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### **Analysis of Black Spot-On NH 48**

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**ABSTRACT:** India's extensive road network, including the Mumbai-Bangalore National Highway 48, plays a crucial role in the nation's development. Despite recent improvements, accidents persist, particularly on stretches like the 7.8 km from Dari Bridge to Mai Mangeshkar Hospital. To tackle this issue, the study utilizes methodologies such as the Weighted Severity Index (WSI) and Accident Density Method (ADM) to identify and analyze black spots—areas prone to frequent accidents.

By collecting accident data from 2020-2022 and employing WSI and ADM, this study identifies locations with high accident densities and severity indices, indicating critical black spots. The findings underscore the need for proactive measures to enhance road safety, considering factors like road design flaws, visibility issues, and traffic volume.

Through a multi-faceted approach encompassing data-driven analysis and community engagement, this study advocates for targeted interventions to mitigate risks associated with black spots. These interventions include infrastructure enhancements and awareness campaigns to promote safer road behavior.

In conclusion, this study emphasizes the significance of addressing black spots to create safer road environments. By prioritizing road safety and implementing proactive measures, policymakers and stakeholders can significantly reduce the occurrence of accidents and safeguard lives on India's highways.

**KEYWORDS**: Transportation, Road traffic accidents, Black spots.

#### I. INTRODUCTION

India has the second-largest road system in the world, with 4,865,000 km in total length. Motorways and highways are important for the growth of the nation, and state and federal public works departments are in charge of building and maintaining the nation's highway system. The central government created the National Highway Authority of India (NHAI) as a distinct entity to handle national highways. Despite recent improvements to road surfaces, accidents still happen when cars are traveling at higher speeds. Finding dangerous regions or "black spots" is essential for reducing accidents. This is accomplished through the Black Spot Identification procedure, which serves as the basis for all initiatives aimed at enhancing safety Depending on the area, many methods may be employed to find black patches. To guarantee that travel is accident-free, common accident causes are taken into account while constructing national roads. To pinpoint problem areas on national roads, accident

data gathered from the Sinhagad Police Station is studied using the Weighted Severity Index Method (WSI) and Accidental Density Method (ADM). The present study aims to identify accidental black spots on a 7.8 km stretch of National Highway – 48 (starting from Dari Bridge to Mai Mangeshkar Hospital) by studying the accidental data provided by the officials of Sinhagad Police station database during the year 2020- 2022.

#### II. RELATED WORK

- In this context, "black spots" typically refer to locations on roadways where accidents occur frequently. Work related to the analysis of black spots involves studying accident data, identifying patterns, determining contributing factors, and proposing solutions to improve road safety.
- In medical imaging, "black spots" might refer to abnormalities or anomalies in images such as X-rays, MRIs, or CT scans. Analysis of black spots in this context involves identifying and diagnosing medical conditions based on these imaging findings.



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• In environmental science, "black spots" might refer to areas of pollution or environmental degradation. Analysis in this context involves assessing the extent of pollution, identifying sources, and proposing remediation strategies.

#### III. PROPBLEM STATEMENT

In Last previous years on NH-48 in between Dari bridge (Jambhul Wadi) to Mai Mangeshkar (warje) hospital number of accidents increased, lot of people lost their lives the problem government took action but they did not sufficient. As a responsible civil engineer our work is not only to construct Structures or roads but also to maintain them from time to time and take required actions on time. The black spot is the increased life risk of pedestrian people and also collapses the overall family.

#### IV. METHODOLOGY

- Identify the Black Spots: The Spots that come under the dari pool to Mai Mangeshkar Hospital are about 7.8 Km long. Where accident frequently causes that spot, the spot we study.
- Collect Accident Data: From the years 2022-2023 accident data was collected from online sources, News Paper & Articles, etc.
- Identify Reasons & Preventive Measures: From Selected spots, we find the reasons and which precautions have already been taken
- Method Selection: Black Spot Study was conducted in various methods such as WSI (Weighted severity index of location), Accident Density method, etc. The method can be chosen according to the location condition and Nature of traffic and accidents of Black spot.
- Study: After finalizing the methods we survey identified spots & give the reasons and preventive measures which help to save life and property of persons.

#### > WHAT IS A BLACK SPOT?

The Ministry of Road Transport & Highways (MoRTH) of the Government of India, road accident black spoton National Highways is a road stretch of about 500m in length in which either 5 road accidents (involving fatalities/grievous injuries) took place during the last three calendar years or 10 fatalities took place during last three calendar years

#### > AREA OF STUDY

Study area Mumbai -Bangalore National Highway, 48, Dari Bridge to Mai Mangeshkar Hospital is a controlled access highway



(Image no.01 (Dari Bridge to to Mai Mangeshkar hospital)

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#### > CALCULATIONS

#### (a) Accident Density Method

- > The chainage ranges from 1 to 10 km.
- > The total number of accidents that have happened in this chain age is then determined.
- The accidents happening for each kilometer (1000m) are independently determined and the accidental density is discovered using a unit length of 1000m.
- The ratio of the total number of incident over the stretch's length determines the benchmark for accidental density.

Distance from start to end	No. of accident	Accident density at 1000m Chainage	Distance from start to end	No. of accident	Accident density at 1000m Chainage
1.4	1 1		3	3	6
1.5		5	3		
1.9	3		3.2	1	
1.9			3.3	1	
1.9			3.6	1	
2.2	3		4.1	1	3
2.2			4.9	1	
2.2			5.1	1	
2.6	3 1 1	5	6	0	0
2.6			7	0	0
2.6			8	0	0
2.8			9	0	0
2.9			10	1	1
3					

 Table 1: Accident Density Method

#### (b) Weighted severity index

According to the quantity and severity of accidents at that specific place, points are given to them using this technique.

The severity of that accident is classified as Grievous Injury (GI), Fatal (F) and Minor Injuries (MI).

- WSI is calculated by the following formula WSI = (41 F) + (4 CI) + (4 MI)
- WSI = (41 x F) + (4 x GI) + (1 x MI)
- Accidental black dots are places with WSI values greater than 40.

#### Sample Calculation

WSI = (41 x 1) + (4 x 0) + (1 x 0) = 41

Fatal	Grievous Injury	Minor	None	WSI
0	1	0	0	4
1	0	0	0	41
	1			4
			1	0
	1			4
2	3			94
	1			4

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1	4			57		
-	•		1	0		
			1	0		
	1			4		
	2			8		
		2		2		
1	2			49		
4				164		
4	4	2		182		
2	2			90		
2				82		
	2			8		
6	1			250		
	2			8		
1	1			45		
BENCHMARK 41						

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 Table 2: Weighted severity index

#### V. CONCLUSION

Addressing black spots requires a multi-faceted approach, encompassing data-driven analysis, community engagement, and infrastructure enhancements. By prioritizing road safety and implementing proactive measures, we can mitigate the risks associated with these hazardous areas and create safer road environments for all. The black spot analysis on the road indicates areas with a higher frequency of accidents or incidents. This analysis can help identify factors contributing to these incidents, such as poor visibility, road design flaws, or high traffic volume. Implementing targeted safety measures in these areas can help reduce the occurrence of accidents and improve road safety overall.

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