Traffic Analysis And Pavement Evaluation Along Sh-200 (For Mhaisang-Asara Section) In Maharashtra

Prof. K.P.Nichat[1], Prajyot Deshpande[2]
[1]Assistant Professor, Dept of Civil Engineering
[3]Dept of Civil Engineering
[1, 2] G. H. Raisoni University, Amravati, Maharashtra, India

Abstract- *The globalization, rapid industrialization and urbanization leading for the continual increase in the traffic movement from last decade and the same calls for the properly designed interconnected road network. As such, in the arena of the Traffic Analysis, Pavement Design and Construction, there is an urgent need of economical and innovative Technology that provides sufficient strength and durability to pavement. Pavement gets damaged due to environment effect and traffic movement.*

In this study, the following road project is selected for Traffic Analysis and Pavement Design/Evaluation:

"Two-Ianing of improvement to SH-200, Akola-Aapatapa-Mhaisang-Aasara Road (Mhaisang to Aasara From Km. 25/000 to 65/200) in Akola District" through Public Private Partnership on Hybrid Annuity basis under Maharashtra Road Improvement Programme (MRIP)".

Keywords- Traffic survey, Characteristic of traffic, ADT, AADT, OD survey, economic appraisal, predictions, flexible pavement design, pavement distress, IRC 37, CBR, Axle load etc.

I. INTRODUCTION

Government of India aims to improve transport efficiency of the National/State Road network, which will contribute to expansion of economic opportunities and poverty reduction. This will be realized by (i) improving the National/state highway network, (ii) facilitating safe and appropriate road usage, (iii) increasing efficiency of transport services and (iv) enhancing Govt. capacity for road asset development and management.

To achieve the above objectives, Government has decided to upgrade the entire single lane/intermediate lane National /State Highways to at least two-lane standards largely in consistent to Indian Road Congress (IRC) guidelines. As part of this endeavor, PWD-Government of Maharashtra has decided to undertake two-Ianing of "Improvement to SH-200, Akola – Aapatapa – Mhaisang-Aasara Road (Mhaisang to Aasara From Km. 25/000 to 65/200) in Akola District" through Public Private Partnership on Hybrid Annuity basis under Maharashtra Road Improvement Programme (MRIP).

II. REVIEW OF LITERATURE

KDM Engineers (India) Pvt Ltd (KDM) (2018) prepared the report for Traffic Study and Pavement Structural Strength survey for Saalipet Road, Near Poranki, Vijayawada, Andhra Pradesh. The report displays Composition of the commercial vehicles from the traffic count, VDF from the axle load survey and Projected MSA for the designed life of 15 years. [1]

PradnyaMawale, Raju Narwade (2017) discusses about the Pavement Management System for Traffic Study & Analysis of SH-93. The paper presented the base year traffic data, its projections, lane capacity calculations based on LOS, and capacity augmentation requirements.[2]

Kathleen T. Hall, Carlos E. Correa, Samuel H. Carpenter, Robert P. Elliot (2001) discussed the Rehabilitation Strategies for Highway Pavements. The report provides a step-by-step process and practical guidance for project-level evaluation and rehabilitation strategy selection for in-service pavements. Pavement rehabilitation is defined for the purposes of this Guide as a structural or functional enhancement of a pavement which produces a substantial extension in service life, by substantially improving pavement condition and ride quality. A review of the pavement rehabilitation practices of State DOTs, and the literature available on pavement evaluation, rehabilitation techniques, and selection of rehabilitation strategies, was conducted for the project.[3]

Pranshul Shahua & Ritesh Kamble (2017) discussed that the thickness of pavement varies with the change in the value of C.B.R. With higher value of C.B.R. the pavement thickness is less and vice versa. Following are the important highlights from their study:

1. From their experimental results it has been observed that the soil SC-SM with 10% fly ash is suitable for the construction purpose for soil subgrade in comparison with only soil, soil with 5% fly ash and

soil with 15% fly ash on the basis of higher values of CBR.
2. Due to the saving in Pavement thickness is less quantity of material will be applicable so that, huge amount of money can be saved.
3. Due to the higher value of CBR for 10% fly ash with soil will be more durable compared to 5% and 15% of fly ash with soil and also with only soil.
4. Further this Research work can be carried with different materials to improve CBR values and also with different Soaking Conditions.[4]

Shamil Ahmed Flamarz Al-Arkawazi(2017) discussed about

1) Most the types of the failures and deterioration were found along the Khanaqin-Kalar rural highway.
2) The severity of the failures and deteriorations ranges from medium to high in the pavement of the rural highway.
3) The major causes of the failures and deteriorations in the selected rural highway are:
4) Additional traffic volume with high axel loads which were not taken in consideration during designing the pavement layers thicknesses of the selected rural highway.
5) Poor or absent of drainage design.
6) Unsuitable pavement layers thickness design.[5]

