

Remedial Analysis of Accidents: A Review

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Abstract- Traffic engineering uses engineering methods and techniques to achieve the safe and time efficient movement of people and goods on roadways. The safe and efficient movement of the people and goods is dependent on traffic flow, which is directly connected to the traffic characteristics. The three main parameters of a traffic flow are volume, speed and density. In the absence of effective planning and traffic management of the city, the current road infrastructure cannot cater the future needs of the city. The current work studies traffic characteristics in the city of Ghatkesar at Railway Junction. In this work emphasis was given on traffic and the analysis was carried out through primary traffic flow surveys at Railway Junction in Ghatkesar. Traffic flow is studied by manual methods. Rapid growth of population coupled with economic activities has resulted in continuous growth of motor vehicles and due to increasing population and vehicles, traffic accidents are increasing day-by-day. Traffic accidents related to deaths and injuries result in not only substantial economic losses but also serious physical and mental suffering. The increasing road accident has also created social problems due to loss of lives and human miseries

Keywords- Black spots, GIS, Road traffic accidents.

I. INTRODUCTION

Developing countries are much more affected from traffic accidents than developed countries. The highway network is accelerated at a fast rate and the safety of vehicular movements becomes a concern for everybody due to reporting of loss of lives and properties along with fatal injuries and periodical obstruction of traffic flow. National highways provide the efficient mobility and accessibility function. The increasing road accidents have created social problems due to loss of lives and human miseries. Road accidents are essentially caused by interactions of the vehicles, road users and roadway conditions. Each of these basic elements comprises a number of sub elements like pavement characteristics, geometric features, traffic characteristics, road users behaviour, vehicle design, driver's characteristics, and environmental aspects. Causation of accidents can be well understood with the help of analysis of accident statistics, which can provide clues to many factors of road accidents. Many researchers have devoted their research to the area of

road accidents and reported pioneering work on the analysis of road accidents. A number of studies on investigating the variations in the rate of accidents have been carried out in India in different cities such as Delhi, Ahmadabad, Hyderabad, Chennai, Bangalore, and Kolkata for predicting road accidents using population and vehicular population. In this study an attempt has been made to accident Analysis on Gohana-Sonepat Road. Urban transport facilities in most of the Indian cities are inadequate and deteriorating over the years. The development of public transport system has not kept pace with traffic demand both in terms of quality and quantity. With the rising motorization and expanding road network, travel risks and traffic exposure grow at a much faster rate, as the growth of registered vehicles always out numbers population growth. Today road traffic accidents are one of the leading causes of deaths, disabilities, and hospitalizations with severe socioeconomic costs across the India. The increasing numbers of road accidents has imposed considerable social and economic burdens on the victims of accidents.

II. OBJECTIVES

1. To study the cause of road traffic accidents.
2. To identify and analyze the risk factors and accident prone sites (Hot spots), which form the crucial determinants of the RTI.
3. To understand the nature, type and mode of occurrence of accidents.
4. To study the nature and type of injuries.

III. LITERATURE REVIEW

Er. Shakir ahmadbhat dr. Rakesh guptain "Review paper of accident analysis of a state highway (gohana to sonepat sh-11 haryana)"

This paper focus on road accidents occurring on Gohana-Sonepat Road. The road accidents are very much on Gohana-Sonepat Road & dueto which it was very essential to evaluate. Accident analysis of Gohana-Sonepat Road. so that the remedial measures should be suggested to the accidents on Gohana-Sonepat road, according the data related to traffic volume, type of vehicles, accident data, type of accident,

causes of accident vehicles involved in the accident, were collected from the last five years and analyzed.

On the basis of data analysis, characteristics of accident and field visits conducted for the study of remedial measures have been suggested to reduce accidents on the accident-prone segments of the studied stretch of the road.

These measures include

- a. Widening of all the narrow bridges/culverts
- b. Improvement of sharp curves
- c. Providing speed control device especially on approaching road
- d. Avoiding of overloading
- e. Providing better road surface.
- f. Providing central verge along town and village area.

Anitha SD Selvasofia, Prince G Arulraj in “Accident and traffic analysis using GIS.”

This paper describes a model developed to identify black spots on roads using Kernel and Overlay analysis in GIS. GIS is location based information to analyze the spatial and non-spatial data. Hence a model for identifying accident spot location on roads can be easily integrated using GIS [1-6].

