11-12	10	24	23-24	14

Table 4 Geometric and Traffic Characteristics of the black spots

Black spot number	Name of the Black spot	Carriage width (m)	Alignment	No. of aspect roads	Volume (PCU/hr)
1	Puttur bypass junction	6.8	Straight	4	818.35
2	Narayanavanam junction	6.5	Curve	1	893
3	Samudhayam	6.5	Curve	0	965.52
4	Chittoor Kandriga junction	7.9	Straight	4	1253
5	Nainaru Kandriga	8.5	Curve	3	978.3
6	Palamangalam junction	7.9	Straight	2	965.73
7	Koppedu junction	7.4	Straight	1	997
8	Koppedu Govt. High School junction	6.9	Straight	3	974.29
9	Pichatur Bypass junction	7.5	Curve	2	962.44
10	Ramagiri junction	7	Curve	2	959.2

V. OBSERVATIONS

Based on the data analysis two sorts of observations (a) General and (b) Specific observations were drawn

A. General observations

1) There are 10 vulnerable places that vulnerable to accidents.
2) Most of the road accidents of vehicles coming into a junction from aspect roads.
3) Trucks/Lorries are accountable for most of the accidents.
4) Most of the road accidents occurred during 9-10am and 4-5pm.

B. Specific observations

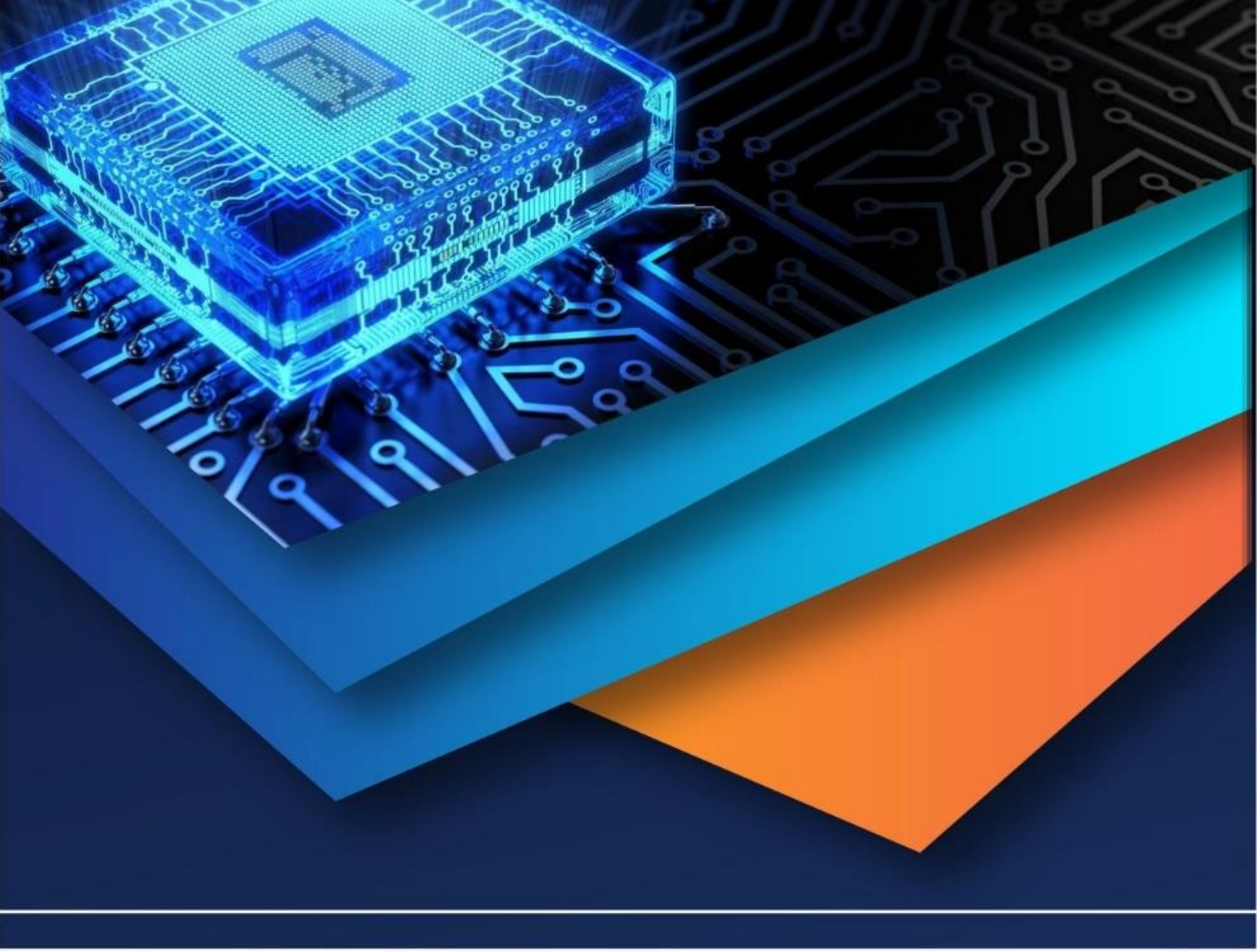
Black spot	Major Accident Causes & Road Deficiency	Remedial Road Engineering & Traffic Calming Measures
Puttur bypass junction	Insufficient sight distances, short entry of aspect roads	Improvement of sight distances, widening of junction, providing correct signs and signals.
Narayanavanam junction	The uncomfortable angle of the intersection arms	Improving the angle of intersection
Samudhayam	Insufficient sight distances	proper road marking, speed breaker on side road
Chittoor Kandriga junction	High traffic volumes on each roads, massive collision space for potential events	Reduction of speed of vehicles on each roads by using traffic signs
Nainaru Kandriga	Improper alignment, sharp curves	Proper alignment, Curve improvement needs to be done i.e. widening to smoother the sharp curves
Palamangalam junction	Insufficient sight distances, short entry of aspect roads	Improvement of sight distances, traffic island, providing correct road signs.
Koppedu junction	The uncomfortable angle of the intersection arms caused an inadequate sight provision	Improving the angle of intersection
Koppedu Govt. High School junction	Improper alignment. little shoulder width	Proper alignment, improving shoulder width, speed breaker on aspect roads
Pichatur Bypass junction	Insufficient sight distances, short entry of aspect roads	Improvement of sight distances, traffic island, providing correct road signs.
Ramagiri junction	sharp curves	widening of the curves

