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IDENTIFICATION OF BLACKSPOT REGION ALONG ANANDAPURAM TO ANAKAPALLI STRECH VIA SH-38

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ABSTRACT

Accidents are not normal but they are caused is a common cliché in the area of traffic safety.Thus,if accidents are caused by some, surely the ones responsible for could be identified and appropriate remedial measures developed and implemented to the extent feasible. Analysis of previous data indicates that 67% of the accidents occur due to human error and 32%due to road parameters such as road network of 3.3 million km consisting of National Highway (NH), State Highway (SH), Major District Roads (MDR) and Other District Roads (ODR).This paper lays emphasis on accident studies on the 49.4km long stretch via State Highway-38 section between Anandapuram and Anakapalli, in the state of Andhra Pradesh. The accident data for the last five years was collected from the concerned police stations and analyzed thereafter.

Keywords: Accident, safety, Black spots, National Highways, State Highways.

I. INTRODUCTION

Accidents, tragically, are not often due to ignorance, but are due to carelessness, thoughtlessness and over confidence. William Haddon has pointed out that road accidents were associated with numerous problems each of which needed to be addressed separately. Human, vehicle and environmental factors play roles before, during and after a trauma event. Accidents, therefore, can be studied in terms of agent, host and environmental factors and epidemiologically classified into time, place and person distribution. This paper lays emphasis on accident studies on the 48 km long State Highway - 38 section between Anandapuram and Anakapalli.

This study stretch State Highway - 38 of starts from Anandapuram bus stop (adjacent to NH-16), (i.e. from Km 0.00 to 49.4Km). It is a single lane highway with side drains. The open side drains exist for some part of the study stretch. The service road exists for short length and is discontinuous.

For the purpose of the study, a Road Traffic Accident (RTA) was defined as accident, which took place on the road between two or more objects, one of which must be any kind of a moving vehicle.

1.1 Road Safety Problem in India

Growth in urbanization and in the number of vehicles in many developing countries has led to increased traffic congestion in urban centres and increase in traffic accidents on road networks, which were never designed for the volumes and types of traffic, which they are now required to carry. In addition, unplanned urban growth has led to incompatible land uses, with high levels of pedestrian-vehicle conflicts. The drift from rural areas to urban

centers often results in large number of new urban residents unused to such high traffic levels. As a result, there has often been a severe deterioration in driving conditions and a significant increase in the hazards and competition between different classes of road users. In addition, the inherent dangers have often been made worse by poor road maintenance badly designed intersections and inadequate provision for pedestrians. All of these have contributed to the serious road safety problems in developing countries like India. It has been estimated that over 3 lakh persons die and 10 to 15 million persons are injured every single year in road accidents throughout the world. Road accidents in developing countries are a cause for growing concern and road accidents cost around one percent of Annual Gross National Product (GNP) resources of developing Countries, which they can ill afford to lose.

1.2 Accident Scenario in India

The spectacular growth in the Road Transportation Sector in India has been a key element in the economic development. In the country, more than 80-90thousand people die and nearly 4.5 lakhs persons are injured in road accidents every year. India's motor vehicle population is just 1.5% of the worlds, but her share of world road traffic accidents is 6%. Even though it can be observed that the accident rate has been steadily increasing over the past 25 years, the accident rate is still very high compared to the developed nations.