The study was an attempt to find out the most vulnerable accident locations or the black spots in Coimbatore districts making use of GIS. The Weighted Overlay Analysis method was used to rank the accident locations. Based on the analysis, Periyayakampalayam, Sarcarsamakulam, Thondamuthur, Madukkari and sulur were identified as most vulnerable accident locations and suggested some possible alternative or corrective measures to improve the transportation system in these locations, from which the decision maker can select suitable measure for the location. The method is found to be effective in identifying the black spots, provided sufficient secondary data is available.

Gourav Goel*, S.N. Sachdeva in “Analysis of road accidents on NH-1 between RD 98 km to 148 km”

This paper deals with the characteristics and trend of road accidents on a selected stretch of NH-1 between RD 98 km and 148 km. Four year road accident data from 2007 to 2010 of 50 km long stretch was collected which includes the period when construction of 6-laning project started on NH-1. The paper also brings forth the result of widening project on road accidents. The data was analyzed to identify cause of accidents, nature of accidents and type of injury, type of

vehicles involved and time of accidents. The widening project has resulted in tremendous increase in number of accidents on the road. Maximum accidents fall in the category of non-injury type (49%). Serious injury type accidents are found to be more than fatal accidents. Findings show that head on/rear end collisions, caused mainly due to over speeding/driver's fault account for 46% of the accidents. It is seen that trucks/canter/buses are found involved in maximum number of accidents (42%). The day time accidents are found to be more than night time accidents. This paper presents the data analysis, improvement measures and conclusions recommendations to reduce road accidents on NH-1.

The following are the main conclusions drawn from the study:

1. Serious injury type accidents are found to be more than minor injury accidents
2. Type of accidents include 46% as head on/rear end collision, 19% as hit and run type and about 14% as overturning type accidents.
3. Over speeding/driver's fault (87—88%) should be checked by strict enforcement.
4. It is observed that trucks/canter/buses are involved in maximum accidents (42%) followed by car/jeep (35%), 2-wheeler (13%) and others (10%). Buses account for 6% accidents. Enforcement measure should specially focus on the road truck/canter/bus as they are found in maximum number of accidents.
5. More accidents take place during day time (61%) than in night time (39%). This may be attributed to less number of cars and 2-wheelers during night.
6. The number of accidents increased tremendously after the start of construction work in May, 2009 for widening of NH-1.

Mengistu Mena Kuleno, Tarekegn Shirko Lachore, Dr Raju Ramesh Reddy in “Cause and Remedial Measures of Road Traffic Accidents: A Case Study of Wolaita Zone, Ethiopia” .

The current study is conducted to analyze the total rate of accident in wolaita zone, Ethiopia. The Accident data were collected from wolaita zone traffic police office. A Multiple Non-Linear Regression equation is developed to estimate the influence of each contributing factors on the occurrence of accidents. From the analysis, it is observed that the influence of over speed and overtakings are more leading in occurrence of accidents followed by failing to give priority and pedestrian factors. Motor cycle takes the highest share of accident occurrence followed by trucks in wolaita zone. The study provides alternative remedial measures to reduce various consequences involved in accidents.

The current study is conducted to analyze the total rate of accident in wolaita zone, Ethiopia. The accident data were collected from the records of wolaita zone traffic police office and wolaita zone road and transport directive. A Multiple Non Linear Regression equation is developed to estimate the influence of each contributing factors on the occurrence of accidents. Rate of accidents is taken as a dependent variable and the contributing factors such as over speed, over takings, failing to give priority, road condition, vehicular condition, pedestrian factors and environmental conditions are taken as independent variables. From the analysis, it is concluded that the influence of over speed and over takings are more leading in occurrence of accidents. From the survey analysis, it was concluded that the dominating factors for accidents in the zone are human factors 91%, road condition 4 %, vehicle mechanical and technical problems 3%, and environmental condition (2%). Motor cycle takes the highest share of accident occurrence followed by tracks in wolaita zone.

FSHATSYON BRHANE GEBRETENSAY1, JAYESH JUREMALANI2 in “ROAD TRAFFIC ACCIDENT ANALYSIS AND PREDICTION MODEL: A CASE STUDY OF VADODARA CITY”.

