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Identification of Geometrical Defects on ADB Road-A Road Safety Audit

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Abstract: ***Roads are one of the major infrastructures for the socio-economic growth of the country. With the increase in population, number of vehicles and road users are increasing day by day. Improper design of roads will lead to congestion on roads and also leads to accidents. Accident studies are done to control the accidents on roads. Traffic studies helps in finding out the peak hour traffic, different types of vehicles, delay points, delay time and journey time between the origin and destination. Road Safety Audit is a systematic procedure carried out to assess the geometrical defects and reasons for accidents on the roads. In the present study, traffic studies like volume studies and moving observer method are conducted to know the peak hour traffic and delay time over the stretch of road. The various delay points and critical points over the stretch of road are identified. Road safety audit is also carried out on the selected study area to identify the geometrical defects at various critical points on the road using the questionnaire prepared based on IRC codal provisions. Finally, the geometrical defects to be corrected at various critical points on the study area are found out, thereby increasing the efficiency of roadway and which in turn reduces the accident rate on selected study area.***

Keywords: Road Safety Audit (RSA), Passenger Car Unit (PCU), Survey, Critical Points, Geometrical Defects.

I. INTRODUCTION

The evolution and advancement in transportation facilities have been closely linked with development of human beings throughout the history of the world. Transportation contributes to the economic, industrial, social and cultural development of any country. Transportation is vital for the economic development of any region since every commodity produced, whether it is agriculture or industrial product needs to be transported at various stages from production to distribution. At the production stage, transportation is required for carrying raw materials like seeds, manure, coal, steel, machines, component parts etc. At the distribution stage, transportation is required from the production centers like the farms and factories to the marketing centers and the later to the retailers and to the consumers. In adequate transportation facilities retard process of socio-economic and cultural development of the country. Development of adequate transportation system in a country indicates its economic growth and progress in social development. In the present day concept, the main objective of a good transportation system is to provide safe, economical, efficient transportation facility for the travel of passengers and transportation of goods. The following critical points are

A. Industries/ institutions
B. Curves
C. Culverts
D. Intersections
E. pilgrimage

The above critical points are identified in the selected stretch of ADB road accident reasons. The problem of accident is very acute in road transportation due to complex flow patterns, presence of mixed type of vehicles and the pedestrian on the roads. Traffic accidents may involve property damages, personal injuries and also deaths. One of the main objectives of traffic engineering is to provide safe traffic movement.

II. STUDY AREA

In the present study investigation is done over the ADB road. ADB road linking KAKINADA PORT to the RAJANAGARAM, geographically located at latitude 17.09143 and longitude of 82.06666. Length of the ADB road is 56 km and the width is 3.7 meter. Critical points on the ADB road are ADITYA GROUP OF INSTITUTION, VIJAYALAXAMI POLYMERS, SVPC, PRAGATI ENGINEERING COLLEGE, SRIVENKATESWARA RICE MILL etc. during investigation we found 13 culvert, 4 extreme curve, 3 fuel station and 2 junctions.

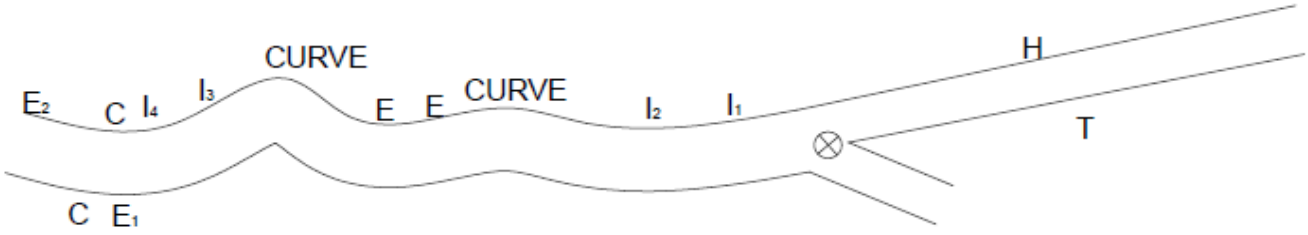


Figure 1: Study Area

III.METHODOLOGY

The methodology adopted in the present study is detailed in figure 2 .The methodology involves selection of particular road, collecting required data, identifying geometrical defects on the road and the causes of accidents. This particular location is chosen because of high accident rate. The following flowcharts explain about methodology

