Rehabilitation of B.I.T Pathway (The Existing Flexible Pavement) Using CBR & is Method In Gida Gorakhpur

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Abstract - The objective of this paper study is to enhance performance characteristics or variables (e.g., ride quality, rutting, Prevention of fatigue cracking & transverse cracking) of flexible pavements. The present time pavement structure have water logging problem, cracks, aggregation problem of pavement it means pavement are fail. We remove all these problem & replace existing pavement in new pavement and we construct 1m2 of pavement sample, it resists the bearing capacity of wheel load and the load not entered to the subgrade it means the sample is good. Flexible pavement may be constructed in a number of layers and the layer has to be strongest as the highest compressive stress. The pavement structure should be able to provide a surface of acceptable riding quality, adequate skid resistance, favorable light reflecting characteristics & low noise pollution. The ultimate aim is to ensure that the transmitted stresses due to wheel load are sufficiently reduced, so that they will not exceed bearing capacity of the sub-grade. The main reason for selecting a flexible pavement is its low construction and maintenance cost and its simple and easier procedures of construction. CBR method for construction of flexible pavement is not only easier to understand, but it is reliable and practically acceptable and widely adopted too. The experiments are conducted to test various aggregate characteristic, soil properties and bitumen test.

Key Words: Replace existing pavement in new pavement, Design of flexible pavement, California Bearing Ratio.

1. INTRODUCTION

Flexible pavements are so named because the total pavement structure deflects, or flexes, under loading. A flexible pavement structure is typically composed of several layers of materials. Each layer receives loads from the above layer, spreads them out, and passes on these loads to the next layer below. Thus the stresses will be reduced, which are maximum at the top layer and minimum on the top of subgrade.

The main objective of this study is to rehabilitation of the existing pavement of BIT pathway.As per IRC recommendation, California Bearing Ratio (CBR) value of sub grade is used for design of flexible pavements. California Bearing Ratio (CBR) value is animportant soil parameter for design of flexible pavements. The California bearing ratio (CBR) test is frequently used in the assessment of granular materials in base, sub-base and subgrade layers of road and airfield pavements.

Mr. Sandeep Khorasiya, 2013, found from his analysis and calculate design is prefer a AASHTO method for because it is provide 750mm thickness as compare to IRC it is provide a 1000mmthickness for pavement so IRC is economical.

Jain, found from their experiment that the pavement is designed as a flexible pavement upon a black cotton soil sub grade, the CBR method as per IRC 37-2001 is most appropriate method than available methods. The pavement is designed as a flexible method from which each method is designed on the basis of their design thickness from which each method has different cost analysis of a section, from which CBR as per IRC is most appropriate in terms of cost analysis.

Misraet. Al., observed from his experiments that the theory of elasticity has been widely used to model pavement structures, and today it forms part of many International pavement design standards. It is still an open question, however, how well the theory of elasticity predicts the pavement response under load. Pavement materials are rarely elastic solids, more often they are particulate, and measurements have repeatedly shown important differences from theoretical values.

Kumar and Pavithra, found from his experiments the thickness of pavement varies with the change in the value of C.B.R. With higher value of C.B.R. the pavement thickness is less and vice versa. Due to the saving in Pavement thickness is less quantity of material will be applicable so that, huge amount of money can be saved.

2. OBJECTIVE

The main objective is to find out the problem of existing pavement and replace in new pavement.

We are focused towards increasing the durability and workability, acceptable riding quality, adequate skid resistance, favorable light reflecting characteristics & low noise pollution of pavement. We are also focusing on the

reduction of drainage & water logging problems on existing pavement.

Present time pavement condition:

3. METHODOLOGY AND MATERIALS

The results for experiments on Soil, Aggregate and Bitumen are shown in tabulated form are as follows:

SOIL TEST		
S. No.	**TESTS**	**RESULTS**
1	Liquid Limit Test	33.6%
2	Plastic Limit Test	20.8%
3	Plasticity Index Test	12.86%
4	Optimum moisture content Test	10%
5	Maximum dry density Test	1.84g/cm3

AGGREGATE TEST		
6	Impact Test	6.40%
7	Crushing Test	13.18%
8	Abrasion Test for grade B	11%
9	Abrasion Test for grade G & F	10%
10	Specific gravity Test	3.2546 g/cm3
11	Water absorption Test	0.5%
BITUMEN TEST		
12	Penetration Test	260.67mm
13	Ductility Test	65cm
14	Softening Test	47.5℃

4. DESIGN OF PAVEMENT

CBR Method:

The California bearing ratio test is penetration test meant for the evaluation of subgrade strength of roads and pavements. California bearing ratio is the ratio of force per unit area required to penetrate in to a soil mass with a circular plunger of 50mm diameter at the rate of 1.25mm / min. The results obtained by these tests are used with the empirical curves to determine the thickness of pavement and its component layers. This is the most widely used method for the design of flexible pavement.

Calculation:

$$\text{2.5 mm Penetration CBR} = \frac{Test\ Load}{Standard\ \ load} * 100$$

$$= \frac{254.84}{1370} * 100 = 18.60\%$$

$$\text{5 mm Penetration CBR} = \frac{Test\ Load}{Standard\ \ load} * 100$$

$$= \frac{377.166}{2055} * 100 = 18.353\%$$

CBR value should be (2.5mm > 5mm). Tests satisfy (18.60% > 18.353%)

Thickness of Pavement:

As per CBR method, for CBR value 18.60% the thickness according to CBR charts for 'D' curve (150 - 450) vehicles exceeding three tons per day.

Provide Thickness = 19.96cm~ 20cm

T = 20cm

5. CONCLUSION

From the experiment, BIT pathway need rehabilitation. According to CBR and IS method we calculate the thickness of pavement is 17.5cm. Distribute the thickness into subgrade, sub base, base course, surface course and provide thickness to subgrade 9cm, sub base 5cm, base course 2cm, surface course 1.5cm.

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