



A CRITICAL REVIEW ON LITERATURE, USE OF CRUMB RUBBER IN WET MIX MACADAM OF A ASPHALT PAVEMENT

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Abstract

One of the major pavement failures are fatigue cracking and rutting these two are also known as the Di-stresses, similarly disposal of scrap tires in to environmental causes environmental issues .so, to avoid the problem of disposing scrap tires in to environment, use the recycled scrap tires as a construction material in wet mix macadam of a pavement, this gives the good result to avoid the pavement failures up to maximum extent, use the recycled scrap tire as a crumb rubber of different sizes i.e. 2.5mm and 4.5mm initially as a replacement of coarse aggregate of different percentages as per gradations suggested by Morth, two pavement samples has to prepared one sample is regular and the other sample which is mixed with crumb rubber after that c.b.r, standard proctor test , Atterberg and repeated load test has to be performed

Index Terms: crumb rubber, C.B.R, standard proctor, repeated load test

I. INTRODUCTION

The major objective of this study is to use the properties of rubber in base course of different proportions to control the fatigue behaviour of binder course .The use of scrap tire derived aggregates have been started in civil engineering since 1990's, but the percentage of using scrap tyre derived aggregates in civil engineering has to be increased more, according to resource management act, new Zealand 16% is used for civil engineering applications.

The use of Crumb rubber in binder course of asphalt pavement has been started earlier to avoid the Di-stresses of a pavement, but there is a still pavement failure. So to avoid that

reinforcement has to provide in the form of crumb rubber with some percentage with replacement of coarse aggregate by that fatigue can be reduced, rubber is also used as a stabilizing agent in expansive soils and it is also used in embankment constructions. Tyre is a mixture of different materials they made of vulcanized rubbers (with styrene butadiene (SBR), natural rubber (NR) and polybutadiene (BR), carbon black, steel, textile cord and little amount of Other additives these materials exhibit different physical and chemical properties and dumping of these waste tires in to landfills causes serious environmental pollution because its degradation takes much more time, in this regard my study is on use of scrap tires in pavement construction.

II. OBJECTIVES

1. The major objective of this study is to use the properties of rubber in base course at different proportions to control the fatigue behaviour of pavement.
2. To study the bonding between
 - A) Aggregate and crumb rubber
 - B) Crumb rubber base course and bitumen

III. PARAMETERS STUDIED

1. Optimum Moisture Content
2. Aggregate Gradation
3. Cbr Values
4. Impact Values & Abrasion
5. Maximum Dry Density

IV. MATERIAL AND TEST METHODS

- 2.1. Crumb Rubber: crumb rubber chips passing through 4.75mm sieve were used in this study, as reinforcement



Figure-1. Crumb Rubber Passing Through 4.75mm Sieve

2.2. Standard Proctor Test:

This test is mainly used for relationship between the moisture content and density of aggregate compacted in a mould of a given size with a 2.5 kg rammer dropped from a height of 30 cm. the results obtained from this test will be helpful in increasing the strength of the structure.

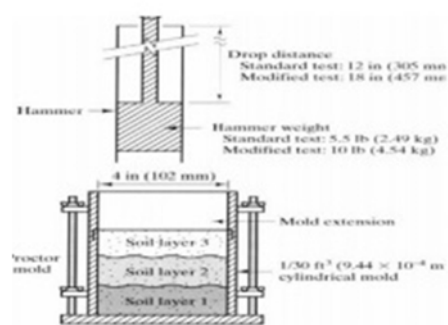


FIGURE.2 STANDARD PROCTOR TEST

2.3. California Bearing Ratio:

The California bearing ratio test is penetration test meant for the evaluation of pavement sections strength of roads and pavements. 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.

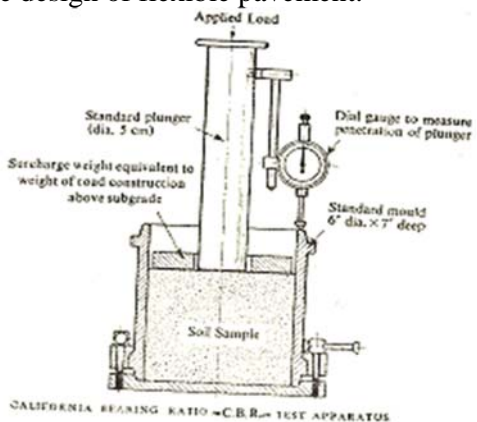


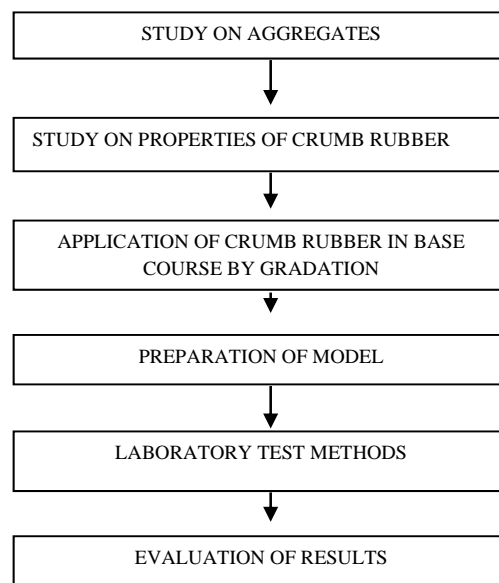
Figure: 2 California Bearing Ratio Test

2.4. Repeated load test and preparation of pavement model:

The model of flexible pavement are prepared in a circular steel tank of 60cm diameter with a depth of 30cm, out of which 20 cm depth is for lying sub grade, 5cm is for sub base and 5cm for base course, the repeated load test is carried out at complete saturated condition on the model

V. METHODOLOGY:

The study on properties of aggregates and crumb rubber has to be done then after that, the replacement of fine coarse aggregate has to be replaced with some percentages of crumb rubber as per the Morth. Standard proctor test and California bearing ratio test has to be performed by mixing the aggregate and crumb rubber, Model of the flexible pavement has to be prepared then after repeated load test has to be conducted.



VI. CONCLUSION AND OUTCOMES

1. Use of waste recycled rubber as partial replacement of aggregate in base course, by this the use natural aggregate in construction can be reduced
2. Durability of pavements will be increased.
3. Failures of pavement will be controlled
4. Bonding between crumb rubber and course aggregate has to be studied in future
5. Various combinations of the materials, like recycled aggregates, poor quality aggregates etc. can be tried and the mix which gives maximum fatigue life can be obtained.

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