LITERATURE REVIEW ON DEVELOPMENT OF FLEXIBLE PAVEMENT CONDITION INDEX FOR HIGHWAY

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Abstract-Pavements are major assets of highway infrastructure. Maintenance and rehabilitation of these pavements to the desired level of serviceability is one of the challenging problems faced by pavement engineers and administration in the highway sector. The evaluation of pavement performance using pavement condition indicators is a basic component of any PavementManagement System. Various indicators like Pavement Condition Index (PCI), Potehole Index(PI),Alligator Cracking Index(ACI),Longitudinal Cacking Index (LCI), Traverse Cracking Index (TCI), Rutting Index (RI),Roughness Index (RI), Structural Capacity Index etc. have been commonly used to assign a maintenance strategy for the existing pavements.

Keywords- Pavement Condition Index, Pothole Index, Alligator Cracking Index , Longitudinal Cracking Index , Traverse Cracking Index, Roughness Index,Structural Capacity Index.

I.   LITERATURE RESEARCH

AbhayTawalare, K. VasudevaRaju (2016) Pavement Performance Index for Indian rural Roads.The performance of a road is evaluated from time to time so as to improve its quality and helps in planning maintenance of roads. For this purpose various pavement deteriorating models as a decision tool are available. But they are not easy to use for field engineers due to either huge past data requirement or complicated calculations. Therefore, this paper presents a Pavement Performance Index for rural roads by using simple methodology. The distress parameters of rural roads were identified through literature review. Similarly rating criteria for each distress parameters were identified through literature. For final selection of distress parameters in context of Indian rural road, opinions of five highly experienced industrial experts were taken. After that the weightage for severity of each parameter causing distress of pavement is calculated by using data of questionnaire survey in which 117 professionals working in PradhanMantri Gram SadakYojana across the country were participated. The paper suggests a formula to decide Pavement Performance Index that depends on rating criterion and severity weightage of distress parameters of pavement performance. The study concluded that suggested Pavement Performance Index makes calculations easy for field engineers and will be useful to decidepriority list of rural roads for repair and maintenance schedule.

ArySetyawan, JolisNainggolan, ArifBudiarto (2015) Predicting the remaining service life of road using pavement condition index.Numerous factors cause damage to the road so that the remaining service life of the existing pavement and long-term road maintenance are unpredictable. The aims of this paper are to evaluate the condition of the road performance and damages and to calculate the remaining service life of the pavement on East Line of South Sumatera, as well as examining the relationship between these two values. This research includes the evaluation of five sections of the route with a various damaged condition and detailed appraisal of road conditions using the Pavement Condition Index (PCI), while the prediction of the remaining service life using the deflection data acquiring from Falling Weight Deflectometer measurements.

 The correlation of +PCI value and remaining life service, intellectually established, created regression model to obtain the relationship and the correlation coefficient. The outcomes demonstrated that the road segments I, II, III, IV, and V have a PCI value of 56.1 (good), 37.8 (poor), 9.3 (very good), 39.0 (poor), and 95.0 (excellent) respectively and the remaining service lives sequentially are 2.39 years, 0.65 years, 4.43 years, 0.11 years and 3.57 years. The correlation between the PCI value and the service life of the pavement is $y = 4,1872\ln(x) -14.728$, with the correlation coefficient is 0.88 which strong level of relationship.

Alexandru-octavianamarie , Andrei radu, NicolaeTaranu and Vasileboboc (2013) Evaluation of a general Performance Index for Flexible Road Pavements. The paper presents the main features of a general performance index developed for flexible pavements in the frame of the COST Action 354 "Performance Indicators for Road Pavements", as a result of combined performance indices. A significant case study for evaluation of this general performance index for

representative sector of the County Road DJ 248 Iasi –Rebricea is also presented. Finally, technical recommendations for the implementation of this methodology in the current practice of road management from our country are proposed..

