

# Analysis of Accident Rate at Black Spots on NH-6, Amravati (Maharashtra)

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**Abstract**— India is a developing country and road safety of is still in a premature stage. An Accident is the result of a combination of factors such as road defects, human error, engineering defects of the vehicle, non-availability of pedestrian facility, cyclist facility, circumstantial factors such as weather condition, visibility etc. Accident causes death, disablement, damage to property and health, social suffering and also general degradation of the environment. The location on a roadway where the traffic accidents often occur is called a black spot. A case study was taken on NH-6 of Amravati district in Maharashtra state. The main problems on this road are bad condition of road and shoulder, trees and poles on the shoulder. The safety deficiencies were detected to minimize accidents on road and save the road users. The deficiencies along with the measures for further improvement had been presented in this paper.

**Key words:** Black Spot Analysis on NH-6, Accident Rate & Frequency, FIR index

## I. INTRODUCTION

Road transport is an important mode of transportation in India. Road transport system has its contribution in national economy of India. There is expansion in motorization, urbanization, number of vehicles and length of the road networks over the years, so as to meet the demands of road transport. The adverse effect of this expansion on country is that, it leads to increase in number of road accidents and road crash fatalities. A Road accident is negative externality

associated with expansion in road network, urbanization and motorization in the country. Road accidents impose a great burden on individuals, society and property. The steep growth of traffic on the Indian roads in recent years has caused a sharp increase in the incidence of traffic accidents. As sustainable solutions for all classes of road safety have not been identified, particularly remote roads and low-traffic rural, a hierarchy of control should be applied, similar to classifications used to improve occupational safety and health.

## II. OBJECTIVE & SCOPE OF THE WORK

The selected stretch of road was divided in to four stretches. The accident data of last eleven years was collected .The study objectives include:

- 1) Identification of black spot on selected road
- 2) Detailed analysis of top ranked spots.
- 3) Suggesting remedial measures to reduce accidents

## III. ROAD SELECTED FOR BLACK SPOT ANALYSIS

Two-lane road of about 20 Km from hotel Gauri Inn to hotel Landmark Badnera on NH-6 was chosen for this study. The road was divided into four stretches of 5 Km each. The following stretches were selected for data collection.

- 1) Stretch 1 - Hotel Gauri Inn to Biyani Square
- 2) Stretch 2 – Biyani Square to Dastur nagar
- 3) Stretch3- Dastur nagar to Annex Restaurant
- 4) Stretch4- Annex Restaurant to Hotel Landmark Badnera

