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Study and Forecasting Of Ring Road Development of Khargone City

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ABSTRACT

The literature till time includes many researches for traffic road network models to address many issues related to traffic research such as noise pollution, air pollution, accidents, traffic prediction, signage, and surveillance. In this work the concentration is on the work related to traffic assessment to model a ring road for the busy area of a city. Traffic assessments can be usually carried out by municipalities for new proposed projects or developments, rezoning requests, traffic congestions, future regional planning and conducting traffic surveys in order to study the traffic behavior in accordance to specific future traffic projection. Usually traffic assessment studies the provided recommendation for some improvements to the area. This paper will present a literature review for traffic assessment studies.

BASIC THEORY

The main purpose of a ring road is to relieve the town centers from cross traffic. It is meant both to divert traffic that has no business in the town centers and to redistribute traffic bound in and out of town centers. Likewise, heavy transport should be led away from the town centre, and the flow of car traffic should be distributed via different areas into the centre of town. The ring road should improve the vehicular access to a town centre, at that time, a ring road was regarded as a solution for the distribution of large numbers of cars. Furthermore, a ring road was believed to open up new opportunities for pedestrian streets in the town centre, areas almost free from heavy car traffic. A ring road is defined to be a main part of a town's road and street structure that encircles its central core. Most ring roads are planned and imposed upon an already existing town structure.

Traffic congestion is uneconomical and the benefits of potential congestion reduction strategies, can significantly affect planning decisions. In any field survey appropriate steps are needed to ensure the quality and accuracy of the data. In the field surveys, to ensure the maximum accuracy, checks were made by conducting the Classified Traffic Volume counts personally by supervisors for a limited period of time at the site a little away from the place of posting of enumerators, without the knowledge of the enumerators. The erring enumerators were warned instantaneously to correct them. Thus the quality of surveys was ensured in the field. When data comes to office, coding and totaling is done with care. It is checked on sample basis by other person and necessary corrections, if any is made. Some of the half-filled forms in the field or filled with erroneous code/ name of the places etc. has been discarded from the sample.

The OD surveys are conducted on a sample basis to supplement the data of the HIS data and Outer cordon survey data. The OD surveys involved roadside interviews of travelers by buses and other modes separately. Passengers were interviewed on a systematic random sampling basis by stopping vehicles with the help of police in each direction. Similarly, drivers of goods vehicles were also interviewed on sample basis. As the survey depended upon the volume of flow and the number of interviewers available the sample size varied with time of the day and direction of flow.

Development Benefits of the Khargone

Development of roads and transportation infrastructure will not only improve the traffic congestion but will also play an important role in overall development of the town. Following are the key benefits:

- The proposed investments on vital infrastructure will make the city

transportation system efficient which in turn will save time and energy (fuel) of commuters.

- Support and facilitate economic development of the town;
- Reduce traffic congestion and safety of passengers which save time and money;
- Reduce pollution in town;
- Projects like bypass will directly save time, energy and reduce pollution particularly within the dense built-up inhabited area of the city.
- Efficient transportation infrastructure will also facilitate mass movement through public transport system directly saving time, energy and improve safety of people in the city.
- The proposed system is expected, both directly and indirectly, to improve the living environment in the city raising standard of living of the general public.

LITERATURE REVIEWED

Muhammad Nomani Kabir, Yasser M. Alginahi, and Ali I. Mohamed, 2016, In this work, traffic movement on the ring road around Al-Masjid Al-Nawabi which experiences intense traffic especially during Hajj and Umrah seasons was chosen as a case study. Traffic movement data was collected from manual counting and machine measurements. To understand the traffic behavior, the data were analyzed and verified using statistical analysis. A computational model for the traffic distribution along the roads intersecting with First Ring Road was built using linear least squares method with constraints. The linear least square problem was formulated by minimizing the difference between the measured number of vehicles and the sum of numbers of vehicles from all entrances of Ring Road that move out at each road. A simulation program for the computational model was developed using Matlab. This program uses the number of vehicles at each entry of the ring road obtained from measurement data and produces the number of vehicles moving out of each exit of the ring road. The simulation results show good agreements with the measured number of vehicles at each road intersecting with Ring Road. Thus the model can be used as a prediction model of vehicle movements. Finally, the analysis and the model can substantially replicate the traffic behavior on First Ring Road.

Todd Litman, 2012, how traffic congestion is evaluated can significantly affect transport planning decisions. This report describes various factors that affect congestion cost estimates and the evaluation of potential congestion reduction strategies, including analysis scope, baseline speeds, travel time valuation, accident and emission impact analysis, induced travel analysis, and consideration of co-benefits. It discusses how these factors influence planning decisions, and describes best practices recommended by experts. It applies these methods to evaluate various congestion reduction strategies including roadway expansion, improve space efficient modes, pricing reforms, and smart growth policies and demand management programs.