A micro level analysis of road accident is performed to develop road accident prediction model each and every parameter related with the accident is considered. For micro level analysis road traffic accident data of last seven year (2010 to 2016) from police station is collected and a detailed analysis is performed on basis like Hour, year, location, type of collision, type of road, physical feature of road, age group, sex, weather condition etc. On basis of this analysis effect of accident is identified. After analysis road traffic accident prediction models is developed based on different parameter.

They concluded.

1. During the last seven years the number of killed peoples (accident severity) of the city is increasing year to year with increasing population.
2. The highest cause of the accident is fault of driver and 2W type of vehicle in the city.
3. Accident is increasing with increasing of type of vehicle and population.

Faheem Ahmed Malik, Shah Faisal Saleh Faisal Farooq Rather Malik Jasif Jabbar, Inam ul haq Wani Shahid Mushtaq Shah Farooq Rashid in “Road Accidents and Prevention”

In this paper they studied accidental records of various police-stations, identified the black-spots of accidents and then analyzed the geometric features of those spots whose observation is given in this paper. The identification of such points provides us ease to work on some section of road which is most prone to accidents. We analyzed the geometric deficiencies and they recommended ways to reduce their affects. The findings indicated that large radii right turn curves were more dangerous than left curves, in particular, during lane changing maneuvers. However sharper curves are more dangerous in both left and right curves. Moreover, motorway carriageways with no or limited shoulders have the highest CR when compared to other carriageway width. Proper traffic guidance and control system to guide road users ensuring safe movement of vehicles has been recommended and some of the facilities such as pedestrian crossings and median openings, acceleration and deceleration lanes were re-designed in order to improve the safety of the road and minimize the accidents. The study shows that the main causes, effects and locations of accidents on National Highways are:

1. Occurring on straight stretches due to high speed.
2. Occurring at four arm junctions due to insufficient sight distance, lack of traffic guidance, and absence of markings and poor road geometries.
3. Head on collisions due to high speed and bad overtaking practice.
4. Pedestrians are most vulnerable due to insufficient pedestrian facilities, poor knowledge of traffic rules and making errors.
5. The main recorded cause of accidents is driver error
6. Negligence and over speeding is as high as 90%.
7. Maximum casualties are in cars, followed by pedestrians and trucks.

Dr. K. Chandrasekhar Reddy in “Study of Accidents on NH-140 and Its Preventive Measures”.

This paper mainly deals with accident analysis on National Highway-140 (NH-140) and its preventive measures. NH-140 is a National Highway in the state of Andhra Pradesh in India and it starts at Puthalapattu and terminates at Tirupati road. It has a total length of 58.85 km. After preliminary survey of the highway four major accident zones namely, Kasipentla zone, Nendragunta zone, Kalroad Palli zone and Mungilipattu zone were selected for detailed study. Accident data for a period of six consecutive years were collected from the concerned police stations for analysis. Various studies carried out to know the actual causes of accidents. From this analysis suitable preventive measures were suggested.

They concluded that Most of the accidents were took place in the four zones of Kasipentla zone, Nendragunta zone, KalroadPalli zone and Mungilipattu of NH-140. Most of accidents are head-on collisions. More number of accidents observed in evening times it may be due to heavy traffic in that time. It is also observed that the curves are narrow curves and sight distance is so small hence drivers may not view the opposite vehicles. Jungles and bushes inside of the curves reducing the sight distance. There is a lack of proper lighting in the night time. Considering all the remedial measures we can evade accidents on the zones considered for the study.

M. Bhagyaiah¹, B. Shrinagesh in “Traffic Analysis and Road Accidents: A Case Study of Hyderabad using GIS”

In this paper they have studied case study on Hyderabad using GIS. There has been increasing trend in road accidents in Hyderabad over a few years. GIS helps in locating the accident hotspots and also in analyzing the trend of road accidents in Hyderabad.

They concluded that The limitations of the police database, which is the legal source of information on fatalities resulting from road traffic crashes, indicate a need for strengthening the road traffic crash surveillance system so that reliable, accurate and adequate data on road traffic crashes and the resulting fatalities and injuries can be collected. This could then form the basis for planning effective intervention strategies to improve road safety in the city. More effort is needed to have a comprehensive understanding of the various aspects of road traffic crashes, and the recommendations made for strengthening surveillance could serve as an initial step towards reducing fatalities and injuries due to road crashes in the long term.

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