

# BLACK SPOT ANALYSIS AND ACCIDENT INVESTIGATIONS ON NATIONAL HIGHWAY – 44

C. M. Hari krishna<sup>1</sup>, Javedali M Jalegar<sup>2</sup>

<sup>1</sup>Pos graduate student, Department of transportation Engineering, AVNIET, Ibrahimpatnam, Hyderabad

<sup>2</sup>Assistance Professor, Department of transportation Engineering, AVNIET, Ibrahimpatnam, Hyderabad,

\*\*\*

**Abstract** - India is a developing country and safety of road is still in a premature stage. Accident severity is increasing in order due to increasing in vehicle population. Accident leads to disablement, death, damage to health and property. The road accident situation in India is alarming. Records show that there is one death at every 2.75 minutes because of road accidents. The high accident rate is largely attributed to the inadequacy of the highways and other main roads to meet the traffic demands, road user behavior, vehicle defects, poor road geometrics and visibility. Road Safety is necessary to reduce accident involving both human and vehicles there by making the road more safe and user friendly to traffic. NH-44 is one of the major connectivity from Srinagar to Kanyakumari which caters to the need of transportation of light goods to heavy goods and passengers. Study area was undertaken on road NH- 44 from Hyderabad to Kurnool, stretch Km 2369/0 to Km2602/0 in Telangana state. Hyderabad as a growing city, multiple development projects, manufacturing industries and export of goods has keep on increasing. The study Stretch is a major connectivity to number of heavy and small scale industries. The location in a roadway where the traffic accident often occurs is called a black spot. The accident data is analyzed using accident frequency and severity index method. The safety deficiencies were detected to minimize accidents and save the road users. The deficiencies along with the measures for further improvement have been presented in this thesis.

**Key Words:** NH-44, safety, accidents, black spot, severity index, ranking method.

## 1. INTRODUCTION

More than 1.2 million people die every year on the world's roads, making road traffic injuries a leading cause of death globally. Most of these deaths are in low- and middle-income countries where rapid economic growth has been accompanied by increased motorization and road traffic injuries. As well as being a public health problem, road traffic injuries are a development issue: low- and middle-income countries lose approximately 3% of GDP as a result of road traffic crashes. (GLOBAL STATUS REPORT ON ROAD SAFETY 2015 by World Health Organization) Road traffic injuries are the number one cause of death among those aged 15–29. Road traffic injuries are currently estimated to be the ninth leading cause of death across all age groups globally, and are predicted to become the seventh leading cause of death by

2030. This rise is driven by the escalating death toll on roads in low- and middle-income countries – particularly in emerging economies where urbanization and motorization accompany rapid economic growth. In many of these countries, necessary infrastructural developments, policy changes and levels of enforcement have not kept pace with vehicle use. In contrast, many high-income countries have managed to break the link between rising motorization and road traffic deaths, with some managing to dramatically reduce such deaths. These achievements are the result of making infrastructure safer, improving the safety of vehicles, and implementing a number of other interventions known to be effective at reducing road traffic injuries.

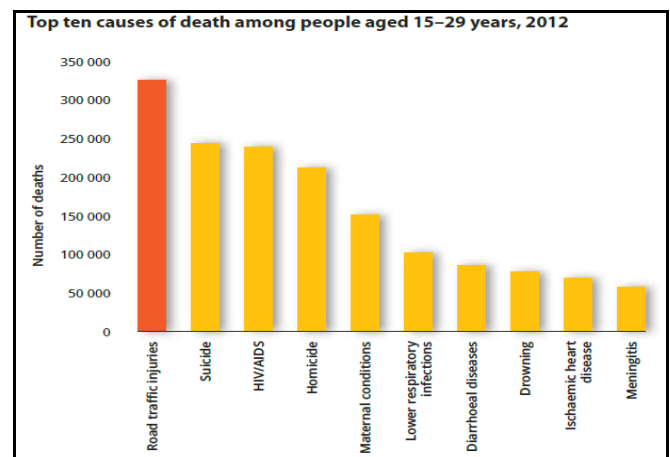


Fig-1 Top ten causes of death among people aged 15-29 years

### 1.1 Objectives of Study

Expansion in the road network, surge in motorization and a rising population of a country contribute towards increasing numbers of road accidents, road numbers of registered motor vehicles in the country and the country's population have increased at a compound annual growth rate (CAGR) of 3.4 per cent, 9.9 per cent and 1.6 per cent, respectively, during the decade 2007 to 2017. During the same period, the number of road accidents in the country increased at a CAGR of 2.1 per cent. Similarly, the number of road accident fatalities and the number of persons injured in road accidents in the country between 2007 and 2017 increased by 5.8 per cent and 2.4 per cent, respectively.

Very little work has been done in India to analyze accidents on two-lane roads.

1. To analyze the black spots and to suggest corrective measures
2. To investigate the accidents to find the lead of accident at particular location
3. Determination of accident rate and frequency of accident
4. Annual variation in accident
5. Monthly variation in accident
6. Hourly variation in accident
7. Accident severity index
8. Accident rate

