Pavement Evaluation by Benkelman Beam of State Highway Section 
(Bhavnagar Road - Ajidam Circle to R.K. University) 

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Abstract—Pavement deterioration is resulted by both environmental and structural causes. It is difficult to maintain the road on the same specification that was owned at the opening and problems start to appear represented in the pavement cracks, holes and undulations. Recognizing defects and understanding their causes helps us to rate pavement condition and select cost-effective repairs. Periodic inspection is necessary to provide current and useful evaluation data. It is the present study is evaluates the PCI for State Highway 121 Bhavnagar Road Ajidam Circle to R.K. University.

Key words: Flexible Pavement, Benkelman Beam, Deflection

I. INTRODUCTION

Roads play a major role in the development of all countries and societies by providing the essential links between different parts of the country to facilitate the movement of people and transport of goods. The importance of roads increases as the area of the country increases; especially in the absence of other means of transport such as railways and waterways, which is often occurred in developing countries. The history of road engineering gives us an idea about the roads of ancient times. Roads in Rome were constructed in a large scale and it radiated in many directions helping them in military operations. Thus they are considered to be pioneers in road construction.

Since early 70’s there has been vigorous economic development of countries on the Mediterranean coast of North Africa. However, this area lies completely within regions of so called hot arid climates.

Many exposed pavements have problems lead to a reduction of the quality of the road and reduce the degree of safety and comfort to road users. Some of these problems occur in asphalt layers, such as cracks and bleeding, and some of the lower classes occur, such as crawl and swell. Studies and researches have been shown that most of the problems faced by asphalt roads. Most of the problems are various types of cracks, hardening, raveling and weathering asphalt materials which are mainly due to a number of environment factors, namely

– High temperatures
– The daily temperature range.
– The intensity of solar radiation.

Although the roads in Rajkot exposed to various types of damage suffered by the asphalt pavement in the rest of the world, it is characterized by the emergence of certain types of damage specific to this region and is due to the influence of environmental factors.

II. NEED OF THE STUDY

A good road management is necessary, and maintenance actions must be taken with good timing. Pavement maintenance activities, though not as spectacular as the construction ones, are of a good road management is necessary and maintenance actions must be taken with good timing.

– Maintenance and rehabilitation
– Give a good riding quality to the road users.
– Reduction number of accidents.

III. OBJECTIVE OF STUDY

Objective of the study included,

– Identification of the Different Types of Distresses on Flexible Pavement
– Carry Out The Surface Condition And Traffic Survey
– To Evaluate The Structural Condition Of Pavement By Using Benkelman Beam Test.

IV. DEFINITION OF PAVEMENT EVALUATION

Pavement evaluations are conducted to determine functional and structural conditions of a highway section either for purposes of routine monitoring or planned corrective action. Functional condition is primarily concerned with the ride quality or surface texture of a highway section. Structural condition is concerned with the structural capacity of the pavement as measured by deflection, layer thickness, and material properties.

V. STUDY AREA PROFILE

Fig. 1: Study Area

My site is Ajidam circle to R.K.university section of state highway 121. Map of site shown below. Which indicate blue line Total length of stretch is 6 km. In these stretch many companies, colleges and residential project are there so that the traffic volume should be increased further days. There are many college buses also loaded trucks travel on the road.
So that the pavement condition become rough, unsafe for road users due to heavy traffic.

The salient features of the road section are:

(Ajidam Circle to R.K.University)
- Length of the stretch : 6km
- Types of pavement : bituminous
- No. of lanes : 2
- Divided / undivided : divided
- Types of shoulder : rough shoulder
- Types of traffic : mixed traffic

VI. VISUAL SURVEY

A. Rutting
Is a surface depression in a wheel path and is a load associated distress.

B. Patching
A patch is an area of pavement that has been replaced with new material to repair the existing pavement.

C. Pothole
Potholes are small usually less than (30 inch) in diameter-bowl-shaped depressions in the pavement surface.

D. Cracking
These types of distresses are obvious clearly in different severity. Longitudinal cracks are present in parallel to the pavement centerline, and located within the lane (wheel path).

While the transverse cracks extend perpendicular to the centerline, as shown in Figure 5.

E. Block Cracking
This distress is measured manually by using tape in “ft²”. Block cracks are interconnected cracks that divide the pavement into approximately rectangular pieces.

VII. STRUCTURAL EVALUATION

There are different NDT test to evaluate the structural condition of existing pavement. The most widely used method in India has been Benkelman beam deflection method.
Deflection should be finding out by Benkelman beam deflection test. It should be used to find out the deflection measurement as per IRC – 81 1997.

Fig. 8: BBD test

VIII. CONCLUSION

The Visual Observation For Distresses Can Explain Weak Spots Of Pavement. The Benkelman Beam Study Should Be Carried Out Of Ajidam Circle To R.K.University. Calculate The Characteristics Deflection Value. The Visual Observation And Benkelman Beam Deflection Correlates Each Other As Per The Prc-81 1997 Guideline.

REFERENCES


IX. APPENDIX

<table>
<thead>
<tr>
<th>SECTION (K M)</th>
<th>SIDE</th>
<th>DIAL GAUGE READING</th>
<th>TEMPERATURE READING</th>
<th>REBOUND DEFLECTION</th>
<th>TEMPERATURE CORRECTION</th>
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AVERAGE DEFLECTION = 1.068
STANDARD DEVIATION= 0.134
CHARACTERISTIC DEFLECTION(Dc) =1.337

Table 1: Benkelman Beam Test Analysis

Name Of The Road: Rajkot- Bhavnagar Road section : Ajidam Circle To R.K.University (0 Km To 6 Km)