



## Remedial Measures to Rectify Blackspot on National Highway

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### ABSTRACT

Road safety becomes a major concern for the regulatory authorities in India. Indian road safety situation is many times worse when compared to the developed countries of the world, leaving much to be done in the field of Road Safety Management. Road safety is defined as the absence of crashes, injuries, and fatalities. The term "safety" implies that there are no occurrences of accidents. The present study was conducted to identify the blackspot stretch on which Injury frequency and severity rate are more. Blackspot is a stretch of National Highway of about 500 m in Length in which either 5 road accidents (in all three years put together involving fatalities/ grievous injuries) took place during the last 3 calendar years or 10 fatalities (in all three years put together) took place during the last 3 calendar years. From the traffic survey, it was found that since 2015-2020 the area near MIET College is not safe for the riders. Statically Casualties occurred shows that 12 % cases related to Fatality, 38% cases related to Minor injury, and 50 % cases have been constituted for Major injury. MIET College area is located at Chainage 500+740 wherein it is located at the 'At-Grade' Intersection. In the present paper, the attempt is made to provide a practical Solution to rectify Blackspot. It includes providing Short-term and Long-Term Remedial Measures. Remedial measures suggested combating the fatalities with exponential scale and ensuring the safety of identified blackspots.

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## 1. INTRODUCTION

The cost of road accidents is borne not only by the victims and their families but also the society and the economy. It was reported that the males aged 19-39 years old had the highest death, about 25% of deaths occurred at the accident spot, 25% of death occur during transfer to the hospital on the way, and 25% of death occurred at the hospital. To prevent death from fatal motorcycle accidents, the safe community program is a promising model (Moghisi et al., 2014). People between 18 and 30 years are mostly involved in road traffic accidents. About 1.3 million people were getting killed due to injuries and fatalities. Major road traffic accidents are due to two-wheeler riders and the majority of death occurs on the spot. At the spot, first aid measures would be a great help. It is suggested to have a good supporting system, providing paramedical training to the people for giving first aid treatment (Jain et al., 2008). The Injury severity rate of drivers without a helmet is more than the drivers with a helmet. It was reported that full-face helmets can decrease facial injuries (Pruthi et al., 2010). The results showed that as compared with rural highways, the urban highways have more crash rates and a larger number of hot zones (Satria et al., 2020).

Road accident blackspot is a stretch of National Highway of about 500 m in length, in which either 5 road accidents (in all three years put together involving fatalities/ grievous injuries) took place or 10 fatalities (in all three years put together) took place during the last 3 calendar years. **Figure 1** shows the blackspot definition. This study was made to identify and rectify the blackspot at the National Highway-8. From the traffic study, it was identified that the stretch in front of Manoharbai Patel Institute of Engineering and Technology Bhandara (MIET) College Nagpur is a Blackspot. This paper is aimed to rectify the blackspot by suggesting short-term and long-term measures. The remedial measures could minimize road accidents, and the precious life of road users can be saved.

## 2. METHODS

Based on on-site inspection using preliminary survey, the type of interventions are required and may be identified using accordingly the action for taking corrective measures. Short-term and long-term measures may be initiated. This study was conducted rectification of blackspot for MIET located at NH-8, Maharashtra, India. The data was collected from the blackspot list as per regional office Nagpur also Accident details are provided by Maharashtra police.

## 3. RESULTS AND DISCUSSION

### 3.1. Identification of Blackspot by Collecting Accidental Data

**Table 1** shows the accident data of the last five years in 2015-2020. The data showed that fatality, minor injuries, and major injuries reached 12, 38, and 50%, respectively. The brief details for probable reasons for accidents at the blackspots are mostly due to the negligence of drivers.

### 3.2. Inspection and Preparation of Drawing

The blackspot shall be thoroughly inspected, a detailed layout drawing of the existing site prepared duly marked with (i) all geometric features of existing road, (ii) all permanent and temporary structures within a row, (iii) traffic flows along and across the (iv) conflict points identified and marked on layout drawing.

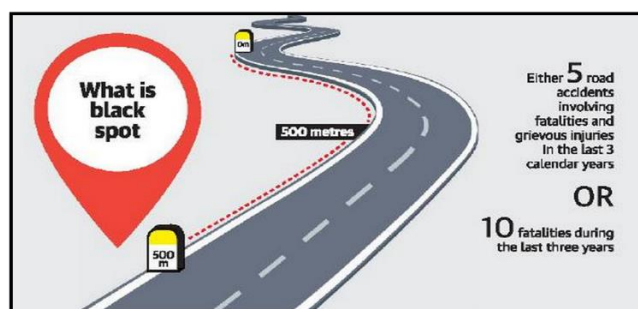


Figure 1 Blackspot definition.