## 2. METHODOLOGY

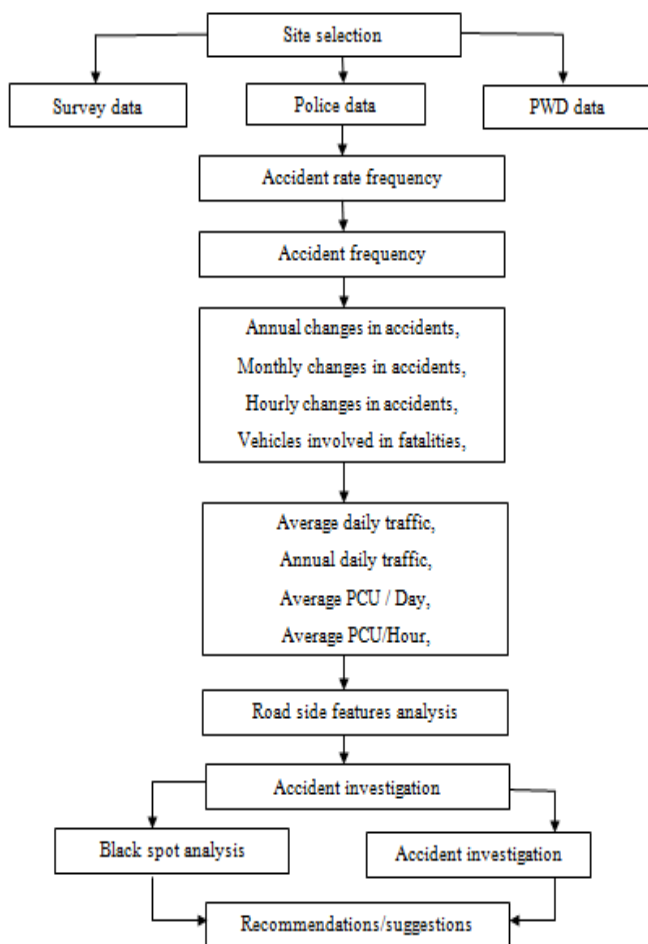


Fig. 2 Flow chart showing methodology

## 3. STUDY AREA

### 3.1 Study area

Study area was undertaken on road NH- 44 from Hyderabad to Kurnool; stretch Km 2369/0 to Km2602/0 in Telangana state.

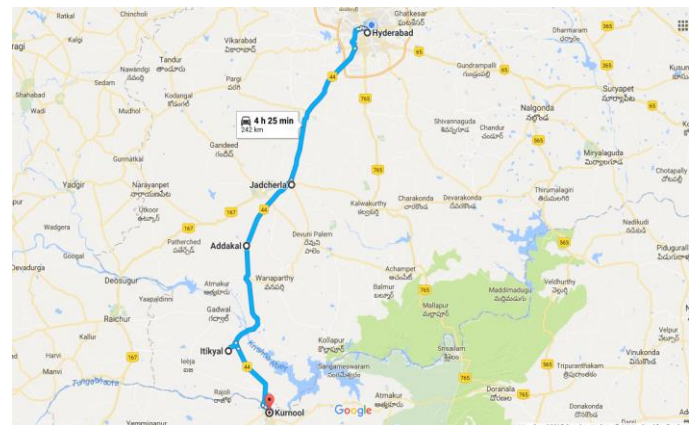


Fig-3 Total study area map

## 4. DATA COLLECTION

### 4.1 Data collected from Police Records

Accidents during 2007-2017 on this road section are shown in Table 4.3. Accident data were collected year wise from stretch police stations records then arranged in month wise. Average yearly variation of accidents during 2007-2017 is shown in Table 4.4.

Table-1: Details of accident in stretch wise

Year	Fatal	Major injury	Minor injury
2007	15	16	37
2008	11	35	50
2009	16	25	45
2010	20	32	39
2011	21	34	40
2012	18	41	84
2013	4	24	61
2014	13	32	81
2015	18	34	84
2016	11	30	58
Total	147	303	579

### 4.2 Data collected from P.W.D Records

P.W.D (Public Works Department) records are the main source of details of road. The Performa used to record these details is shown in Table 2

**Table-2:** Performa for details of road section

Carriage way width	7 mt
Formation width	12 mt
Land width	45 mt

In addition to the above data, traffic volume data were also collected from PWD records. These data is shown in Table 3

**Table-3:** Traffic volume data

YEAR	ADT	AVERAGE PCU PER DAY	PCU/HR
2007	10897	4004.86	80.987989
2008	11589	5874.08	99.325152
2009	10582	7854.86	100.36545
2010	12347	6854.86	120.35622
2011	13364	8802.24	146.704000
2012	12893	7688.57	128.142833
2013	12236	7259.12	120.985333
2014	11589	7589.39	126.489833
2015	12789	8987.61	149.793333
2016	10239	6987.46	116.457667
2017	13712	6125.49	102.091500

Itikyala to kurnool	50.4k m	239	47.8
---------------------	---------	-----	------

**Table-5:** Accident frequency

Distance of origin	Frequency	No of accidents (2007-2017)	Total frequency
0-5	32.5	228	32.5
6-10	29.6	208	62.1
11-15	3.7	26	65.8
16-20	34.1	239	100
Total	100	701	

From the Table 4.1 and 4.2 it is observed that frequency and rate of accident is more for stretch-4 followed by stretch-1, 2, 3 respectively

