



A Review of Study on Black Spot and it's Identification on Roads

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Abstract

The identification of road sections characterized by high risk accidents is the first step for any successful road safety management process, considering the limited available resources. Although researchers started to study black spot decades ago, there are many un-clarified questions in this field. In the identification process of black spots three main methods can be used: screening methods, clustering methods and crash prediction methods. These literatures concentrate mostly on one type of road each time, although road characteristics (i.e. speed, ADT) can highly affect the success and precision of the applied method. Therefore, the most important question to be answered is which method for which road? This question can be answered by comparing different applied methods for different road types. However the comparison of different methods is still not adequately explored areas. This article aims to compare different methods used in identifying black spot, where speed is one of the important road characteristics which is still not adequately explored.

Keywords:-Blackspot,signing,darkspots,shoulders ,medians,alignment

I.Introduction

Ministry of Road and Highway development decided to make concerned efforts in improvement of roads and national highways. To perform this objective Accident prone areas known as Black spots were to be identified based on the fatality and accident records from police stations and by monitoring the highway traffic and accidents. The black spots have been to be recognized and to be categorized into first priority, second priority and third priority, etc. based on all the recorded data and to be removed.

Black Spots:-An accidental black spot or black spot is a region where road accidents and fatalities have been concentrated majorly. They are not human made but occur due to various reasons such as sharp turning point at intersection, less value of friction coefficient, hidden junction on a fast road and due to non-availability of

sign posts showing speed regulations and information regarding coming traffic. Government each year appoints a committee to check for black spots in each state and work for removing them

For some years, the method adopted for removing these black spots was to provide a signage board, speed restrictions, improving sight line but later on government bodies decided to implement different methods of removing these black spots.



Fig: 1.1 Road Safety Mandatory Signs

Locations of Interest in Black are a strategy for locating particularly dangerous patches in a roadway layout, i.e., the dark spots.

Diagnosis is the process of determining what the concerns are, as well as the factors that contribute to the accident and insufficiencies for each of the black patches that have been identified.

Countermeasures are being sought requires doing a comprehensive investigation in order to design effective solutions for each dark spot, taking into account real concerns and inadequacies.

Estimating Effects is a cycle for evaluating the health implications (and, if needed, other consequences) as well as the price of appropriate countermeasures.

Prioritizing Finding the ideal exercise plan is what prioritizing entails (or speculation program), as indicated by

Some characterized rules, and dependent on assessed impacts and expenses just as spending plan

Limitations.

Implementation is the genuine acknowledgment of the organized estimates remembered for the activity plan (or speculation program).

The final and most important step is follow-up and evaluation, which involves assessing the actual outcomes (impacts and expenses).

Generally, the current "safe frameworks" approach depends on reductionism i.e. the street transport framework is misleadingly separated from its more extensive condition and broken into significantly littler, discrete parts, (for example, street clients, vehicles and streets).



Fig: 2.1 Road sign showing an Accidental black spot

II.Literature Review

When a black spot is identified within a selected kilometers after that, we begin looking for accidents within those specified kilometers. Accidents do happen but not always concentrated to appoint so we check for the specific point and type of accident occurring at that place, i.e. Day-Night time, Type of collision, junction or a short curve or some other dangerous point.

It is possible to calculate the accident distribution based on day and night; normally it is 30% in night, 66% during day time and 4% for dusk and dawn period. A night percentage of more than 30% indicates a special problem for night traffic.

Black Spots- Identification

This includes unique characteristics such as population density variation across the area, employment location, number of lanes and cars, and their interconnection. The steps in analyzing a location are as follows:

1. Collecting data from the local police station and statistic available online of road fatalities
2. To convert the place into a digital map that can be utilized in computer-assisted analysis.
3. Mapping: selecting an appropriate map in the unexpected area.
4. After preprocessing the available data and maps in order to use them for analysis, we are left with various black patches that must be prioritized.

The factor responsible for accidental prone area on a road network depends on these:

1. Width of the road
2. Number of the lanes on road
3. Number of vehicles crossing the road in a day
4. Type of the pavement
5. Length of the network before intersection
6. Presence of shoulders, medians.

Prioritization of black spots

Prioritization assigns different weights to aspects that must be evaluated in order to attain a desired outcome. The elements that influence the occurrence of road accidents are given a weight on a scale of 0-10, with the one that tends to enhance the likelihood of an accident on the road receiving the lowest weight.

Diagnosis

Diagnosis is the process of determining what issues black spots are experiencing, as well as the accident-causing variables and shortcomings of the discovered black spots. The diagnosis is based on the several criteria used to classify the location as a black spot. Possibilities for advancement and cost-effectiveness differ depending on the values.