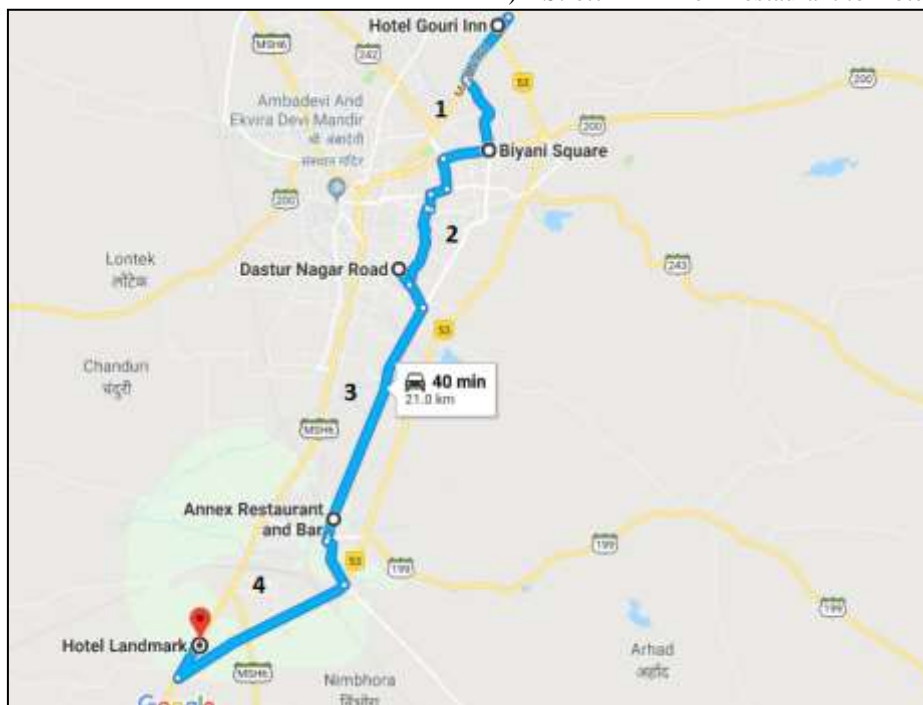


Fig. 1: Study Area Source: Google Map

#### IV. DATA COLLECTION & ANALYSIS

Accident data was collected from police department from FIR index (First Information Report) during period 2007-2017. Accident data includes:

- 1) Date and Time of occurrence of accidents
- 2) Location of accident.
- 3) Details of accident i.e. injuries, fatalities and property damage.
- 4) Type of Hitting Vehicle
- 5) Type of Hitten Vehicle.

##### A. Accident Rate & Frequency

Accident Rate =  $M / L$

Where M = Total no of Accidents of a stretch.

L = Length of Road.

Name of stretch	Length	No. of accidents in a year	
		Sum of 11 year	Accident rate
Hotel Gauri Inn to Biyani Square	5 km	21	4.2
Biyani Square to Dastur nagar	5km	103	20.6

Dastur nagar to Annex Restaurant	5km	73	14.6
Annex Restaurant to Hotel Landmark Badnera	5km	120	24

Table 1: Accident Rate

Distance of origin	No of accidents (2007-2017)	Frequency	Total frequency
0-5	21	06.6	06.6
6-10	103	32.5	39.1
11-15	73	23	62.1
16-20	120	37.9	100
Total	317	100	

Table 2: Frequency of Accident

#### V. BLACK SPOT ANALYSIS

The location of road where the maximum numbers of accidents occurs is known as a Black Spot. Analysis of road is required for improving traffic environment. The detail analysis of four stretches is shown in Fig 2,3,4,5 and Table 3,4,5,6.

