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# A REVIEW ON ANALYSIS OF BLACK SPOTS OF HIGHWAYS AND CITIES IN INDIA

Danish Bashir[1]; Ajay Kumar Duggal[2]

[1]*P.G Student Department of Civil Engineering, NITTTR Chandigarh, India*[1]
[2]*Associate Professor Department of Civil Engineering, NITTTR Chandigarh, India*[2]

***ABSTRACT:*** ***India is among one of the volantly evolving nations in the world, thus supervening in emanation of large traffic volume across the roads. Due to constant increase in traffic volume engendering in snarl-up and escalation of accident rates in India. Therefore black spots are ratified across the country to reduce accidental rates. So these spots should be identified along with its causes so that proper remedial measures can be taken to eradicate the problem and save as many lives as possible. Accidents are the major concern of everyone at every level so a lot of work is being done in this way, and a lot should be done so as to tackle this issue. Around 50% of death rates are due to Strollers, bicyclist and motorbikes on the roads. Thus review of Literature has been carried out so as to get an idea of accidents happening around highways in India along with its causes such as non availability of separate service roads, improper traffic law enforcing agencies and remedies such as proper installation of street lights, providing sufficient sign boards, speed limits etc.***

***KEYWORDS:*** ***Black Spots, Strollers, Accident, safety measures, engendering, snarl-up, ratified, frontage, urban corridor, ominous, déclassé.***

## I. INTRODUCTION

Indian road network is the 2nd largest road network in the world having around 55lakh km road length. Being the largest road network it carries almost 85% of the country's passenger traffic. Street accident toll is around 1.3 million individuals worldwide per year, mainly caused due to the failure of driver, vehicles, design parameter and environmental factors. Therefore Safety measures are the primary concern for the government to tackle the road accidents. To further prevent accident expertise in safe road design and road geometry is needed.

**Road accidents scenario in India:**
Road accident scenario in India is worrisome as it is seen that more than 1, 37,000 people scum to injuries in road accidents. Around 30% of accidents are due to two wheelers, also the new vehicles with advance safety features are more engaged in accidents. According to a government report from 2014 it was stated that 75,000 people were killed due to bad road conditions, 41% of total deaths are due to speeding, and 36,543 deaths are due to overloading of vehicles. India recorded 4, 80,652 road mishaps in 2016, prompting 1, 50,785 fatalities. The number proposes that no less than 413 individuals passed on consistently in 1,317 road mishaps. Additionally, separating the insights, the information uncovers that no less than 17 deaths happened in street accidents in 55 mishaps consistently per hour in the given time. Contrasting the new accounts and information from earlier year demonstrates that notwithstanding recording less accidents in 2016, more fatalities have happened in 2016 as compared 2015. In 2015 approximately 1, 46,133 individuals had passed on in 5,01,423 road mishaps. The accident seriousness, or, in other words the number of people died per 100 accidents, was recorded at 29.1 in 2015 which is lower than 31.4 in 2016.

**Road accidents scenario in Chandigarh city:**
Chandigarh being the well-planned city in India in case of road network, still black spots exists. Chandigarh police have identified 21 expository stretches along the city. Chandigarh is ranked 7$^{th}$ in case of deaths and road accidents. According to government report prepared by the Ministry of Road Transport and Highways, Chandigarh stands 3$^{rd}$ largest among union territories, it also states that total of 428 accidents occurred out of a which 144 were baneful road accidents causing 151 deaths, 18 persons were seriously injured and 202 acquired minor injuries. As per the report, 381 road accidents were proclaimed on city roads apart from the National Highway, in which 127 persons died. Also, 47 road accidents were reported on NH roads in the city resulting in 24 deaths. Out of the total tragedies, 380 accidents were due to over speeding of vehicles, 10 due to red-light jumping and 9 due to drunken driving. This is the high time to identify black spots and to have proper remedial measures to ensure safety of people.

