THE CEMENT STABILIZED SOIL AS A ROAD BASE MATERIAL FOR SRI LANKAN ROADS

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DECLARATION

I certify that this thesis does not incorporate without acknowledgement any material previously submitted for a degree or diploma in any University to the best of my knowledge and belief and it does not contain any material previously published, written or orally communicated by another person or myself except where due reference is made in the text. I also hereby give consent for my dissertation, if accepted, to be made available for photocopying and for interlibrary loans, and for the title and summary to be made available to outside organizations.

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ABSTRACT

Soils that can be stabilized are Granular, Sandy, Salty and Clayey materials. In Sri Lanka, lower quality coarse–grained and sandy materials are available which give higher elastic modulus than fine–grained material (Salty and Clayed materials).

In order to control shrinkage cracks, Unconfined Compressive Strength (UCS) at seven days should be limited. According to the findings, it was revealed that the most practical thickness of the cement stabilized base is 200mm and the most practical UCS at seven days is 3-4MPa to achieve compaction and the decided life with economical pavement thickness.

When the strength is measured in terms of CBR (California Bearing Ratio) and UCS, different cement contents arise from these two measuring methods. Therefore this study was performed to identify correct strength measure. The correct strength measure is UCS only and no relationship was found between UCS and CBR.

For road pavements with stabilized base, critical tensile stress or strain is located at the bottom of the stabilized layer. To control the fatigue cracking for required number of axial load repetitions, this tensile stress should be limited.

Above mentioned limitations cannot be analyzed using the conventional pavement design based on Structural Number principle. Hence a Mechanistic–Empirical Method is used to analyze pavements with a stabilized base which is difficult to carryout in general practice.

Therefore, through this study, pavement design charts for pavements having 200mm thickness of a Cement Stabilized soil Base (CSB) were developed by a Mechanistic–Empirical Method for various sub grade and traffic classes. According to the developed pavement design chart, it was revealed that CSB can be used for roads with traffic less than $1.5x10^6$ standard axial load repetitions.

Key words: Cement Stabilized soil Base, Unconfined Compressive Strength (CUS), California Bearing Ratio (CBR), Mechanistic Empirical Method

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