#### 4. DATA ANALYSIS

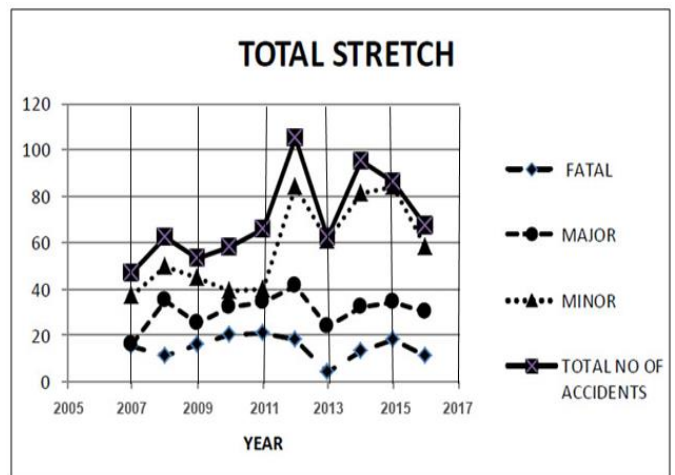
##### 4.1 Accident rate and frequency

$$\text{Accident Rate} = \frac{M}{L}$$

Where M = Total no of Accidents of a stretch  
L = Length of Road

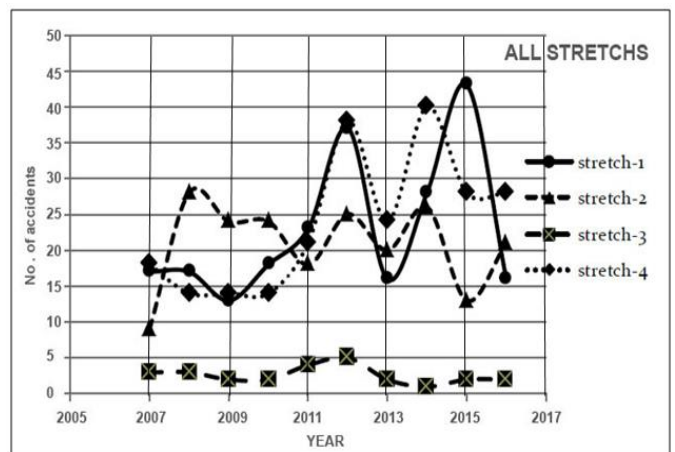
**Table-4:** Accident Rate

Name of stretch	Length	No of accidents in a year	
		Sum of 10 year	Accident rate
Hyderabad to jadcherla	84.8k m	228	45.6
Jadcherla to addakal	37.5k m	208	41.6
Addakal to itikyala	24.8k m	26	5.2



**Fig- 4** Annual variation in accidents of total stretch

##### 4.2 Annual changes in Accidents



**Fig-5** Annual variation in accidents of four stretches

Fig. 5 shows the annual variation in accidents of total stretches during year 2007-2017. It is observed that percentage accidents are increasing relatively in most of the year. In the year 2007 accident rate was high and low in the year 2002. It may be due to increase in no of vehicles, bad traffic environment, and increase in population.

It is observed that no of accidents are more for stretch-1 and 4 are more higher than stretch -2 and 3. This is because of high traffic volume on stretch 4. Traffic volume decreases on stretch-3 as stretch -4 is connected to NH-23 which goes towards coal mines. Stretch-1 has high population density as this is the main town of the Mahabubnagar. Accident rate is more due to more no of commercial and noncommercial vehicles on the road, bad traffic environment.

4.3 Monthly changes in Accidents

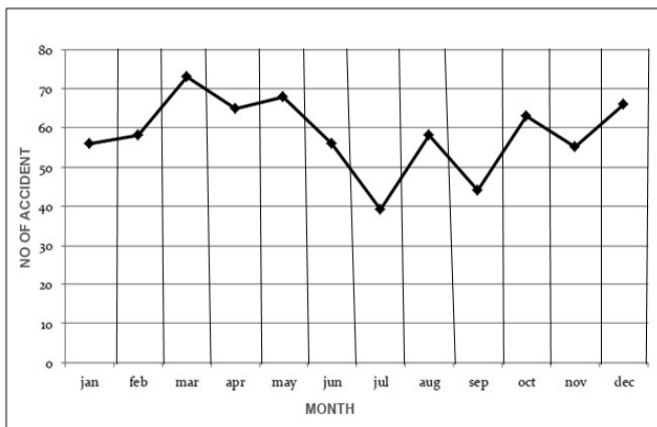


Fig-6 Accident month wise (2007-2017)

Fig 6 shows the monthly variation in accidents. Peak accident occurs in summer season i.e in the month of March, April and may. This is due to distraction related to environment. Problem in these months are glare, fatigue, inconvenient heat.

4.4 Hourly changes in Accidents

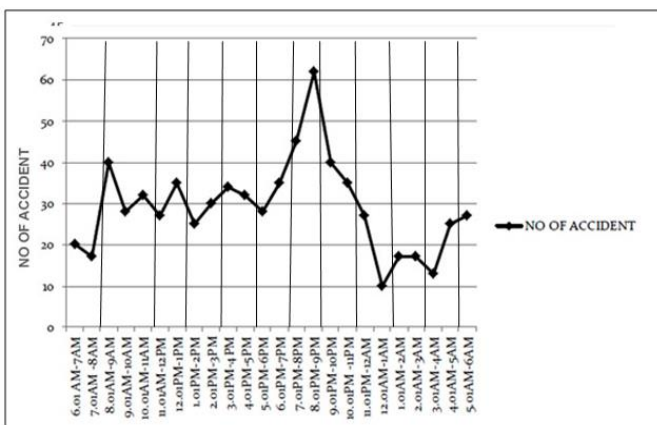


Fig-7 Accident time wise (2007-2017)

Fig 7 shows hourly variation in accidents. One can observe more accidents occurs in between 8PM to 9PM. In this hour line truck (Truck Series) start their long journey. Most of the driver do not use speedometer as they drive by approximation. Speed crosses limiting speed as a result accident occur.

Also they drink and drive in the evening hour. In the late night they use marijuana as a result reaction time increases and loss of control occurs. Some drivers make the vehicle over load. In India load capacity is 10 ton or 16.2 ton for goods carriage but they carry more than that results uncontrolled and leads to accidents.

4.5 Vehicles Involved in accidents

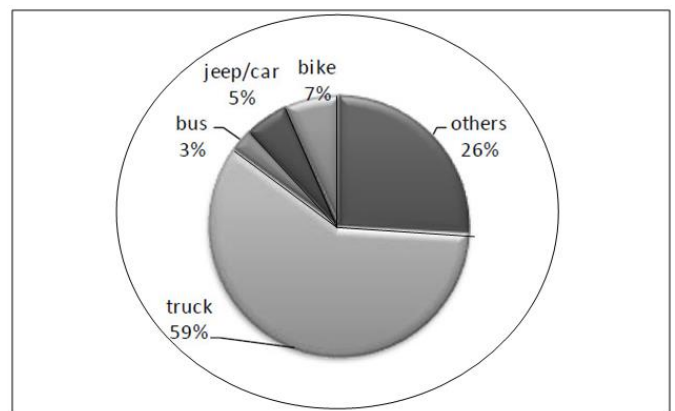


Fig-8 Vehicle involved in fatalities during (2002-2017)

Vehicle users related to fatalities during 2007-2017 are shown in pie chart in percent. The results indicate that 59 percent of fatalities are due to truck drivers followed by 26 percent by unknown driver, 7 percent by motor cycles, 5 percent by car and jeep, 3 percent by bus respectively as shown in fig.8. They consume alcohol and drugs in long driving. As a result reaction time increases and loss of control occurs during speed driving leads to fatalities.