Sudhir C, 2012, this paper aims at analyzing three different solutions suggested for traffic congestion relief in Port Louis, the busiest city of Mauritius. It evaluates the impact of the three alternatives which are the use of Light Rail Transit (LRT) as an alternative mode of transport, the construction of a Ring road around Port Louis, and the upgrading of the current bus network into a Bus Rapid Transit (BRT) system. The impact of these three solutions has been evaluated by performing Traffic Cellular Automata (TCA) simulations. Our studies reveal that the Ring road will lead to more congestion while introducing the LRT or upgrading the current bus network will reduce congestion significantly.

Amol R.Rode, 2014, The present research primarily aims at evaluating various characteristics of traffic flow and noise pollution of Nagpur city by conducting experimentations at wider range of values for important parameters. This paper deals with experimental study of detailed traffic analysis of ring road of Nagpur city and formulating the strategies for effective traffic operation of the street. The present study is conducted for wide range of control delay, fuel consumptions and noise pollution to maintain high degree accuracy to be applicable for the traffic flow with wider traffic volume data, signal timing

and noise level data from each intersection of ring road.

Leni Stephen, Anjana Anna Sunny , Aravind S , Dipesh P Nath, 2016, Provision on adequate infrastructure is a pre-requisite 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. The number of vehicles plying the road has increased dramatically. Hence, there is an urgent need to standardize the present inadequate road network in terms of its capacity. Kottarakkara , a town in Kollam district in Kerala is considered. Due to high acquisition price, impossibility in widening due to dense population and due to cross traffic, Construction of ring road was considered.

Robert Bain, 2009, This paper addresses that shortcoming by reporting the results from the largest study of toll road forecasting performance ever conducted. The author had access to commercial-in-confidence documentation released to project financiers and, over a 4-year period, compiled a database of predicted and actual traffic usage for over 100 international, privately financed toll road projects. The findings suggest that toll road traffic forecasts are characterised by large errors and considerable optimism bias. As a result, financial engineers need to ensure that transaction structuring remains flexible and retains liquidity such that material departures from traffic expectations can be accommodated.

Kartikeya Jha , Nishita Sinha , Shriniwas S. Arkatkar, And Ashoke K. Sarkar, 2016, Modelling of growth trend and improvement in forecasting techniques for vehicular population has always been and will continue to be of paramount importance for any major infrastructure development initiatives in the transportation engineering sector. Although many traditional as well as some advanced methods are in vogue for this process of estimation, there has been a continuous quest for improving on the accuracy of different methods. Time-series (TS) analysis technique has been in use for short-term forecasting in the fields of finance and economics, and has been investigated here for its prospective use in traffic engineering. Towards this end, results obtained from two other traditional approaches, namely trend line analysis and econometric analysis, have also been collated, underlining the better results obtained from TS analysis. A regression model has been developed for predicting fatality rate and its results have been compared with those from TS analysis. Based on the incentive provided by reduced errors obtained from using increasing number of data points for model-building, forecasting has been done for the year 2021 using time-series modelling. With most of the datasets used and locations analysed for forecasting, the TS analysis technique has been found to be a useful tool for prediction, resulting in lower estimation errors for almost all the cases considered. It has also been inferred that the proximity of the forecasting window to the sample dataset has a noticeable effect on the accuracy of time-series forecasting, in addition to the amount of data used for analysis.

Tim Veitch, Aaron Alaimo, Lauren Walker, 2013, In this paper, previously unpublished forecasts made by the Zenith Toll Choice model for a number of recent toll roads are documented. These forecasts have proved to be encouragingly accurate, suggesting that the science of demand forecasting is in better shape than would be indicated by a survey of official demand forecasts. The paper also describes in detail the innovative methods used by the Zenith Toll Choice model, including the automatic generation of tolled alternatives, explicit modelling of the choice between tolled alternatives, detailed travel market segmentation, and explicit treatment of toll caps and other pricing mechanisms.

A.K.M. Abir and Md. Sami Hasnaine, 1995, The current work studies traffic characteristics in the city of Dhaka at one selected priority junction. In this work emphasis was given on traffic volume and the analysis was carried out through primary traffic flow surveys at AUST-Flyover junction to Shatrasta Junction in Dhaka city. Traffic flow is studied by manual methods. For better understanding of the present status of traffic flow at the junction, traffic survey is conducted. Calculation of Passenger Car Units (PCU's) for different vehicle types was provided by our respected course co-coordinators of the course CE452. With the help of the data

collection, an attempt had been made to understand the traffic patterns during different time periods. Traffic control at that junction is also dependent on the traffic flow characteristics. Hence the results from the present study are helpful in controlling the traffic at the intersection and also in suggesting some of the remedial measures to improve the traffic safety in the region. Remedial measures such as widening the road, changing 4-lane to 6-lane or by providing more public transport can be recommended based on the outcomes of the work.

S. .R. Pells, 1989, This paper presents a review of the known evidence on the various aspects of user response to new road capacity.

