



e-ISSN: 2319-8753 | p-ISSN: 2347-6710

# IJRSET

International Journal of Innovative Research in  
**SCIENCE | ENGINEERING | TECHNOLOGY**

# INTERNATIONAL JOURNAL OF INNOVATIVE RESEARCH

IN SCIENCE | ENGINEERING | TECHNOLOGY

Volume 11, Issue 6, June 2022

**ISSN** INTERNATIONAL  
STANDARD  
SERIAL  
NUMBER  
INDIA

Impact Factor: 8.118

9940 572 462

6381 907 438

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# Identification of Black Spot on National Highway No 48 Sarola to New Tunnel Mangadewadi(40.1KM)

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**ABSTRACT:** India is a great country; highway plays an important role in the development of the nation. As national roads are the backbone of transport in the country so they should be safe from accidents. National highways transport people and building materials from one place to another at high speeds. The increase in the number of vehicles on the roads has increased the chances of accidents. The causes of accidents can be divided into two categories namely independent features and objective features. The main features refer to the attitudes of drivers and pedestrians on the roads while the intended features refer to road conditions, road geometry, etc. related to the engineering perspective. Independent factors (psychological factors) cannot be controlled by external means but the target factors can be controlled through various corrective measures. Therefore, in this paper, the intended features are analyzed and described as well as additional visual inspections and corrective measures. In order to analyze the black dots by mistake the data was collected. Key data was collected by conducting a visual survey on NH-48 and secondary data (Available data) was collected from India Highway Authority (NHAI) authorities for two years (2020-2021). The primary and secondary data were then analyzed in the form of scale, weight gain method and method of accidental congestion and accidental black dots obtained from NH-48. Corrective measures can then be raised in the right place at risk after conducting a separate study. Remedial measures if they can eliminate the risks to zero will reduce the risks to a minimum. The study of accidental black spots focuses on road safety research as it is a related topic so if road safety is satisfied it means it will reduce the level of accidents. This risk reduction will eliminate the dark area by mistake if any. Risk areas should therefore be assessed for safety measures and thus adjusted to the existing road design or road condition to achieve a safety feature. The Indian National Highways will therefore be constructed taking into account all of these inputs related to safety and design standards.

**KEYWORDS:** Accidental Black spots, NH-48 (National Highway 48), Ranking Method, Severity, Index Method, Accidental density method.

## I. INTRODUCTION

Accidentally dark spots can be defined as open areapart of the road where the risk of an accident is high or where an accident occurs frequently. In recent years road safety it has become a major global problem. Therefore road safety is very important in the current situation. In Maharashtra, there were 3577 fatal accidents and 9396 deaths serious accidents occur on national highways (As mentioned above Report of the National Crime Records Bureau 2015). I accidental diagnosis, analysis and treatment of blacks spots are the most effective means of road accidents prevention. Maharashtra is one of the fastest growing provinces in India. The main reason for its development is due to the widespread spread road network. This road network helps even better the immediate delivery of goods internally means supports state development. As a community increase, vehicle numbers are also increasing leading increased risk thus hindering the development of situation. To avoid accidents on the highways, study should be made to locate a common hazardous area and on request steps to repair that part of the road. In an effort to reduce risk levels and improve overall performance road conditions and driving information for road users a formal safety test called Road

the Safety Inspection Report is made annually by the National Highways Authority of India. This helps to achieve the potential for collision of newly formed and existing variants roads thus help to improve and maintain good condition roads.

The main purpose of this report is to 1) Reduce the incidence of crashes. 2) Reduce the risk of injury. 3) Ensuring safety measures are met in the design of roads 4) Including the safety of every road user. Thus we can summarize the main purpose of road safety Audit Report is to ensure that every new and existing highway the systems work as securely as possible. This means security should be considered in all arrangements as well construction of any project. As road safety is a big issue and the subject of death and life is an important part of it accidental black color analysis.

