

Accidental study on NH-48 Dehu Road Pune - Satara stretch

¹S. S. Charkha, ²C. R. Rathod, ³A. T. Gavhane, ⁴R. R. Galande, ⁵S. S. Nikam

^{1,2}Research Scholar, Civil Engineering Dept, Sinhgad College of Engineering, Pune-41

^{3,4,5}Assistant Professor, Sinhgad Institute of Technology, Pune-41

ABSTRACT: Road accidents have presently become a major social worry in India which is increasing year by year. These road accidents lead to loss of human life, injuries and property damage which is a grave concern. In this study, a road accident analysis study was done on NH-48 commonly referred to as the Golden Quadrilateral highway, which is a busy National Highway in India that runs (through Delhi, Haryana, Rajasthan, Gujrat, Maharashtra, Karnataka & Tamil Nadu). For analysis, we select the Dehu Road Pune - Satara stretch of NH-4 140.300 km long stretch. The accidental data was collected from visual surveys on both lanes of the NH-48 stretch of 7 km from the new Katraj Tunnel to Navale Bridge. It has been found that major accidental crashes are due to Overspeeding (majorly Human Fault). Black Spot is Along "Six lanes of Pune-Satara NH-48 contributing to road accidents include human error, such as speeding, reckless driving, and impaired driving, as well as road infrastructure deficiencies, vehicle defects, and inadequate enforcement of traffic laws. To ascertain the effect of various parameters on accident occurrence, data on road accidents for a stretch of 140.300 km of an Indian national highway was collected for the past 3 years. The analysis of the data using the regression technique enables prediction of the occurrence of accidents for a certain situation and a similar application can be carried out on any stretch to get a regression equation of a similar type.

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I. INTRODUCTION

Pune - Satara National Highway Section 48 is a six-lane highway connecting many major manufacturing and commercial and cultural centres. It is one such highway which connects the educational hub of Pune with the newly developing corridor Satara. The Pune – Satara highway has six lanes constructed and maintained by the National Highway Authority of India (NHAI). It has been observed in the recent past numbers of fatal accidents have occurred on this highway and this highway has become a death trap. An accidental black spot is the spot where accidents have occurred historically many times. Safety committee "HAX COMMITTEE" maintains a record of accidents occurring on this highway. By using this secondary data with the help of various methods like severity index and ranking method accidental black spots analysis is done on the Pune - Satara national highway. So by using such analysis, the basic case of accidents can be identified and according to that remedial measures may be adopted to improve the performance of highways.

Road accidents have been recognised as one of the major problems in the world. In addition, it has a major impact on a country's society, economy and progress. Road accidents occur when traffic conflicts between vehicular movements which can cause delays and traffic congestion, traffic, vehicle and road conditions, and the surrounding environment have been determined as key factors that influence driving behaviour, which can in turn contribute to road accidents.

Road accidents increase relatively from year to year. The increment is proportionate to the growth in population, economic development, industrialisation and motorisation in the country. The problem of accidents is very acute in highway transportation due to complex flow patterns of vehicular traffic, and the presence of mixed traffic along with pedestrians. Traffic accidents lead to loss of life and property. Road accidents cannot be prevented but by suitable traffic engineering and management, the accident rate can be reduced to a certain extent. For this reason, a systematic study of traffic accidents is required to be carried out. Proper investigation of the cause of accidents will help to propose preventive measures in terms of design and control.

Maharashtra is one of India's more advanced states and has a relatively higher density of road network as well as motor vehicles as compared to other states. NH 48, commonly referred to as Delhi–Chennai Road, is a busy National Highway in India that runs through Delhi, Haryana, Rajasthan, Gujarat, Maharashtra, Karnataka & Tamil Nadu. The Satara -Pune stretch of NH 48 is a 140.300 km long stretch starting at Km. 725+000 near Satara and ending at Km. 865+350 near Dehu on the old Mumbai-Pune highway in the State of Maharashtra. It passes through Pune and Satara district of Maharashtra State.

