Micro Surfacing for Bituminous Road

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***Abstract*- This study introduced us Micro surfacing for bituminous road have ventured in pavement preservation solutions which is an extended field of maintenance and portfolio of preservation system includes slurry sealing, Fog sealing, Mill & Fill. It is a preventive maintenance technique (preventive maintenance strategy aims at producing the most cost effective improvements in pavement quality and life) involving 3 to 6 mm sized bitumen aggregate treated with special emulsion. This layer is neatly laid down on road section requiring maintenance. The aim of this study to investigate the properties of micro surfacing mixture with Glass Fibre. To evaluate effect of glass fibreon micro surfacing. Indirect tensile strength were carried out according to international Standard on the sample for different percentage of fibre. Examining indirect tensile strength samples, constructed glass fibre content 0.15 to 0.45 respectively.**

Index terms- Glass fibre, indirect tense strength, Micro surfacing.

I. INTRODUCTION

It is an eco friendly surface treatment used to restore and preserve the surface characteristics of the road. It is of two types mainly(1)4mm to 6mm thick (type 2), (2)6mm to 8mm thick (type 3). Micro surfacing has undergone many developments since its inception although originally formulated as a rut filling system. It is now commonly use as a surface system for road surface problem throughout the world. Micro surfacing was 1st introduced in Germany in 1960 and in India was introduced in 2000. It is to be applied over an existing pavement surface which is structuraly sound but the surface is showingsign of premature ageing, gaggregate loss, high degree of polishing, oxidation or hungry surface etc. Micro surfacing is a mixture of polymersied bitumen emulsion specially graded course aggregate, cement, water and necessary additives mixed homogeneously on site in a special micro surfacing machine, uniformly spread immediately over a properly prepared surface evenly by means of spreader box attach behind the machine. For micro surfacing with Glass fibre special grade, AR glass fibre shall be added to the mix at the rate of 0.15%, 0.25%, 0.35%, 0.45% by weight of aggregate by special dispensing unit.

II. MATERIAL AND METHODS

A] Pavement Material:

1. Binder: The bitumen shall be modified bitumen emulsion confirming to requirement specified in the table mention below. Modified Bitumen polymer or rubber preferbly synthetic natural rubber latex blended into bitumen or aqueous phase of emulsion prior to during the emulsification process it may also required to be specifically design grading of aggregate is presented in table 500-32 of MORTH Specifications.
2. Aggregate: The mineral aggregate shall be crushed stone, dust clean sharp durable and uncoated dry particles and shall be free from soft pieces and organic and other deletions substance. The aggregate shall satisfy requirements and grading shall confirm by table 500-26 of MORTH specifications.
3. Filler: The mineral filler shall be ordinary Portland cement. It was used to minimize the risk of segregation to adjust the grading curvr and as a setting agent the type and amount needed was determined by laboratory mix design.. The amount use equted 2%by mass of dry aggregate.
4. Water: Water shall be portable free from harmful contaminants. The pH of water shall be in the range of 6-7.portable water from local sources was wetting agent and improve workability.
5. Additives: For micro surfacing glass fibres soecial grade AR glass fibres shll be added to mix at the rate of 0.15% to 0.45% byr weight of aggregate.

III. DESIGN & PROPORTIONING OF MICRO SURFACING MIX

The compatibility after aggregate, emulsion, filler and additives shall be verified by mix design for a selected type and grading of aggregate as specified in table 500-26 MORTH Specification.

The mix design report shall clearly shows the proportion after aggregate, filler, water and bitumen content based on the dry weight of aggregate. The design criteria for micro surfacing mixture is specified in table 500-33 of MORTH specification.

IV. PREPRATION OF SAMPLE

Apparatus: Stainless steel bowl, Spactula, beakers, Measuring cylinder, Spoon, Weight machine.

Procedure: Take 1 kg of graded aggregate and needed cement in a bowl, add required quantities of glass fibres, required quantity of emulsion and mix the content in a bowl vigorously. With the help of spatula till the emulsion and mix begins seizing its workability then add this mixture to the cylindrical shaped mould then compacted with 75 blows both sides of samples. Cure it for 24 hrs. Same procedure applied for the other samples.

In direct tensile test were was undertaken on the samples. The large scale photos were then used in order to investigate the behavior of cracks in fibre-reinforced asphalt mix.

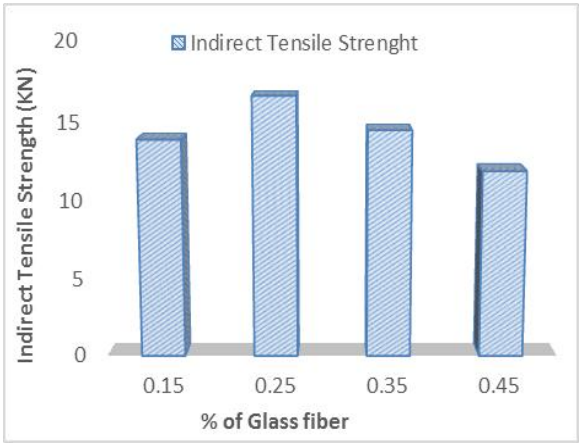
Preparation of specimen and choice of percentage of fibers.

Selecting the appropriate amount of glass fibres content in micro surfacing mixture is important. 4 different samples were constructed of different percentage of glass fibers 0.15;0.25;0.35;0.45.

V. RESULT

Glass fibers was assessed for tensile strength test and performance in a micro surfacing system using aggregate source, blend and emulsion formulation. The initial criteria mandated for this evaluation was that the increases glass fibres% tends to increase tensile strength but we get different results. Result of test are given below in table:

% of Glass Fiber	Indirect Tensile Strength
0.15	13.880
0.25	16.600
0.35	14.460
0.45	11.900



VI. CONCLUSION

This experimental study aims to evaluate the effect of glass fibre on tensile strength, rutting resistence and the behaviour of crack propagation. Micro surfacing is still having important in the preventive maintenance of the nation's roadways. In this experiment we study indirect tensile strength used to identify the properties of asphalt mixture by adding different percent of glass fibre. Based on our result we conclude that,

1. Tensile strength initially increased and then decreases with increase in addition of glass fibre so the highest in tensile strength can be achieved for the mixture containing glass fibre content 0.25%. Increasing in tensile strength can put off asphalt cracking.
2. Sample containing fibres have longer and nonliniear failure screen and therefore resulted in higher loading capacity.
3. It is Economical.
4. It is Eco friendly.

AKNOWLEDGMENT

Research or study of a project is of great importance in one’s life because this is an application of knowledge of one’s mind. So we are now satisfied with our step of completing research on our project i.e., “MICRO SURFACING ON BITUMENOUS ROAD”

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