# A REVIEW PAPER ON DETERMINATION OF ACCIDENT POINTS AND MEASURES TO REDUCE OR MODIFY THEM ON NATIONAL HIGHWAYS

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***Abstract*— India is one of the fastest developing countries in the world, resulting in more purchasing power for its citizens. There has been an explosion of vehicles on Indian highways, which has exceeded 400 percent from 2001 to 2013, i.e., it has increased only 133 percent over national highways in 12 years, resulting in an increase in the incidence rate in India. Blackspots are being declared all over the country with the aim of achieving the target of reduction in accident by upto 50% by 2020. In the middle-income countries, there are about 52 percent of the world's automobiles, but they account for more than 88 percent of the world's road traffic death. At this rate of development, fatal accidents are going to be the 5th largest cause of the crash in the world by 2020. Pedestrians, cyclists and motorbikes are around 57 percent of the mortality rate on the world roads, of which 15 to 44 year olds account for more than 60 percent of the world's total fatal accident rate. The review of the literature has been shown with its causes and solutions, the scenario of accidents occurring on various highways of India.**

***Index Terms*— Accidental Black spot, National Highway, severity index, Ranking method.**

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## I. INTRODUCTION

The alarming rise in road accidents is one of India's worst kept secrets. Around 377 people die every day in road accidents, which is equivalent to a jumbo jet crashing every day. In 2016 alone, 1,46,133 people were killed in road accidents in India, thereby showing 4.6% rise over 2015 when around 1,39,671 were killed. Such alarming statistics only show the lack of proper road safety measures in the country.

The state of Haryana contributes a major part in India's alarming accident count. According to Government of Haryana Transport Department, road traffic accidents accounted for 50.4% deaths in Haryana in 2017, surpassing the national average of 36.4%. Ambala Cantt is one of the most crowded city in Haryana and one of the fastest developing cities in India. With the rapid growth of population in the city, the traffic problems are also increasing at an alarming rate.

The National highway-344 passing through Ambala Cantt is one of the most important National highways of India as it provides the entrance to various states and connects the city with other states of Eastern India. Due to the ease of connectivity, there has been an exponential growth in the number of vehicles plying through this area which has subsequently accelerated the number of road accidents. Hence, it has become important to properly analyze the stretch and locate the areas where the frequency of accidents is high. In this dissertation, an attempt has been made to determine such accident prone areas, called black spots on National highway-344 from Ambala Cantt to Yamuna Nagar, measuring 54 km. Through further analysis, proper safety measures and laws can be implemented which will drastically reduce the severity of road accidents in these areas.

India is second largest country with 4,865,000 Km of total road length. Highways and expressways are considered as main vein for the development of country. National highways being a central subject are run by state public work department and in some places by central public work department. National highway authority Of India is a setup of separate organization to deal with National Highways by central government. By the improvement of pavement surfaces in past few years by the States, there is increase in the speed of the vehicles travelling on these roads. The accident mitigation process was divided into various steps to improve the physical condition of the roadways. The starting point of all the processes is identification of locations for safety improvement, which is known as Black Spot identification or hazardous location identification. It is necessary to identify right site for safety improvement, if not resources will be wasted on sites and the unsafe spots will go untreated and remain unsafe. Therefore, accident spot identification is an important step for their improvement. Methodologies to identify an accident spot may vary from place to place. For accident free highway, normal causes of accidents are taken into consideration during designing of National highway. In this dissertation, we will study accidental data collected from National highway Authority of India, analyzed by Weighted Severity Index Method and Accidental Density Method and black spots on national highways were found out.

## II. LITERATURE REVIEW

Srinivasan and Chand (1984) [1] proposed Accident Risk Index to determine the level of accident rates for different states. They computed the index using a set of accident ratios which have been combined by assigning certain weights. Accident Risk Index is

one such indicator which reflects the impact of the vehicle, road length, area and population on the number of accidents and identifies the prevailing probability for an accident to take place in the district or state.

Agnelo Duarte and Bruce Corben (1998) [2] aimed at improving the effectiveness of various treatment programs related to Victoria's 'Accident Black spot' Programs. The five treatment types investigated were treatments for skid resistance, bridge guard rail treatments, facilities for pedestrians, improvements in street lighting and erection of traffic signals.

AN Dehury et al. (2013) [3] hinted at various methods adopted to identify accident black spots on National highway-55 in Orissa. Using two methods of analysis namely-Accident Rate method and Accident Frequency method, the ranking of the identified black spots were done. Detailed analysis was then carried out on the top-ranked black spots.

R R Sorate et al. (2015) [4] attempted to identify the accident black spots on National Highway. Three methods of analysis were used, namely-Ranking and severity index method, Accident density method and weighted severity index method. The stretches appearing in all the three methods were taken as the accident black spots.

Vivek and Rakesh Saini (2015) [5] aimed at identifying the major accident black spots on National highway-3 and suggested necessary measures for improvement. The study was carried out by collecting secondary accident data from police stations and prioritizing the accident prone areas by using Accident Severity Index method.

## III. METHODOLOGY

Accident Rate Method is used for identifying the accident spots on the aforesaid section. The method is adopted by dividing the entire road into smaller sections. In Accident Rate Method, the accident rates of each section are evaluated by using the mathematical formula,

Accident Rate =M/L,

Where M = Total no. of accidents in a stretch`

L = Length of Stretch

- Data Collection: The data taken for the study is collected from various traffic outposts. The whole section is to be divided into six respective stretches.
- Analysis of Accident-Prone Stretch: Using the data obtained from various police stations, the accident rate for each stretch will be determined. In the accident rate method, the section with the highest value of accident rate has been considered as the region within which the exact black spot is located.
- Safety Measures: Some remedies which can be drawn out to reduce the number of accidents on the black spot will be discussed.

## IV. OBJECTIVES

The basic aim of study is to find out accident prone spots on Ambala Cantt - Yamuna Nagar stretch by considering different parameters such as; nature of accident, classification of accident and cause of accident.

- To rank the black spot based on the level of accident severity.
- To identify various traffic and road related factors causing accidents.
- Detailed analysis of the top ranked spots and suggestion of possible improvements

## V. FUTURE SCOPE

To develop the methodologies to identify the most vulnerable accident stretch along the National highway. The results from the case study can be used for better assessment of roadway section for future considerations.

1. By identifying blackspots on any National Highway further accident causes can be reduced leading to a safe journey.
2. It is very important to know the black spots on National highways so that drivers can apply safety measures while driving.

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