## II. RELATED WORK

In 2018, Fayaz, Mrudula, George, Yoyak and Roy are pregnant remove the dark area identification using the risk indicator method. They used the size indicator method by mistake accidental black spot identification in Cochin City. Okwe black color analysis three years data by mistake has been mentioned. After analyzing this data they found that The Cheranallur signal was a high-risk area and the location of the road.

2017, Landge and Mohan applied weight to weight loss index indicates an accidental orientation Amravati-Nagpur Road stretches from Asian Highway 46. The the top five locations were selected as the black area according to the value of each WSI from the data collected and the method of operation. Depending on dark spots correction methods were suggested.

2015, Sorate, Kulkarni, Bobade, Patil, Talathi, Sayyad and Apte identified dark areas of danger in NH 4 (New Katraj Tunnel to Chandani chowk). The main goal was to find dark area by mistake by collecting secondary data from National Highway Authority of India (NHAI) and police data, conducting a visual survey (key data) and analyzing this data in the form of a standard and an index of size, by accident method of congestion and indicator of weight gain.

In 2011, Naidu, Venkat and Vamsi identified and analyzed dark spots on NH5-Visakhapatnam (India). The data was there collected at the police station for 3 years from 2008 to 2010. Preliminary analysis reveals its existence five black spots on a particular road. This study attempted to identify black spots by mistake by counting the percentage of accidents that occur in a particular area.

In 2010, Thube researched the rural highway and found it various causes of accidents and raised repairs steps. Identification of the most common risk areas was performed by PWD according to information obtained from the local police at the station. These areas are categorized based on size of accidents. Continued is the kind of adjustment rate that should be adopted in these areas was stated.

## III. PROBLEM STATEMENT

From last few years, it has been observed that from SAROLA TO NEW TUNNEL MANGADEWADI there is increase in accidents and due to accidents number of fatalities also increases.

It is the National Highway 48 so that there is increase in traffic & unfortunately in accidents. Also it has been observed that between Sarola to New Tunnel Mangadewadi there are some black spots are there where the accidents are frequently happened.

So, to reduce the accident rates it is very important to identify the places where accidents frequently are happened i.e Blackspots & give preventive measures for it.



**IV. STUDY AREA**

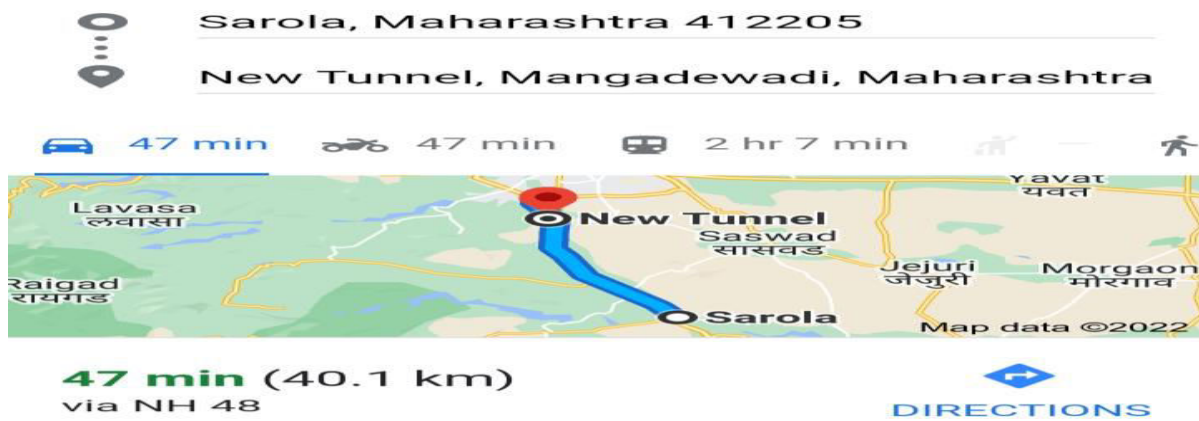
The research site was selected for the Pune region for which National Highway 48 also passes with a view to study 40.1 km part of the road was chosen between Sarola to New Tunnel Mangadewadi