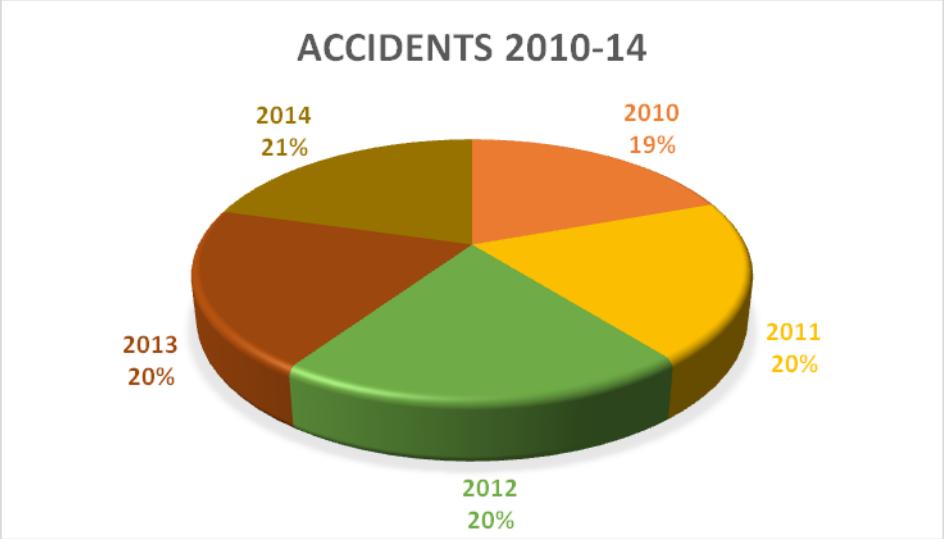

Fig.1.Accident rate in India from 2010-2014 on an average

1.3 Road Condition and Traffic Safety

The effect of road conditions in road safety to date is still underestimated. On the basis of widespread scientific research involving analysis of road accidents and a study of how vehicles are driven under different road conditions, it will be probable for the highway engineer to establish the effect of road conditions on accidents. The main road conditions that contribute to accidents are:

1. Road Width
2. Width and state of shoulders
3. Width of the median
4. Grades
5. Deficiency in sight distance

6. Radius of the horizontal curve and deficiency in super elevation at curves.

II. DATA COLLECTION

The main data requirements for the evaluation of the accident reduction measures of State Highway-38 are:

- ✓ Details of road inventory
- ✓ Signage Inventory
- ✓ Traffic volume
- ✓ Pedestrian Volume count
- ✓ Spot Speed
- ✓ Speed and Delay
- ✓ Accident Study

A detailed inventory survey was carried out on the entire section to measure the roadway geometric parameters like the roadway width and footpath width and signage inventory. Classified traffic volume counts was carried out on normal working day for 24 hours to assess the total daily traffic, hourly variation, composition, peak hour volumes and directional flows at three representative locations. Pedestrian volume count was carried out for 12 hours near Anandapuram, Pendurthi and Anakapalli due to heavy pedestrian movement at these locations. Spot speed studies were carried out at same locations. Further, these locations were selected in such a way that the impact of local traffic on the operating speed could also be ascertained along with the geometrics of the road such as horizontal curves. Speed and delay study was also conducted for the entire section (from 0.0 Km to 49.4 Km) covering different hours of day by moving car method. Accident data was collected for the year 2013-14 from the concerned police station (Anandapuram Traffic Police, Pendurthi police station and Anakapalli Rural Police), who are responsible for recording and maintaining of accident data. Assess the total daily traffic, hourly variation, composition, peak hour volumes and directional flows at three representative locations.

III.ANALYSIS OF DATA

3.1Traffic studies

The section of State Highway caters to various types of traffic such as urban, rural and regional traffic. The development alongside the highway indicates that land use on both sides of the highway is mixed with urban and rural and mainly consists of commercial, residential and industrial establishments .Based on the land use and other activities, the stretches from 0.0 Km to 20.0 Km can be classified under rural areas and 20.0 Km to 22.2 Km can be classified under semi-urban area, from 22.4 Km to 47.0 Km classified as rural areas and 47.0 Km to 49.4 Km under semi- urban area. In order to appreciate and assess the traffic characteristics, as envisaged in the previous section.

IV. CLASSIFIED TRAFFIC VOLUME COUNTS

From the surveys it was observed that the road stretch under consideration carries highly mixed traffic of both fast moving vehicles (such as cars, jeeps, vans, scooters, motor cycles, tempos, trucks, LCVs and buses) and slow moving vehicles (cycles, tractors, animal drawn carts etc.). The average daily traffic (ADT) varied from

11130 vehicles (at Km371.4km) to 64400 vehicles (at Km 0.0). The higher ADT was observed within the urban area and as expected the ADT decreased on the semi urban / rural stretch of highway as shown in Table 1. It is interesting to note that SMVs are considerably small in proportion. Light fast vehicles are predominant in the entire study stretch. But in the rural section the goods vehicles increase in proportion.

Table 1. Traffic volume counts for 7 days at three important locations in the way

KM	LOCATION	Car/jeep	LCV	BUS	TRUCKS	HCV	TOTAL
0.0 km	Anandapuram	6978	1675	1789	22354	45	32841
20.0 km	Pendurti junction	7984	2312	2102	23356	56	35810
49.4 km	Anakapalli Bypass Jn.	7623	1709	4140	21032	74	34578

4.1 Speed and Delay Studies

As expected, the lower speeds were observed from 13.0 Km to 20.0 Km and near 36.00 Km to 39.8 Km due to heavy roadside development, higher proportion of local traffic, intersection delays and side friction.

