BLACK SPOTS ANALYSIS ON PUNE - BANGALORE NATIONAL HIGHWAY

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Abstract - India is a country with a high population. It needs excellent transportation system for it to grow. As road transportation enables door to door transportation and has greater density and distribution all round 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 the growth as it causes 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 National Highway Authority of India by using methods Weighted Severity Index and Accidental Density Method.

Key Words: Accidental black spots ,National Highway, Weighted Severity Index ,Accidental Density Method.

1.INTRODUCTION

India is second largest city with 4,865,000 Km of total road length.[1] Highways and expressways are considered as main vein for the development of country. National Highways being a central subject are being done by state public work department (PWD) and in some by central public work department (CPWD). National Highway authority Of India (NHAI) is a set up of separate organization to deal with National Highways by central government. Due to improvement of surface of its routes in the past few years by the State, increases the speed of the vehicles travelling on these roads. The accident mitigation process was divided into various steps to improve the physical conditions of the roadway. The starting point of all the process 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 can be wasted on sites and the unsafe

spots will go untreated and remain unsafe. Therefore, black spot identification is an important step for black spot improvement. Methodologies to identify a black spot may vary places to places. For accident free highway , normal causes of accidents are taken into consideration during designing of National Highway. In this article, we will study accidental data collected from National Highway Authority of India (NHAI) is analyzed by Weighted Severity Index Method (WSI) and Accidental Density Method (ADM) and black spot on national highway was found out.

The present study aims to identify accidental black spots on a section (820 km-830 km) of National Highway - 4 by studying the accidental data provided by the National Highway Authority of India (NHAI) during year 2014-2015. In present study for identification of black spots Weighted Severity Index (WSI) and Accidental Density Method (ADM) is used. During that study basic causes of accidents were found out and suitable remedial measures were also provided for a particular spot.

2. What is Black Spot?

Accidental Black Spots are places on the highways where accidents have been historically concentrated. These spots are identified by using methods which are designed to identify the black spots by using the accidental data provided by the responsible authorities.[1]

3. Study Area

Pune-Bangalore highway is a controlled access highway with speed limit of 100 km/hr for present study 820km-830km has been selected.
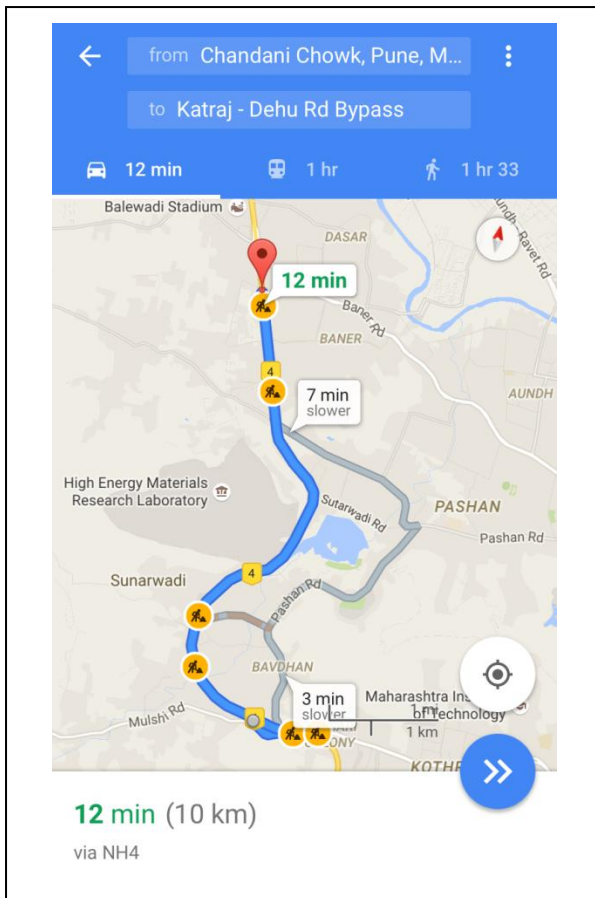
Figure-1: Study Area - Chainage 820 to 830

4. Methodology

The basic aim and objective of the study is to identify accidental black spots on National Highway (NH4). The first step includes collecting primary data provided by the NHAI (National Highway Authority of India) and Police records which was to be correlated with the data collected from physical survey. It was analyzed by the following methods:

4.1 Accident Density Method:

a. It is the density or number of accidents on a particular stretch on a highway.
b. Unit length is taken as 1000m.
c. Predetermined number of accidents is calculated as average number of accidents that have occurred per unit length.

