A Review Paper on Identification, Analysis and Suggestions Upgrade of Accident Related Black Spots on Nh-86, Division Sagar, Madhya Pradesh

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Abstract — The problem of road vehicle collisions owing to Black Spots is very severe in highway transport, occurs by a complicated vehicular traffic flow pattern with miscellaneous traffic and roadside pedestrians, and also caused by the presence of human fault or road factors. Roadway collisions are the main causes of property rupture, death and damages all over the world. The essential fundamentals in road collisions are becoming road operators, sleazy automobiles, pavement conditions, pavement layout geometrical and environmental aspect. Road collisions cannot avoid nevertheless via employing appropriate traffic engineering, traffic controlling measures and superior security plans, road collisions rates can be decreased. An accidental "black spot" is a segment of the roadway where accidents frequently happen.

Keywords: Black Spots, Weighted Severity Index (WSI)

I. INTRODUCTION

The analysis of Hazard an Accident's Location and Treatment, one of the best methods for preventing traffic accidents is commonly recognized as using black spots. Black spots are areas of the road that are deemed hazardous for the reason that many collisions have occurred there, Road accidents occurred there because of numerous causes such as a pointed horizontal curve, inadequate super elevation design at the curve, Improper road junction, Broken warning signs board and Poor pavement condition, etc these all reason called geometric design deficiencies. The most important reasons of highway traffic collisions become improper design parameters and poor road conditions and also drunken drivers, careless driving and over speeding, etc. By examining the accidental related records providing by the police station over the previous five years, the current study seeks to discover unintentional black spots on a stretch of NH-86 (from Sagar to Shahghar). This study consists of a black spots were identified using the weighted severity index (WSI), and it was determined that the frequency of road traffic accidents during this study indicated that the fundamental causes of accidents had been identified. Appropriate corrective strategies were also offered for a specific site.

To build a procedure to recognize the most dangerous accidental extend along National Highway. The result from the case study can be used for enhanced valuation of roadway sections for upcoming attentions. The black spots studies on Sagar to Shahgarh stretch (72.7.km) have been taken up with the subsequent objectives-

- To pinpoint different pavement-related factors that contributes to accidents.
- Perform black spot analysis utilizing WSI techniques.
- To determine how frequently traffic accidents occur on the roads.
- Each spot's best-suited enhancement for each black spot is likewise identified.

The studied area is situated in district Sagar of Madhya Pradesh and this study stretch is between Sagar to Shahgarh on National Highway-86. Some feature of this road section is specified below-

- No toll booth at a select stretch.
- No Bus lay-bys and Truck lay-bys.
- The shoulder of the road was not suitable for turning or waving.

II. LITERATURE REVIEW

In developing countries, the issue of traffic collisions is becoming more and more problematic. Road security is necessary to lower accidents that cause harm to both people and vehicles. To reduce accidents and protect road users, safety issues were discovered. Accidental black spot analysis is performed utilizing the rate of accident approach and numerous accident characteristics. A regression study is used to construct a model for the data. By using this study, black spots for improving various road safety have been located, and the reasons for accidents have also been researched. The Sangli-Kolhapur Road (SH-75) is used for the study, and its longitude and latitude are N 16.8530 and E. 74.5630 for Sangli and N 16.7290 and E. 74.282 for Kolhapur, respectively.

In 2015, Mr. Bobade and Dr. J.R. Patil tell about that how can identify the accident- prone location by ranking the parameters based on their severity and severity index. The field survey was carried out at a particular location in a select study area. The study area is Mumbai – Pune Expressway and Pune – Solapur highway and a large number of vehicles move on it also accident rate increases per year than other highways of Maharashtra state. The parameters which caused a maximum quantity of accidents were assigned maximum weighted and top rank. The summation of the weighted was calculated to find out the overall severity. The severity Index was created by summing the weights assigned to each parameter and dividing the result by the severity of all the allocations.

Researchers always have a difficult problem when it comes to indicating road safety-related factors throughout the planning and operational phases. The effectiveness of any approach used to pinpoint a hazardous area or black spots (BS) on the pavement would largely shows documents is segmented into distinct homogenous groups. This study is carried out to investigate and evaluate how various Black spot identification (BSID) method approaches perform in the methodological variety of road network segmentation. To achieve this, four widely used BS techniques—spatial assembling, constant length, constant volume of traffic, and the traditional segmentation technique from the Highway

Safety Manual—have been compared to four different segmentation methods. The effectiveness of the strategies has been compared using two assessments.

The segmentation techniques are initially assessed established based on the precision of the created safety performance function (SPF).

This report is based on a thorough investigation of accidental black spots and traffic safety. The most important resolution of this investigation is to recognize comprehensive investigations for the analysis of accidental black spots and their correction. The strategies and procedures utilized for selecting the project study stretch (where a large number of accidents happened), collecting accident data, dividing the data for better observation, and analyzing accidental black spots and accidental black zones are all covered in this study. Additionally, it makes use of some methods for profiling these accident sites as well as before-and-after research to calculate the impact of treatment on the Black Spots Zone. This study concludes the methodology of rectification is based on short-term measures, long-term measures, mitigation measures, or enhancement of geometric design dependent on the state of the road.