The traffic effects of-new road capacity have important implications for the appraisal of road schemes. The conventional method for inter-urban roads (and increasingly for urban road projects) assumes that the volume of trips, and their destination between pairs of zones, is given. The only response to new investment that is modelled is re-assignment between routes. Relative to this, new road capacity creates the potential for several effects. These effects include:- Wide area re-assignment, involving re-routing of trips external to the study area, Redistribution of trips to different destinations, Attraction of trips from other modes, Re-timing of trips, Generation of trips, consisting of trips which are either entirely new or are made more frequently.

Jason D. Lemp, 2009, This paper represents a review of many key studies and reports dealing with uncertainty in traffic and revenue forecasts for highway projects. These studies found that tolled projects tend to suffer from substantial optimism bias in forecasts, with predicted traffic volumes exceeding actual volumes by 30% or more about half of the time. Moreover, projects with greater uncertainty tend to overestimate year-one traffic volumes more and stabilize at lower final traffic volumes. But after controlling for added optimism bias in traffic forecasts (compared to non-tolled projects), there is little difference in uncertainty levels between tolled and non-tolled forecasts. A typical way to address uncertainty in traffic forecasts is through sensitivity testing, via variations in key inputs and parameters. A more extensive and less arbitrary version of this, Monte Carlo simulation, can provide probability distributions of future traffic and revenue, though it tends to require many simulations, which demand greater computational effort and time, unless networks are streamlined. Nonetheless, if reasonable assumptions for model input and parameter distributions can be made, Monte Carlo simulation generates a variety of useful information, and establishes the actual likelihood of loss (rather than more basic win/lose indicators from a limited set of "stress tests").

Peter Headicar, 2015, Paper presents insightful paper reflecting on the seminal Buchanan report and exploring what the future holds for traffic and our towns. When Colin Buchanan's report was released in 1963, it was at a time when it appeared that the motor car would dominate our lives and our built environment. Buchanan was aware of the challenges this posed, and framed his conclusions as a set of choices and trade-offs, cautioning against urban sprawl and warning about the costs of retrofitting existing towns. Many of Buchanan's predictions have come to pass, but in the light of the recent fiftieth anniversary of his report, this seems an appropriate point to ask what travel in our towns might look like in another fifty years. The changes currently afoot could be as significant as those experienced in the 1960s. Peter Headicar's perceptive paper alerts to the major shifts we are experiencing in Britain in terms of population growth, settlement patterns and travel trends. For the latter, he points to the ITC's own co-sponsored 'On the Move' research which has been exploring why car use has been stagnating in recent years at a time when inter-urban rail travel has been rapidly increasing. This paper offers a number of conclusions that policy makers would do well to heed in an election year. In the context of moves to devolve decision-making powers to cities and localities, an opportunity is identified to take a much more ambitious stance than has hitherto been possible.

Jingyuan Wang, Yu Mao, Jing Li, Zhang Xiong, Wen-Xu Wang, 2015, Researcher rely on the precise records of daily vehicle mobility based on GPS positioning device installed in taxis to uncover the potential daily predictability of urban traffic patterns.

Using the mapping from the degree of congestion on roads into a time series of symbols and measuring its entropy, Researcher find a relatively high daily predictability of traffic conditions despite the absence of any prior knowledge of drivers' origins and destinations and quite different travel patterns between weekdays and weekends. Moreover, researcher find a counterintuitive dependence of the predictability on travel speed: the road segment associated with intermediate average travel speed is most difficult to be predicted. Researcher also explore the possibility of recovering the traffic condition of an inaccessible segment from its adjacent segments with respect to limited observability. The highly predictable traffic patterns in spite of the heterogeneity of drivers' behaviors and the variability of their origins and destinations enables development of accurate predictive models for eventually devising practical strategies to mitigate urban road congestion.

Artur Hołuj , Jarosław Frączek, 2015, The aim of this study is to analyse the intensity of traffic in the village of Bysina taking into account, that local municipality is planning to build ring road of Bysina nearby. Conducted traffic measurements confirmed that existing transit route – the county roadNo.K1935is characterized by allow transit traffic with a relative stabilization of its level in the various periods of the year. In addition, there is no increased arduousness at night and during all the days off from work. The discussion was also subjected to an assessment of the accuracy of the report on environmental impact of one particular road investment. Basing on authors research, there was found that the report should not be used as the ultimate document judging the road usefulness.

S.P. Sekar and S. Kanchanamala, 2011, Chennai Metropolitan Area is experiencing a differential growth among the villages. The dynamics in the growth trends are attributable to various influencing factors. This paper attempts to study the growth dynamics of CMA to find out the factors influencing the same. Policies and directives for future development and their impact on the growth trend of CMA is also examined. It is concluded that in the context of rapid urbanization, planning for development of the metropolitan area deserves utmost importance on par with the city area. Since the urban areas abutting the city area are targeted by the urbanization process, projection of future population, planning for achieving a balanced growth in terms of population density, planning for provision of adequate infrastructure facilities, strengthening of the institutional mechanisms, monitoring and enforcing of regulatory measures, planning for in-built mid-course corrective measures and futuristic planning for adjacent areas outside the metropolitan area need emphasis.

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