

# Multi Criteria Analysis to Draft a Model for Pavement Maintenance Management

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**ABSTRACT:** Highway plays a dynamic part for economic growth of any country by providing basic substructure for orderly and timely movement of raw materials and industrial products from one point of a country to other point so as to maintain the flow of economy from one zone to the other. The important role that Highway plays in monetary progress is well recognized. A country cannot progress economically unless it has a good system of Highway which links its different parts together and also changed amounts of the world. The need and importance of Highway in national economy can be determined by evaluating the economic and social impacts of that project on the people of the Nation. Economic growth of any nation is dependent on growth of Highway, including India. According to census 2011, 31% of population of India is considered to an urban population (MOUD 2011). So it is hereby needed to have a connecting mapping of countryside and metropolitan Development. Therefore comprehensive development will be needed in physical, institutional, public and monetary substructure. Road is Simple substructure that fast-tracks the progress course by joining and introductory up of the recessive areas to job and deal.

**KEYWORDS:** Multi Criteria Analysis (MCA), Pavement Management System (PMS), Pavement Management Information System (PMIS).

## I. INTRODUCTION

The continued extension and improvement of the highway network does however create new and growing challenges in terms of an increasing maintenance burden. In instruction to brook the benefits of the investments made in improving roads, there is a need to boost capacity in terms of providing adequate maintenance.

For the roadway improvement it is necessary that PMS should use so that highway repairs can be ranked prioritization is a well and justifiable process. This process include the minimization of life cycle cost thus serviceability level decreases for the same budget that is no extra budget required sound engineering judgment pay a worthy role in prioritization. Today the roadway improvement in and fiscal deficit lead the prioritization process on a peak condition that is it play I significant role than ever. Basically prioritization is systematic process which quantifies specific criteria in which road way condition, level of traffic, various functions of pavement is included.

PMS is gives information so that roadway improvements should be priority graded. Such as pavement condition, traffic level, pavement functions, etc. A growing portion of total funding needs to be allocated to maintenance of existing roads together with the technical staff required to attend to road maintenance. With increase in population and vehicular density in urban and Rural areas, the roads are having traffic above the capacity for with they are designed, which lead to wear and tear in road conditions. Roads are of vital importance in order to make a nation grow and develop.

## II. PAVEMENT MAINTENANCE

Unfortunately in India, we construct and forget our infrastructural assets. This truth is also applicable to our roads. We build roads and remember them only when they reach in extremely bad condition. The pavement management system

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and the systematic approach contained in this are not adequately implemented for repairs and rehabilitation. Noncompliance result into heavy losses, discomfort, Mechanical damages in vehicles and loss of man hours. In many cases the high speed corridor pavements have failed prematurely in the absence of adequate maintenance during the design life itself. For the roadway improvement it is necessary that PMS is used so that road maintenance can be ranked .for the roadway improvement and modern fiscal deficit leads the prioritization process on a peak condition that is play a main role than ever. Prioritization is a systematic process which verifies specific criteria in which highway condition and various function of pavement.

**Preventive Maintenance:** it is cost effective practices that extent pavement life and increases safety.

**Corrective Maintenance:** it is activities to solve the failure of pavement and restore it.

**Emergency Maintenance:** it is fixing damage of highway and other activities in emergency situation.

**Research methodology:**

- First, prepare an inventory of various assets viz. pavement, embankment, drains, drainage structures, road signs, traffic control devices, protective works for the countryside streets under jurisdiction of each Executive Engineer and consolidating for the state.
- Provide routine maintenance to the infrastructure in a good and maintainable condition. "Good" condition is regarded as when it requires a minimum of routine maintenance, consisting of preventive works measures most of which can be carried out utilizing native labour, implements and materials.
- Rehabilitate existing assets that must drop into serious disrepair.
- Control and prevent encroachment on the Right-of-way.

**Questionnaire survey:**

Surveys are a very traditional way of conducting research. Initially the leading questionnaires for the questionnaire were established based on PMS currently practiced. Then the test assessment is prepared and questions are asked to the targeted respondents who are related to the construction companies according to their views. The surveys were Personal contacts as well it is been distributed via email, bands etc. through which 19 have responded the manner of accumulating facts by the questionnaires to respondents is most extensively employed in various economic and business surveys. The merits claimed on behalf of this method are as follows:

1. Questionnaire cover and general information and instructions to the participants.
2. Information of alleged.
3. Structure care does.