4.6 Accidents according to Traffic Volume

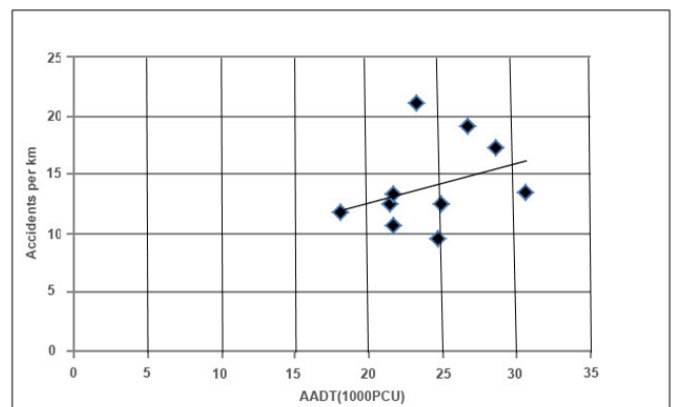


Fig-9 Accidents according to Traffic Volume



Fig. 9 Accidents per km-year as related to traffic volume In order to find the relationship between accident rate and traffic volume, accident rate was presented in two forms. In one case it is the number of accident that occurred in a road section per kilometer per year and presented as accident per km-year. And in other case, it was the number of accidents that occur in a road section per million vehicles (MV) taken in terms of passenger car unit (PCU) per Kilometer (K) per year(Y), represented as Accident per MVKY.

The rate of accidents in terms of accidents per km-year is shown in Fig 9. The curve indicate that accident rate per Km-year increases with AADT

Fig.9 shows the plot between accidents per MVKY and AADT on the road. It was found that accident per MVKY increases with increase in AADT. It may due to faulty design and operational features of highway and influence of other parameters like roadside features, shoulder condition and operational environment.

4.7Trend of Accidents, Injuries and Fatalities during 2007-2017

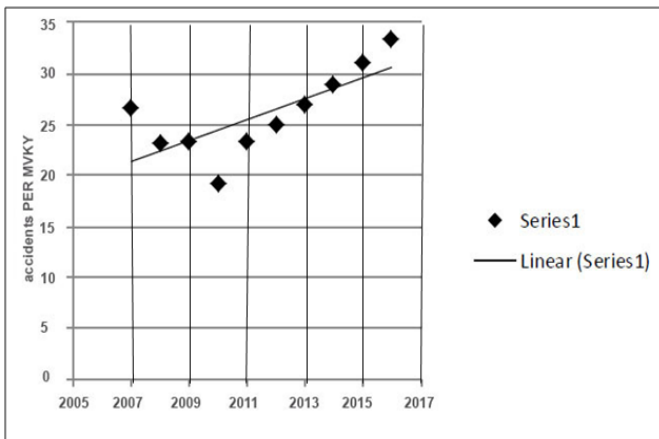


Fig-10 Trend of Accidents (2007-2017)

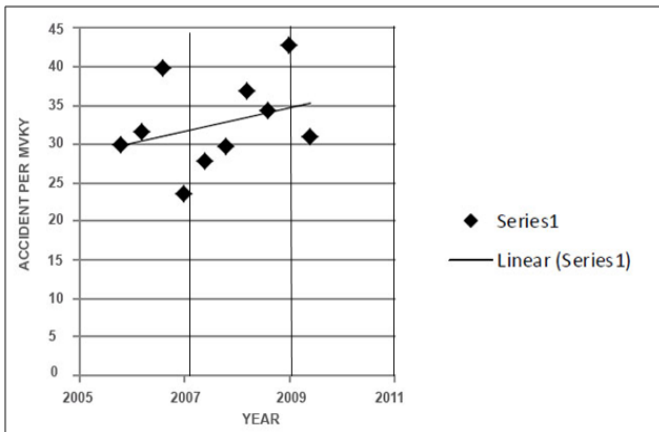


Fig-11 Trend of injuries

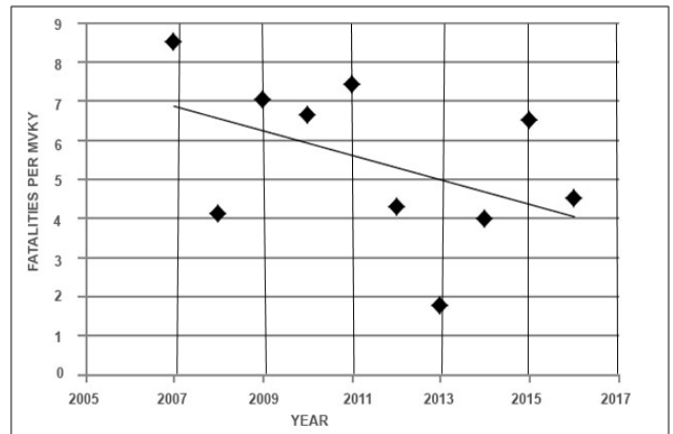


Fig-12 Trend of Fatalities (2007-2017)

The yearly trend of accident per million vehicle-kilometer-years (MVKY) on the road is shown in Fig 11. From the figure it is found that accident rate per MVKY increases in each subsequent Year. The increasing trend in accident rate may be due to increase in population due to town growth, industry growth, poor maintenance of shoulder, electric poles on the road, transformer station on the shoulder, old girth trees on the shoulder, sight distance obstruction due to trees, unsignalized intersection, on street parking of vehicles and lack of general awareness of road safety among road users.

The yearly trend of injuries is shown in Fig.12. Injuries per MVKY is increased in subsequent years as accident rate is increasing.

