

DEDICATION

To

The spirit of the Late Director General of SMEA Nyala,

Engineer Mohamed Hassan Hammed

I plead God to bless and accept him

To

My family

&

All the people who helped me

Abbas

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First

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ABSTRACT

In road evaluation it is essential to determine the in-situ soil strength and compaction level under field conditions for different soils strata.

The Dynamic Cone Penetrometer (DCP) is a popular in-situ test method commonly used to estimate soil strength. It gives immediate results of indirect CBR values promptly at various locations in the field.

The main objectives of the study is to analyze the DCP test data and then to predict in-situ soil strength in terms of either CBR value or Mechanistic Resilient Modulus(MR) for the purpose of road pavement structural design, and also to apply the DCP to soil strength characteristics for road pavement.

The data analysis in this study was carried out by using Microsoft Excel for DCP computation and Computer software (UKDCP version 3.1) for soil layers strength analysis.

The study results indicated that the DCP can be applied to predict in-situ soil strength, preliminary site soil investigation, pavement guide design, structural evaluation of existing pavements and compaction control. The research recommends assessment of DCP to soil strength characteristics.

مستخلص البحث

إن تحديد قوة التربة الموضعية ومستوى الدمك تحت الظروف الحقلية لمختلف الطبقات يعتبر جوهرياً فى تقييم اعمال الطرق.

جهاز الاختراق المخروطى المتحرك (DCP) هو الطريقة الاكثر استخداماً فى اختبارات تربة الحقل الموضعية و المستخدمة لقياس نسبة تحمل كالفورنيا (CBR) ويعطى نتائج سريعة غير مباشرة لقياس نسبة تحمل التربة لعدة مواقع فى الحقل.

الهدف الرئيسى لهذا البحث هو تحليل بيانات اختبارات جهاز الاختراق المخروطى المتحرك ومنها تقدير قوة التربة الموضعية الحقلية بدلالة نسبة تحمل كالفورنيا (CBR) او ميكانيكية معامل الرجوعية (MR) لغرض التصميم الانشائى لطبقات الرصف المرن للطرق وكما يهدف البحث ايضا الى تطبيقات جهاز الاختراق المخروطى المتحرك فى تقييم خصائص التربة لطبقات رصف الطريق تحليل البيانات التى استخدمت فى هذه الدراسة تم بواسطة برنامج الحاسوب مايكرو سوفت إكسل فى حسابات معدل الاختراق و برنامج العقل الإلكتروني (UKDCP version 3.1) فى تحليل قوة طبقات التربة

نتائج الدراسة تؤشر الى ان جهاز الاختراق المخروطى المتحرك يمكن تطبيقه فى تقدير قوة التربة موضعياً وإستكشافات التربة الاولى وتصميم و تقييم طبقات رصف الطرق المشيدة وضبط مستوى الدمك.

يوصى البحث باستخدام جهاز الاختراق المخروطى المتحرك (DCP) فى ايجاد خصائص قوة التربة.

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LIST OF ABBREVIATIONS

Abbreviation	Description
AASHTO	American Association of State Highway & Transportation officials
ASTM	American Society for Testing Material
A.S.	Australian Standard
B.S.	British Standard
CBR	California Bearing Ratio
CSIR	Council for Scientific and Industrial Research, South Africa
DCP	Dynamic Cone Penetrometer
MDD	Maximum dry density
OMC	Optimum moisture content
Mn/DOT	Minnesota Department of Transportation
NCHRP	National Cooperative Highway Research Program
TRL	Transport & Research Laboratory
T.R.R.L	Transport & Road Research Laboratory
USCS	Unified Soil Classification System

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