Study And Forcasting Of Urban Transportation Of Barwani City For Future Development

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ABSTRACT

A variety of transport modes, such as, walking, cycling, two-wheelers, para-transit, public transport, cars, etc. are used to meet these travel needs. Travel demand is determined by a number of factors, the primary one being the size of the population. Other determinants include: average number of journeys performed by a resident each day (per capita trips) and the average length of each such journey (trip length). Travel demand has, thus, grown faster than the population because it is a function of both the rising number of trips undertaken by the incremental population as well as increased trip lengths necessitated by expanded city size. Further, it has been found that residents, on an average, tend to perform more trips per day as per capita income levels go up. A study carried out for the Ministry of Urban Development, covering 21 cities in the country, suggests that more than 75 per cent of the trips in a city are on account of either employment or education. The paper reviews existing researches and problem is defined with methodology and possible outcomes for research scope.

Keywords: Traffic study, urban transport, OD survey, Daily traffic, trip distribution, trip assignment, traffic forecasting.

LITERATURE REVIEW

Kartikey Tiwari, **2013,** the present paper details the systemic, functional, operational planning and design to implement the intelligent transportation solutions in the city of Indore. The paper documents the recommended technological improvements to improve operational performance of the pilot (A-B Road) BRTS corridor. The paper scope is limited to implementation of field and centralized equipment and software to the A-B Road corridor.

Dorina Pojani, and Dominic Stead, 2015, There is increasing recognition that combinations (or packages) of measures are necessary. Certain combinations of policies can work together and give rise to synergies, leading to impacts greater than the sum of their individual parts. The identification of policy packages is a crucial issue for promoting more sustainable urban transport: packages should maximize potential synergies. It

is crucial to consider local factors such as costs, feasibility, and barriers. Finally, caution is advised both in terms of the appropriateness and effectiveness of policy solutions being transferred to smaller and medium-sized cities in developing countries from larger cities and/or from more developed countries.

S.I. ONI, 2010, In the next decade or so the population in the cities of Nigeria will double creating more than 11 cities with more than a million people. This will increase demand for public transport not only in the provision of services but also in the provision of facilities. The increase in the population and economic development will place a services constraint on the local government enough to force them to look seriously into the issue of public transport. Three issues at stake are financial resources and availability of appropriate manpower and maintenance. With economic recession in the country local government will face a serious problem in sourcing funds to provide transport services and facilities. Second, the quality of manpower at local level will pose a challenge to local governments to be able to plan, manage and coordinate public transport. The third issue is maintenance; Nigeria depends entirely on importation of vehicle components and parts. The assembly plants are unable to meet the demand for buses even at this stage. The need to work inward is now more vital than ever before.

S. A. Veenstra et al. (2010), A fresh trip distribution model named limited destination model for not homogeneously distributed destinations. Model is performed and prepared conducting survey for shopping trips in the Dutch city of Almelo. New model presented in this paper performed effective than traditional gravity model.

In this paper distribution is performed with function of distance. Study shows that most trips are noticed to nearby super market and most trips are made with cars. It was proved in this paper that trip modeling with new method improves traffic flow prediction.

Amrita Sarkar et al. (2012), Fuzzy logic can be applied effectively as a mathematical approach to traffic and transportation modeling. The paper tried to explore importance of fuzzy logic in traffic problem solution. It can solve complex problems which cannot be solved using traditional techniques.

Md Majbah Uddin et al. (2012), It is found that trips and vehicle attraction from centers are studied in western countries but not that much in Asian countries. This paper research is performed in Bangladesh, trip rate analysis method is approached to study and analyze trip attraction rate of shopping centers at Mirpur Road, Dhanmondi area of Dhaka. Six shopping centers are considered and number of vehicles and peoples visiting during peak hours. Parking space, Shopping area and number of stores are the factors on which trip attraction depends. The study is helpful to assess traffic impact due to new upcoming shopping centers and its impact on traffic volume.

Elyasuddin Jalal et al. (2015), Study is conducting at fastest growing city Kabul, capital of Afghanistan, Traffic congestion due to population increase and economic growth is problem for this city. The paper research approaches Kabul city traffic planning, travel demand is analyzed and forecasted for the year 2025. Results of this paper pointed that private transportation demand is less in city. In short term no need of new road link is required and existing road network is required to raise to achieve traffic improvements.

Anuj Jaiswal and Ashutosh Sharma, 2012, This study is concerned of assessment of public transport demand for Bhopal and identifies the major factors for poor ridership with estimation of the probable shift of personal vehicle users to bus due to the increase in its level of service also identifies ways to account for qualitative factors in the public transport project evaluation by adjusting travel time values to reflect comfort and convenience.

