Road Accident Analysis: A Case Study of Vidisha City

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Abstract— India is densely populated country and Madhya Pradesh is its one of the biggest state which is densely populated too. Vidisha near Bhopal the capital of Madhya Pradesh is noisy, congested, polluted, and typically disordered. The roads in the city are crowded and interrupted by several movements and actions. Bus services and local transportation facilities become progressively worse and their efficiency and quality of service have been declining thus inducing passengers to turn to personalized modes and IPTs. This turns in restricting the traffic flow and also putting the road users life in danger. The number of death rates in accidents or fatality rate is increasing year by year. During the year 2014 total number of registered accidents are high upto 943 in which 177 persons were dead . Pedestrian deaths as a percentage of all road fatalities are also extremely high. Also, the adult working age group (18 to 60 years) accounted for more than 80 percent of all casualties. Due to the development of localities, schools , hosiptals by the side of national highway(NH-86) passing through the centre of city it becomes the most crowded and accidental prone area of the city. other accidental prone areas of the city constitute of curves and squares such as curve at rangai village road and at sagar-Ahmedpur square. We suggest that individual road safety audit for these locations should be carried out by a multi-disciplinary team of experts to suggest corrective measures.

Key words: Road Accident Scenario In India, IPTs, Road network

I. INTRODUCTION

Transportation facilities in India are incompetent and degrading year by year. The transport system is not developing with the same rate as the traffic demand increasing. The consequences of which is the increment of personalized transport such as three-wheeler, two wheeler and intermediate mode of transport. Footpaths and roads of the cities are majorly occupied by parked vehicles, so the pedestrians have to walk on road. This turns in restricting the traffic flow and also putting the road users life in danger.. Apart from encroached roads ,the surface of the roads are also not fully fulfill the standards. Road markings are not properly done, even traffic signs are not present on their appropriate locations and intersections also require corrections most of the time. In Vidisha city wholesale goods center is in the mid of the city which creates congestion due to the heavy vehicles on the city roads. Vidisha near Bhopal the capital of Madhya Pradesh is noisy, congested, polluted, and typically disordered . Vidisha is located near the river betwa .National highway NH-86 passses through the city.City is properly connected with the rest of the states by railways, roadways .

The current road network in the city is incmpetent. The roads are below the geometric sub-standards. As the population increases rapidly, the modes of public transport is degrading day by day, the use of personal vehicles increasing with a high rate. The number of vehicle registered in 2010 is about 13,943 which increases in 2014 upto 22,664. This paper pursuit to analyze the road accidents in Vidisha city using annual data from the year 2010 to 2014.

II. ROAD ACCIDENT SCENARIO IN INDIA

Road accidents are a severe problem in most of the developing countries including india. Road accidental deaths per 10,000 vehicals i.e defind as fatality rate is also quite high in comparison to developed countries. While in Europe and North America the condition is generally improving, many developing countries face a threatening situation. The problem is really very different in developing countries in many ways as in developed countries.The fraction of commercial and public vehicles in road accidents are very high. Pedestrians and cyclists are often more unsafe on roads. As the people not following the traffic rules sincerely . Problem of providing medical aids instantly or inadequacy of medical facilities increases the number of death rates in the country.

Table 1 presents the growth in number of vehicles and road accident in India in 2009-2013. It has been observed that death rates per thousand vehicle has decreased lightly from 1.4 in 2009 to 0.9 in 2013, as the vehicles in India is increased by 78.0% and the amount of road accident has increased by 51% during the same period.

Table 2 represents road accident deaths by type of vehicles during 2013 .

The road accidents reports that the major deaths are caused by trucks . The report inform us that 34,187 persons (24.9%) were killed riding on two-wheelers, 24,081 persons (17.5%) were occupants of trucks/lorry, 14,803 persons (10.8%) were killed while travelling in car and 12,055 persons (8.8%) were killed while travelling in buses. As the population of vehicles are increasing very rapidly as comparision with the development of road network, so the problem of road accidents also increases.

S.NO	YEAR	ROAD ACCIDENT (in thousands)	PERSONS INJURED (in thousands)	PERSONS KILLED DEATHS (in nos.) THOUSAND	NO. OF VEHICLES (in thousands)	RATE OF PER VEHICLE
(1)	(2)	(3)	(4)	(5)	(6)	(col5/clo6)

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1	2009	421.6	466.6	1,26,896	89,618	1.4
2	2010	430.6	470.6	1,33,938	1,14,953	1.2
3	2011	440.1	468.8	1,36,834	1,14,953	1.2
4	2012	440.0	469.9	1,39,091	1,41,867	1.0
5	2013	443.0	469.9	1,37,423	1,59,490	0.9

Table 1: Growth In Number Of Vehicles And Road Accidents In India (2009-2013)

Source: Accidental Deaths & Suicides In India 2010, 2011,2012 and 2013 Published by National Crime Records Bureau, Ministry of Home Affairs, GOI, New Delhi

A. Fatality Rate and Risk

Fatality rate is represented as number of deaths per ten thousand vehicles. Figure 1 shows the fatality rates in Vidisha city of some years. There is a minor increase in fatality rates shown in the figure and table below.