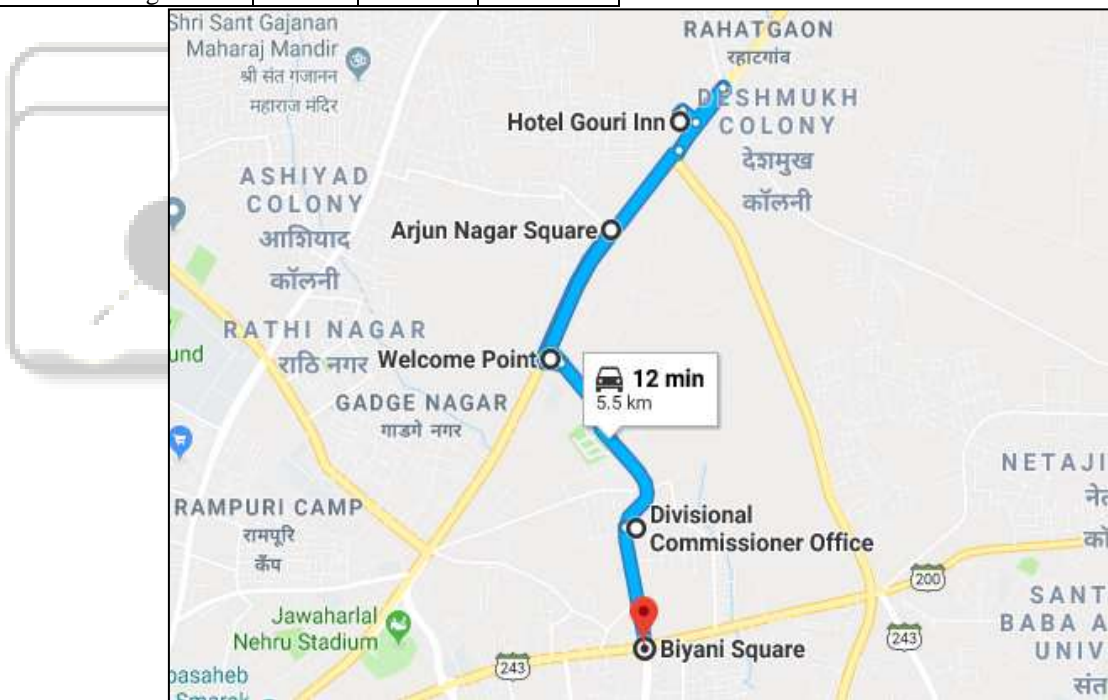


Fig. 2: Black Spot Points on Stretch 1 Source: Google Map

Accident Point	Nos	Problems	Safety Enhancement
Hotel Gauri inn	4	Unsignalised T junction	Junction Improvement
Arjun Nagar	2	Trees on shoulder	Trees on Shoulder should be removed
Welcome point	4	On Street Parking of Vehicles	Off Street Parking Facility
Divisional Commissioner Office	3	Trees and poles on shoulder, Sight distance obstruction	Clearance of obstruction on shoulder, Sight distance visibility
Biyani Square	10	Cross junction, Unpainted Median, auto stand	Junction improvement