The yearly trend of fatalities is shown in Fig 12. The fatalities rate per MVKY has decreased. This trend may also be attributed to the cautious driving or regular road users.

4.8 Surface Property

4.8.1 Skid Number

$$SN = \frac{v^2}{2gl} \times 100$$

Where,

SN=Skid Number

v =Velocity of the Vehicle

g = acceleration due to gravity

l = skid length

The value of skid number for different stretches were calculated by using a Tata Indica V2 car with kerb weight 1050 kg with Two Person are shown in Table 4.4 .Normally for a Asphaltic surface skid no varies between 70 to 100. From the below observation it is found that surface friction lies in normal limit.

**Table-6:** Skid Number values of four stretches

Stretch No	ADT	Qmax(pc u/s)	Access Road	Trees on Shoulder	Pol es	Curves	Shoulder condition	Lighting condition
1	63600	0.82	35	23	53	6	Good	Good
2	32160	0.74	21	25	21	5	Average	Average
3	32160	0.74	6	0	0	3	Poor	Poor
4	48960	0.92	4	1	1	6	Poor	Poor

**4.8.2 Average Surface Texture Depth**

Average surface depth was determined by modified sand patch method (Pestle method). Sand passing through 300 micron and retaining on 150 micron was collected as sample. 50 ml (85gm) sample was spread evenly on road surface such that it will fill the depression completely in the shape of a circle. The diameter of circle was measured.

$$\text{Average Surface Texture Depth} = \frac{35416.66}{0.785 \times d^2}$$

The average surface texture depth along the stretch are shown in the Table 4.5 48

**Table -7:** Average Surface Texture values of Road Surface

Sample	Vol(ml)	Dia(cm)	Avg Depth(mm)	Remark
1	50	32.5	0.43	Normal
2	50	30	0.5	Normal
3	50	30	0.5	Normal
4	50	30	0.5	Normal
5	50	38.5	0.3	Slippery Surface

**5. RESULTS**

**5.1 Accident Investigation**

*Accident no-1*

*Accident type:* Head-on collision

*Location:* Dhuskal Road

*Date and Time:* MAR 06, 2015; 4.30PM

*Vehicle 1:* Tata Truck no MH-07/ A-5964

*Vehicle 2:* Bajaj pulsor 150 motor cycle no AP-28/K-6525

*Fatalities/Injuries:* One person dead and one person severe Injured.

*Description:* On 30th march 2015 one Bajaj motor cycle with two person collided with a aluminum loaded truck at Dhuskal road around 4.30PM. The motor cycle was coming from captive power plant and truck was moving on highway. The motor cycle rushed to the right side of truck front. The truck applied brake and turned towards left side. The bike fell down under the rear right wheels. The victims were severely injured. The rider lost his right leg completely and left leg scratched while other was under truck with severe knee and head injuries. The rider had used helmet and saved from head injury. The ambulance came after 30 minutes and took victims to the hospital. The victims were wife and husband from Hyderabad town and rider lost his life after two hour of incident. Cause of accident was due to presence of old banyan tree on the corner of T-junction and ditches of shoulder was filled with water. The motor cycle could not notice the truck due to that big tree and collided with truck on the highway. The tire skid mark length was 11mt. The victims were severely injured. The rider lost his right leg completely and left leg scratched while other was under truck with severe knee and head injuries. The rider had used helmet and saved from head injury. The ambulance came after 30 minutes and took victims to the hospital. The victims were wife and husband from Hyderabad town and rider lost his life after two hour of incident. Cause of accident was due to presence of old banyan tree on the corner of T-junction and ditches of shoulder was filled with water.

*Accident no: 2*

*Accident type:* collusion with tree

*Location:* Thomulapally stage

*Date and Time:* JUN 16, 2016; 12.30PM

*Vehicle 1:* Asok Leyland bus

*Vehicle 2:* Bajaj Auto

*Fatalities/Injuries:* Ten person minor Injured

*Description:* The Bus was on the highway with normal speed. At a T-junction one auto with nine passengers was changing direction (left turn) from bus stop road to highway. Both vehicles became front to front. The bus driver applied sudden brake and struck the vehicle with a old tree present at corner of junction. The auto was escaped from collision. Driver and ten passengers got injured.

*Accident no: 3*

*Accident type:* collision with tree and compound wall

*Location:* Smelter traffic post Angul

*Date and Time:* JUN 19, 2032; 6.10AM

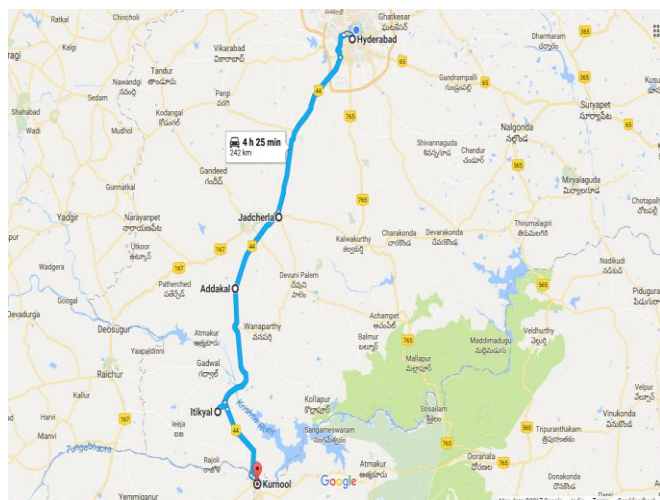
*Vehicle 1:* Tata truck

*Fatalities/Injuries:* One person severe Injured and one minor injured

*Description:* The truck was moving on NH-55.Near traffic post the truck driver could not notice traffic median due to absence of sign post and signal. The truck ran over median and hit with a tree and finally struck with compound wall. The driver became severe injured and helper became minor injured. The vehicle, tree and the compound wall were completely smashed.

