



BYPASS PLANNING AND UPGRADATION PROPOSED TO THE SELECTED ROUTE - A REVIEW

Engineering

Shwetha Menon Post Graduate Student, RUAS

Yateen Lokesh Assistant Professor, RUAS

Nikhil T R* Assistant Professor, RUAS*Corresponding Author

ABSTRACT

Urban traffic congestion is one of the major problems of the developing countries. Growing volumes of through traffic are often attributed to traffic flow challenges. Bypass roads or alternative routes are studied to reduce congestion in the city center. Bypass diverts through traffic away from town centers leaving local streets to local traffic. This study aims to check the viability of the stretch to serve as an alternate route in terms of projected divertible traffic and also the methodology to propose and estimate the improvement required to the geometrics, pavement, cross drainage structures and existing junctions.

KEYWORDS

Alternate route, divertible traffic, improving design aspects, geometric design, pavement composition, cost estimate.

INTRODUCTION

A Provision of adequate infrastructure is a prerequisite for sustained growth of economy and inherent to such growth is the need to ensure cost-effective movement of people and goods. An efficient road infrastructure is therefore an essential requirement for development of any nation. India has the second largest road network in the world with 4.4 million km of roads.

Though India has got a good network of roads, the augmentation of the capacity has been very minimum compared to the vehicle growth. Traffic plying on rural highways many a time has to pass through the urban areas of various sizes with or without the purpose of halting within the urban areas. The non-halting traffic is known as through traffic with its origin and destination lying outside the limits of the urban area. The frequent interaction of through traffic with the local traffic of the urban area besides bringing down the level of operation of both types of traffic would also erode the traffic environment of the township. In all such cases, proper planning of alternate route including assessing the viability of the proposed route and proposed improvement and upgradation assumes great importance for providing unhindered movement to the through traffic and decongests the townships.

In this article we will look at many cases studies that deal with highway bypass studies which includes the planning and various approaches adopted to support the viability of bypass or alternate routes. The methodology adopted for the improvement and upgradation of existing road to enhance the traffic capacity for accommodating the expected traffic volume, improvements in geometrics and other features of the road to improve road safety and travel time are also reviewed in this paper.

CRITICAL REVIEW:-

Kumar, Ashok. et al. (2016) This study examines how software tools like MX Road helps in creating various design options and other geometrical improvement more quickly than conventional technique used.

Dzebo, S., (2017) In this work, a simplified model of traffic allocation to the intended bypass road is presented. The purpose of such model is to provide to the planners a tool for simple, fast and inexpensive way to estimate the expected traffic volume on the planned bypass

Biju, Aparna. et al. (2022) The goal of this research is to examine the current traffic flow of the Ettumanoor-Kottayam route using a transportation survey and traffic volume. Based on the survey results, the main nine factors contributing to congestion and the condition of the area are identified and analysed using SPSS software, and solutions are recommended based on the results.

Deepthy, B. et al. (2016) This research assesses the present condition of the road network using traffic analysis, including speed and delay survey, traffic volume survey, and other surveys such as a existing road condition survey, parking features, and a pedestrian volume count.

Based on this information, a suitable road development plan and improvement plans was formulated.

Gichuki, D.K., (2012) The research explored the LIDAR's elevation accuracy in relation to a collection of GPS base points placed on various surfaces. The RTK GPS altitudes at randomly chosen places at various land covers were compared with the LIDAR points. The findings demonstrated that LIDAR was less accurate on rough surfaces than it was on grass. The outcomes also demonstrate the significance of understanding the accuracy and constraints of any data before using it.

Babić, Darko. et al. (2022) The research article discusses the primary characteristics functions and significance of road markings and signs in traffic safety road markings and signs are also discussed in terms of practical issues potential trends and recommendations furthermore all markings and signs must be consistent and standardised so that drivers of all ages understand what they mean and adjust their behaviour accordingly it is also recommended to further explore the link between the effects of vehicle technology on drivers and the overall level of road safety.

Bezabih, Berekat. et al. (2020) This paper presents the different methods used to carry out the road inventory and condition survey. The data arrived at after this survey was presented and also the major lesson learnt were discussed.

You, Kesi, et al., (2022) This study concentrated on employing optimization theory to create a well-balanced highway alignment. This technique aids in getting the optimal horizontal alignment design while staying within the bounds of safety and economy. Economic, safety, and position constraint are the three goal functions that can be attained. Two situations, either with or without limitations, were examined. It was determined that the optimization approach might aid in enhancing both the economics and safety of highways.

Chakole, H. and Wadhai, P.J., (2022) The typical roadway design using AutoCAD Civil 3D and the manual approach are contrasted in this essay. The road was designed efficiently and precisely using Civil 3D. When done manually, geometric design takes a lot of time, and mistakes may be very expensive. Using a total station, a survey can be finished rapidly. The elevation, easting, and northing coordinates are used to import the total station's points into Civil 3D. These ground coordinates are essential for establishing alignments, building surfaces, and creating other geometric features.