 

## II. LITERATURE REVIEW

Harman Singh and S. K Dhattarwal (2004) investigating 450 cases of lethal road accident in Rohtak during one-year duration 2000 to 2001.The authors statistically examined highlights of type of injury, pattern and distribution of injuries, body part involved, deadly injuries and causes of death. The authors inferred that 28.7% cases were in pedestrian which is commonest group of victims, which was preceded by multi utility vehicles (25.8%) and two-wheeler (23%). The contribution of National highway was 31.6% and for State highway it was 27.1% of total road mishaps. Heavy vehicles were the most in charge of fatalities on road 38.9% followed by multi utility vehicle (30.4%). Human error was the most remarkable for the road accident. The authors emphasis on proper training of vehicle/road user by authorized centre's and suggested that the administration should strictly enforcing traffic rules and proper ratification in law to avoid drunk and drives. [1]

B. S Rao, E. Madhu, S Jalihal and TS Reddy (2005) author has taken a shot at finding the black spots on NH-5 between Anakapalli to Vishakhapatnam, from the literature review, indicates that 60% of the road mishaps occurred due to human mistakes and 33% due to road parameters such as room and vehicles directions. Author has collected data for the road accident analysis such as roadway inventory data, signage contents, traffic and pedestrian volume, spot speed, speed and delay, accident examine. After analyzing of all the data, data showing that vehicle drivers are the single major factors responsible for accidents to happen, two wheelers are the one who suffer the greatest number of fatalities and injuries followed by trucks. [2]

A Tortum and Muhammed Yasin (2010) in this study author has collected 18-year each in 4 period time series data that composed of foremost failures responsible for traffic crashes on roadways were used to calculate their consequences on road safety of road elements with linear regression analysis. As per the examination, it is discovered that surface depressions were observed to be a critical factor in traffic crashes. The reason of this sort of deformity in both flexible and non-flexible surfaces are, deficient compaction between base, sub base and sub layer, load bearing strength of pavement, poor drainage, frost flushing near shoulders of pavement, crack sections, and improper construction and maintenance techniques. Insufficient road marking also has a potential contribution to crashes. The reason of this type of defect is a lack of care and maintenance. [3]

Deepthi Jayan K and B Ganeshkumar (2010) In this examination exertion has been made by author to distinguish BS locations inside Kannur district, Kerala utilizing GIS. For this motive, road crash information from 2006 to 2008 relating to Kannur district have been utilized. Road Mishaps particulars like date, area, sort of vehicle included, no. of people died on or injured are incorporated into GIS database. Simple and kernel densities were utilized in distinguishing the mishap examples and street geometry was estimated in mishap zones to discover the reasons for mischance's. Author collected ground control points with the help of GPS system. Five ground control points were collected: Data Processing, Map Scanning, Geo Referencing, Digitizing and Assigning Attributes. After analyzing the data author concluded that issue of urban transport is congestion of movement. This outcome in expanded number of treks, expanded journey time, travel cost, mental desolation and diminished openness which also leads to road mishaps. Stochastic traffic is another severe problem which causes jams. [4]

Naidu V.M., Venkat L and P.I. Vamsi (2011) conducted a survey in Vishakhapatnam city of Andhra Pradesh. The information has been gathered from the closest police post accessible for ensuing 3 years from 2008 to 2010. Primer investigation uncovers that there are 5 'BS' in the given segment. The point by point examination has been completed by author on these five areas gave following conclusion:

- Males are more involved in accidents.
- Car and trucks are causing most of the accidents.
- Pedestrian are subjected more to the accidents.
- Out of the total accidents, death occur about in 25%. [5]

Rakesh Kumar and S. K Suman (2012) author has collected accidental data from 2000 to 2010 from (Hajipur to Muzaffarpur) NH-77 in the state of Bihar. Data collected from police posts of a particular jurisdiction in the form of FIR lodged which includes, accidents, fatality, and injury data month wise, vehicle involved, type of vehicle and data from PWD also collected like traffic volume data, road condition, road design etc. After the investigation, author concluded that accidents occur because of drivers' fault, mechanical fault in vehicle bad road conditions and other environmental factors. Accidents related to traffic volume in which author found out that accidents rate increases with AADT, trend of road accidents, type of injuries and trend of fatalities. [6]

Mizanur Rahman, Shakiful Ahsan and Hadiuzzaman (2012) author has compared the accident data of three major national highways of Bangladesh i.e. NH-1(Dhaka-north Bengal corridor). Accident data has been gathered for seven years (2000 to 2006) from Accident research institute (ARI), BUET.