II. LITERATURE REVIEW

In this particular study, we referred to some research papers which is directly based on the objectives mentioned below

Paper Name: Accidental Risk Analysis of Highway Construction Sites and its Safety Strategies

Author Name: Upendra Nath Tripathi, Anjelo F. Denis, Ehsan Ali and Franklin E. Kujur

Published Year: December 2014

Published By: Journal of Academia and Industrial Research (JAIR)

This study presents the quantification of accidental risk of highway construction and the expected model provides a suitable, dependable and well-organized tool that helps in classifying, scrutinizing and supervising accidental risks in a highway construction project. The study model enables us to know the strategies that suggest accident deterrence, accident repositioning and future suggestions. The collection of data is based on a survey of five highway construction projects namely Afcon Infrastructure Ltd., Mumbai, Apco Infratech Ltd., Purnia (Bihar), Punj Lloyd Ltd., Udaipur, L&T, Faridabad, NCC Ltd., Agra. This study investigated and evaluated the accidental risk and developed safety management guidelines for the company which can be adopted for highway projects for better and accident-free construction work.

Paper Name: Black Spots Analysis On Pune - Bangalore National Highway

Author Name: Snehal Bobade-Sorate, Anuj U. Manerikar, Devika J. Buttepatil, Prem M. Rathod

Published Year: April 2016

Published By: International Research Journal of Engineering and Technology (IRJET)

India is a country with a high population. It needs an excellent transportation system for it to grow. As road transportation enables door-to-door transportation and has greater density and distribution all around our country, it becomes a primary factor in transportation which is responsible for the economic and social growth of our country. Accidents on these roads obstruct growth as they cause high economic loss and loss of life. Hence it is important to curb these accidents by identifying these accident-prone zones and rectifying these spots. This article is based on black spot identification on Mumbai Bangalore Highway. These black spots are identified by studying the accidental data collected from the National Highway Authority of India by using methods of Weighted Severity Index and Accidental Density Metho

Paper Name: A Review On Traffic Volume And Accidental Studies On Highways

Author Name: Er. Aman Sharma, Dr. Devender Sharma, Er. Abhay Dhiman, Er. Chetan Kumar

Published Year: July 2022

Published By: International Research Journal of Modernization in Engineering Technology and Science

In India, where there is a vast population and a high traffic density, road accidents are a particularly important Issue. The accident rate rises along with the number of vehicles. Human mistakes or faulty road conditions are to blame for the incidents. According to the analysis of prior data, 36% of accidents are caused by parameters of the road, such as interactions between vehicles and the road, another road user, and environmental conditions, while 63% per cent are caused by human error. Most modern societies are now quite concerned about road safety. By identifying locations (Black spots) that are riskier from an accident standpoint, road safety regulations can be better planned. This should resource the toll road safety audits in the country for identifying specific areas in country-wise highways depending upon the geometric aspect which is aimed to improve as a section of protection improvement program.

III. AIM AND OBJECTIVES OF THE STUDY

This study aims to analyze the accident data to identify blackspots along “SIX LANING OF PUNE – SATARA (Km. 725+000 TO Km. 865+350) NH-48 and to prevent them to increase the efficiency of that highway and traffic flow.

This study focused on the analysis of the main reasons behind the accidents in the stretch between Satara to Dehu Road Pune which was based on collected data

.the following objectives:

- To study the causes of accidents and suggest corrective measures at potential locations.
- To evaluate the existing design

- To compute the total number of accidents that occurred during a particular stretch.
- To identify various traffic and road-related factors causing accidents

IV. METHODOLOGY

The methodology adopted for this study involves identification of the study area, accident data collection from the Toll Plaza and blackspot identification.

3.1 Data collection

Accident data was collected from Toll Plaza covering all police-recorded accidents. The data included; the number of fatal, the seriousness of the injuries (i.e., serious and slight injury) and several accidents that did not involve any injury. A three-year accident period was used, starting from March 2020 To March 2023.

The data collected need proper storing and retrieving for the following purposes. The purposes are as follows:

1. Identification of the location of points at which an unusually high number of accidents occur.
2. Detailed functional evaluation of critical accident location to identify the causes of accidents.
3. Development of a procedure that allows identification of hazards before a large number of accidents occurs.
4. Development of different statistical measures of various accident-related factors to give insight into general trends, common causal factors, driver profiles, etc.

V. OBSERVATION AND DATA

This table shows actual observed data for that particular stretch which is considered for this study. That data is subdivided into the causes of accidents for 2020-23 for particular three years.