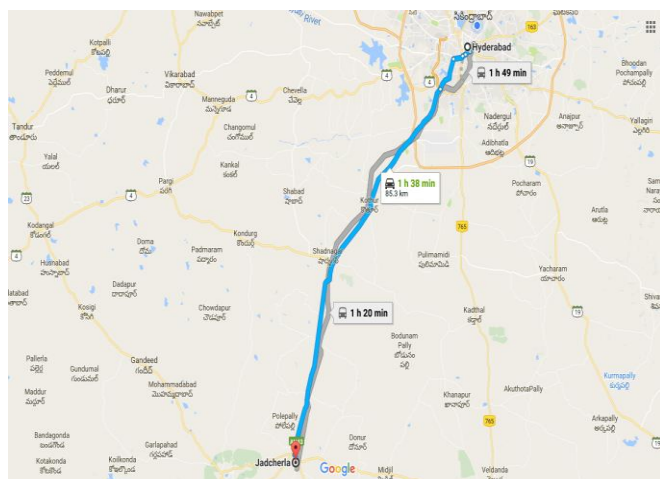
**5.2 black spot recommendations**

**Total Stretch**



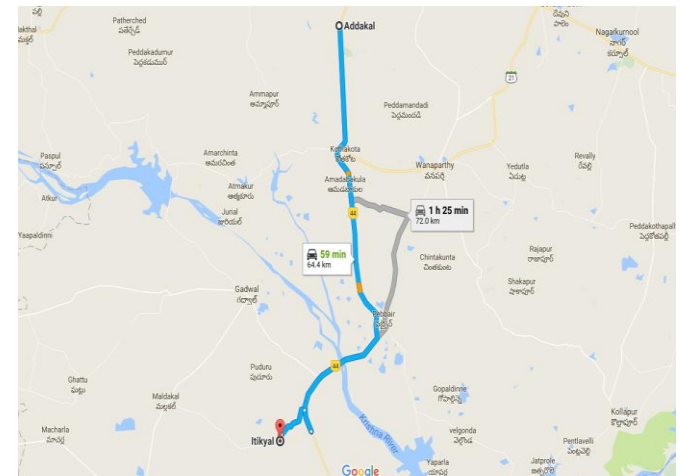
**Fig-13 total stretch**

**Stretch - 1**



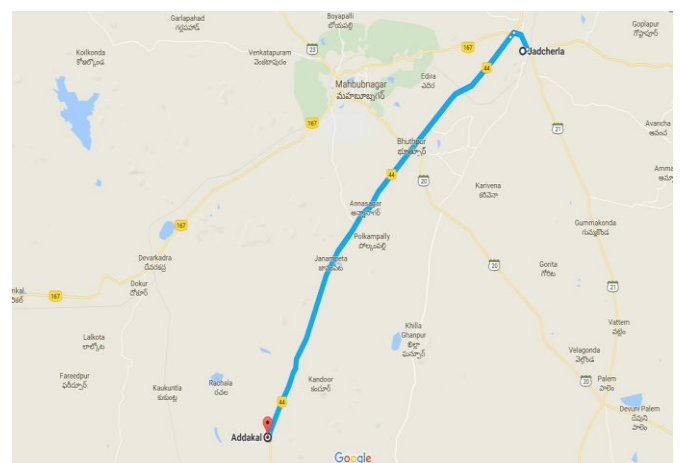
**Fig-14 Black Spot Points Stretch-1**

**Stretch - 3**



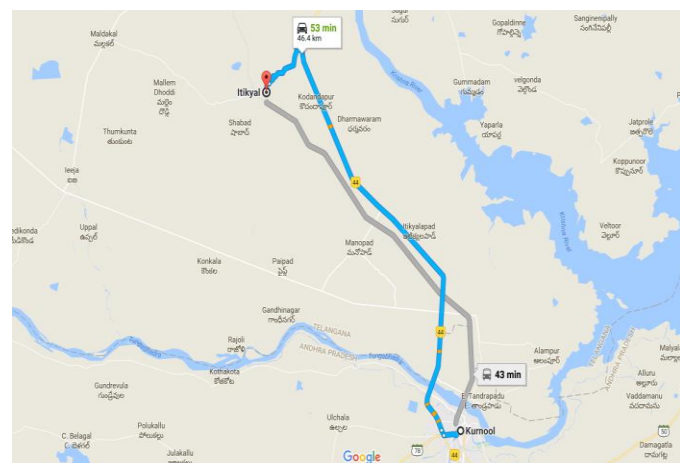
**Fig-16 Black Spot Points Stretch-3**

**Stretch - 2**



**Fig-15 Black Spot Points Stretch-2**

**Stretch - 4**



**Fig-17 Black Spot Points Stretch-4**

**Table -8: Black Spot recommendations of stretch-1**
**NATIONAL HIGHWAYS – 44: Category-A (20 or more Accidents/Deaths) - Nil**

NATIONAL HIGHWAY – 44										
Category-B (10 or more Accidents/Deaths)										
Sl. No.	Name of the Unit	Name of the PS	National Highway No.	Name of the land mark/ Black spot	Type of vehicles and No. of vehicles involved in the accident	No. of accidents	No. of deaths	No. of persons injured	Reason for accident	Recommendations
1	Mahabubnagar	Balanagar	44	Balanagar "X" Road	Tavera, CAR, LORRY, LORRY, PRIVATE BUS, TRACTOR, MC, MC	13	8	7	X-Unsignalised, 10w Garages, Sight distance obstruction by Shops	Junction Improvement, Sight distance visibility
2	Mahabubnagar	Balanagar	44	Peddaipally Cross Road	LORRY,LORRY, MC, TOOFAN, CAR, DCM, UNKNOWN, CAR, UNKNOWN, DCM	10	6	6	O-Unsignalised, Transformer,2w Show Rooms	Junction improvement,Clearance Of obstruction on the Shoulder
3	Mahabubnagar	Balanagar	44	Rangareddyguda "X" Road	RTCBUS, CAR, LORRY, TRACTOR, MC, MC, UNKNOWN, TIPPER, MC, MC, CAR	11	5	6	O-Unsignalised, Taxi stand,Stalls on the Shoulder	Clearance of obstruction on Shoulder,Sight distance visibility
4	Cyberabad	RGI Airport	44	Satamrai "U" Turn	Car, Lorry, Oil tanker, Trailer, DCM, Bike, Jeep, Privata Bus, RTC Bus	16	9	10	T ,Taxi stand, Vegetable Market	Clearance of obstruction on Shoulder,Sight distance visibility

