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# Review on Construction Management of Highway Project with Special Emphasis on Quality

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**ABSTRACT:** The most effective way of managing accident risk is through the development of a “safety culture”. A safety culture is the beliefs and ideas shared by all members of an organization about accidents and their risk of happening and proper measure which are to be taken to decrease in the number of accidents. Highways are designed in such a way they would be accommodate traffic volume at that time of design with a forecast on what the possible increment in traffic volume in the future years would be. Due to increase in traffic volume as a result of more vehicle ownership, increase in human activities such as educational activities, business activities and many more constitute the factors which necessarily leads to increase in volume of traffic thus exceeding the capacity of the highway which in turn leads to upgradation of existing highways to more lanes and sometimes to more durable materials such as upgrading from flexible pavements to rigid pavements in order to accommodate the present traffic volume and as well that of considerable future traffic volume.

## I. INTRODUCTION

### A. CHALLENGES ENCOUNTERED IN UPGRADING EXISTING HIGHWAYS

Highways form a vital role in the economic prosperity of any nation, due to its importance, the Government at all levels desire to have a good road network to facilitate the movement of goods and services, however, the construction of these highways are very capital intensive projects thus leading to the higher cost on the government or the major client of the project, as the cost of upgrading existing highways will not be compared to the initial cost of construction of the highway, this is because the numerous factors to be considered like labour, cost of materials, cost of land acquisition, cost of survey, cost of earth machines, cost of construction etc. keeps increasing and hardly falls. Thus, the Cost will be significantly higher in upgrading existing highways after years of initial construction.

### B. SOCIAL CHALLENGES

Due to large number of commercial establishments and dense habitation at some locations, the need of 3 bypasses was necessary in the proposed upgradation of existing Highways. Many families find their livelihood or economic dependency from commercial activities near and around highways, but due to upgradation these activities are affected and suspended temporarily or permanently. This affects the psychological state of individuals and leads to subsequent death.

## II. LITERATURE REVIEW

**Sagar B. Patil et al (2019)**, The objective of the study of geometric features of road and accident rate wants to find various geometric features of road using post-& pre- analysis approach. It affects geometric features and accident rate. The study is based on traffic volume. Major accidents occurred due to speed, horizontal radius, lack of visibility, super elevation, steep gradient, vertical gradient. A total of 18749 vehicles from 8.00am to 8.00pm on Waghbil road were collected (combined vehicles), for analysis approach. The analysis shows ratio of vehicle count for every 15 mins interval. Manual calculation was the purpose for this investigation. Road & human safety are the major consideration of the project, basic methodology for better understanding. Studying, analysing and determining is the basic approach of this project.

**Kumar A., Dhananjay et.al (2015)**, The author explains that development of effective road transport system is primary need of any developing country. Also upgrading of existing road network is essential for developed countries to carry out its transportation functions smoothly as with increasing traffic volume urban and non-urban roads reach to their



saturation level in passage of time. The design of route alignment and pavement structure decide cost of project which totally depend on time taken for same. So for this job the best available Highway Geometric Design Software must be deployed. Keeping this in view the author have used MX ROAD Software for the geometric design of the existing state highway (SH 131) in Maharashtra to improve its geometric features and upgrading it from two lanes to four lanes. The Software uses 3D string modeling technology and gives the desired values of different components of geometric design such as Horizontal and Vertical Curves, Super elevation, Shoulder, etc.

**Jain K. a, et.al (2014)**, The traffic composition on multilane highways in India comprises of a wide range of vehicles in terms of their type, size, engine power, manoeuvring ability, etc. This mix of vehicles with different operating capabilities results in a broad range of speed. Slow moving or non-motorized vehicles occupy the lower ranges of speed spectrum whereas the new technology cars dominate the higher ranges. To understand the real traffic behaviour, it requires quantification of some of the basic traffic flow characteristics such as Speed, Flow, Density and Occupancy through which the capacity can be derived. The radical changes in road network and vehicle technology have resulted in variations in speed-flow characteristics and subsequently road user costs. The problems arise out of three major aspects associated with several types of vehicles in the traffic mix i.e. speed and acceleration capabilities of vehicles, their manoeuvres and lateral clearance requirements within the right of way. The main objective of the present study is to estimate the basic traffic flow parameters for six lane divided traffic stream under study.

**Karim et al., (2009)** studied issue and challenges about safety of the roads. A fairly recent measure which aims to identify possible deficiencies related to road safety in various stages of implementation of any road project has been instituted in early 1997. The road safety audit covers new road infrastructure projects as well as road improvement schemes. The road safety audit procedures have been developed to include all stages of project implementation, i.e. from planning stage to preliminary design, detailed design, construction (or pre-opening) and operational stage.

**Dr. S. S. Jain, et.al. (2009)** worked on safety audit on four lane national highways. Road Safety Audit (RSA) is a formal procedure for assessing accident potential and safety performance of new and existing roads. RSA is an efficient, cost effective and proactive approach to improve road safety. It is proved that RSA has the potential to save lives. The RSA was originated in Great Britain and is well developed in countries like UK, USA, Australia, New Zealand, Denmark, Canada, Malaysia and Singapore. It is at varying stages of implementation in developing nations like India, South Africa, Thailand and Bangladesh. RSA appears to be an ideal tool for improving road safety in India, as basic and accurate data on accidents have yet to be collected.