Drlíčiak, M., Čelko, J. and Cingel, M., (2021) The article examines the modal split in the Zilina during peak periods in the morning and afternoon. The results are based on a mobility survey that was conducted in the area. Based on the composition of households and residents, three major population categories were identified. A modal split analysis was performed on all major groupings and the largest subgroup—economically active people. The findings indicated that there is more traffic than the actual road capacity allows, and they also

identified how many trips needed to be changed to the train, a different mode of transportation.

Anand, E et.al; (2016) This study looks at the condition of the road from the KTC junction to the K.S.E.B substation Kanjikode and conduct a number of tests on subgrade soil that may or may not include additives. Using the data, a new pavement design is proposed.

Bavithran,R. and Sasikumar,N. and Yamuna,G ;(2016) In this research paper , the level of service and the traffic scenario in the study area are evaluated together with an analysis of the current road junction using a volume count survey. Provision of additional lanes, enhanced transit, and better lateral clearance are a few of the suggested upgrades.

Panda, R.K., Mishra, S.P. and Sahoo, S.C., (2022) This study assesses the current state of the road and traffic through various surveys , as well as the influence area's potential for expansion, and makes recommendations for suitable upgrade plans, such as increased traffic capacity, new pavement designs, and new structures such as VUP for the proposed road.

Zhou, H. et.al; (2013) The main purpose of this research project was to identify cost-effective methods for collecting highway inventory. Various advantages and disadvantages were examined and recommendations like GPS data logger method can be used small stretch and less traffic, robotic total station at intersections, photo/video method or LIDAR for large scale inventory data collection are suggested.

Babić, D. et al., (2020) The goal of this paper is to provide a systematic review of the impact of longitudinal, transverse, and hazard location road markings on driver behavior and overall road safety. The study was divided into two sections: Impact on (1) driver behavior; (2) road markings. The results various road marking designs have proven to be an effective speed reduction and compliance measure, especially in high-hazard areas. There are some still "gaps" in understanding the relationship between the reflectivity of road markings and accidents, which is required to be analyzed further.

Rajashekara,M .R; and Breeten, S.R; (2015) This paper aims to improve the performance of a 2Km stretch of Bannerghata road by conducting traffic studies and understanding the LOS. Existing Level of service was proposed to be improved through at grade improvement.

Minati,K.P; and Gopishankar,k (2014) This paper focuses on determining the future traffic by analysis the traffic volume survey of the proposed stretch, improvement of existing pavement as per the pavement design arrived at , cost analysis and assessing the cost-effectiveness of lane widening using the cost-benefit ratio method. As the ratio was more than 1, the project was found to viable. This developed method is recommended to be used to assess the feasibility of similar projects.

Sodikov, J., (2005) In this paper a study was carried out to check the viability of using Artificial neural network (ANN) as a suitable tool for estimating project cost at conceptual stage when the project details are not too well defined. The author also highlights that this method can be further refined by adding fuzzy logic, case based reasoning and other techniques and further analysis is required in this area.

Hasan, M.M. et al.(2020) The study focuses on using quantitative approaches using criteria such as factor analysis and linear regression to understand the satisfaction level of the study area. . The Analytical Hierarchy Process (AHP) method was used to determine the weights of the criteria. The Rajshahi City Bypass Road which was taken as study stretch was analyzed and the total satisfaction score was determined by taking into account five complex elements, including comfort, safety, amenities, roadside signage, and emergency services. The study came to the conclusion that the level of overall satisfaction is strongly influenced by road user comfort.

Hasna, A, K; and Sangeetha, K. (2020) The purpose of the article is to investigate how the corridor's land use has changed as a result of the bypass. The major goals were to study current land use and identify changes in land use in the area, their impact, and the challenges that local communities experience as a result of recent developments. The impact analysis aids in understanding both the favorable and

unfavorable effects on local residents as well as the probable trends in land use changes.

CONCLUSIONS

The study presents a comprehensive review of the various approaches and analysis adopted for bypass or alternate route planning to ease the congestion on the main road and up gradation of the proposed road stretch to accommodate the estimated traffic. This study also discussed various softwares and tools used for analysis to arrive at the projected divertible traffic, geometrics improvements, estimated cost and viability of the proposed route. Based on the review of numerous research papers , the conclusion is that current studies on estimating diverted traffic for bypass or alternate routes are limited to smaller cities rather than a larger area. Furthermore, it has been observed that there are few case studies available to demonstrate the use of computer-aided design to create an optimal geometric design for the project road with a constrained ROW and a limited budget, while maintaining the existing centreline whenever possible.

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