NATIONAL HIGHWAYS - 44										
Category-C (5 or more Accidents/Deaths)										
Sl. No.	Name of the Unit	Name of the PS	National Highway No.	Name of the land mark/ Black spot	Type of vehicles and No. of vehicles involved in the accident	No. of accidents	No. of deaths	No. of persons injured	Reason for accident	Recommendations
1	Mahabubnagar	Kothur	44	Thimmapur Check Post	Lorry, Car, Car, DCM, Tipper, M/C.	5	5	3	X-Unsignalised, 10w Garages, Sight distance obstruction by Shops	Junction Improvement, Sight distance visibility
2	Mahabubnagar	Kothur	44	Venkateshwara Harcheries	M/C, Auto, Car, Lorry, DCM	5	4	1	O-Unsignalised,Transformer,2w Show Rooms	Junction improvement,Clearance Of obstruction on the Shoulder
3	Mahabubnagar	Kothur	44	IOC Patrol Bunk	Tractor, Car, M/C, Lorry, Auto, DCM.	7	4	1	O-Unsignalised, Taxi stand,Stalls on the Shoulder	Clearance of obstruction on Shoulder,Sight distance visibility
4	Mahabubnagar	Kothur	44	Y Junction	TRACTOR, UNKNOWN, TRACTOR, CAR, LORRY	8	2	7	T ,Taxi stand, Vegetable Market	Clearance of obstruction on Shoulder,Sight distance visibility
5	Mahabubnagar	Kothur	44	RM Steel Company	CAR, CAR, LORRY, LORRY, UNKNWON, UNKNOWN	6	0	6	X-Signalized, Cinema Hall,2w garages, Trees and Poles on Shoulder	Clearance of obstruction on Shoulder,Sight distance visibility
6	Mahabubnagar	Shadnagar	44	H P petrol Pump	CAR, LORRY, MC, UNKNOWN, CAR, MC, CAR, LORRY, LORRY	3	8	0	T, Cinema Hall, Trees on Blind Corner, Trees and Poles on Shoulder, Main Bus Stop	Clearance of obstruction on Shoulder,Sight distance visibility
7	Mahabubnagar	Shadnagar	44	Dhuskal Road	BOLERO, LORRY, RTC BUS, LORRY, UNKNOWN, UNKNOWN, TOOFAN	5	3	5	X-Signalized, Paved Shoulder with no Marking, Transformer on blind corner, On Street Parking of Vehicles	Clearance of obstruction on Shoulder,Sight distance visibility
8	Mahabubnagar	Shadnagar	44	Keshampet 'X' Road	INNOVA, LORRY, RTC, CAR, MC, UNKNOWN, AUTO, DCM	8	2	5	Paved Shoulder with no Marking,On Street Parking	Installation of Speed Breakers and Marking

**Table -9: Black Spot recommendations of stretch-2**
**NATIONAL HIGHWAYS – 44: Category-A (20 or more Accidents/Deaths) - Nil**

NATIONAL HIGHWAY - 44										
Category-B (10 or more Accidents/Deaths)										
Sl. No.	Name of the Unit	Name of the PS	National Highway No.	Name of the land mark/ Black spot	Type of vehicles and No. of vehicles involved in the accident	No. of accidents	No. of deaths	No. of persons injured	Reason for accident	Recommendations
1	Mahabubnagar	Addakal	44	Kommireddy pally L & T Room	CAR, CAR, UNKNOWN, CAR, LORRY	4	#	5	Bad Shoulder, Front area of Petrol Pump damaged	Shoulder maintenances,Petrol Pump Front should be repaired



NATIONAL HIGHWAYS - 44										
Category-C (5 or more Accidents/Deaths)										
Sl. No.	Name of the Unit	Name of the PS	National Highway No.	Name of the land mark/ Black spot	Type of vehicles and No. of vehicles involved in the accident	No. of accidents	No. of deaths	No. of persons injured	Reason for accident	Recommendations
1	Mahabubnagar	Addakal	44	Janampet stage	MC, CAR, LORRY, BOLERO, UNKNOWN	6	5	1	T Junction	Sign boards & Speed control fiber stoppers placed
2	Mahabubnagar	Addakal	44	Addakal stage	MC, LORRY, LORRY, LORRY, CAR	6	2	4	Over speed	Fiber stoppers & Sign boards placed

Table 6.4 Black Spot recommendations of stretch-3

NATIONAL HIGHWAYS – 44: Category-A (20 or more Accidents/Deaths) – Nil

NATIONAL HIGHWAYS – 44: Category-B (10 or more Accidents/Deaths) – Nil

NATIONAL HIGHWAYS - 44										
Category-C (5 or more Accidents/Deaths)										
Sl. No.	Name of the Unit	Name of the PS	National Highway No.	Name of the land mark/ Black spot	Type of vehicles and No. of vehicles involved in the accident	No. of accidents	No. of deaths	No. of persons injured	Reason for accident	Recommendations
1	Mahabubnagar	Kothakota	44	Palem stage	DCM, AUTO, MC, UNKNOWN, MC, LORRY, UNKNOWN, DCM, LORRY	4	50	8	X-Signalized, Paved Shoulder with no Marking, Transformer on blind corner, On Street Parking of Vehicles	Clearance of obstruction on Shoulder, Sight distance visibility
2	Mahabubnagar	Pebbair	44	Thomulapally stage	MC, TRACTOR, LORRY, BUS, DCM, LORRY	3	6	7	On Street Parking, Hotel Verandah Shoulder	Clearance of obstruction on Shoulder, Sight distance visibility
3	Mahabubnagar	Pebbair	44	Kurnool By pass	CAR, CAR, UNKNOWN, BUS, LORRY, LORRY, UNKNOWN	6	1	9	Petrol Pump, Taxi Stand, Trees and Poles on The Shoulder	Clearance of obstruction on Shoulder
4	Mahabubnagar	Pebbair	44	Rangapur limits	INNOVA	1	5	1	T Junction	Sign boards & Speed control fiber stoppers placed