Table 3: Black Spot Analysis of Stretch 1

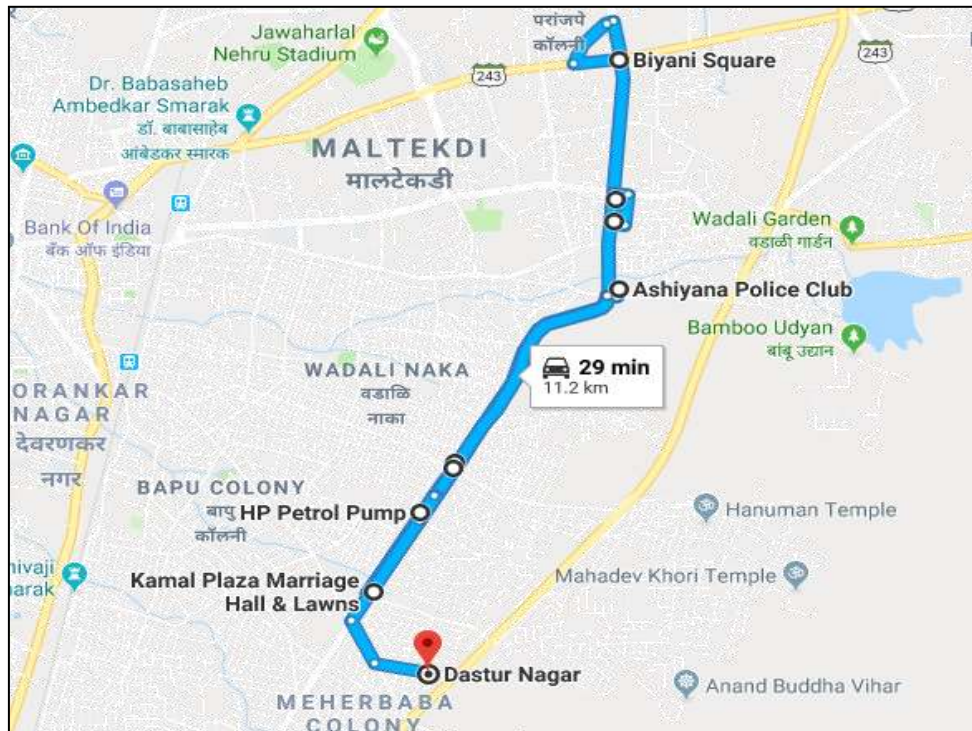


Fig. 3: Black Spot Points on Stretch 2

Accident Point	Nos.	Problems	Safety Enhancement
Yashoda Nagar Square	20	X-Unsignalised, bad condition of median, On Street Parking, Shops on Shoulder	Junction Improvement, Clearance of obstruction on the Shoulder, Off street Parking Facility
Ashiyana Police Club	7	T, Trees on Blind Corner	Trees on Shoulder should be removed
HP Petrol Pump	4	Bad condition of Speed Breakers and shoulder	Speed Breaker and Shoulder maintenances
Kamal Plaza	10	T-junction, poles and trees on shoulder	Junction Improvement, Clearance of obstruction on the Shoulder
Chaprashipura Masjid Square	12	X-Unsignalised, Vendors on Road, Bad Median Condition	Junction Improvement, Restriction on Vendors, Maintenance Of Median
Sakha Mangal Karyalya	3	On Street Parking	Off Street Parking Facility
Adaneshwar Temple	5	Bad Shoulder, Edge drop	Shoulder maintenances
Wadali T-Point	6	T Junction, Trees on Blind Corner, Bus Stop	Trees on Shoulder should be removed, Road Marking
Kumbhar wada	5	Taxi stand, Trees and Poles on Shoulder, Median without Sign on the Road	Junction Improvement, maintenance of Shoulder
Shukrawar Bazar Road	3	Cross junction, Vegetable Vendors on Road,	Restriction to vendors on Road
Hanuman Temple	2	T, Road without Marking, Bad Shoulder	Road Marking, Shoulder maintenances
SBI Bank	4	Bus Stop, Bad Condition Of Road	Road maintenances
Aditya wine shop	6	Stalls on the Shoulder, Steep Gradient	Speed Restriction, Clearance of Obstruction on the Shoulder

Table 4: Black Spot Analysis of Stretch 2

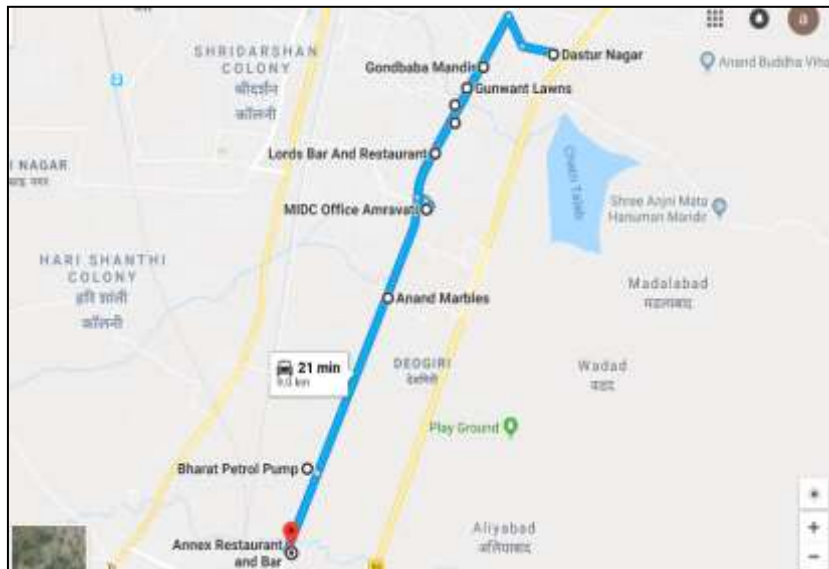


Fig. 4: Black Spot Points on Stretch 3

Accident Point	Nos.	Problems	Safety Enhancement
Dastur Nagar ChowkS	10	X-Unsignalised, Auto stand, Vehicle Parking on Shoulder, Vendors on Shoulder, Bus Stand	Junction Improvement, Separate Auto stand, Off-street Parking, Clearance Of Obstruction from Shoulder
M.I.D.C Office	17	T junction, Steep Gradient, Bad Condition of Shoulder and Road	Speed Restriction, Maintenance of Shoulder and Road
Manor Mangal Karyalya	5	Y junction, Bad Condition of road, Road Without Marking	Improvement of Road condition, Provide marking on Road
Gunwant Lawn	6	Cross junction, Blind Curve, Trees and Poles on Shoulder	Clearance Of Obstruction from Shoulder, Curve Sight Distance
Gondbaba Temple	8	Cross Section, Auto stand, Blind Curve, Unpainted Median	Speed limit Resstriction, Junction Improvement, Medians to be Painted
Lords Hotel	3	T Junction, Trees on Shoulder, No Bad Speed Breakers	Installation of Speed Breakers, Clearance Of Obstruction from Shoulder
Anand Marbles	4	T junction, Road Without Marking, Bad Condition of Road and Shoulder	Junction Improvement, Separate Auto stand, Shoulder maintenances, Road Marking