Table 1. Accidental data provided by Maharashtra Police.

Sr No (as per RO)	Sr No (as per PIU's)	Sr No (as per MH Police List)	As per Details provided by Maharashtra Police			
			Name of District	NH Number	Location and Chainage [KM]	Police Station Jurisdiction
32	32	282	Nagpur ( R )	NH-53	Mahadula-Phata Chainage-500	Mouda
33	33	283	Nagpur ( R )	NH-53	Marodi Vishaka Company Chainage-500	Mouda
34	34	284	Nagpur ( R )	NH-53	Rabdiwala Savli Phata Chainage-500	Mouda
35	35	284	Nagpur ( R )	NH-53	Rabdiwala Savli Phata Chainage-500	Mouda

### 3.3. Preparation of Short-Term Remedial Measures with Layout

One of the examples in the short-term remedial is the authorized median opening that is just 740 m ahead of the college gate (at km 500.000) and it is not considerable. In an open country, median openings shall not be spaced closer than 2 km. Additional controlled openings shall also be provided for inspection and diversion of traffic during repair and rehabilitation. In the built-up area, the median opening shall be provided as per site requirement and the spacing between two medians opening in the built-up area shall not be less than 500 m. (IRC: SP-84). At the blackspot, the Bus-Bay Observed was not as per IRC: SP:84-2019 for merging and demerging traffic lanes. It is desirable to fix the location of bus bays using: (i) the bus stops shall be sited away from bridges and other important structures and embankment sections more than 3 m high, (ii) as far as possible, bus bays shall not be located on horizontal curves or at the summit of vertical curves, (iii) the location shall have good visibility, not less than the safe stopping sight distance, and (iv) at major four-way intersections involving the transfer of a substantial number of passengers from one pick-up stop to the other, it might be desirable to construct a single, composite bus stop of suitable design to cater to all the bus routes collectively.

### 3.4. Preparation of Long-Term Remedial Measures with Layout

Slip lanes of proceeding VUP at Shahpur Village (approaches ending at Chainage 501.100) are not extended up to the proposed bus bay near the entrance of the college. It is desirable to construct a service road for vehicles coming out of the college campus and taking the NH. To the riders going towards the Bhandara side, proper merging lanes shall be provided. And, for riders going towards Nagpur side, they shall use the extended Slip lanes of Shahapur VUP which is extended up to the college gate, and use the VUP for going towards Nagpur. It was also observed that the speed breakers should not be constructed on National Highways as per the norms. It is suggested to incorporate safety measures (IRC: 99). The speed breakers are recommended to be provided on road connecting the college campus. The proper road marking for smooth flow of traffic is in the form of Transverse bars and road studs as per IRC 35. The warning signboard showing college ahead should be erected as per clause. No. 15.28 of IRC 67-2012. The following are the

alerting signage's shall be installed at the identified blackspot immediately: (i) cautionary accident blackspot signs, (ii) soldered blinking signals at both ends, (iii) rumble strips together with rumble strip signs, and (iv) restriction end signs.

Some of the long-term measures depending upon the location of the blackspot are as follows the location in front of MIET college is at grade intersection hence it is suggested providing the flyover, underpasses, overpasses. Cautionary measures can be taken up. Once long-term measures are adopted. To have cost-effective long term measures, the following measures can be suggested: (i) to avoid the Maregaon junction to become a future blackspot, a new VUP is proposed at the authorized median opening of Maregaon junction chainage km 500,000 which is 740 m ahead from college gate, and (ii) the slip roads of proposed VUP are to be extended towards Nagpur in such a way that they meet the slip lanes of preceding Shahapur VUP. In this study, remedial measures are suggested to rectify the blackspot. The authorized median opening is just 740 m ahead of the college gate is the main reason that causes accidents in front of the college. Thus, it is advisable to close the median opening and Additional controlled openings shall be provided at a distance of more than 500 m. The location of the bus bay is also not proper. Bus bay should be clearly visible to road users from a far distance. For the speed breakers, the proper road marking for smooth flow of traffic in the form of Transverse bars and road should be provided and, the warning signboard showing college ahead should be erected.

#### 4. CONCLUSION

It is essential to implement short-term measures with immediate effect to combat the accidents/fatalities on an exponential scale to make a compulsory provision of traffic calming measures to calm the traffic. As far as a long-term measure is concerned the National highway, authorities need to write a proposal to the Govt. So, that funds will be allocated and a flyover can be built.

#### 5. ACKNOWLEDGMENTS

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#### 6. AUTHORS' NOTE

The authors declare that there is no conflict of interest regarding the publication of this article. The authors confirmed that the paper was free of plagiarism.

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