WASTE ENGINE OIL WITH RECLAIMED ASPHALT CONCRETE FOR LOW VOLUME ROAD SURFACING IN SRI LANKA

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Declaration by the candidate

I certify that this is my own work and, to the best of my knowledge, this dissertation differs from any thesis that has been submitted for a degree or diploma in any University or Institute of higher learning. I have not incorporated approved published or written material by another individual into this work except where the acknowledgements are made in the text. I declare that I have the right to use this content wholly or partially in any future projects (like articles or books).

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The individual mentioned above has conducted research work for the Masters dissertation under my supervision and guidance. I affirm the above statement made by the student is accurate and correct.

Name of the supervisor: ……..

Signature of the supervisor: …….. Date: ……

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Abbreviations

WEO – Waste Engine Oil
RAC - Reclaimed Asphalt Concrete
NA – Not Applicable
WC – Wearing Course
BC – Binder Course

Abstract

This thesis focuses on an evaluation of the effectiveness of waste engine oil (WEO) in modifying asphalt concrete for application in low traffic pavement construction in Sri Lanka. The objectives include: The first application includes the assessment of the potential for using WEO in asphalt mixes, the second is to identify the optimal ratio of WEO for certain characteristics of the material, and the third is considering the possibilities for improving the state of the environment by introducing WEO in road construction, increasing the rate of waste recycling.

The research used a detailed collection of data from the scientific sources on the subject, work upon the aspects of waste-engine oil and reclaimed asphalt concrete. Initially, basic studies evaluates the versatility ranges of WEO in asphalt mixtures to establish the right proportions (0.5%, 1%, 1.5%, 2.0 %) of this additive to be incorporated. A detailed mix design was worked out and Marshall specimens were made for the purpose of testing. Density, stability, flow, air voids, and voids in mineral aggregates (VMA) have been used for assessment purpose.

The study shows that waste engine oil has a high potential of replacing the conventional materials in the wearing and binder courses of pavement through using it in asphalt concrete mixtures. _evaluation of waste engine oil was carried out at 0.5% to 2.0% for the wearing course and 0.5% to 1.5% for the binder course. These concentration levels are within regulatory requirements used in road construction. In particular, the mixes with 0.5 % 1 % and 1.5% w/w of waste engine oil meet its required quality, which indicates that the incorporation of waste oil weakens the material's performance.

The outcomes of the study suggest that it is indeed possible to incorporate waste engine oil in to the asphalt mixtures for construction of low traffic volume roads; thus a sustainable solution to waste disposal. It promotes environmental sustainability to end the continuation of pollution in Sri Lanka by attempting to recycle waste products. Consequently, the use of waste engine oil within the asphalt concrete mixtures can be a good approach to promote sustainable construction, and at the same time cut down pollution.