Table 5: Black Spot Analysis of Stretch 3

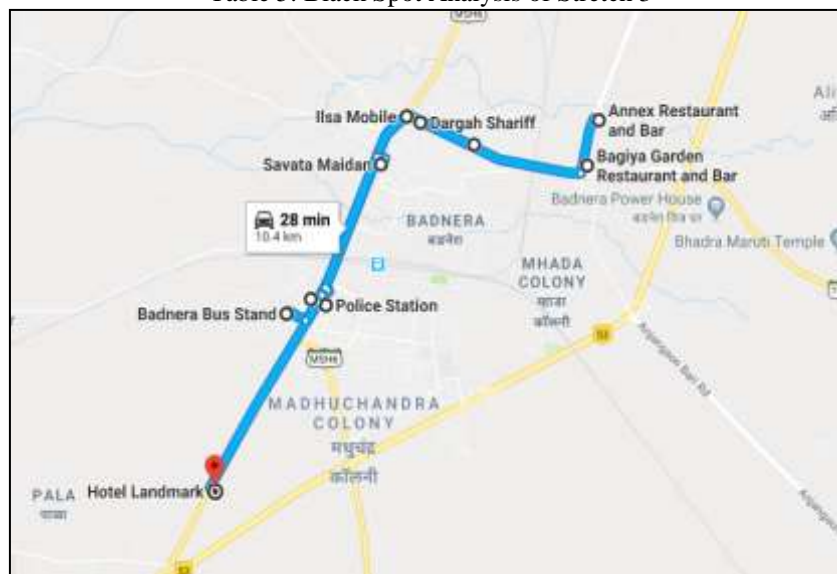


Fig. 5: Black Spot Points on Stretch 4

Accident Point	Nos.	Problems	Safety Enhancement
Annex Restaurant and Bar	2	Plants on Shoulder, Bad Condition Of Road, Road Without Marking	Clearance of obstruction on the Shoulder, Maintenance of road
Bagiya Restaurant	8	T junction, Steep Gradient, Trees on Blind Corner	Trees on Corner should be removed, Speed Restriction
Darga Shariff	5	X-Unsignalised, Bus Stand, Auto Stand, On Street Parking of Vehicles,	Off Street Parking Facility, Restriction for Vendors, Junction Improvement
Savata Maidan	9	Trees on Shoulder, School, Edge drop	Clearance of obstruction on the Shoulder, Road Maintenance
Badnera Police Station	2	T junction, Bad Speed Breakers	Maintenance of Speed Breaker, junction Improvement
Badnera Bus Stand	4	Motor garages, Shops on Shoulder	Clearance of obstruction on the Shoulder
Railway Bridge	15	Bad Condition of Shoulder and Road , Edge drop, Median Unpainted	Shoulder and Road maintenances, Medians to be Painted
Old By Pass Railway Gate	8	Edge Drop, Road without Marking, Median Unpainted	Shoulder Improvement, Road Marking, Median to be Painted
Modi Hospital	3	Taxi stand, Trees and Poles on Shoulder, Median without Sign on the Road	Clearance of obstruction on the Shoulder, Maintenance of road
Juniwasti Bus Stop	4	Vendors on Road, Road without Marking	Restriction to Vendors, Road Marking
Gandhi College		T, Road without Marking, Bad Shoulder, Auto Stand	Road Marking, Shoulder maintenances
Nimbhora Nagar	7	Bus Stop, Paved Shoulder with no Marking	Shoulder maintenances
Almas Chowk Juniwasti	6	Cross Junction, On Street Parking	Off-Street Parking Facility, Junction Improvement

Table 6: Black Spot Analysis of Stretch 4

#### VI. CONCLUSIONS

- 1) Stretch 4 has the highest number of accidents which accounts for 37.9% of total accidents .The accident rate can be decreased by road side clearance, junction improvement, proper maintenance of shoulders and lighting. Speed limit should be brought down by providing speed breakers near accident spots. Providing Off-street parking facility.
- 2) Stretch 2 have the second highest number of accidents which accounts for 32.5% of total accident. The accident rate can be reduced by providing signalized junction, junction improvement, and shoulder Clearance, shifting of poles, installation of humps, removal of trees near the edge of pavement etc.
- 3) Number of accidents on stretch 3 accounts 23% of total accidents. Accidents can be minimized by clearing-off shoulders, reducing speed limit, junction improvement, providing the medians, improving road condition.
- 4) Stretch 1 has minimum number of accidents. Speed limit reduction near junction should be provided to prevent accidents.

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