**Table1. Participant’s Respondents to Pavement Maintenance**

S.NO	Maintenance practices	Frequency Analysis			
		Yes	%	No	%
1	Regular Maintenance	10	52.63	09	47.37
2	Periodic Maintenance	12	63.15	07	36.85
3	Preventive Maintenance	14	73.68	05	26.32
4	Emergency Maintenance	08	42.10	11	57.90
5	Corrective Maintenance	06	31.57	13	68.43
<b>Analyzing Method Preference</b>					
6	Multi Criteria Analysis	10	52.63	09	47.37
7	AHP- Analytical Hierarchy Process	12	63.15	07	36.85
8	Artificial Intelligence	15	78.94	04	21.06

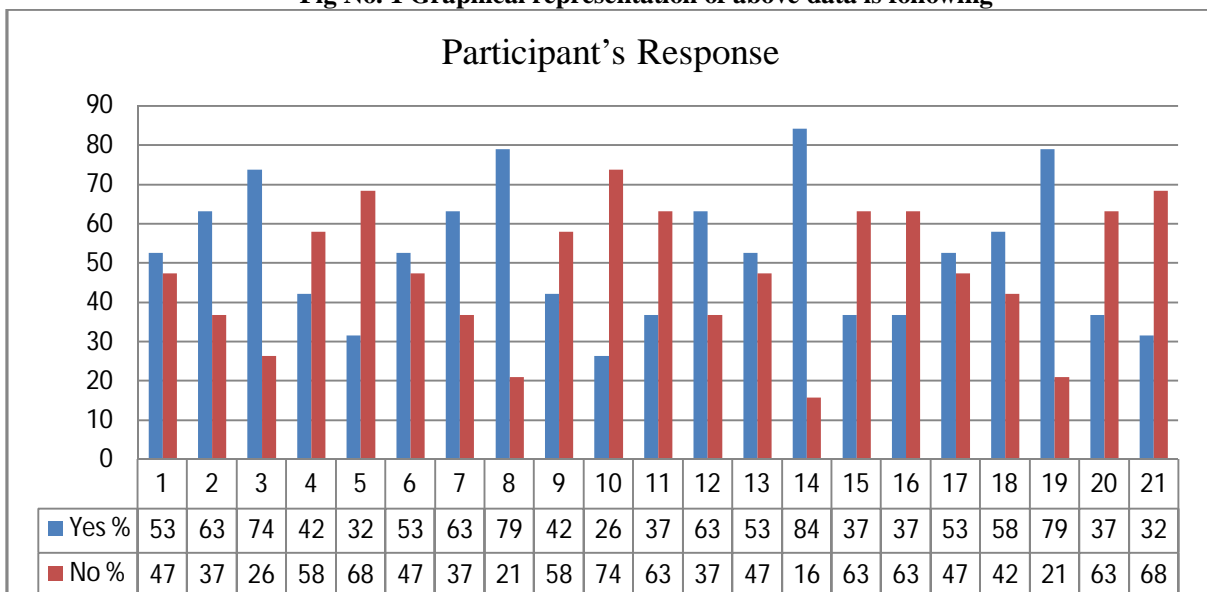
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9	Mat Lab	08	42.10	11	57.90
10	SPSS	05	26.31	14	73.68
11	Economic Based	07	36.84	12	63.16
<b>Surface Failure-Rigid</b>					
12	Potholes	12	63.15	07	36.85
13	Scaling	10	52.63	09	47.37
14	Mud Pumping	16	84.21	03	15.79
15	Cracking	07	36.84	12	63.16
16	Corrugation	07	36.84	12	63.16
<b>Surface Failure-Flexible</b>					
17	Potholes	10	52.63	09	47.37
18	Ravelling	11	57.89	08	42.11
19	Slippery Surface	15	78.94	04	21.06
20	Distortion	07	36.84	12	63.16
21	Rutting	06	31.58	13	68.42

**Fig No. 1 Graphical representation of above data is following**



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## III. RESULTS AND DISCUSSION

Study case was analysed as per parameters and constraints suggested by the contractor created on software having a data base of respondents to the questionnaire survey. The recommended safety is need based and the Pavement Maintenance practices are as under:

- Have a Pavement Maintenance Specialist.
- Have a complete overview of Traffic Flow.
- Public and Monetary Survey should be performed by the specialist
- Emphasis on PMS.
- Emphasis on hazards at road that could lead to pavement Surface Failure.
- Department review inspection .
- Emphasis on emergency access and egress at workplace.
- Have a regular monitoring.

## IV. CONCLUSION

The disparate roadway care tasks are integrated with public and monetary aspects all together in a practical manner. That will ultimately limit what should be reached in Highway Management but the task facing success rate of Highway Engineers from day to day is to achieve the highest standards of pavement quality within the constraints of available resources.

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