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CONTENTS

ABSTRACT

The aim of this study is to predict the swelling pressure by using one of the artificial intelligence branches called Artificial Neural Networks.

The Artificial Neural Networks is a new computing system, which proved in the last years a high ability in treating the ambiguous and strange phenomenan,which may be hardly solved by other methods.

A model made by using Artificial Neural Networks was used to predict swelling soil pressure by defining its main properties. Then a parametric study was done to know the effects of parameters on swelling pressure. Moreover the predicted values were compared with the experimental ones.

It is found that Artificial Neural Networks is a powerful tool in solving problems containing multiple variables, and has a good ability in performing parametric analysis.

تجريد

الهدف من هذه الدراسة هو ايجاد ضغط الانتفاخ فى التربة باستحدام أحد فروع الزكاة الاصطناعى والمعروفة باسم الشبكات العصبية الاصطناعية.

الشبكات العصبية الاصطناعية هى أحد أنظمة معالجة وتحليل البيانات والتى أثبتت فى الاونة الاخيرة مقدرتها العالية فى معالجة الظواهر ذات السلوك الغريب المبهم,

والتى من الصعوبة بمكان حلها بواسطة الطرق العادية الاخري.

تم عمل نموزج بواسطة الشبكات العصبية الاصطناعية لإيجاد ضغط الانتفاخ للتربة بمعرفة خصائصها الأساسية. ثم أجريت دراسة للعناصر المختلفة الخاصة بضغط إنتفاخ التربة لمعرفة أثر كل عنصر عليها.

وجد بأن الشبكات العصبية الاصطناعية أداة فعالة لحل المسائل التى تحتوى على عدة متغيرات ولها مقدرة كبيرة لإجراء دراسة أثر العناصر.

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NOTATIONS

PP	Percentage Passing Seive No. 200
Ac	Activity
PI	Plasticity Index
LL	Liquid Limit
PL	Plasticity Index

LI	Liquidity Index
IS	Swell Index_____
Δh	Percent Swell
EI	Expansion Index
F	Factor Passing No.4 Sieve
IS	Shrinkage Index
SP	Swelling Pressure
NMC	Natural Moisture Content
e	Void Ratio
Q	Shear Modulus
N	SPT Value
ϕ	Soil Internal Friction Angle
ρ	Mass Dencity
n	Porosity
f	Average Shear Factor
M	Earthquake Magnitude
g	Peak Ground Surface Acceleration
V_s	Shear Wave Velocity
D_R	Relative Density
$F^{/}$	Average FormationFactor
γ_d	Dry Dencity

γ_b Bulk Dencity

a_{max} Maximum peak ground acceleration

σ_0 Total Vertical Stress.

σ'_0 Effective Vertical Stress

S_{wc} Connate Water Saturation

S_{or} Residual Oil Saturation

S_{int} Water Saturation at The Intersection Point Of The Two Curves

K_{or} @ S_{wc} End Point Oil Relative Permeability at Connate Water Condition

K_{rw} @ S_{or} End Point Water Relative Permeability at Residual Oil

K_{int} The Relative Permeabilty at Intersection Of The Two Curves