Table -10: Black Spot recommendations of stretch-4

NATIONAL HIGHWAYS – 44: Category-A (20 or more Accidents/Deaths) – Nil

NATIONAL HIGHWAYS – 44: Category-B (10 or more Accidents/Deaths) – Nil

NATIONAL HIGHWAYS - 44										
Category-C (5 or more Accidents/Deaths)										
Sl. No.	Name of the Unit	Name of the PS	National Highway No.	Name of the land mark/ Black spot	Type of vehicles and No. of vehicles involved in the accident	No. of accidents	No. of deaths	No. of persons injured	Reason for accident	Recommendations
1	Mahabubnagar	Itikyala	44	Kodandapur junction	CAR, LORRY, RTC BUS, MC, UNKNOWN	6	2	10	Turning	Fiber stoppers & Sign boards placed
2	Mahabubnagar	Itikyala	44	Vemula road	CAR, LORRY, UNKNOWN, MC, MC, TOOFAN, CAR, LORRY, RTC BUS	7	4	6	Road Up & Down	Fiber stoppers & Sign boards placed
3	Mahabubnagar	Itikyala	44	Monapadu bus stop	MC, UNKNOWN, MC, AUTO, RTCBUS, UNKNOWN, UNKNOWN, CAR, DCM	9	5	8	Road crossing	Sign boards installed
4	Mahabubnagar	Itikyala	44	Mamidala padu junction	DCM, AUTO, MC, UNKNOWN, MC, LORRY, UNKNOWN, DCM, LORRY	4	5	3	Junction	Sign boards, light signals & road crossing signals placed
5	Mahabubnagar	Itikyala	44	Panchalingalla Y junction	TRACTOR, UNKNOWN, TRACTOR, CAR, LORRY	8	2	7	T, Taxi stand, Vegetable Market	Clearance of obstruction on Shoulder, Sight distance visibility

### 3. CONCLUSIONS

#### 7.1 General

Finally we completing the project by the parameters causing accidents were selected by referring international journal papers, interviewing local commuters, preliminary survey. The analysis of existing data and field survey data was collected stretch local police stations. The data was further analyzed by Accident priority Method and was correlated with the results obtained from above methods to give recommendations for prevention of accidents

#### 7.2 Conclusions

(1) The available uneducated on accident analysis indicate that 76.4 percent of road accidents in India is caused due to driver's error.

(2) Commercial vehicles like truck are involved in maximum no of accident on two-lane roads. It is come to know that fatalities caused by commercial vehicles are 60% followed by other (27%) and bike (8%) and jeep (6%) and bus (4%).Road safety awareness should be raised among road user.

(3) Stretch one has the highest no of accidents which accounts for 35.1% of total accidents .The Accident rate can be decreased by road side features clearance, proper maintenance of shoulders, lighting, and junction improvement. Speed limit should be brought down by providing humps near accident spots. Sight distance near curves should be obstruction free.

(4) Stretch four has the second highest no of accidents accounts for 33.5% of total accident. The Accident rate can be reduced by providing signalized junction, junction improvement, and shoulder Clearance, installation of humps, shifting of poles, and removal of trees near the edge of pavement etc.

(5) No of accidents in stretch three accounts for 30.6% of total accidents. The accident rate can be reduced by clearing-off shoulders, reducing speed limit, junction improvement, providing Signals on the median, shifting structures on the shoulder.

(6) Stretch two has minimum no of accidents accounts for 4.7% of total accidents. Speed limit reduction near junction should be reduced to prevent accidents.

#### 7.3 Future Scope of the study:

After finding the identified accident black spots of the study area if the rate of accidents decreases then the accident density method can be used to identify accident black spots on all types of roads

### REFERENCES

- [1] Achuta nanda dehuri, "impacts of roadway condition, traffic and manmade features on road safety
- [2] Sivakumar, .Krishnaraj(2012),Road Traffic Accidents (RTAs) Due To Drunken Driving In India, Challenges In Prevention international journal of research in management and Technology, ISSN: 2249 9563 VOL. 2, pp.401-406
- [3] Accidental deaths in india(2011), National Crime Records Bureau, Ministry of Home Affairs, Government of India,New Delhi
- [4] Chandraratna et al(2006) Crash involvement of drivers with multiple crashes, Accident Analysis and Prevention vol. 38 pp.532-541Global Road Safety Partnership Annual Report (2011)
- [5] Torregrosa et al.,(2012) New geometric design consistency model based on operating speed Profiles for road safety evaluation, Accident Analysis and Prevention Article in press AAP - 2915 pp.1-10
- [6] Anne et al., (2010), the effects of minimum legal drinking age 21 laws on alcohol-relate driving in the United States Journal of Safety Research Vol.41, pp.173-181
- [7] Blower et al., (1998) Fatalities and Injuries in Truck crashes by Time of day, University of michigan Transport Research Institute 1998
- [8] Osueke and Okorie(2012)The Role Of Tire In Car Crash, Its Causes, And Its Prevention Vol.2 Issue 12 Dec 2012

### BIOGRAPHIES



C. M. Hari Krishna,  
Doing post graduate in Department of transportation Engineering, AVNIET, Ibrahimpatnam, Hyderabad



Javedali M Jalegar  
Working as assistant professor in AVNIET, Ibrahimpatnam, Hyderabad. Completed M.Tech from NIT watangal.