Leena Samuel Panackel et al. (2013), Paper explains that long term transportation plans required travel demand forecasting models. Paper focuses to formulate trip production models applying regression technique to towns of Kerala. Three medium size towns are selected for research study and data is collected through household interviews. The quantitative and qualitative data analysis is performed using correlation and multi regression analysis. Results shows that regression model with independent variables provides better results and estimations for trip produced. The forecasting is conducted to achive fast travel demand forecasting.

Nadezda Zenina et al. (2013), The research paper aims trip generation models with mixed use transport infrastructure. The aim is to improve the transport trip generation accuracy. Experimentation is performed for trip generation using linear regression equation and smart growth tool in this paper. Accuracy of generated trips per hour was maximized by the evaluation of "smart growth" criteria.

Navya S V. et al. (2013), There is continuous growth in travel demand in Thiruvananthapuram city. The reason is software sector employment, education sector and high volume commercial activities. There is rise in public travel pattern due to residential and business areas and hence produces high traffic stress. This paper develops home based trip generation model and factors affecting trip generation are studied. Mathematical model is developed for study area and it is found that rate of trip generation is mostly dependent on the employment status of the people.

Shivendra Goel et al. (2012), This paper points the involvement of society to transport demand. To find volume of trips between various zones is critical for transportation study. It is based on trends and linear programming mathematical models to future traffic generation. This research article performed modeling for generation of trip and its distribution for Delhi urban area using genetic algorithm. All zones of city are considered and model for trip is generated for all zones which can be applied effectively to future scenario. The

paper explains easy use of linear programming based model for traffic simulation and forecasting.

PROBLEM IDENTIFICATION

Route Selection
Barwani city is studies in literature and routs are selected which are traffic congested in city.
The routes selected are:
From Bus stand to Olympic Square. (2 .7 Km)
From Jhanda Chowk to Karanja (MG Road) (1.2 Km)
From Hospital Square to Pati Naka (1.1 Km)
From Kalka mata to Anjad Naka (2 Km)

Neeed to study Brwani Urban Traffic
Badwani city development master plan is already drafted for year 2035. As Barwani city is subjected to traffic growth with increasing percentage in near future years, the need of traffic study for number of critical routs is the need statement for Barwani city transport.

PROPOSED METHODOLOGY
Data Collection Methods

Manual Survey

The survey is to be conducted in morning and evening peak hours, it is conducted to record vehicle flow volume with purpose of travel's

A Traffic Surveys & Inventories
The traffic survey is conducted to collect data as mentioned in Problem statement. Traffic flow with vehicle types is to be conducted for various routs.

Origin-Destination (OD) Survey
Origin - destination surveys is conducted with the help of physical traffic survey method for 2 hours morning and evening peak hrs.

Terminal Area Survey
Data and information is collected for movement of traffic for selected four terminals inward and outward. Design of a public transport system also requires a prior decision with regard to the type of city. Geographical features like the availability of land, in turn, often determine city type. Highly dense cities, that have severe land availability constraints, would have only one or a few city centres and would require high capacity public transport systems. However, in medium density cities less expensive bus-based systems would be adequate.

METHOD FOR DATA COLLECTION STRATEGY
OD survey is started to collect origin destination pattern which will help to calculate average daily traffic, purpose wise and route wise traffic load, correlation regression analysis and traffic forecasting for future year.

Table 1: O-D Survey for All Four Routes

Surveyor	Location	Approach Arm	Purpose Type	Morning Peak Hours		Evening Peak Hours	
				Inflow	Out Flow	Inflow	Out Flow
1	Bus Stand	Olympic Square	Education	227	218	159	146
			Business	143	117	297	287
			Work	79	84	89	77
			Other	313	297	402	389
2	MG Square	Karanja Square	Education	49	55	64	47
			Business	264	287	316	346
			Work	199	224	178	149
			Other	203	187	204	273
3	Hospital Chouraha	Pati Naka	Education	124	146	149	178
			Business	76	86	97	95
			Work	67	67	98	89
			Other	132	138	146	141

4	Kalka Mata	Anjad Naka	Education	107	143	109	127
			Business	213	207	247	278
			Work	176	190	121	187
			Other	187	274	194	141

Same O-D Survey is conducted for continuously seven days, it helps to prepare Route and Purpose Wise Average Daily Traffic

Trip Assignment Models

With the help of regression analysis the trip assign with the Models. The equation "Y" is the basic equation to calculate the Number of trips For N number of years. With the help of these equation Trip assignment Models has been Prepared. The purpose of the trips are Business, Industrial, Education and Others. The trips mainly depend upon these for purpose with that region we have decided the trip to be generated.

$$Y = a + b_1X_i + b_2X_P + b_3X_v$$

Where,
Y = Number of Trips
X_i = income growth
X_p = population growth
X_v = vehicle growth
a = $\sum Y/n$
b = $\sum xY / \sum x^2$
n = Number of years

Trip Distribution Models

Trip Distribution Models Helps in the Separating the Number of Trips in Region or Zone wise Distribution of Total Number of Trips in Particular Region or Purpose. For a Zone the total Number of Trips Is generated by Trip generation Models but the percentage of Number of Trips in Different Purposes will identified with the trip Distribution Models. In General there are two technique First One is Growth factor Method and second is Synthetic Methods. Trip distribution models will give the details of Percentage of Number of Trips in Particular purpose.

