NUMERICAL MODELING OF EFFECT OF UNDERGROUND CAVITIES ON FOUNDATIONS

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MASTER OF ENGINEERING IN FOUNDATION ENGINEERING AND EARTH RETAINING SYSTEMS

DEPARTMENT OF CIVIL ENGINEERING

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SRI LANKA

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This thesis was submitted to Department of Civil Engineering University of Moratuwa in partial fulfillment of the requirements for the degree of Master of Engineering in Foundation Engineering and Earth Retaining Systems

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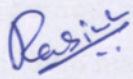
DECLARATION

I Haluweerage Rasike Maduranga do honestly and truly declare that the work included in this thesis in part or whole has not been submitted for any other academic qualification at any institution.



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ABSTRACT

NUMERICAL MODELING OF EFFECT OF UNDERGROUND CAVITIES ON FOUNDATIONS

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Simulation of the behavior of foundations over underground cavities and identification of factors affecting the design of the foundations over such cavities are valuable to foundation design engineers.

Matale area in the central province of Sri Lanka provided the background for this work, where many foundations on problematic sub-surface condition are giving rise to distress in building. The various factors and parameters used in this work are based on actual data obtain previously by studies conducted in the Matale area by NBRO. The main objective of this work is to use numerical modeling to investigate the effect of underground cavities on footing foundations.

The numerical study carried out here conform the generally excepted behavior of a footing placed on ground with a cavity. A parametric study carried out using finite element analysis, yielded more specific quantitative data on the interaction between a footing foundation, and ground with cavities. Particular emphasize was placed on such parameters as the vertical displacement, stress distribution and the extent of the influence zone.

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