International Journal of Advances in Engineering and Management (IJAEM)
Volume 3, Issue 7 July 2021, pp: 3265-3268 www.ijaem.net ISSN: 2395-5252

Road Maintenance Management System

Ms. Priyanka D Lad [1], Ms. Yogita Fulse [2]

[1] *M.tech Civil (construction management). School of Engineering and Technology, Sandip University, Nashik*
[2]*Yogita Fulse Assistant Professor Civil Engg Department School of Engineering and Technology, Sandip University, Nashik.*

Submitted: 15-07-2021 Revised: 29-07-2021 Accepted: 31-07-2021

ABSTRACT: Pavement management system predicts the future deterioration of pavement due to traffic, weather and recommends maintenance and repair plan according to severity of distress in pavement section. This project aim is to develop pavement management system is based on following parameters Pavement Inspection, Condition Assessment, Condition Prediction, Condition Analysis and Work Planning.

KEYWORDS: Road Maintenance System, Physical Inspection, Pavement Condition Index, Distresses Analysis.

I . INTRODUCTION

In India infrastructure plays important role which include highways, dams, bridges, flyovers, airports, sea-links . by using road network achieved a very important position in the overall transportation sector in India. India has 2nd largest road network in the world in which the part of rural road network is large. Population growthrate of the country is high so the percentage of road user's increases. The road traffic is tremendously increasing, 60% of all goods and 85% of all passengers' are transported by using road network. So more importance is now given to rural road network to make the main cities and rural area well connected

In a developing country like India, transportation projects are undertaken upon the basis of initial cost of construction owing to the negligence of future costs (i.e. M & O costs) incurred in the entire life of the project. This has been done because of lack of funds from the government than the required in the development of infrastructure. Such decisions had led most of the infrastructure projects throughout the country in deteriorating condition or failure since they underestimate the necessary future uncertainties associated in the project. Road projects are one of the infrastructure projects that are facing such situation in recent era. Lots of funds have been accrued for such projects yet still the cost of maintenance and operation over weights the initial construction costs So for the safe traveling there is a need of well-maintained road network. The cost of reconstruction of a road is high as compared to maintenance work so maintenance is mostly preferred in developing countries. So there is need to develop technical approach to know the actual requirements of rehabilitation and maintenance work for pavement. This is actual need to develop proper maintenance management system for existing roads. The PMMS will help in the assessment of financial need, to develop a maintenance strategy, and also help to give priority to the maintenance work. In this situation, development of an effective PMMS would provide proper information, helpful analysis and most cost- effective decisions which will help in the preservation of the road networks. PMMS is a tool which will help to take management decisions. pavement section. This project aim is to develop the PMMS which will be based on following parameters such as material management, inspection of the road network, condition assessment of road network, condition analysis against the distresses, maintenance work planning. This entirely adds in creating an effective PMMS to which project planners can refer to the design of project.

II. LITERATURE REVIEW

1. Akhai Mudassar Mohammed Shafi, Ahmed Afaque Shakeel, and Siddesh Kashinath Pai,(2017) In this paper author described about future need of road network in India. According to author we are behind the actual plan of constructing the road network. In this paper he described about total cost of construction required for flexible and rigid pavement for per meter square. Also cost of maintenance for flexible and rigid pavement is calculated by using PMGSY report for year 2016.According to him cost of construction of rigid pavement is 20%-25% greater than flexible pavement.

2. C.H Juang, and S. N. Amir khanian (May 2015), In this paper author describes about evaluation of distresses for flexible pavement. According to his

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research there are six main distress mostly obtained in flexible pavement also described about the measurement of severity of distress and decide rating scale for each distress type. Author also did pavement distress analysis using fuggy sets. Pavement management system is based on the unified pavement distress index.

3.Bharath Boyapati, R. Prasanna Kumar,(2015) Prioritization of pavement maintenance based on pavement condition index" The main objective of this research is a calculation of pavement condition index (PCI) by using field data collection and analyses this data to give priority to maintenance work on the pavement. Data regarding to patches, potholes, rutting, cracks, etc. collected for selected sections to measure the severity of distress. Corrected to deduct values are obtained by assigning importance to distress severity and pavement condition index is calculated.

