

بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ
رَبِّنَا تَشْرِحْ لِنِي صَدْرِي وَيُسِيرْ لِنِي أَمْرِي
الْخَلِيلُ عَنْ قَدَّةِ مِنْ لِلْكَلَّانِي لِلْيَقِنِهِ وَأَقْوَلِي
صَدِيقُ اللَّهِ الْعَظِيمِ

صدق الله العظيم

سورة طه الآية (25-28)

DEDICATION

To the throne base.....

To those from whom I read and write

Under their bright hands.....

Revise all of my lessons

Enter all examination and gain

All of my certificates

Under their care, love and fair blessings.

**To the spirit of my mother who used to raise her
bright hand asking for our success...**

**To those hands, I am fully indebted, for every
piece of knowledge.**

To my sisters and brothers

Who helped me a lot.

TO every one who did create valuable things

And sat on sofa of this magnificent field

To every engineer

For every one assigned helping and attitudes

Or said nice words urging me to advance

And go forward.

I present this humble effort....

Suhair

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ABSTRACT

The importance of Sub-grade soil strength to road pavement plays a great role in design optimization of overlying structural layers. Sub-grade soil strength is major factor in the design, construction and performance of road pavements.

An accurate determination of the characteristic sub-grade materials is essential for successful analysis intended to support structural design.

The main objective of this study is to study sub-grade soil properties and their effects on the structure of road pavement layers employing Laboratory and field tests to estimate physical and engineering properties of the soil.

Also is to estimate a moisture adjustment factor to simulate field condition then present comparative analysis between laboratory tests results with field results.

The field investigation for sub grade soils consisted of excavation of test pits along the centerline of the roads alignment and DCP field tests approximately one meter below ground surface.

Laboratory and field tests were performed on samples taken randomly from Streets in Khartoum City (Al-Giraffe west Street), Khartoum Bahari City (Mara bee Al-Sharif, Zaim Al-Azharry, Almoulead and Bahari Alshabia Street) and Omdurman City (Sook AL- Shabby Streets).

The analysis process in this study was carried out by the using Microsoft Excel Spread Sheet and UKDCP3.1 program for the analysis and drawing graphics of the test results.

The main findings of the study concluded that the sub grade soil strength and moisture content affects road pavement structural layers

This research recommends processing the top of foundation preparation of sub grade soil to achieve the maximum density in roads and the control of moisture content.

مستخلص البحث

أهمية قوة التربة التأسيسية في رصف الطرق يلعب دوراً عظيماً في التصميم الانشائي الأمثل للطبقات الأرصفة الفوقيّة.

قوة التربة التأسيسية هو العامل الرئيسي في التصميم والتشييد وأداء أرصفة الطرق . دقة حساب خصائص مواد التربة التأسيسية يعتبر جوهريا في نجاح عملية تحليل مساندة أحمال التصميم الانشائي

الهدف الرئيسي لهذا البحث هو دراسة خواص التربة التأسيسية وأثرها في طبقات الرصف الانشائي وذلك باستخدام التجارب المخبرية والحقليّة لتقدير خواص التربة الفيزيائية والهندسية.

ويهدف البحث لتقدير عامل ضبط محتوى الرطوبة لمحاكاة الظروف الحقليّة وبعد ذلك عمل مقارنة تحليلية بين النتائج المخبرية والحقليّة.

اشتملت الأبحاث الحقليّة لطبقة التربة التأسيسية على تنقيب حفر اختبارات على طول مسار الطريق على اختبارات جهاز الاختراق المخروطي المتحرك تقريرياً بعمق متر من سطح التربة التأسيسية.

تم عمل اختبارات مخبرية وحقليّة وذلك بأخذ عينات عشوائية من الطرق بمدينة الخرطوم (الجريف غرب)، مدينة الخرطوم بحري (مربع الشريف، الزعيم، الازهري، المولد، وبحري الشعبيّة، ومدينة امدرمان (طرق السوق الشعبي).

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ولقد خلص البحث في أن قوة التربة التأسيسية ومحتوى الرطوبة تؤثر في طبقات الرصف الانشائى

ويوصي هذا البحث بمعالجة اساس طبقة التربة التأسيسية للحصول للكثافة المطلوبة القصوى وضبط محتوى الرطوبة في الطرق.

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LIST OF ABBREVIATIONS

Abbreviation	Description
AASHTO	American Association of State Highway & Transportation officials
A.C	Asphalt Cement
ASTM	American Society for Testing Material
B.S.	British Standard
C B R	California Bearing Ratio
DCP	Dynamic Cone Penetrometer
ESAL	Equivalent Single Axle Load
LC	Level of Compaction
LL	Liquid Limit
MDD	Maximum dry density
MR	Modulus of Resilient
NCHRP	National Cooperative Highway Research Program
NMC	Natural moisture content
OMC	Optimum moisture content
PI	Plasticity Index
PL	Plastic Limit
RD	Relative Density
TRL	Transport & Research Laboratory
USCS	Unified Soil Classification System

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