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Review on Analysis of Road Accident on National Highway in Hilly Region in Himachal Pradesh

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ABSTRACT

The increasing number of traffic accidents on National Highways, which make only about 2% of the whole road network, are to blame for one-third of all fatalities.. Because there are no facilities for pedestrians on Indian roadways, the traffic is diverse in character with a high proportion of slowly moving automobiles, forcing pedestrians to use the carriageway. Road accidents are becoming more and more common due to a lack of enforcement and contempt for traffic laws. In addition to the losses to society and the individual in terms of suffering, human loss, handicap, and mental anguish, traffic accidents also result in a 1% loss of GDP.

Due to a number of evident factors, the road accident scenario is even more bleak in mountainous areas. Some of the factors that contribute to accidents on hills include small roads, steep slopes or gradients, hairpin bends, narrow and abrupt curves, the existence of valleys or rivers on one side of the road, poor visibility in the winter, the monsoon, landslides, the width/type of the shoulder, the pavement's surface, and the standard of maintenance, among others.

It is crucial to always consider how the road, the car, and the other users of the road interact to cause accidents. The same factors contribute to accidents on uphill roads, thus it's critical to research them and examine their interactions. Even if one element seems to be in the lead, this interaction still exists.

The THREE E's Le Engineering are just one of the many elements that ensure road safety. To at least lessen, if not totally prevent, accidents and lessen their severity, enforcement and education should be researched. The components and their interactions that are directly related to accidents on hill roads or that can be helpful in the study of accidents on hill roads were thoroughly reviewed in the literature.

KEYWORD: Introduction, Study area, the roads characteristics, road safety cell.

1.Introduction

The spectacular growth in the road transportation sector in India has been a key element in the country's economic development. This growth has also led to the deterioration of the road traffic environment due to increased congestion, environment pollution and road accidents and further leading temporarily reducing the capacity of network. Often road accidents cause property damage, human injuries and even human death and can be defined as a collision of a moving vehicle on a public road in which a road user (human or animal) is injured.

In India more than 80,000 people are killed and nearly 400,000 persons are injured in about 300,000

road accidents every year (22). The economic loss to the society on account of road accidents is estimated to be about USS 600 million every year (22). The number of accidents in India is basically attributed to the growth of motor vehicles, inadequate road infrastructure, near absence of flyovers and subways to eliminate conflicts, absence of motorways and expressways, heterogeneity of vehicles on Indian roads, poor road surface condition due to paucity of funds, lack of traffic education, traffic culture etc. To deteriorate the matter further, there are deficiencies in the vehicle design, its poor maintenance, bad driving habits, lack of enforcement and casual attitude of road users and the concerned agencies towards the basic tenets of road safety (28)

India has a dubious distinction of a nation with about 8-10% of world's road accidents deaths. Although there is no dearth of technologies that can be made available for managing traffic for safety, but the traffic is in shambles in cities as well as in sub urban / non urban roads. Condition is further deteriorates in case of safety on roads in hilly areas. This status of road safety is completely linked to the population which is illiterate on road use, including those who are officially called literate. The road safety status is generally the reflection of the traffic culture and it is extremely poor in India.

2. Study area

Road construction is the main driver of progress in a state with hills like Himachal Pradesh. Rail lines of any real length cannot be built in these regions. Without a well-established system of roads and road transportation, no movement of any kind of goods or people is even remotely feasible in many industries including agriculture, horticulture, and industry. Thus, the highways are the economic backbone of Himachal Pradesh. As of the end of 2018–19, Himachal Pradesh had 65.97 km of motorable roads per 100 sq. km of land. The state of Himachal Pradesh has a good road system. At the end of the fiscal year 2018–19, the state of Himachal Pradesh total road length increased to 38,454 from 37,586 during the previous year. In Himachal Pradesh, the length of the roads expanded to 39475 Km in the 2019–20 fiscal year. There are 108 State Highways/Major District Roads (MDR) with a total length of 4681.03 kilometers and 19 National Highways with a total length of 2,592 kilometers (HPPWD=1238 kilometers, NHAI=785 kilometers, and BRO=569 kilometers).

3.THE ROADS CHARACTERISTICS

- Road, lane width and shoulders type :A number of studies were conducted to quantify the accident rate relationship with different parameters of road. The summary of various studies given by Stewart Robertson & Lisa Aullman is presented. Another study performed by Charles V. Zegeer to quantify the effects of lane and shoulder width on accidents on rural roads carrying fewer than 2000 vehicles per day. After analysis of the data the following were found;
- Accident rates on paved, low-volume roads are significantly reduced by wider roadway width, improved roadside conditions. No differences in accident rates were found on roads with paved shoulders in comparison with the rates on roads with unpaved shoulders. Accident rates are most highly correlated with lane and shoulder widths for single-vehicle and opposite-direction accidents.
- For roads with lane widths of 3.1 m (10 ft), shoulders of 1.5 m (5 ft) or greater arc needed to reduce accident rates. For roads with lane widths of 3.4 and 3.7 m (11 and 12 ft), shoulder width of at least 0.9 m (3 ft) results in significant accident reductions in comparison to roads with narrower shoulders.. For a combination of reasons there is no apparent benefit in terms of reducing the number of accidents from widening of lanes from 2.7 m (9 ft) to 3.1 m (10 ft) unless shoulders of 1.5 m (5 ft)

or more are also added. Indeed the study produced evidence that existing roads with 2.7-m (9 ft) lanes with narrow or wide shoulders are preferable to roads with 3.1 m (10 ft) lanes with narrow shoulders, perhaps because of lower vehicle speeds on roads with 2.7m (9 ft) lanes and thus lower numbers of accidents.