Mala.S, Krishnachandana.D.M, Nikhil., Tinkumurtem Gowtham B (2017) discussed:

1. According to the ASTM D6433 code book the PCI values for Muttkur and Harshinakuntae road obtainedas 39.8 and 35.53.
2. For the obtained PCI values both roads require rehabilitation as per ASTM D6433.[6]

Hani H. Titi, Nicholas J. Coley, and ValbonLatifi(2018) discussed results of the ME analyses performed using AASHTOW are Pavement ME Design demonstrated that OW vehicles are likely to have a significantly greater relative contribution to pavement deterioration than typical legal-weight trucks in Wisconsin. For example, while OW trucks are only 1.8% of truck traffic on STH 140, they are predicted to cause 18.5% of bottom-up fatigue cracking; that is, a typical OW truck is predicted to contribute over 1000% of the bottom-up fatigue cracking caused by a typical legal-weight truck. While the absolute impacts of OW vehicles on pavement performance were predicted to be minor for the highways experiencing lower OW permit traffic volumes, the relative impact of OW vehicles on pavement performance was universally higher than that of typical legal-weight vehicles. For highways such as STH 140, which experience relatively low levels of truck traffic yet also receive high levels of OSOW traffic; these analyses demonstrate the importance of accurately quantifying the specific nature of the OW vehicle traffic on those roadways. By using OSOW permit history data to develop traffic inputs for ME analyses—including ALS— the marginal contributions of OW vehicles to the pavement performance can be better understood. [7]

Bhrugu Kotak, ParthZala, Abhijitsinh Parmar, Dhaval M Patel, Mittal Patel (2015) observed traffic pattern which promotes to design Flexible pavement. Actual road is weaker presently because of poor maintenance & heavy rainfall in monsoon season. Our soil testing record shows all the FSI results are below 50%, does mean soil does not require any special treatment. Our soil group is Silt and very fine sand; rock flour ; fine sand with low plasticity (ML) , which is suitable for subgrade for flexible pavement.[8]

J. C. Pais, S. I. R. Amorim, and M. J. C. Minhoto (2018) discussed about study about the impact of overloaded vehicles on road pavements performance by studying the truck factor for different types of vehicles when applied to a set of pavements including five different asphalt layer thicknesses and five different subgrade stiffness moduli. The study includes an analysis of a traffic database consisting of traffic information for 5 years for a motorway.[9]

Antonio Pantuso, Giuseppe Loprencipe, Guido Bonin and BagdatBurkhanbaiulyTeltayev (2019) discussed about the use of the PCR, to give an overall score of the pavement functional condition, would be valid for deciding pavement needs at the network level, and it can be used as a first screening tool for identifying the most suitable pavement maintenance treatment in pavement sections. However, deflection measurements at the network level enhance pavement decision-making because they can help discriminate, among the pavement sections that the PCR states are in good condition, those in need of structural maintenance treatments.

• The definition of rules for the designing of maintenance and rehabilitation strategies for the homogeneous sections would support the decision-making process at the network level. The proposed approach through pavement condition indicators provides information for the prediction of the maintenance and rehabilitation strategies of road segments. The indicators can estimate the expected benefits of maintenance treatments that are to be performed on the network.
• The proposed approach leads to the implementation of a PMS for the national network of Kazakhstan, but it is still an

early project that would evolve with further pavement inspections on the network. At the moment, it provides a glimpse of the current state of the network, which needs to be calibrated to the country's local conditions (construction practices and procurement contracting) [10]

Ravinder Kumar (2014) discussed about the design of flexible Pavement using non-conventional layer requires less thickness of pavement and less quantity of bitumen (which is one of costlier material of pavements, saving of bitumen layer upto 47 %) which leads to less usage of material specially the aggregate which is good for environmental point of view. Saving of bitumen and more usage of cement is a better practice as cement is abundantly available which bitumen depends on the imports. The traffic and sub-grade soil characteristics are necessary in order to design a pavement. The IRC method of design can be used to find the total pavement thickness due to its simple approach. A decline in the yearly variation of commercial vehicles like bus, truck and HCM/EME was observed from the data analysis of traffic volume data. An increase in the yearly volume of cars was also observed from the analysis. The volume of commercial traffic has decreased in 2013 as compared to previous years probably due to imposition of heavy toll and construction work of widening of road from 4 to 6 lanes going on the road.[11]

III. ACKNOWLEDGMENT

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IV. CONCLUDING REMARKS

From the review of various research papers, it can be stated that less emphasis is given by various researchers to the combine investigation of Traffic analysis & pavement evaluation. So, there is a need to study on analysis of Traffic and pavement evaluation simultaneously, which helps in deciding the roadway capacity and pavement crust.

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