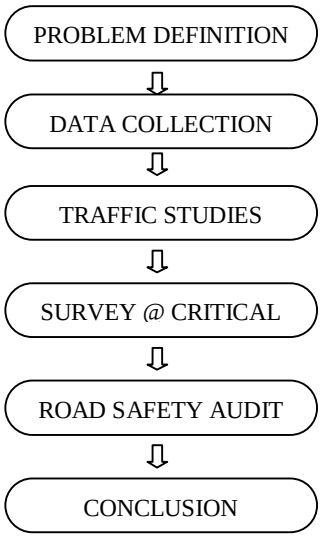


Figure 2: Flowcharts of Methodology

IV. RESULTS & DISCUSSIONS

A. Volume Studies

Traffic volume studies are conducted to determine the number, movements and classifications of roadway vehicle at a given location. The most common method of collecting traffic volume data is the manual method of traffic volume count. This involves a group of people recording number of vehicles passing, on a pre-determined location, using tally sheets. Traffic volume studies are conducted on the selected stretch for 3 days (24x3). The data is presented in the table 1.

TABLE 1: Peak hour data

SL.NO	TIME	PCU
1	7.45 – 8.45 AM	1857.5
2	8.45 – 9.45 AM	2336
3	5.00 – 600 PM	2000.5

In table 1 three days peak hour data is presented. Peak hour is the time when the number of vehicles in the road is maximum in a day. The obtain peak hour is 2336 PCU.

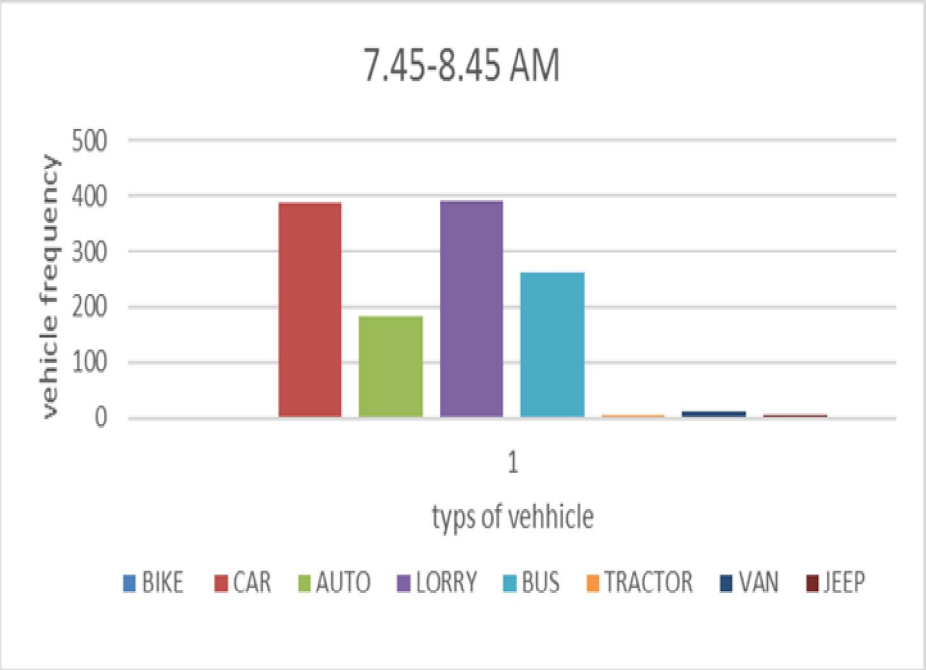


Figure 3: Peak hour vehicle frequency

B. Moving observer method

Traffic delays and traffic volume is observed by moving car method and data is shown in table 2.

TABLE 2: Delay time and journey time

Direction	Journey time (min-sec)	Time of delay (min-sec)	Number of vehicles		
			Overtaking	Overtaken	Opposite direction
E-W	45-00	00-26	32	19	639
E-W	47-31	01-16	29	11	621
W-E	42-16	00-21	19	07	572
W-E	43-40	00-30	26	12	531
MEAN	44-46	38-25	26.5	12.25	590.75

In the above table 2 data collected from moving observer method. In this method the test car is driven by an observer along the test section so that the test car floats with traffic. The test vehicle attempts to pass as many vehicles those that pass his test vehicle. The time taken to traverse the study recorded.

RSA is carried out along the stretch and the following geometrical defects are identified at every critical point. All these defects should be corrected to reduce the accident rate on ADB road. The interventions at various critical points are shown below.

C. Survey At Curves

S no	CHAINAGE	PHOTO	DISCREPANCIES	INTERVENTIONS
1	ALTITUDE-144ft LATITUDE-17.008189 LONGITUDE-82.10554 MITIGATION POINT-CURVE LOCATION-SATYANAGAR (RCW & LCW)		• Earthen shoulder not provided. • Level difference between shoulder and paved shoulder. • Proper illumination not provided • Traffic signals are not provided • There is no cat eyes	• Minimum width of 2 m earthen shoulder should be provided • There should not be any level difference between pavement and shoulder • Proper illumination required • Traffic signals should be provided • Cat eyes are required to show road alignment.