J. RajendraPrasada, ShaliniKanugantib, Pooja N. Bhanegaonkarc, Ashoke Kumar Sarkar , ShriniwasArkatkard (2013) Development of Relationship between Roughness (IRI) and Visible Surface Distresses : A Study on PMGSY Roads. Roughness has been universally accepted as a measure of functional condition of a pavement. It constitutes the smoothness and frictional properties of the pavement surface and in turn is related to the safety, and the ease of the driving path. It is determined using the international roughness index (IRI), which is a measure for texture of the pavement surface, and also depends on the amount of other functional distresses present on the road surface. The present study focuses on developing a relationship between the roughness and other surface distresses of PMGSY roads. Accordingly, eight PMGSY roads were selected in Jhunjhunu and Churu districts of Rajasthan, India. Distress data was collected for every 50m separately. Roughness data was collected using Bump Integrator, which was calibrated using MERLIN on the couple of selected study stretches. Unevenness data was also collected from a newly laid stretch of pavement, and the value thus obtained was subtracted from the observed unevenness values of the test stretches, to get the net effect of the distresses on the pavement condition. A regression equation was then developed with the IRI value and the visible distresses based on the data collected in the field.

YogeshU.Shah, S.S. Jain, DeveshTiwari, M.K. JainDevelopment of Overall Pavement Condition Index for Urban Road Network.Pavements are major assets of highway infrastructure. Maintenance and rehabilitation of these pavements to the desired level of serviceability is one of the challenging problems faced by pavement engineers and administration in the highway sector. The evaluation of pavement performance using pavement condition indicators is a basic component of any Pavement Management System. Various indicators like Pavement Condition Index (PCI), Present Serviceability Rating (PSR), Roughness Index (RI), etc. have been commonly used to assign a maintenance strategy for the existing pavements. The present paper is an effort in the similar direction, to develop a combined Overall Pavement Condition Index (OPCI) for the selected network of Noida urban roads.

Hein, david k., p. Eng. Aho, brian(2009) Development of a pavement condition index Procedure for interlocking concrete pavements. This paper outlines the procedures used to develop a pavement distress guide for ICPs following the MicroPAVER protocol. The paper provides an overview of the development of distress guidelines for ICPs, summarizes the results of the analysis and provides an example of the use of the procedures to determine the pavement condition index for a roadway constructed using ICPs. A detailed survey of pavements was completed and a list of typical interlocking concrete pavement distress types and photographs were compiled. The influence of each of the distresses on the performance of the pavement was determined through consultation with industry and other design professionals. Influence functions were then developed for each distress type and severity to permit the calculation of "deduct" values.

 The deduct values are combined to determine the overall pavement condition index (PCI) for the pavement section. The deduct curves were then validated through field inspections of municipal roadway type pavements constructed using interlocking concrete pavers. Members of the Interlocking Concrete Pavement Institute (ICPI) were canvassed to identify field evaluation sections for investigation. A total of 83 pavement sections were inspected at locations throughout North America to validate the deduct curves. The comparison of the predicted PCI values versus field estimated PCI values indicated a good correlation.

Kyungwon Park; Natacha E. Thomas, and K. Wayne Lee, Ph.D., P.E. (2007)Applicability of the International Roughness Index as a Predictor of Asphalt Pavement Condition. This note establishes the relationship between the surface distress of an asphalt pavement and its roughness, as conveyed respectively by the pavement condition index _PCI_ and the international roughness index _IRI_. The DataPave software provides the roughness of varied roadway pavement sections from the North Atlantic region that were investigated under the long term pavement performance _LTPP_ study. The MicroPAVER1 software system computes the condition of the same sections using cross-referenced distress data from DataPave. A transformed linear regression model predicts pavement condition given roughness. It confirms the acceptability of the IRI as a, albeit not the sole, predictor variable of the PCI whereby the former accounts for the majority, close to 59%, of the variations in the latter. Further, an analysis of variance confirms the existence of a strong relationship between both variables.

II CONCLUSIONS

The study was primarily aimed to use the outputs of different pavement condition indicators of flexible pavement in deciding the M&R requirements. The index was evaluated by considering the effects of four main pavement performance indicators viz. distresses, roughness, structural capacity and skid resistance for selected road sections of Flexible road.

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