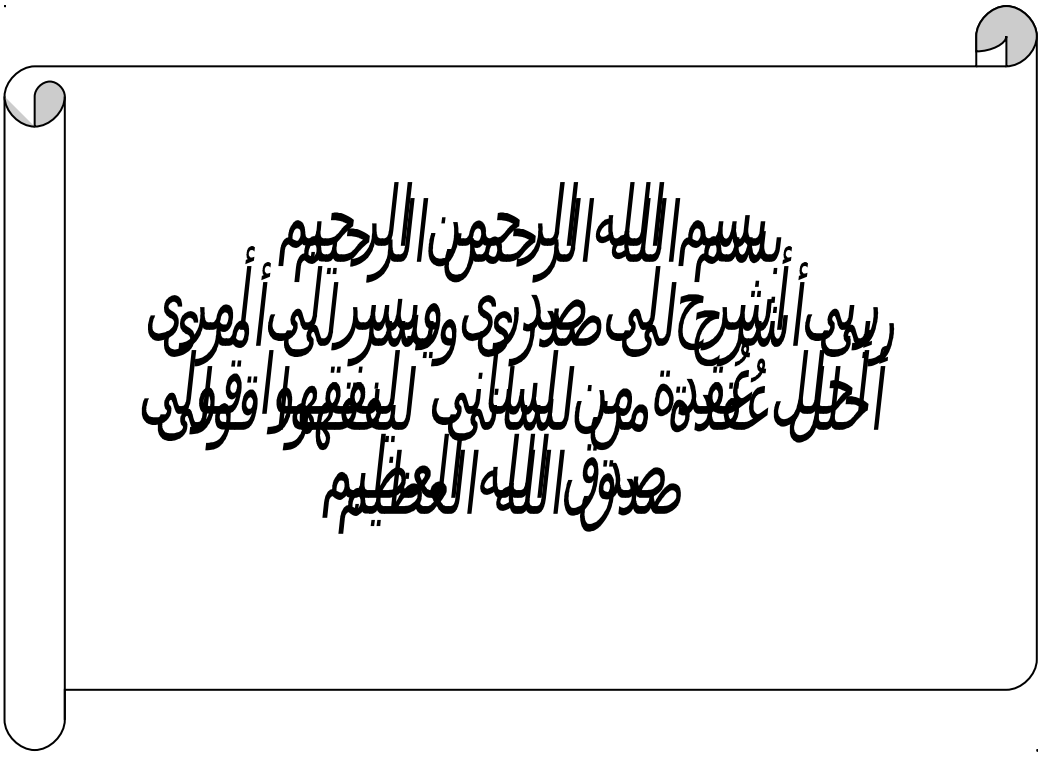


صدق الله العظيم

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**

# ACKNOWLEDGEMENTS

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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 عظيما في التصميم الانشائى الأمثل للطبقات الأرصفة الفوقية.

قوة التربة التأسيسية هو العامل الرئيسي في التصميم والتشييد وأداء أرصفة الطرق . دقة حسبان خصائص مواد التربة التأسيسية يعتبر جوهريا في نجاح عملية تحليل مسائدة أحمال التصميم الانشائى

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

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

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

تم عمل اختبارات مخبريه وحقلية وذلك بأخذ عينات عشوائية من الطرق بمدينة الخرطوم ( الجريف غرب)،مدينة الخرطوم بحري (مرابيع الشريف،الزعيم الازهرى ،المولد، وبحري الشعبية ،ومدينة امدرمان (طرق السوق الشعبي ) .

تم في هذه الدراسة أستخدم برنامج مايكروسوفت أكسل لرسم المخططات والتحليل بواسطة برنامج العمل الإلكتروني UKDCP version 3.1.

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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