D. Survey At Institutions

S no	CHAINAGE	PHOTO	DISCREPANCIES	INTERVENTIONS
1	ALTITUDE-233ft LATITUDE-17.08337 LONGITUDE-82.06685 MITIGATION POINT-INSTITUTION LOCATION - ADITYA GROUP OF INSTITUTE (RCW)		• Rumble strips are not provided at approach of industry • Level difference between paved shoulder and earthen shoulder • Sufficient illumination not provided • Road sides are not free from any objects.	• Rumble strips must be provided at approach of institution. • Level difference between shoulders to be rectified. • Sufficient illumination is required • Road sides are should be clear for better visibility • Median gap of minimum 18 to 20 Meter maintained.

E. Survey At Culverts

S no	CHAINAGE	PHOTO	DISCREPANCIES	INTERVENTIONS
1	ALTITUDE-153ft LATITUDE-17.08100 LONGITUDE-82.10820 MITIGATION POINT-CULVERT LOCATION-IN FRONT OF S.V.P.C RICE MILL (RCW & LCW)		• Earthen shoulder width is not sufficient. • Surface of earthen shoulder is loose soil. • Level difference between paved shoulder and earthen shoulder. • Sufficient illumination is not provided • Road markings are not adequate. • Proper signals are not available	• Earthen shoulder of width minimum 2 meter provided • Earthen shoulder surface should be hard • Paved shoulder should be free from level difference with earthen shoulder. • Proper illumination required • Road markings should be laid. • Proper traffic signals are required

F. Survey At Intersection

S no	CHAINAGE	PHOTO	DISCREPANCIES	INTERVENTIONS
1	ALTITUDE-174ft LATITUDE-17.08172 LONGITUDE-82.11932 MITIGATION POINT-ROAD INTERSECTION (Y) LOCATION-ENTRENCE OF PEDDAPURAM (LCW & RCW)	 	• Proper signals are not provided as per the location. • Minimum shoulder width not provided • Paved shoulder are not free from level difference • Cat eyes are not provided • There is no gap in median. • Road sides are not free from bushes or trees. • Road safety cameras are not used • Proper illumination not provided • Hoardings distance are not maintained are its not free from RGB colors. • Pedestrian crossing not provided.	• Proper signals should be provided as per the location. • Minimum shoulder width 2 meter should be provided • Level difference to be rectified • Cat eyes are should be provided • Gap in median provided at the intersection • Road sides are should be clear for better visibility. • Road safety cameras should be provided. • Proper illumination should be provided. • Hoardings distance 10 m should be maintained from carriageway. • Pedestrian crossings are required.

V. SUMMARY & CONCLUSIONS

A. Based on the work done, the following conclusions are drawn

1) The observed peak hour on the ADB road is from 8.45 – 9.45 AM with 2336 PCU per hour.