The data has been analyzed and compared considering the following parameters

a. Based on the road accident severity.

b. Based on the accident involvement by different types of vehicle.

c. Based on the location/area of the accident.

Author concluded that deadly accidents are higher in accident severity parameter followed by grievous, simple and collision one. One of the major finding from the data available comes out to be that accident in which pedestrians are hit account for 40% of total accident and 47% of deadly accidents. [7]

Liyamol-isen, Shibu A, Saran M.S (2013) author revealed the most vulnerable and accident-prone locations or black spots in Alappuzha and Ernakulam districts making use of GIS. 16 spots were selected as per the WSI (Weighted Severity Index) method. WSI follows the system to assign scores based on the number and severity on accident in a particular location. WSI method is found to be effective in identifying the black spots only if the secondary data is available. After analyzing the data author came up with following conclusion:

a. Accident rate is increasing year by year with increase in population.

b. The highest cause of accident is the fault of driver.

c. Two wheelers are more prone to accidents. [8]

## III. ANALYSIS OF DATA

Data will be analyzed by collecting the existing data from the nearby police station and National Highway Authority of India , also the reports collected form the survey data of accidents to compare both of them, identification of the causes of road accidents and black spots is done, using three methods:

a. Accident severity index
b. Method of Ranking.
c. Accident Density Method

### ACCIDENT SEVERITY INDEX

Severity index expresses the amenability of specific accident spot. This method characterize that the no. of calamitous accidents at an area is given more emphasis than non- calamitous accidents. Accident Severity Index (ASI) uses the following equation. [10]

$$ASI = Nf\ Wf + NsWs + NmWm$$

Where,

$Nf$ = Number of fatal accidents at the spot in the last 3 years
$Wf$=Weight assigned to fatal accident=6
$Ns$=Number of serious accidents at the spot in the last 3 years
$Ws$=Weight assigned to serious accident=3
$Nm$=Number of minor accidents at the spot in the last 3 years
$Wm$=Weight assigned to minor accident=1

### METHOD OF RANKING

After accessing the severity values, ranks are given to the black spots which are then arranged in ascending order of severity value. [10]

### ACCIDENT DENSITY METHOD

The accidents density index is gauged from the number of accidents per length for the radius of highway. Area with more numbers of accidents is considered as the high road accident location. Advance no. of road mishaps is calculated as average number of accidents that have occurred per unit length. **Average number of accidents = total number of accidents / roads length**.

## IV. CAUSE AND REMEDIAL MEASURES OF ACCIDENTS

### CAUSES OF ACCIDENTS

There are various major causes of accidents which need to be rectified such as,

a. Absence of frontage road in the urban corridor.
b. Absence of crucial road arrangements like lane recognizing, traffic lights, ominous sign boards, intersections, speed breakers.
c. Nihility of pathways and cycle tracks paths along the road.
d. Déclassé road spatial like absence of shoulders, imprudent layout of accumbent and vertical Curves.
e. Not following the traffic statute.
f. Over speeding.

**REMEDIAL MEASURES SUGGESTED**

**a)** Adaptation of Intelligent transportation system.
**b)** Shaping and implementing the draconian charter against disobeying traffic rules
**c)** Fitting of CCTV cameras along major highways so as to control traffic.
**d)** Construction of speed breakers on the expressways and national highways so as to limit speed.
**e)** Road markings should be properly provided.
**f)** Proper construction of pedestrian paths as per IRC: 93
**g)** Proper construction of railings along medians.
**h)** Time to time maintenance and repair of roads.

## V. CONCLUSION

India is among one of the volantly evolving nations in the world, thus supervening in emanation of large traffic volume across the roads. There is more than 100% growth in National highways which has resulting in deluge thus resulting in increase in accident rates. Due to this there is an enormous need to identify and rectify the black spots, and is being done throughout the country reduce accidental rate by a considerable amount. According to recent Researches on accidents and black spots its being seen that proletariat countries own about half percent of the world's vehicle which are responsible for more than 88 percent of the world's road traffic causalities. Around 57 percent of death rates happening on the roads are due to Pedestrians, Cyclist and motorbikes together. Thus with this growing traffic it is necessary to identify the black sports in the country and to provide specific remedial measures accordingly to tackle the problems and to save life of people.

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