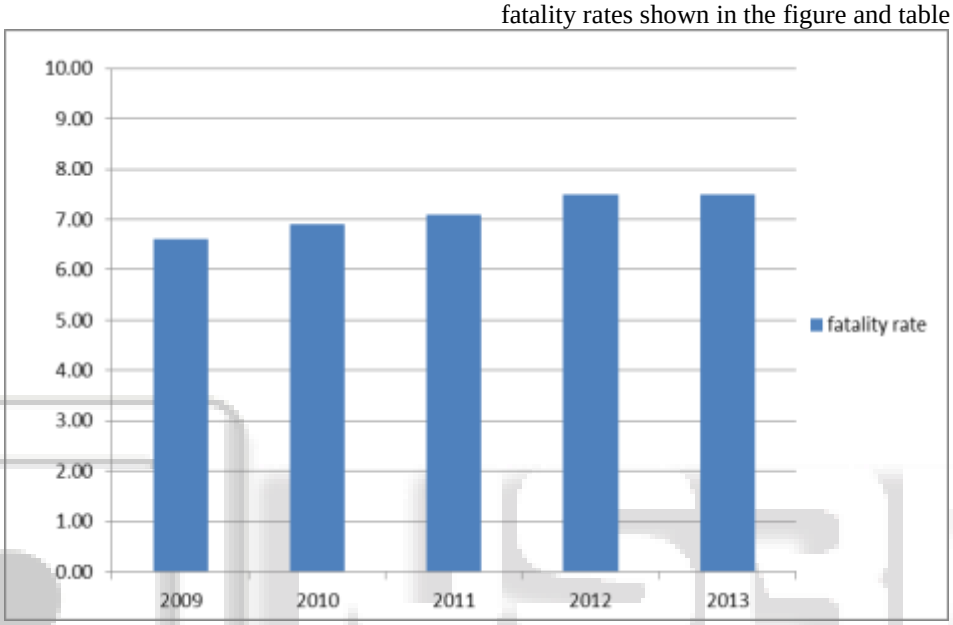

Fig. 1: Fatality Rate In Vidisha

Year	No of road accidental death	Estimated mid year population	Fatality risk
2009	57.2	867	6.6
2010	60.6	883	6.9
2011	64.4	899	7.1
2012	68.8	916	7.5
2013	74.2	931	7.5

Table 2: Rate of road accidents in India & Fatality risk

Source: Accidental Deaths & Suicides In India 2010, 2011,2012 and 2013 Published by National Crime Records Bureau, Ministry of Home Affairs, GOI, New Delhi

S.No.	Type Of Vehicle	Total No Of Road Accidental Deaths
1	TRUCK/LORRY	24,081
	Government	380
	Private	23,701
2	BUS	12,055
	Government	3,699
	Private	8,356
3	TEMPO/VANS	8,138
	Government	244
	Private	7,894
4	Jeep	8,596
	Government	274
	Private	8,322
5	CAR	14,803
	Government	238
	Private	14,565
6	THREE WHEELER	6,492
7	TWO WHEELER	34,187
8	BICYCLE	2587
9	PEDESTRIAN	12,385
10	OTHERS	14,099
	TOTAL	1,37,423

Table 3: Road accidental deaths according to type of vehicles during 2013

Source: Accidental Deaths & Suicides In India 2013 Published by National Crime Records Bureau, Ministry of Home Affairs, GOI, New Delhi

III. TRANSPORT SYSTEM IN VIDISHA

A. Road Network

The existing transportation system of Vidisha is mixed type system. But basically ,there is no such system followed by the roads. The rotaries and intersections are not satisfying the needs as the population of vehicles increasing at a rapid rate and the development of roads remain the same. This concludes with the collision of vehicles. The deficiency of the bypass for the heavy vehicles which passes through the city creates congestion. The other basic problem is the improper traffic management. The geometry of the roads are inadequate.Transportation system in Vidisha is majorly consitituted by local minor streets and roads heavily

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congested. Traffic jamming is severe problem nowdays, results due to improper transportation planning.