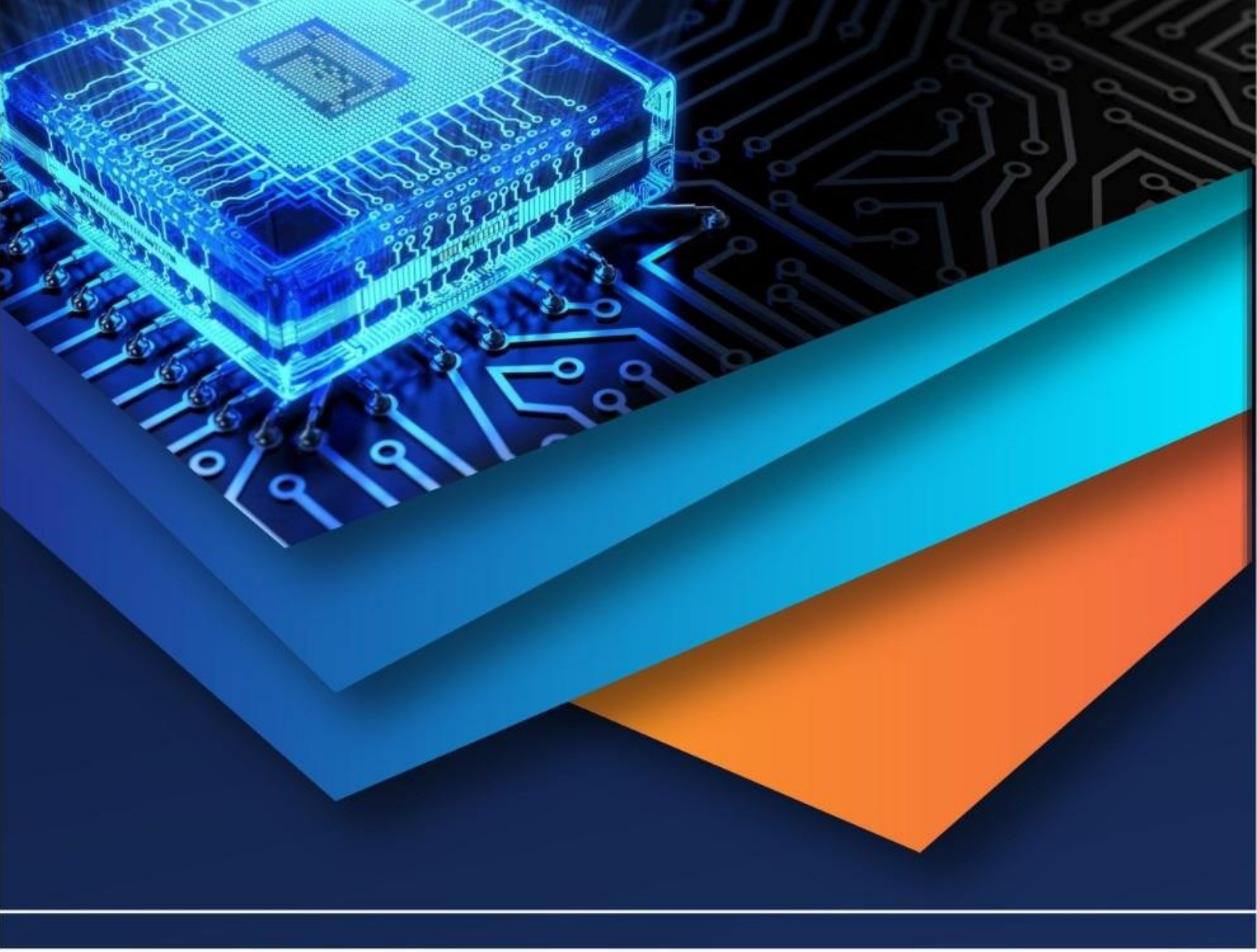
2) The delay time & travel time are observed to be 25 sec & 44 minute 35 seconds.

3) Rumble strips should be laid at each & every point of critical location.

4) Paved shoulder of 1.5 meter & earthen shoulder of 2 meters to be provided over the stretch of road.
5) All the interventions should be provided at every critical point
6) Solar blinkers should be provided at the critical points

REFERENCES

[1] Chetan R. Mankar and N.H Pitale, "Road Safety Audit: An Accident Studies of Stretch Road", International journal of innovative research and development, vol 3, Issue 5, ISSN- 0211, May 2014.
[2] B.K Banik, M.A.I Choudhury, "Road Accident And Safety Study In Sylhet Region Of Bangladesh", journal of Engineering Science and Technology, vol. 6, no. 4 (2011)493-505.
[3] Francisca Nonyelum Ogwueleka, "An Artificial Neural Network Model for Road Accident Prediction: A Case Study of A Developing Country", Faderal University – Wuakari, vol. 11, no. 5, 2014.
[4] Himanshu Bharadwa, "SSRG International Journal of Civil Engineering Traffic Volume Study of Sitapura, Jaipur", SSRG-IJCE) – volume 3 Issue 7 –ISSN: 2348 – 8352 www.internationaljournalssrg.org Page 111, July 2016
[5] Hassan Abu Hassan, "ROAD TRAFFIC ACCIDENTS AMONG YOUTH WORLDWIDE", A. (2010). Road traffic accidents among youth worldwide. UCQ Nursing Journal of Academic Writing, winter 2010, 28-36
[6] Andrew Dickerson, John Peirson and Roger Vickerman. "Road Accidents And Traffic Flows: An Econometric Investigation",April 199
[7] Dr. E.Ravi Kiran, "Prospective Study on Road Traffic Accidents", Associate Professor, Community Medicine, JPAFMAT, 2004; 4. ISSN 0972-568
[8] Abdul Rahoof, NIMS University Rajasthan, India. International Journal for Technological Research in Engineering Volume 4, Issue 7, ISSN (Online): 2347 - 4718 March-2017\
[9] Singh, A.P, Ph.D. Research Scholar, Department of Civil Engineering, International Journal of Advanced Engineering Technology E-ISSN 0976-3945
[10] Nilam Phadtare, Asst.Prof. Department of civil engineering, D.Y.Patil college of Engineering, Akurdi, Savitribai Phule Pune University , Nigdi Pradhikaran , PCMC, Pune , Maharashatra, India, Volume: 04 Issue: 08 Aug -2017



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