4.1.1 Sample Calculation:

a. Chainage selected here is ranging from 820km-830 km.

b. The total number of accidents is then found out which have occurred in this chainage.
c. With a unit length of 1000m the accidents occurring for each km (1000m) is separately found out and accidental density is found
d. The accidental density benchmark is calculated by the total number of accidents in that stretch to the distance of the stretch.
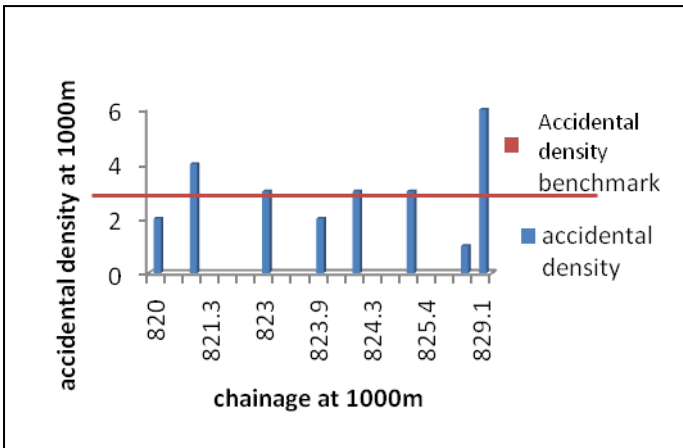   For eg:
   For chainage ranging from 820km-830km the distance here is 10km and the accidents occurring have been found to be 23

Accidental density benchmark= (23/10)=2.3

	No. of accidents	Accidental density at 1000m chainage
820 820.4	2	0
821.2 821.3 821.3 822	4	4
823 823 823	3	0
823.9 823.9	2	0
824.1 824.3 824.6	3	0
825.3 825.4 825.8	3	0
828.4	1	0
829.1 829.2 829.3 829.3 829.6 829.75	6	6

Chart -1: **Accidental density at 1000m chainage**

Graph -1: **Accident Density Method**

4.2 Weighted Severity Index

In this method, scores are assigned to the accidents on the basis of their number and severity at that particular location.

a) Severity of that accident is classified as Grievous Injury (GI), Fatal (K) and Minor Injuries (MI).
b) WSI is calculated by the following formula
c) **WSI = (41 x K) + (4 x GI) + (1 x MI)**
d) Locations with WSI more than 40 are termed as accidental black spots.

4.2.1 Sample Calculation

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

 = 41

	Fatal	Major	Minor	None	WSI
820.4	Y	N	N	N	41
821.2	N	N	Y	N	1
821.3	N	Y	N	N	4
821.3	N	N	Y	N	1
822	N	N	Y	N	1
823	N	Y	N	N	4
823	N	Y	N	N	4
823	N	N	Y	N	1
823.9	N	N	Y	N	1
823.9	N	Y	N	N	4
824.1	N	N	Y	N	1
824.3	N	Y	N	N	4
824.6	N	N	Y	N	1
825.3	N	Y	N	N	4
825.4	N	N	Y	N	1
825.8	N	N	Y	N	1
828.4	N	N	Y	N	1
829.1	N	N	N	Y	0
829.2	N	Y	N	N	4
829.3	N	Y	N	N	4
829.3	N	Y	N	N	4
829.6	N	Y	N	N	4
829.75	Y	N	N	N	41
Benchmark			40		

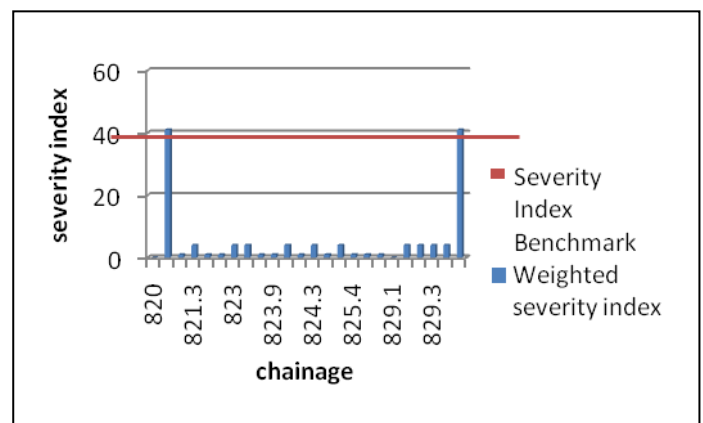**Chart 2 : Severity Of Accidents**

Chart 2: Weighted Severity Index

5. CONCLUSIONS

By considering all the parameters of Accidental Density Method (ADM) black spots are found at chainage 821.2 km, 823 km, 824.1 km, 825.3 km and 829.1 km.

By considering all the parameters of Weighted Severity Index (WSI) black spots are found at chainage 820.4 km and 829.75 km.

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7. REFERENCES

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8. BIOGRAPHIES

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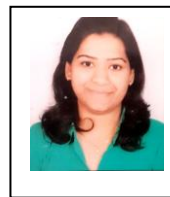RMDSinhgad School Of Engineering Warje

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