The journey speed in the study stretch varied from a minimum of 33.7 kmph to a maximum of 65.4 kmph. The average journey speed and the average delay for entire study stretch is about 45.0 kmph. respectively in the directions. The delay per kilometer is about is about 2min. 36 sec. in both the directions for the entire stretch.

4.2 Accident Scenario

To assess the accident scenario, it is very much necessary to collect the accident data. In this regard, accident data was collected for the year 2013-14 from the concerned police stations, who are responsible for recording and maintaining of accident data. Out of the total study stretch, the VCTP are responsible for recording of accident data in the stretch from 0.00 km to 36.00 Km whereas the remaining study i.e from 36.0 Km to 49.4 Km comes under the jurisdiction of Anakapalli Rural Police. A cursory review of accidents within the study area showed that about 152 accidents occurred on the study stretch in the year 2013-14. A further analysis of this data also revealed that about 32 persons were killed and about 330 persons were injured on the study stretch in the same years.

The most frequent accident configurations involved two wheelers (35%) followed by goods vehicles (23%), cars (17%), autos (15%), Buses (9%) and unknown vehicles (1%).

The accidents distribution during different hours in a day evident that the number of accidents is slightly more in the day because of heavy traffic conditions. The severity index (ratio of number of people killed to the total number of accidents) is high in night hours when compared to the day hours.

From the accident analysis, it indicates that the accidents are occurring almost uniformly during day as well as night hours but severity index is very high in the night hours. This may also be attributed to poor illumanisation and absence of warning measures such as delineation and retro-reflective material. This is mainly because of the discontinuous of service roads leading to wrong side movement of traffic in order to avoid long detours. Poorly designed access roads from the adjacent areas also leading to frequent conflicts between local traffic (mostly two wheelers) and through traffic (goods vehicles).

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Table.2.Summary of Design Features of Anadapuram – Anakapalli Section via SH-38

Chainage(Kms)	No. of Culverts	side drains		median openings	No. of Access		Curves		Service road		Road signs		
		L	R		L	R	L	R	L	R	M	W	I
0-1	2			1	1				Yf	Yf	1		
1.0-2.0	3				1								
2.0-3.0	2				1			1					
3.0-4.0	4				3								
4.0-5.0	3						1						
5.0-6.0	1												
6.0-7.0	2						1	1				2	
7.0-8.0	2				1			1					1
8.0-9.0					1	1	1						
9.0-10.0	2				1		1	1					
10.0-11.0	4				1		1	1					
11.0-12.0	0					1							
12.0-13.0	1												
13.0-14.0	2				1			1					1
14.0-15.0	5				2								
15.0-16.0	2				1	1	1						
16.0-17.0	3					1		1					
17.0-18.0	2					1	1						
18.0-19.0	3				1	1	1	1				1	
19.0-20.0	3	Yo											1
20.0-21.0		Yo		1					Yf	Yf			
21.0-22.0	3	Yo											
22.0-23.0	2					1						1	1
23.0-24.0	4	Yo			1								1
24.0-25.0	1	Yo			1	1							
25.0-26.0	5	Yo	Yo										
26.0-27.0	2	Yo	Yo				1	2					
27.0-28.0	2	Yo	Yo		1		1					1	
28.0-29.0		Yo	Yo			1	1						
29.0-30.0	4	Yo	Yo		1	1					1		
30.0-31.0		Yo	Yo								1		1
31.0-32.0	3	Yo	Yc			1	1						
32.0-33.0	2	Yo	Yo				1	2					
33.0-34.0	1	Yo	Yo		1	1		1					

34.0-35.0	1	Yo	Yo										
35.0-36.0	2						1				1		1
36.0-37.0	1	Yo	Yo				1	1					
37.0-38.0	2	Yo	Yo			1		1					
38.0-39.0	1	Yo	Yo		1				Yp	Yp			
39.0-40.0	1	Yo	Yo										
40.0-41.0	4	Yo	Yo			1	1						
41.0-42.0	3	Yo	Yo										
42.0-43.0	2	Yo	Yo				1						
43.0-44.0		Yo	Yo		1								1
44.0-45.0	1				1			1					
45.0-46.0	3		Yo			1	1						1
46.0-47.0		Yo	Yo										
47.0-48.0		Yo	Yo	1	1		1	1	Yp	Yp		1	
48.0-49.0													
49.0-50.0													