- Accident experience does not appear to be significantly different for unpaved versus paved roadway surfaces at traffic volume of 250 vpd or less. At traffic volume greater than this, accident rates are significantly greater for unpaved roadway than for paved roadway, all else being equal. Therefore, paving of rural roads with traffic volumes of 250 or more vpd will generally improve their safety.

4. ROAD ACCIDENT DATA MANAGEMENT SYSTEM (RADMS):

The Government of HP has implemented the integrated Microsoft Accident Analysis Program (iMAAP), a crash data management system created by Transport Research Laboratory (TRL), a UK-based Consultancy Service, as of the month of August 2015 in order to support the improvement of the situation with regard to road safety in the State of Himachal Pradesh. RADMS, short for Road Accident Data Management System, is the name of this program. The stakeholder departments, including the police, public works, health, and transportation departments, use this application. Police use RADMS to record crash reports and link to relevant data sources from various stakeholders. This application is helpful in developing data led, result oriented countermeasures program and strategies in order to reduce the frequency of Road traffic accidents, fatalities and injuries by implementing.

➢ **FUCTION OF RADMS**

The main goal of RADMS is to improve the state of road safety in Himachal Pradesh by giving access to timely, complete, and pertinent information on road accidents. RADMS is primarily concerned with the collection and electronic storage of police accident report information and its subsequent analysis to improve road safety systematically. Samsung Tablets have been given to each police station in Himachal Pradesh in order to deploy this method there. When the police station was informed of the accident, the investigating officer hurried to the scene with a tablet and recorded all pertinent information on the accident site as well as the exact location using the tablet's GPS system.

This accident data may be downloaded both offline and online. The remaining fields related to the police department are filled out in the police station, and the tablet is then synchronized with the central accident database, also known as ADMC, Accident Data Management Cell. After the Police Department's entire field has been filled out, the other stakeholder departments are given access to the accident data and asked to complete their own forms. In order to reduce the frequency of road traffic accidents and to develop corrective measures, the data is digitally saved in the Central Accident Database and then evaluated.

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6. ROAD SAFETY CELL

In accordance with an order from the Supreme Court's Committee on Road Safety, a Lead Agency/Road Safety Cell has been constituted in the Himachal Pradesh Department of Transport. This road safety cell has been operational since the 16th of July 2019 with the appointment of Executive Engineer from the PWD department, DY.SP from the Police Department, and supporting staff.

➢ INJURY COUNTERMEASURES

There is a lot of literature on accident analysis. Numerous studies have looked at the key factors influencing traffic accidents and recommended solutions to increase safety. It indicates that road accidents are complicated occurrences influenced by a number of variables, including road geometry, pavement quality, volume of traffic, and the presence of safety measures. Idealistically, a complete accident study should take into account all or most factors. However, because it is impossible to separate out the effects of each parameter, this is essentially impossible. As a result, studies on accidents often only look at a few aspects of the issue. Although the main causes of road accidents are generally acknowledged, diverse research have not always produced reliable findings.

According to Hughes et al. (2001), even within the same study, results may not be consistent between test sites. This can be ascribed to important site-specific variations such road geometry, the environment along the side of the road, or variations in design methodology.

➢ REQUIREMENTS FOR FUNCTIONALITY

The crash barrier's primary purpose is to, if at all possible, control the motion of the vehicle using external forces throughout the entire crash phase, that is, from the moment of initial contact between the vehicle and the barrier until the driver is able to regain control of the vehicle or until the vehicle comes to a stop outside the traffic lane. Simply said, functional requirements for the barrier are constraints on the kinematic behavior of the vehicle and the control forces the barrier will apply to it.

➢ REQUIREMENTS FOR THE STRUCTURE

The structural requirements that a crash barrier must meet can be translated from the aforementioned functional requirements. The barrier's longitudinal strength must be sufficient to sustain the forces of the hardest potential impact without breaking. This is the first condition. Experience from the project has shown that a structure's anchoring at the beginning and finish must be able to withstand a force of at least 40 tons. By allowing the structure to deflect gradually during the collision, lateral accelerations can be decreased. For both light private automobiles and heavy trucks, the deflection will need to be at least 1 meter in all cases when extreme impacts (speed 100 km/h, impact angle 20") occur. Of course, it's not that easy.

Since private vehicles weighing 500 to 1500 kgf make up the majority of the traffic, the structure will in any event need to deflect sufficiently when struck by these. It will undoubtedly deflect even more if large trucks collide with it. However, the deflection must stay within acceptable bounds, and as the deflection progresses, the resistance must rise.

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