

# Performance Evaluation of Pavement [Reviews]

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**Abstract**— Now a day's road user increases day by day due to development in commercial, residential, industrial area. Because of it deterioration increased in road pavement. To know about history of riding quality of the pavement functional behavior or performance evaluation of pavement is needed. In functional behavior visual observed by measuring cracking, rutting, potholes, releveling, patching in deterioration pavement. In the structural evaluation of flexible pavement the pavement deflection is measured by the Benkelman beam. Rebound deflection is used for overlay to pavement. Sub-grade soil test is also test for selected location stretch. The objective of the present study is to carry out the various studies to evaluate the performance of flexible pavement on selected stretch.

**Key words:** Functional evaluation, Structural Evaluation, Pavement performance, BBD technique, Road roughness

## I. INTRODUCTION

Transportation infrastructure plays a lead role in economic growth and development of country. Pavement are one of the most important part of any transportation system. There is need for efficient and effective management and maintenance. Flexible pavements undergo functional deterioration as well as structural deterioration simultaneously due to the combine effects of climate, environment and traffic loads. Due to heavy traffic load of commercial vehicles, all the components of the pavement surface get disturbed and distress.

The functional deterioration is indicated by the changes in surface condition of the pavement in the form of deterioration in the riding quality, which can be measured by simple methods; it is also possible to restore the surface to original condition of the pavement by providing a profile correction course and a resurfacing layer.

The rate of structural deterioration of flexible pavement depends on several factors such as (a) the stability of the existing pavement structure and the component layers (b) magnitude and reoperation of traffic wheel loads (c) growth rate of traffic loads (d) effective functioning of pavement drainage system and severity of the climatic and environment factors.

Quality of the road surface, stiffness and thickness of pavement layers are important parameters which influences the performance and efficiency of roads. Pavement evaluation of existing roads and quality control of new roads.

The aim of the research has been functional evaluation visual observed by measuring cracking, rutting, patching, releveling etc. in deterioration pavement. In structural evaluation of existing flexible pavement by Benkelman beam method and find out deflection of pavement. Then after calculate the thickness of overlay of flexible pavement as per IS standard.

## II. OBJECTIVES

- 1) Carry out the present pavement condition. And traffic volume.
- 2) To evaluate the structural condition of pavement by using BBD test.
- 3) To carry out soil sample and testing.
- 4) To calculate the thickness of overlay layer pavement.

## III. RESEARCH STUDIES

### A. Pavement Evaluation By Benkelman Beam Of State Highway Section (Waghodiya Crossing To Limda)

In this they have measured structural evaluation of flexible pavement deflection by the Benkelman Beam. Rebound deflection is used for overlay design. A detailed pavement condition survey is done on State Highway 158 (Waghodiya crossing to Limda) and the road condition is evaluated structurally. Their present study is evaluates the overlay thickness for State Highway 158 Waghodiya crossing to Limda.

This studied method in they have carried out visual survey and structural survey. In visual survey find Rutting, Patching and Pothole. And in structural survey find deflection by Benkelman beam deflection test.

Finally their conclusion based on visual observation for rutting, patch work, potholes and cracks are weak spots of pavement. Calculate the overlay thickness on existing flexible pavement in terms of bituminous macadam by BBD technique. The visual observation and Benkelman beam deflection correlates each other as per the IRC81 1997 guideline [1].

### B. Structural Evaluation Using Benkelman Beam Deflection Technique and Rehabilitation of Flexible Pavement For State Highway 188 (Sarsa Junction To Vasad Junction)

In this research they have studied on structural evaluation. In the structural evaluation of flexible pavement the pavement deflection is measured by the Benkelman beam. It is possible to measure the rebound and residual deflections of the pavement structure. While the rebound deflection is one related to pavement performance, the residual deflection may be due to non-recoverable deflection of the pavement or because of the influence of the deflection bowl on the front legs of the beam. Rebound deflection is used for overlay design.

A detail pavement condition survey is done on state highway 188 (Sarsa junction to Vasad junction) and the road condition is evaluated structurally. The present study is evaluates the overlay thickness for state highway 188 Sarsa junction to vasa junction.

In this they have done pavement performance data like as visual survey data, structural evaluation of pavement by Benkelman beam, existing pavement composition and

soil sampling & testing. And finally given the overlay thickness design.

The conclusion of research, the visual observation for cracks, potholes, raveling and stripping can explain weak spots of pavement. The Benkelman beam study was conducted on all the selected section of SH: 188 from Sarsa to Vasad junction of the road and structural inadequacy were found in all the sections. There is needed to go for measures such as an overlay on all the sections of SH: 188 form Sarsa to Vasad junction. The overlay thicknesses in terms of bituminous macadam were found for all the stretches, it ranges from 110mm to 210mm. The visual observation and Benkelman beam deflection correlates each other [2].

#### C. Study on Performance of Flexible Highway Pavements

In this research they have studied on functional and structural evaluation at 4 National highways and 1 State highway, in the structural evaluation the pavement deflection was measured in flexible pavement by the Benkelman Beam technique. It is possible to measure the residual & rebound deflections of the pavement structure. While for pavement performance the rebound deflection is one related it, the residual deflection may be due to non-recoverable deflection of the pavement or because of the influence of the deflection bowl on the front legs of the beam. For overlay design the rebound deflection is used. The present study objective is to carry out the various studies on at flexible National Highways and State Highway near Bhopal to evaluate the performance (in service behavior).

They have done performance data of existing pavement according to Benkelman beam deflection. Also given the basic principles of method of deflection and technique of Benkelman beam deflection that how can perform a test according to standard specification.

In these research conclusions, The Traffic volume study indicate that in case of NH 12, NH 69, NH 3, NH 86 and SH 23, the traffic is of very high intensity and also heavy axle load vehicles ply on the roads. The heavy axle loads on the road are leading to its premature failure and distresses like rutting, cracking, localized depressions etc. The drainage system both longitudinal and transverse are inefficient and is not working properly especially for NH 3 and NH 86 leading to failures pertaining to improper drainage system, namely Potholes, Stripping etc. On all the five stretches, the Benkelman beam study was conducted and structural inadequacy was found in the sections of all the five stretches i.e. NH12, NH69, NH3, NH86& SH23. The Pavement Performance or evaluation Study will help in arriving at the most appropriate overlay & maintenance activity or remedial measures, suitable for a particular section of the road. [3]

#### IV. FUTURE SCOPE OF WORK

In this review paper, functional evaluation and structural evaluation have been done respectively. And structural evaluation has been done by Benkelman beam, despite of it FWD method could be used. For measuring roughness index marlin can be used. For measuring traffic load traffic volume count can be used. After collecting data standard IRC code have to use as a solution for data analysis.

#### V. CONCLUSION

- 1) The visual observation for cracks, potholes, raveling, patching can explain weak spots of pavements.
- 2) The visual observation and Benkelman beam deflection correlates each other.
- 3) The Benkelman beam study was conducted on all the selection sections of SH and NH of the road and structural inadequacies were found in all the sections.

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