Growth Factor Method are based on the assumption that the present travel pattern can be projected to the Design year in the future by using certain expansion factors. This can be represented by Formula:

$$T_{i\text{-}j} = t_{i\text{-}j} \ X \ E$$

Where,
$T_{i\text{-}j}$ = Design year , Number of Trips From Zone i To Zone j.
$t_{i\text{-}j}$ = Observed Base year , Number of Trips From Zone i To Zone j.
E = Growth Factor.

EXPECTED OUTCOMES AND OBJECTIVES

The following issues are to be analysed:
1. To find Average Daily Traffic
2. To point Traffic type and Vehicle type
3. To investigate Peak Hour Traffic.
4. To evaluate Passenger trip Purpose
5. To perform trip Generation
6. To Perform Trip distribution
7. Outcome will be accounted growth in number of vehicles on road for forecasting.
8. Congestion on roads due to mixed traffic will be noticed and solve.
9. Poor public transportation will be helped to improve.
10.Improvement of the existing Road and new construction of road network to facilitate free flow of traffic.
Junctions and traffic signals improvements will be suggested for transportation improvement.

CONCLUSION

Urban areas in Indian cities are facing continuous high traffic growth and it is already known that it will grow with higher percentage in coming decades. There is urgent requirement of transport system study for future transport planning and forecasting specially at urban areas. There is an urgent need for significant improvements in the transport system including mass transport system keeping

in view the long term requirements of the City. There is absence of scientific planning and implementation of scientific methods to forecast urban city traffic and transportation plans.

REFERENCES

[1] Kartikey Tiwari, Comprehensive Reporting Of Traffic Management System with Planning & Execution of Bus Rapid Transit Network in Indore City (M.P), India, IJIRD, Vol2, Issue 7, 2013

[2] Sustainable Urban Transport, Shanghai Manual – A Guide for Sustainable Urban Development in the 21st Century. 2000.

[3] Dorina Pojani, and Dominic Stead, Sustainable Urban Transport in the Developing World: Beyond Megacities , Sustainability 2015, 7, 7784-7805; doi:10.3390/su7067784

[4] DR. S.I. ONI, Issues In and Future Of Urban Transportation and Traffic Management System in Nigeria, Sixth International Conference on Competition and Ownership in Land Passenger Transport.

[5] S. A. Veenstra, T. Thomas, S. I. A. Tutert, Trip distribution for limited destinations: a case study for grocery shopping trips in the Netherlands, Springerlink, Transportation (2010) 37:663–676, 676, May 2010.

[6] Amrita Sarkar, G.Sahoo and U.C.Sahoo, Application of Fuzzy Logic in Transport Planning, International Journal on Soft Computing (IJSC) Vol.3, No.2, May 2012.

[7] Md Majbah Uddin , Md Riad Hasan , Istiak Ahmed , Priyanka Das , Md Ahasan Uddin and Dr.Tanweer Hasan, A Comprehensive Study on Trip Attraction Rates of Shopping Centers in Dhanmondi Area. International Journal of Civil & Environmental Engineering IJCEE-IJENS Vol. 12 No. 04, 2012.

[8] Elyasuddin Jalal, Prof. Shoshi Mizokami, Transportation Policy For Kabul City, International Journal of Technical Research and Applications, Issue 32, September, 2015

[9] Er Anuj Jaiswal, Dr. Ashutosh Sharma, Optimization of Public Transport Demand: A Case Study of Bhopal International Journal of Scientific and Research Publications, Volume 2, Issue 7, July 2012.

[10] Haitham M. Al-Deek, Comparison of Two Approaches for Modeling Freight Movement at Seaports, Journal of Computing in Civil Engineering, October 2001.

[11] Leena Samuel Panackel, Padmini A.K, Formulating a Trip Production Prediction Model for the Residential Land Use in Medium Sized Towns of Kerala, IJRET, International Journal of Research in Engineering and Technology, Volume: 02 Issue: 09, Sep-2013.

[12] Nadezda Zenina, Arkady Borisov, Regression Analysis for Transport Trip Generation Evaluation, Information Technology and Management Science, 2013.

[13] Navya S V., S. Sanjay Kumar, Gymmy Joseph Kattoor, Trip Generation Model for the Core Area of Thiruvananthapuram City, International Journal of Innovative Research in Science, Engineering and Technology, Volume 2, Special Issue 1, December 2013.

[14] Shivendra Goel, J.B. Singh, Ashok K. Sinha, Trip Distribution Model for Delhi Urban Area Using Genetic Algorithm, International Journal of Computer Engineering Science (IJCES), Volume 2 Issue 3 (March 2012)