4. Yogesh U. Shaha, and S.S. Jain, Devesh Tiwari, and M.K. Jain (2013) In this paper author describes the evaluation of pavement performance done using pavement condition indicators and pavement condition indicator basic component of pavement management system. The pavement maintenance management strategy decided over pavement condition index, present serviceability index, roughness index. In this paper author did work on development of overall combined index for the Noida urban road network.

5. Hein, David K., Brian (2013) In this paper author described in America PMMS is used to calculate maintenance and rehabilitation cost also he was described about calculation of distress quantity, severity, type and this information will help to calculation of pavement condition index. In this paper detailed procedure for the calculation of pavement condition index is described .this is the key point of this research work that will help to predict future deterioration of pavement sections.

III. METHODOLOGY

The work undertaken for the study includes detection of distresses in flexible pavement by physical inspection. The condition analysis of pavement is done by finding pavement condition index for the particular section of pavement. Overall condition assessment is Done and rating is give to the pavement. Distress analysis and severity of the distress is measure according to American society

Pavement distress:

These are types distresses in pavement
1)Alligator cracking 2) Bleeding 3) Block cracking 4) Bumps and sag 5) Corrugation 6) Depression 7) Edge cracking 8) Joint reflection crack 9) Lane/shoulder drop off 10) Long. And trans. Crack 11) Patching.

Pavement condition

Pavement condition index is determined by the ratio of total distress area to total patch area. Also distress quantity, severity, types of distress helps to determine the pavement condition index.

Table no : 1 Survey Of Road and Chainage (Samples of Road Major District Road)

Sr .No	Road Name	Road No	Chainage From	Chainage Till
1	Gadhinglaj Mahagaon Nesari Road	MDR	105	122.3
2	Kolhapur-vijaymarga-hanmanta Ghat Road	MDR	80	106
3	Kolhapur-washi-parite -ghota-wade-gaibi Road	MDR	102	118.3
4	Waghbil Panhala Road	MDR	85	108.2
5	Bambawade Shirla Road	MDR	115	135.5

Table No: 2 PCI RATING

PCI	RATING
85-100	Excellent
70-85	Very Good
55-70	Good
40-55	Fair
25-40	Poor
10-25	Very Poor

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00-10	Failed

Table No: 3 Distress measurement (for National Highway patch first)

Table No: 3

DISTRESS SEVERITY	Quantity			Total
Types of distress identified	1	7	10	
15L	138.8	103.2	298.66	538.99
9 L	358.4			358.4
2H	11.4			11.04
3M	196	184.8		380.8
				1289.23sq.ft

Pavement condition index sample calculation
for patch first from Kasegaon to Nerla
Pavement Condition Index = total distress area / total area of the patch X 100

= 1289/ 9184 X 100

= 13.8

IV. FIELD SURVEY WORK FOR NATIONAL HIGHWAY ROAD SECTIONS

The actual survey of the National highway ,Major district road and village road in Kolhapur district was carried out. By visual inspection of the sections, it was found that there are some few alligator cracking of medium and high severity, a few edge cracks of high severity, some medium-severity potholes and a few low- to medium severity longitudinal and transverse cracks. The survey and distress identification procedures were carried out as per the references mentioned for the national highway,major district road and village road table no 3 shows the condition survey data sheet for National highway, which shows that the sample has PCI = 13.8 and a rating of very poor Table no 3 also tells us that the distresses in the sample are high-severity edge cracks. Like these values of all selected sections of the national highway,major district road and village road inspected according to pavement condition index formula and by measuring distress severity And suggest maintenance priority based on distress severity.

VI .CONCLUSION

In this study, an attempt was made to evaluate in a flexible pavement severity alligator cracking, edge cracking and patching is high.Average pavement condition index for national highway, major district road ,village road is in between 0-55 it shows that road condition is poor. For preservation of good road first maintenance priority is given to maximum PCI road. By using maintenance management system we can predict future Deterioration for the road network and prepare preventive maintenance plan for this.PCI method promotes the distress

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