**Devaraj Hanumappa et.al (2009)**, conducted a study on 'Cellular Automata Model for Mixed Traffic Flow with Lane Changing Behavior' Indian cities are seen with predominantly mixed traffic plying on the streets. Modeling the mixed traffic involving vehicles characterised of different speed, length, and width is a challenging issue. Based on the finer cell system of cellular automata (CA) models, this paper proposes to evaluate the mixed traffic behavior with cars and motorcycles for intermediate lane width, which is more common in Indian cities. The maximum car flow is observed (even with the presence of motorcycles) in the results which is higher than the Na-Sch model for cars. This increase is mainly due to the changing behavior. The car flow decreases as the density of the motorcycle increases. Furthermore, the paper proposes to evaluate the effect of lane change behavior on the speed and flow of the traffic stream using the fundamental diagrams of speed flow density curves. The simulation result suggests that lane change probability has little effect on the speed and flow of the traffic stream.

**Singh et.al (2006)** carried out road accident analysis in patna city and studied about the various reasons for accidents. 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 the traffic demand both in terms of quality and quantity. As a result, the use of the undesirable modes such as personalized transport, mainly two-wheelers, and intermediate public transport, mainly three-wheelers, is growing at a rapid speed. Roads and footpaths today are heavily encroached by parked vehicles, hawkers, and roadside business forcing pedestrians to walk on the road. This results not only in restricting the traffic flow, but also putting the pedestrians „life at a great risk. Bihar is one of India's poorest and densely populated states, its capital city Patna, is noisy, crowded, polluted, and typically chaotic. The roads in the city are congested and encroached by other activities. Bus services in particular have deteriorated, and their efficiency and quality of service have been declining thus inducing passengers to turn to personalized modes and IPTs. This results not only in restricting the traffic flow, but also putting the road users „life at a great risk. The total number of fatal accidents as well as related fatality in the city is increasing over the years. The vehicular population growth is tremendous in Patna, with just 4,384 registered motor vehicles in 1981 to 294,164 in 2001, an increase of 67 fold in a span of just two-decades. If we calculate it from 1981 to 2001, annual growth rate figure goes up to around 23%. It is observed that growth of personalized vehicles such as two-wheelers and cars is very steep due to non-availability of





mass transport system. Public transport system in Patna, in general, is inadequate, inefficient, and unplanned and therefore, it is not able to serve the travel demand of the public in the best possible way.

### III. AIM OF THE STUDY

The project is aimed at investigating the challenges that are faced as a result upgrading existing highways and as well the effects that may have in a considering some factors such as economic, cultural, environment etc.

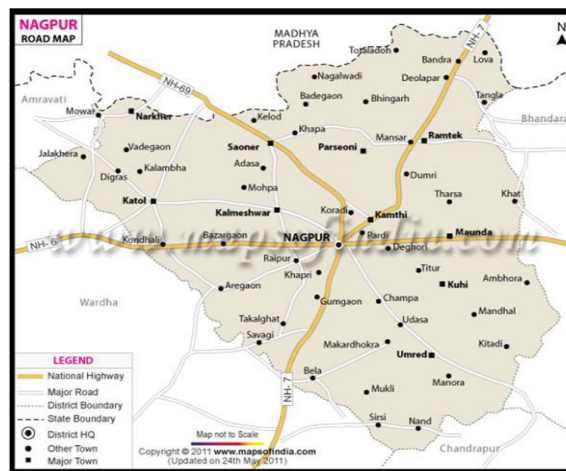
### IV. OBJECTIVES OF THE STUDY

- To study the existing road geometric design of Two-lane divided carriageway from Nagpur to Katol stretch (NH-353J).
- To define the various major risks involved in highway construction project.
- To identify and classify the various risks involved in construction of highway.
- To analyze traffic data required for upgrading highway for optimum traffic flow.
- To analyze or evaluate construction management strategy involved in highway construction
- To use analyze data for pavement.
- To analyze the existing geometric condition of road under varying roadway and traffic conditions.
- Investigate the Economic, Environmental and Social implication effect of such projects.

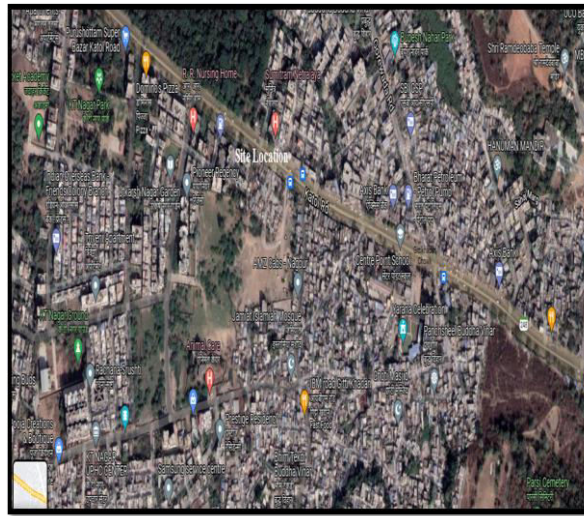
### V. CASE STUDY

#### CASE STUDY AREA

In this project used Nagpur Katol major road for investigating study find out necessarily data using GPS survey (katolnaka to Kalmeshwar Bypaas aprox 15km).



[Fig.5.1: Nagpur Road Map]



[Fig.5.2: Satellite View of Nagpur Katol Major Road]



[Fig.5.3: Katol Naka (Study Point)]

## VI. PROPOSED CONCLUSION

From the study following conclusion can be drawn o Road Safety Audit is very important for controlling accidents and for the proper design and maintenance of the Highways-

- There are three locations which are located as the black spots since the value of ASI of these locations is more than average ASI.
- Total horizontal curve length provided generally less than required w.r.to degree of curvature.
- Vertical curves length are inadequate for safe sight distance for 100kmph at many locations.
- Checklist for layout, location and access to Fuel Stations and Properties along national highway has been prepared with the latest notifications of MORTH.

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