VI. CONCLUSIONS

A. Ten accident hot spots /accident-prone locations were identified.
B. Most of the road accidents of vehicles that are getting into a junction wherever a lot of aspect roads.
C. Vehicles liable for most of the accidents are Trucks/Lorries and followed by Auto Rickshaw and Car/Jeep/Van.
D. Most of the road accidents occurred during 9-10am and 4-5pm; it may be due to peak hour traffic.
E. Vehicles approaching intersections are directed to definite paths with appropriate islands and channels, marking etc.
F. Shoulder width, pavement width, sight distance, signal and pedestrian crossing facilities ought to be improved.

REFERENCES

[1] Guidelines on Traffic Management in Work Zones-IRC:SP:55-2014 Published by Indian Roads Congress (IRC), NewDelhi-110022, January, 2014.
[2] Mahmoudreza Keymanesh, Hasan Ziari, Samira Roudini, and Ali Nasrollahtabar Ahangar (2017) Identification and Prioritization of (Black Spots) without Using Accident Information, Hindawi Modelling and Simulation in Engineering, Vol. 2017, pp 1-9.
[3] Pranav Dholiya and Praful Shinkar(2016), Identification of Accident Prone Stretches in urban Area a Case Study of Rajkot City, IJSRD - International Journal for Scientific Research & Development| Vol. 4, Issue 02, 2016, pp 1722-1725.
[4] Report of the Committee on Road Safety and Traffic Management, Published by The Secretariat for the Committee on Infrastructure, Planning Commission, Government of India, New Delhi - 110 001, www.infrastructure.gov.in. February 2007.
[5] Road Accidents in India - 2015 Government of India, Ministry of Road Transport & Highways, Transport Research Wing, New Delhi, www.morth.nic.in.
[6] R.R.Sorate, R.P. Kulkarni, S.U. Bobade, M.S. Patil, A.M. Talathi, I.Y. Sayyad, S.V.Apte (2015) Identification of Accident Black Spots on National Highway 4(New KatrajTunnel to Chandani Chowk), IOSR Journal of Mechanical and Civil Engineering (IOSR-JMCE) Vol. 12, Issue 3, Ver. I, May - Jun. 2015, PP 61-67.
[7] Shah Dhruvit and Shah Pranay M.(2016), Road Accident Analysis and Identify the black spot location On State Highway-5 (Halol-Godhra Section), International Journal of Engineering Development and Research, Vol. 4, Issue 2, 2016, pp 507-513.
[8] Shenjun, YAO., and Becky, P. Y. LOO. (2012) Identification of Hazardous Road Locations for Pedestrians, Procedia Engineering 45 (2012), Elsevier, pp 815 - 823.
[9] Vivek and Rakesh Saini (2015) Identification and Improvement of Accident Black Spots on N.H.- 3 District Una, Himachal Pradesh – A Case Study, International Journal Of Core Engineering & Management (IJCEM)Vol. 2, Issue 3, June 2015, pp 155-177.



10.22214/IJRASET

45.98

IMPACT FACTOR: 7.129

IMPACT FACTOR: 7.429

INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY