

Feasibility Study on Widening and Designing of Pavement

Manisha . P Gupta, S. D. Ghodmare, B. V. Khode

Department of Civil Engineering, G. H. Rasoni College of Engineering, Nagpur, Maharashtra, India

ABSTRACT

Article Info

Volume 8, Issue 3

Page Number : 1044-1048

Publication Issue

May-June-2021

Article History

Accepted : 01 June 2021

Published : 15 June 2021

In this era, accidents are major cause of loss of life. The increasing traffic on the road is the main culprit of accidents. The roads designed earlier were sufficient for handling traffic at that time. With increase in the vehicles on roads, the main aim is the passage of traffic smoothly in short duration. This can be done by increasing the areas of movement of traffic. This project carries the study of traffic on road in current situation. The analysis will be carried out according to axle load carried by the existing road with current flowing traffic. This project will also consider the IRC guidelines given for the movement of traffic. If the road needs the expansion, the number of lanes required to be increased as per IRC guidelines, its provision of construction on the stretch of road, its financial feasibility and estimation will also be carried out in the project. The results and conclusion will be given according to the density of traffic as per the survey by calculating Actual daily traffic (ADT). The outcome of the project will be taken out whether that stretch of road will require expansion or not. If it requires expansion what type of road would be preferable as per cost analysis and service that would be given by road for traffic for next 10 year.

Keywords : Axle Load, Financial Feasibility, Actual Daily Traffic

I. INTRODUCTION

Among the four basic modes of transportation, road plays the most important mode for a developing country like India. With the increase in population, the traffic has been constantly increasing day by day. Because of this the roads with older lanes are not capable of taking traffic with increased loads. This causes several difficulties for movement of traffic like increase time required for transportation, wear and tear of vehicles due to application of brakes again and again, increase of accidents. To overcome the

problem, the work has been undertaken for increase of road lanes as per traffic loads. The study will be carried out for a stretch of road as per current traffic conditions. The axle roads will be considered taking into account different categories of vehicles by carrying out survey on the stretch. The project will also take into account the economic analysis for checking the financial feasibility and total cost required of construction of new lanes as per current rates. The project will also give the land area and arrangement of it on that stretch of road.

II. LITERATURE REVIEW

The literature was studied related to the topic and the methodology and conclusions are as follows:

1. Dr. Kam W. Ng and Dr. Khaled Ksaibati, (2016)

A. Methodology:

In research work, survey is carried out in different parts to determine the benefits of using Intelligent compaction for roads.

B. Conclusion:

This type of compaction reduces the maintenance cost and thus the overall cost required for the construction purposes is finally reduced. This makes the quality assurance easy. Thus this makes the overall cost of project feasible. The benefit-cost analysis is carried out using survey. In the survey the author concludes that the compaction cost is reduces about 54% by using IC.

2. Massimiliano Gastaldi et.al, (2012),

A. Methodology:

The work is carried out for the estimation of Annual Average Daily traffic for a stretch of road by considering one week survey on seasonal traffic count.

B. Conclusion: The survey could improve the interpretability of results and measure of non specificity traffic count. The paper presents an approach to estimation of the Annual Average Daily Traffic (AADT) from a one-week seasonal traffic count (STC) of a road section. with the aim of improving the interpretability of results with measures of non-specificity road groups.

3. Sheng-Guo Wang et.al, (2011)

A. Methodology:

The study has been carried out for AADT estimation in nearby community area which lacked monitoring systems for traffic count. The models were proposed for estimation of Annual Average Daily count (AADT) and Vehicles miles travelled (VMT) using algorithms.

B. Conclusion:

The study carried out in making new models on automatic algorithm and making a new software for the same. The software analysis is also done on field for verification purposes.

4. Pengjun Zheng et.al, (2012)

A. Methodology:

The profound work takes into consideration the empirical observation and quantitative errors in counting the traffic manually. Being traffic counted manually, there are errors in the count creating the data incorrect.

B. Conclusion:

The paper concludes that counting the vehicles manually based on vedio recording , the errors are small (<1%), their classification does not have significance of about 4-5%. The most important error is error due to reflection making it difficult to judge the length of vehicle.

5. Ming Zhong et.al, (2012)

A. Methodology:

In the research, FHWA (Federal Highway Administration) is used for calculation of AADT. The method helps to take into consideration the seasonal variation of traffic by functional calculation. Above that, the research also uses Bayesian approach for considering the factor of safety in the traffic count.

B. Conclusion:

This makes the short term and long term errors less than 13%, which could be 21.7% if traditional methods would be used. This could helps in changing the counting process of traffic.

6. Noelia Caceres et.al, (2012),

A. Methodology:

The author in this research helps to develop the traffic count which helps in strategic and planning of highways. The author develops the

traffic flow profiles taking into view some consistent patterns across the region.

B. Conclusion:

The profiles can be used to calculate the AADT in very short duration of time making it easy for the surveyor to carry on work.

7. Nedal T. Ratrouf et.al, (2014)

A. Methodology:

The researchers in the research tried to correlate AADT with exogenous factors for determining traffic demands. The peak traffic demand is the most important factor for finding the need for services to be provided. The authors basically take into consideration the factor of peak day, vacation day traffic for calculating the traffic demand.

B. Conclusion:

This could be helpful in calculating AADT for specifically for demand of services to be provided. This is more important while considering the economic feasibility for the services as per demand.

8. Vittorio Astarita et.al, (2014)

A. Methodology:

In the work, the researchers consider the factor of delay due to reconstruction of road. The maintenance of roads is important in order to increase its life and cut off the cost for construction.

B. Conclusion:

The author develops a new simulation model for determination of delays that can increase the overall travelling time for the passengers. It considers the difficulty in transportation caused due to service of single lane by development of simulation model.

9. Miao Fu et.al, (2017)

A. Methodology:

The study is carried out for the purpose of finding AADT with less cost for processing. This reduces

overall cost required for finding the traffic count and level of service required can be calculated.

B. Conclusion:

The traffic count is calculated by usual methods and regression methods are used for estimating the AADT. This reduces the cost required for calculations and reduces the time for estimation. This paper provides an alternative and low-cost approach for estimating annual average daily traffic values (AADTs) and the associated transport emissions for all road segments in a country.

10. Xiaobin Chen et.al, (2015)

A. Methodology:

In this paper, the study has been conducted for the purpose of designing the road segment on the basis of increased loads. The field test were conducted in order to calculate the thickness for road in case of composite pavement. The non dynamic model is used for calculations if pavement. The road bed is constructed ranges at 20 to 50kpa.

B. Conclusion:

The study provides the solution to carriage of heavy load traffic with less cost of construction.

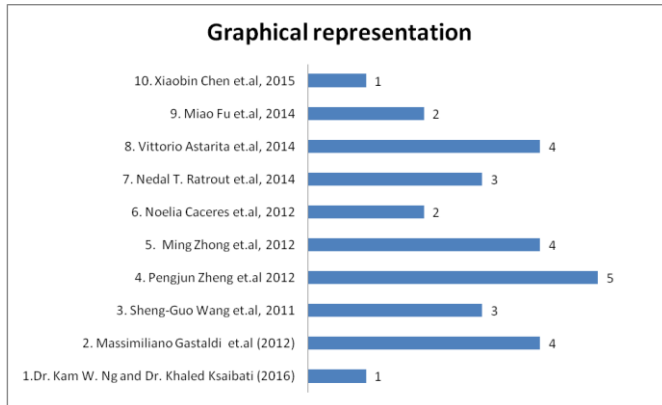
III. LIMITATIONS

The work done in the categories, is limited to

1. Finding the AADT for the traffic and for improving the data collected by survey.
2. The work is done for improvising the techniques for the surveyed data via creating profiles simulations and reducing the time for estimations and data collection work.
3. Reduction of cost and time required for traffic survey work.
4. The axle loading work was done, but composite pavement was considered with the view of increase in loads carriage.
5. The empirical formulas were formulated considering the data of traffic loads.

IV. GRAPHICAL REPRESENTATION

The research work reviewed can be represented graphically according to the significance point of view:



V. PROBLEM IDENTIFICATION

The literature in the work has the major limitation of improvising the available facility of lanes. Developing countries faces a major problems of government funds for construction of projects. So if the existing facilities can be improvise with less cost as compared to whole new construction. It would be highly beneficial for development. With the increase in the population, the traffic has been constantly increasing day by day. With the increase in the population, the difficulties in managing that traffic movement is the question of this era. The already constructed facilities are now unable to provide service in the current situation. This is causing problems like heavy accidents, traffic jams, increase in the time of travel, more carbon emissions due to slow moving vehicles and many more. Due to these difficulties, even the problems are faced by emergency services via ambulance, fire brigaded and other recreational vehicles. So the increase in the lanes will give solution for the major problem of traffic carriage.

VI. CONCLUSIONS

The search work gives the solution to the traffic movement with less cost required. The work done for traffic movement is based on the traffic intensity of current loaded vehicles. The work gives the solution of the number of lanes required to be increased as per increased traffic with 10years of furcating. The axle loads calculated according to the traffic loads will give and type of pavement for new facilities can be decided.

VII. FUTURE SCOPE

1. The work can be expanded using the composite pavement for new lanes.
2. The lanes constructed can be divided for major categories of vehicles as per count of traffic.
3. The emergency services can be provided with the separate lanes along with bifurcation.
4. The AADT data can be used for bifurcation of the traffic by constructing flyovers in case of less land available for development.
5. The lanes newly constructed can be separated as per the individual vehicle loading so that existing facility can be used for light loaded vehicles.

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Cite this article as :

Manisha. P Gupta, S. D. Ghodmare, B. V. Khode, "Feasibility Study on Widening and Designing of Pavement", *International Journal of Scientific Research in Science and Technology (IJSRST)*, Online ISSN : 2395-602X, Print ISSN : 2395-6011, Volume 8 Issue 3, pp. 1044-1048, May-June 2021. Available at Journal URL : <https://ijsrst.com/IJSRST2183112>