From & To Date:	01-April-2020	31-March-2023	Financial Year	FY 2020-2023
Nature of Accident:	All		Section:	Khedshivapur
Classification of Accident:	All		District	Pune
Causes:	All		Chanaige	795.000 to 865.350

Table-1. Details of the Strech

Sr. No.	CAUSES OF ACCIDENTS	NO. OF ACCIDENTS
1	DRUNKEN	39
2	OVERSPEEDING	234
3	VEHICLE OUT OF CONTROL	159
4	FAULT OF DRIVER OF MOTORVEHICLE	35
5	FAULT OF DRIVER OF ITHER VEHICLE	3
6	FAULT OF PEDESTRAIN	12
7	MECHANICAL FAILURE OF VEHICLE	15
8	OTHER REASON	4
9	OVERSPEEDING & VEHICLE OUT OF CONTROL	1
Total		502

Table-2. No. of Accidents and their causes

VI. RESULTS AND DISCUSSION

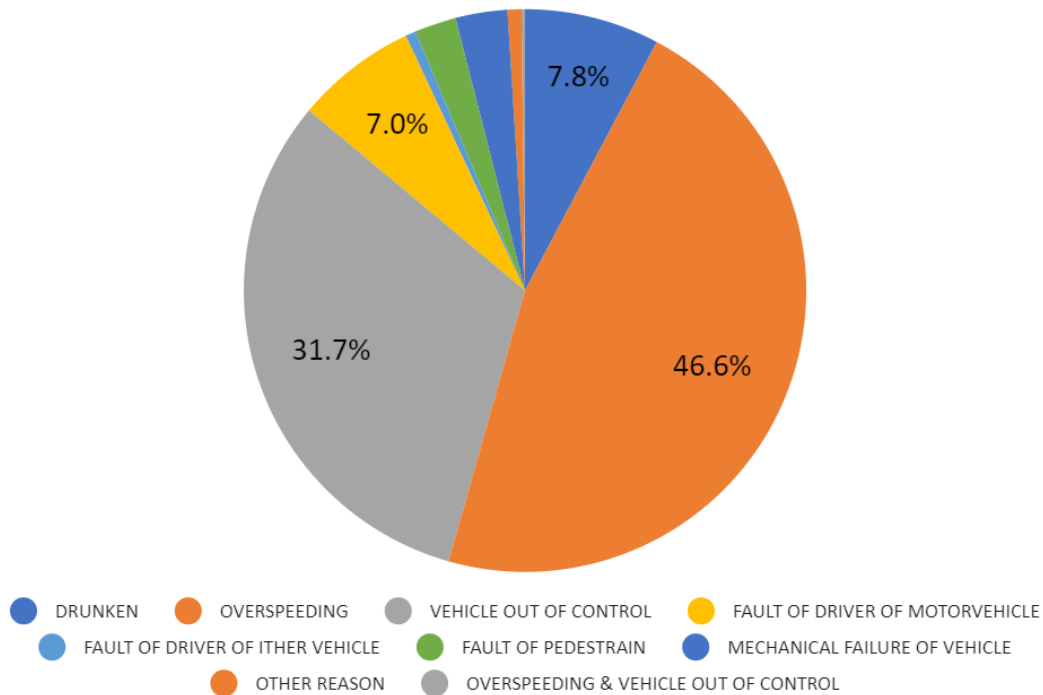


Chart 1. Chart shows the causes vs Percentage of accidents.

After observation and data study it shows that in the particular stretch between Dehu Road To Satara NH-48 in the year 2020-23, the total number of accidents was 502 accident. In that 502 accidents, the causes of road accidents described earlier have been coded into 9 different categories and the leading reason is due to overspeeding which shows 46.6% of accidents happened due to overspeeding.

VIII.CONCLUSION

Based on the above Study work and observation charts we found conclusions which are mentioned below,

1. According to this study, we understand the causes of accidents occurring in the Dehu Road to Satara stretch.
2. After a comparative study of accident causes we found that the main cause of accidents is overspeeding which is 46.6%.
3. Furthermore, we discovered that other factors, such as road geometry features such as gradients, carriageways, curves, etc., are also involved and have an impact.
4. Road injuries are tragic, a preventable phenomenon that causes immeasurable loss. By informing the various reasons for those injuries and enforcing focused interventions, it's far more feasible to noticeably reduce their frequency and impact.

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