B. Growth of Vehicles

The vehicular population growth is enormous in Vidisha, with just 17,491 registered motor vehicles in 2011 to 22,664 in 2014, an increase of 5,173 vehicles in a duration of 3 years only .Due to the non-availability of public transport a tremendous growth in personalized vehicles mainly two wheelers and cars is being observed. The number of two wheeler and motor cars registered vehicle was 14387 in 2011 which gone high upto 16836 in year 2014. The yearly growth in different types of vehicle is shown in table 3 given below. The following data is collected from the transport department of Vidisha.

TYPE OF VEHICLE	2011	2012	2013	2014
TRUCKS	88	99	151	189
MOTOR CABS/LUXURY CABS	30	29	43	62
MOTOR CARS	395	480	693	856
MOTOR CYCLES	14,387	9,037	1,1078	16836
PUBLIC SERVICE VEHICLES	3	2	17	14
THREE WHEELED VEHICLE FOR PUBLIC TRANSPORT	98	77	131	198
TRACTOR	2,273	1,186	1,200	3,932
Total	17274	10910	13313 22087	

Table 4: Motor vehicle population in Vidisha

Source: RTO VIDISHA MADHYA PRADESH

IV. ROAD ACCIDENTS IN VIDISHA

A. Type of Accidents

There is a tremendous increase in the number of accidents during last three years. The number of accidents in year 2011 was 754 in which number of fatal accident were 112 and non fatal were 617.The number of accidents in the year 2014 goes high upto 943 in which the fatal accidents were 158 and nonfatals were 706 that means 70% increase in fatal accidents is observed during the last three years. Table 4 below represtns the accident scenario in vidisha.

Year	fatal	serious	minor	total accidents
2011	112	22	595	754
2012	120	119	468	748
2013	129	39	574	783
2014	158	149	557	943

Table 5: Types of accidents in Vidisha

B. Accident Severity Index

Seriousness of accidents and the availability of medical facility in the city is measured by accident severity index. The number of persons killed in the accidents from year 2011 to 2014 is increasing from 112 to 177 respectively , an increment of about 63% in just four years. As the severity index increases ,outcome of this is in the degradation of the medical facilities in the city. Some of the minor accidents are not recorded by the traffic police of the city, so figure shows high severity index.

C. Fatality Distribution by Age

The age group which is mostly prone to road accident fatality (35-45 years). The age group 20-45 years are regarded for over 45% of all casualties every year. Hence the both age group which compose a large fraction of road accident fatalities. The child fatality rate is comparatively low then the working age group in Vidisha. The pedestrian casualties is also not much in Vidisha city.

	<20 years	18 to 30 years	35 to 45 years	>60years
2011	2	87	10	13
2012	5	93	16	11
2013	3	106	24	17
2014	6	120	27	24

Table 6: Fatality distribution by age

D. Road User Type Fatalities

Two wheeler riders had a high percentage of all road fatalities in Vidisha city. Including cyclists, three wheeler or some time pedestrians also having some percentage of road accident fatalities in the city. According to the data collected by the traffic police, most of the road accident fatalities are due to two wheelers. As they create a large fraction of the accident problems, the management of the traffic and some road facilities should be check for the citizen's convenience.

E. Causes of Accidents

As per the data provided by the traffic police shows that the accident caused are generally by the driver's fault. But in most of the cases it's the faulty roads causing accidents, mechanical breakdown of vehicle. Some times the problem of road geometry causes accidents.

V. ACCIDENT PRONE SPOTS IN PATNA CITY

Some of the locations are observed by the traffic police of Vidisha as the accident prone locations on the basis of regularity of accidents. Vidisha- Sanchi road near Rangai bridge, Ahmedpur square, Durga nagar square , Neemtal were some of the most accident prone location in the city till

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now. As the national highway (NH-86) passes through the city. The heavy vehicles navigate through the national highway causing accidents. The problem of improper rotaries causing the accidents in Neemtal or in different areas. Around 40% of accidents occur in these locations. Overtaking of vehicles may also causes accidents on the bridges in Vidisha We suggest that individual road safety audit for these locations should be carried out by a multi-disciplinary team of experts to suggest corrective measures.

VI. SUMMARY

The road traffic accidents are a major but undervalued global problem. Transportation facilities in India are incompetent and degrading year by year. Problem of providing medical aids instantly or inadequacy of medical facilities increases the number of death rates in the country. . It has been observed that death rates per thousand vehicle has decreased lightly from 1.4 in 2009 to 0.9 in 2013, as the vehicles in India is increased by 78.0% and the amount of road accident has increased by 51% during the same period. The existing transportation system of Vidisha is mixed type system. Transportation system in Vidisha is majorly consitituted by local minor streets and roads heavily congested.

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