The dark spot distinguishing proof cycle has recognized unsafe kilometers dependent on three

Various rules:

- Accident rate,
- Accident recurrence,
- Seriousness Value

III. Conclusion

An accidental black spot or black spot is a region where road accidents and fatalities have been concentrated majorly. They are not human made but occur due to various reasons such as sharp turning point at intersection, less value of friction coefficient, hidden junction on a fast road and due to non-availability of sign posts showing speed regulations and information regarding coming traffic. Government each year appoints a committee to check for black spots in each state and work for removing them. For some years, the method adopted for removing these black spots was to provide a signage board, speed restrictions, improving sight line but later on government bodies decided to implement different methods of removing these black spots.

The requirement for black spot improvements is usually considerably larger than what can be implemented with the resources available. As a result, a fair balance between the needs and what can realistically be accomplished must be struck. When doing so, the emphasis should be on the most appropriate safety effects, with initiatives prioritized accordingly

It is necessary to remember these 3 points when we are planning to implement the improvement of black spot:

1. Which black spot should be selected
2. Which design should be used on each site
3. In what order and which design should be implemented

A. Day-time –evening

It is possible to detect the accident's spread during the day and night. The average spread of disasters is 66% during the day, 30% in the evening, and 4% at dark and first light (PP streets).

Exams can be conducted using these standard rates. A night rate of more than 30 indicates an unusual traffic problem. Because the rates for intersections and areas are almost identical, there is no need for separation.

B.Surface conditions

On the basis of surface conditions, the accident transmission can be determined. Ordinary rates are as follows:

- Dry surface 63 %,
- 32 percent wet,
- Blanketed 3 %
- Frosty 2 %.

C.Investigations at the site

A site visit is also a crucial element of the diagnosing process. This visit is much beneficial as it gives detailed information about the site. The site visit has also been done before in the identification process. Finally, a site visit is very helpful in diagnosing. The diagnosis may have revealed trends that necessitate a more thorough site assessment.

Countermeasures

1. Improving the signing , providing speed limit sign boards and warning boards
2. Improving the alignment of the curve by increasing or decreasing the curve radius.
3. Improving the pavement by providing the same level of driving lanes and shoulders.

D.Pedestrian and bicyclist improvements

On city streets, sidewalks They reduced the number of motorcycle injury accidents by 30% and pedestrian injury accidents by 5%, while they increased the number of motor vehicle injury accidents by 16%.This translates to a -7 percent reduction in all injury accidents

E.In rural places, Separate bicycle and pedestrian lanes are provided.

Pedestrian and bicycle lanes are frequently isolated from car traffic lanes in rural areas. A separate pedestrian and bicycle lane may not always guarantee fewer accidents in rural areas

F.In urban places, bicycle and pedestrian lanes are segregated.

Curbstones can be used to divide pedestrian and bicycle lanes from motor vehicle traffic in urban areas, and building in metropolitan locations, having a distinct pedestrian and bicycle lane minimizes the number of injury accidents

G.Pedestrian and bicycle intersections separated by grade

It is estimated that constructing a grade-separated junction will result in a 30% reduction in the number of injury accidents. (-44 percent; -13 percent). For pedestrian accidents, for grade-separated pedestrian and bicycle junctions, the expected decrease factor is -80%. (Interval -90 percent; -69 percent). For fatalities and injuries, the same factors are employed.

IV. References

1. Determination of the parking place availability using manual data collection enriched by crowdsourced in-vehicle data: Martin Margreiter, Foteini Orfanou, Philipp Mayer.
2. Determinants of carrier selection: updating the survey methodology into the 21st century: Tomi Solakivi, Lauri Ojala.
3. Survey of detection techniques, mathematical models and simulation software in pedestrian dynamics: C. Caramuta, G. Collodel, C. Giacomini, C. Gruden, ... P. Piccolotto.
4. Study on the characteristics of travel time based on the method of wavelet decomposition: Jiyang Jiang, Xiaofa Shi, Tianchang Zhang.
5. Evaluation of a transport mode detection using fuzzy rules: Anke Sauerländer-Biebl, Elmar Brockfeld, David Suske, Eric Melde.
6. Reclassification of urban road system: integrating three dimensions of mobility, activity and mode priority: Bing Liu, Linli Yan, Zhiwei Wang.
7. Bi-level Programming Model for Exclusive Bus Lanes Configuration in Multimodal Traffic Network: Si Bingfeng, Zhong Ming, Yang Xiaobao, Gao Ziyou.
8. Exploring factors influencing crash injury severity on freeways using ordered probit model: Qian Fu ; Zhibin Li ; Mengjia Yao ; Xiang Zhang.
9. Comparison of Machine Learning Algorithms for Predicting Traffic Accident Severity: Rabia Emhamed AlMamlook ; Keneth Morgan Kwayu ; Maha Reda Alkasisbeh ; Abdulbaset Ali Prefer.
10. Identifying vehicle driver injury severity factors at highway-railway grade crossings using data mining algorithms: Haniyeh Ghomi ; Liping Fu ; Morteza Bagheri ; Luis F. Miranda-Moreno.