Note: L – Left; R – Right; Yp – Partly Exists; Yo – Open Drains Exists; Yc – Covered Drains Exists; Yf – Fully Exists; M – Mandatory/Prohibitory Signs; W – Warning / Cautionary Signs; I –Informatory Signs

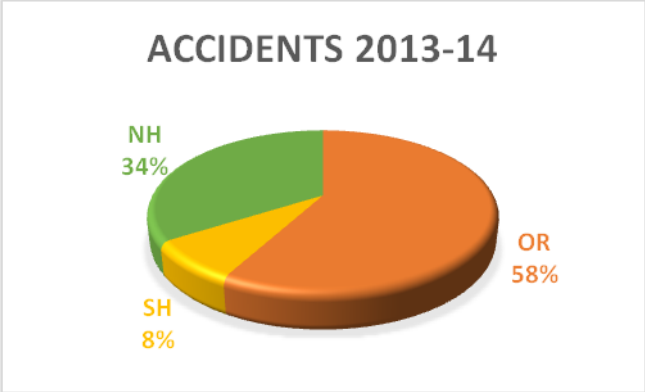

Fig.2.Accident rate in india from 2013-2014 on an average

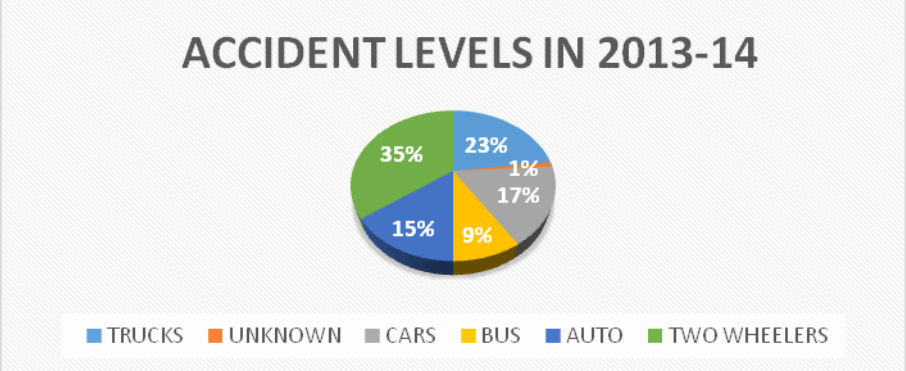

Fig.3.Accident rate in the study stretch 2013-2014 on an average

V. IDENTIFICATION OF BLACK SPOTS

The entire section of study between Anakapalli to Visakhapatnam is unsafe from safety point of view. The main reason is local traffic has direct access to the State Highway, which results in congestion and accidents. Analysis of accident data within the study area showed that about 210 accidents occurred on the study stretch in the year 2013-14. A close look on the total accidents on all types of the roads in the Visakhapatnam city has revealed that the accidents in study stretch alone are around 34%, which is a significant part and a major reason for authorities concern. Maximum accidents were occurred at (Gandidundam, Lodagalavanipalem, neelakundilu which comes under anandapuram jurisdiction and Pendurti junction, Akkireadypalem, Pendurthy railway bridge, Gurampalem, Pinagadi,. The identified black spots were investigated in detail to assess the cause of accidents and suggest the remedial measures to minimize the accidents.

4.3 Black spot regions in the stretch

5.1 Remedial Measures

In order to improve the safety and ensure smooth flow of traffic, it has been suggested to construct service road on both sides of the State Highway-38, side drains along the road for free flow of water during rainy times. As illumination was one of the greatest factor for cause of accidents during night time, minimum requirements of illumination should be provided for free flow of traffic. Further, it is suggested for provision of improved junction geometrics, sign boards and high mast to improve illumination during night.

VI. CONCLUSION

From the accident analysis, it can be concluded that the accidents are occurring almost uniformly during day as well as night hours but severity index is very high in the night hours. This may also be attributed to poor illumination and absence of warning measures such as delineation and retro-reflective material. It can also be seen from the analysis that two wheelers and trucks contribute to majority of accidents. This is mainly because of the discontinuous service roads leading to wrong side movement of traffic in order to avoid long detours. Poorly designed access roads from the adjacent areas of the highway are also leading to frequent conflicts

between local traffic (mostly two wheelers) and through traffic (goods vehicles).

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