Six-Lane NH48 (Sarola To New Tunnel Mangadewadi 40.1km)

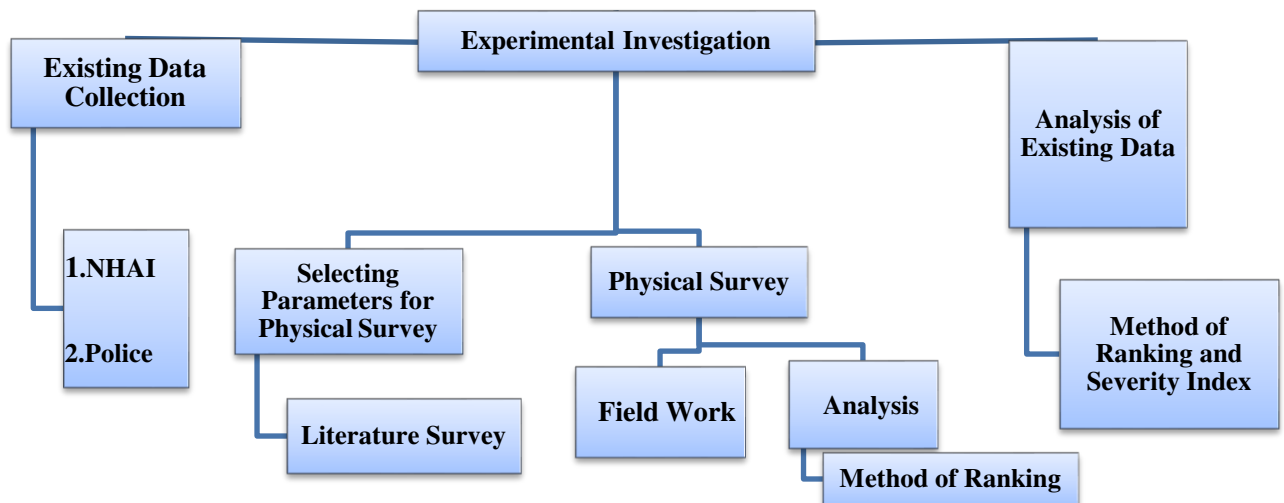
Sarola is located in India at the longitude of 180°17'77" N and latitude of 730°95'53"E New Tunnel Mangadewadi is located in India at the longitude of 180°44'89"N and latitude of 730°86'80"E.

Straight Line Distance : 40 KM and 100 meters / 28.1 miles.

Travel time : 36 Minutes. Direction and bearing : West side, 260 degree



**V. METHODOLOGY**





The methodology mainly consisted of the collection of existing data as well visual survey. There are usually two ways

- Existing data collection

Details are collected from the National Highway Authority of India (NHAI). The data obtained from NHAI was organized sequentially in the 1000M series. I error data made in summer including location for risk, type of risk, risk classification as well type of victims and accident summary. Then the data were analyzed in different ways

I. Measurement method and size indicator

ii. How to accidentally congest

iii. Method of limited size

- **Visual research**

Here the data on road conditions were confirmed by conducting visual exploration of local conditions. I a visual survey was conducted in two different phases as provided-

- **Existing data collection**

The data was collected from online last 3 Year FIR. The accidental data was summarized including the location of accident, nature of accident, classification of accident and the type of causalities along with summary of accidents. Then data was analysed by different methods which are

1. Method of ranking and severity index
2. Accidental density method
3. Weighted severity method

- **For Existing Data**

for analysis of existing data, the data was segregated into different categories.

