MUD CONCRETE AS AN ALTERNATIVE PAVING MATERIAL

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Degree of Master of Science

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University of Moratuwa
Sri Lanka

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An experimental study has been carried out to find the suitability of using Mud Concrete as a paving material for low-volume rural roads in Sri Lanka

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Thesis/ Dissertation submitted in partial fulfilment of the requirements for the degree Master of Science

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DECLARATION

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Date: 23 December 2019

The above candidate has carried out research for the Master's dissertation under my supervision.

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Research Supervisor

Prof. Rangika Halwatura

Senior Lecturer

Date: ……..

ABSTRACT

Along with the highways, main roads and connecting roads, rural roads which comprise of the largest portion of roads should also be improved, refurbished and maintained every so often. The limited amount of budgetary allocation will restrict what needs to be done. The conventional methods available at moment are not always within the budget range of regional administration bodies. Thus, some rural roads never see the development they need and will remain remote forever.

The underprivileged communities living in these areas fall behind due to these inaccessible roads thus they sgould be able take matters into their own hand and find the best solution for themselves.

Considering the critical cost factor., most of the road cost goes for the supply of material in each method of paving. In addition, the special machinery used for laying and labour costs will limit its affordability. If a more economical material can be invented which will not require additional manpower, it will be ideal for such communities to implement.

Hence, as a result, Mud Concrete, a paving material which has the same characteristic that of other methods such as Concreting, Concrete blocks etc. is introduced. This study will conduct some experimental studies on this material. i.e on strength, durability and thermal performances and observe how it will behave in actual condition. Finally, feedback/views from the general public will be recorded.

The developed mix design for the mud concrete used consists of laterite soil (sieved with 20 mm sieve) with 5% of clay, 60% of Sand particles and 35% of gravel particles mixed with 18% of cement by weight to obtain a workable mix, layed using the same method of concreting.

The section constructed at the actual condition showed 14.2 N/mm^2 at 28 days showed no signs of thermal cracks. The surface was even, and no weathering was observed. The section was able to withstand different weather conditions and showed no significant damages.

The thermal behavior of the surface was measured and compared with other paving methods such as Asphalt, Primed, Concrete, Concrete blocks. Asphalt and primed sections indicated higher surface temperature peaking highest around 1.00 p.m. to 3.00 p.m. Concrete and concrete block were slightly lesser than above, but Mud Concrete displayed considerably lower temperature rises almost same as the normal gravel ground. The natural surface colour of Mud concrete created an aesthetically appealing sight to the eye.

The pavement was subjected to a heavy load induced by heavy vehicle but did not caused any damages to the surface or the base.

The feedback given by the road users after a half a year, depicted that they are satisfied with how the new material behaved against the more well-known paving materials. Almost all the responders suggested that they would recommend the Mud Concrete to be tested in other similar roads.

Key words*: Mud Concrete, Road pavements, paving materials, sustainability, low-cost*

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B.M.S.D Bandaranayake

Table of Contents

List of Tables

List of Figures