

بسم الله الرحمن الرحيم





شبكة المعلومات الجامعية التوثيق الالكتروني والميكرو فيلم



جامعة عين شمس

التوثيق الإلكتروني والميكروفيلم

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لم ترد بالأصل





Cairo University

SEISMIC EFFECTS ON DEEP TUNNELS INCLUDING SOIL INTERFACE FRICTION

By

Amr Ibrahim Abdelaziz Mohamed

A Thesis Submitted to the
Faculty of Engineering at Cairo University
in Partial Fulfillment of the
Requirements for the Degree of
DOCTOR OF PHILOSOPHY
in
STRUCTURAL ENGINEERING

FACULTY OF ENGINEERING, CAIRO UNIVERSITY
GIZA, EGYPT
2021

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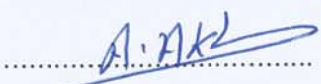
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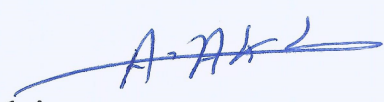
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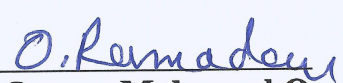
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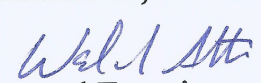
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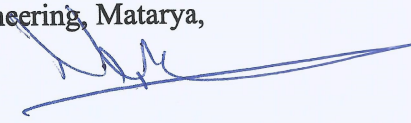
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Key Words:

Circular Tunnels; Slippage Condition; S-waves; P-waves; Soil-tunnel interface

Summary:

This study develops analytical solutions for calculating the seismic tunnel forces under vertically propagating transverse seismic P-wave and S-waves. Slippage at the interface is implemented in the proposed solutions. ABAQUS software has been utilized in the validation process. Comparisons showed that the results of the proposed solutions in terms of liner thrust forces and bending moments are reasonably close to the numerical predictions of ABAQUS. Then, the effect of ground stratification on the seismic forces is investigated considering linear and nonlinear soil properties. Considerable magnifications of seismic forces in tunnels due to soil stratification are observed.

Disclaimer

I hereby declare that this thesis is my own original work and that no part of it has been submitted for a degree qualification at any other university or institute.

I further declare that I have appropriately acknowledged all sources used and have cited them in the references section.

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Date: / / 2021

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Dedication

To My Parents, Sisters and Brother,
For their support and their faith.

To My Wife,
For her encouragement and her patience.

To My Daughter Habiba

To My Sons Hamza & Malik

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