a) Nature of accidents: -

- i) Overturning, ii) Head on collisions, iii) Rear end collisions, iv) Collisions brush, v) Right turn collisions, vi) Skidding

b) classification of accident:-

- i) Fatal, ii) Greivous injury, iii)Minor injury, iv)Non injury



**Observation table for Identification of Black Spot on NH48 (Nature of Accidents)**

Sr.no	Chainage	Nature of accident						SI β	SI %	
		1	2	3	4	5	6			
1.	798.300	N	N	N	N	N	N	0	28.57	
2.	802.100	N	N	Y	N	N	N	6	28.57	
3.	805.600	N	N	Y	N	N	N	6	28.57	
4.	805.800	N	N	Y	N	N	N	6	28.57	
5.	811.200	N	N	Y	N	N	N	6	28.57	
6.	811.550	N	N	Y	N	N	N	6	28.57	
7.	816.250	N	N	N	N	N	N	0	0	
8.	820.050	N	N	Y	N	N	Y	11	52.38	
9.	820.150	N	N	Y	N	N	N	6	28.57	
10.	821.900	N	N	Y	N	N	N	6	28.57	
11.	823.400	N	N	Y	N	N	N	6	28.57	
YES		0	0	9	0	0	1			
RANKING		3	5	1	4	6	2			
WEIGHTAGE		4	2	6	3	1	5			
SI BANCH MARK										28.57

Sample calculation: -

Sum of top 3 weight age = 6+5+4= 15

W=6+5+4+3+2+1=21

SI Benchmark = 100-((15/21) x100) = 28.57 SI = (6/21) \*100 = 28.57



**Observation table for Identification of Black Spot on NH48 ( Actual number of accidents).**

SR.NO	CHAINAGE	NO .OF ACCIDENT	ACCIDENTAL DENSITY
1	798.100 -799.100	0	0
2	799.100-800.100	0	0
3	800.100-801.100	1	1
4	801.100-802.100	0	0
5	802.100-803.100	1	1
6	803.100-804.100	0	0
7	804.100-805.100	2	2
8	805.100-806.100	3	3
9	806.100-807.100	0	0
10	807.100-808.100	0	0
11	808.100-809.100	2	2
12	809.100-810.100	2	2
BENCHMARK			0.9167

Sample calculation: - Total accident =11, Unit length = 1000m

Accidental density= 11/12 = 0.9167

### VI. FURTHER SCOPE OF WORK

With the advent of technology and advanced algorithms to manage the traffic flows and integrate the analysis of the work it is possible. It would be possible to apply machine learning algorithms to determine the most probable black spots by analyzing the real-time traffic conditions and provide the safest and most comfortable traffic environment. As the population is rising, there will be a corresponding rise in the traffic related issues, to counter the evil effects of the black spots. The currently used traffic calming agents could be modified to suit the real-time analysis of black-spots

### VII. CONCLUSIONS

The identification and analysis of accident black spots help in identifying the stretches where accidents are more and these spots reduce the road safety in general. The spot on the road where traffic accidents frequently occur is termed as black spots. The current study was an attempt to find out the most vulnerable accident locations or black spots on National highway. Using Ranking and Severity Index method. All together 11 black spots were detected in the stretch of 40.1km on National Highway 48 by neglecting the recurring values of chainage in all the above tables. The NH-48 is one of the major traffic corridors in the state which has reported 134 accidents from 2019 to 2021 as per the data



acquired from National Highway Authority of India. Our studies carried out on the stretch spanning from Sarola to New Tunnel Mangadewadi has found out that one of the major reason of accidents is the rear end collisions which occurs due to improper transition, over speeding, loss of control over vehicle and visibility at junction. The chainages 798.3, 802.1, 805.6, 805.8, 811.2, 811.55, 816.25, 820.05, 820.15, 821.9 and 823.4. Thus, summing up the tally of black spot to 11 on the stretch surveyed has been quantified as accidental black spots through the analysis carried out. The NH-48 has most of the problems leading to the development of accidental black spots due to the negligence of periodic maintenance. If the authority carries out the periodic maintenances with diligence, we can surely see a considerable reduction in the number of black spots in the coming future

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SJIF Scientific Journal Impact Factor  
**Impact Factor: 8.118**



**ISSN** INTERNATIONAL  
STANDARD  
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