To locate accident-prone areas on National Highways and make improvements there, this study report uses three scientific methodologies. To find the black spots in their study, these three techniques were applied, namely:

1) Weighted Severity Index (WSI) Method.
2) Quantum of Accident Technique.
3) The accident susceptible index method (API).

The investigation concluded that the WSI-based strategy worked best for locating black spots.

III. Result and Discussion

Existing road problems & roadside hazard checklist when visiting the site

A. *Existing road problem*

1) In some places, Shoulders are misplaced
2) Shoulder irregular and too thin
3) The horizontal curve's too-small radius (sharp curve)
4) Improper Drain in a mountainous area
5) A section of the road does not contain road markings.
6) Improper Super elevation

B. *Roadside hazard*

1) Guard rails missing
2) Inappropriate bus stop position
3) Destructive sign boards are seen
4) Not at all parking Places in municipal area
5) There is absence of footpaths or lights on city streets.

The top five "black spot" locations that are situated in the route of National Highway (NH-86) are identified on the basis of analysis of accidental data by using the Weighted Severity Index method and the road traffic accident rate method.

Rank	Name of Accidental Black Spot Location
1	PATHANWALI DARGAH
2	CHHAPRI PATH
3	DALPATPUR VILLAGE
4	RURAWAN
5	IMLAKHEDA

Table 3.1: Representing the top five black spots

A detailed study of the top five accidental Black Spots areas is provided, along with suggestions for improvement as given below-

1) Pathanwali Dargah:

Fig. 3.1(a): Pathanwali Dargah accident location I

Fig. 3.1(b): Pathanwali Dargah accident location II

Suggestions:

1) Ensure Gradient under NH and IRC regulations.
2) Offer additional winding near the Sharpe curve.
3) Cut or remove big, heavy stones from the shoulder.
4) Offer a hard shoulder that is the right width.
5) Broaden the curve's radius.
6) Place appropriate road markers and delineators.
7) A speed limit, a warning signal, and a required signal were provided.

Guidelines for Improvements at Pathanwali Dargah Accidental Locations (I and II) are as designed below

Fig. 3.2 (a): Ideas for improvement at Pathanwali Dargah accidental location I

Fig. 3.2 (b): Ideas for improvement at Pathanwali Dargah accident location II

2) *Chhapri Path*

Fig. 3.3: Chhapri Path accident location

Suggestions:

1) Eliminate & Cutting down trees and other obstructions from the roadside, and increase sight distance.
2) Provide rigid Shoulders and supports on both sides of the highway.
3) Revise the geometric design of the super elevation because as per Indian Standards the value of super elevation is restricted to 0.07-0.10.

Fig. 3.4: Ideas for improvement at Chhapri Path accident location

3) *Dalpatpur Village:*

Fig. 3.5 (a): Dalpatpur Village accident location I

Fig. 3.5 (b): Dalpatpur village accident location II

Suggestions:

1) Construct distinct bus bays.
2) For the protection of pedestrians, create a pathway on both sides of the street.
3) Install a zebra crossing close to the bus stop for pedestrians to cross safely.
4) Create parking spaces to prevent cars from parking on the side of the road.
5) Raise public awareness of traffic regulations.

4) *Rurawan turn:*

Fig. 3.6: Rurawan turn accidental locations

Suggestions:

1) Increasing the curvatures and horizontal radius.
2) Provide appropriate barriers.
3) Also, provide some additional widening at a curve and maintain uneven marking.

Fig. 3.7: Ideas for improvement at Ruravan turn locations

5) Imlakheda Ghat:

Fig. 3.8: Imlakheda ghat accident location

Suggestions:

1) Provide proper cross barriers.
2) Set up declinators and road markings.
3) Also, provide extra widening at a curve and maintain uneven shoulders.

Fig. 3.9: Ideas for improvement at Imlakheda Ghat locations

IV. Conclusion

Accident black spots, which are areas of road where accidents occur frequently and which lower overall road safety, can be recognized and analyzed. Black spots are defined as areas of a highway where accidents commonly happen. The goal of the current study was to identify the National Highway-86 stretch's Sagar to Shahgarh stretch's most dangerous accident black spots. The weighted severity index (WSI) approach and the frequency of road traffic accidents (RTAs) were used to categorize the accident-prone areas along a particular section of NH 86. Based on the value of WSI from the data gathered on traffic accidents, the top five locations were identified as black spots and proposed some potential improvements to the transport system.

This study included two significant information points. One is data on traffic accidents, while the other is road geometry data. Data on road accidents was gathered from the police department and is used to briefly summarize some of their general characteristics, such as clashing position, amount of collisions annually, the quantity of fatalities, and amount of injuries. According to the examination of accidental data, there are significant differences in the frequency and amount of road accidents along some stretches due to many variables, including road alignment effect (such as Tangent, mountainous, and escarpment areas), Temporal variation (such as monthly, yearly), Traffic rules awareness, and road user characteristics, among others. On the additional hand, the essential data from pedestrians, locals, vehicle drivers, and government officers of the closest police station is used to determine the reasons for road traffic accidents through questionnaire surveys and interviews. Road design issues include excessive speeding, inability to yield to other traffic or pedestrians, overtaking in sweeping horizontal curves, and a disregard for traffic regulations.

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