



Ain Shams University
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Structural Engineering Department



***Analysis of Interaction of
In-Situ Walls with Ground***

By

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A Thesis

***Submitted in Partial Fulfillment for the Requirements
of the Degree of Master of Science in Civil Engineering***

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the 1990s, the number of people in the UK who are employed in the public sector has increased by 1.5 million, from 2.5 million in 1980 to 4 million in 1998 (Department of Health 1999). The number of people employed in the health service has increased by 1.2 million, from 2.2 million in 1980 to 3.4 million in 1998.

There is a growing emphasis on the need to improve the efficiency of the health service, and to ensure that the health service is able to meet the needs of the population in a cost-effective manner. This has led to a number of initiatives, including the introduction of the Health Service Act 1990, the Health Service Act 1997, and the Health Service Act 1999. These initiatives have led to a number of changes in the way the health service is organised and managed, and to a number of changes in the way the health service is funded.

The Health Service Act 1990 introduced a number of changes to the way the health service is organised and managed. It introduced the concept of the health service as a single entity, and it introduced the concept of the health service as a single entity. It also introduced the concept of the health service as a single entity. It also introduced the concept of the health service as a single entity.

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STATEMENT

This dissertation is submitted to Ain Shams University for the degree of M. Sc. in Civil Engineering.

The work included in the thesis was carried out by the author in the department of Structural Engineering, Ain Shams University, from April, 1996 to July 1997.

No part of this thesis has been submitted for a degree or a qualification at any other university or institution.

Date : / / 1997

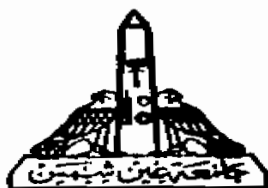
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Abstract

Braced excavation construction is an important and commonly encountered geotechnical problem in urban development. It is usually analyzed using conventional design methods or linear elastic finite element analysis without sufficient consideration of the modeling of the construction operations and soil-structure interaction effects.

This research proposes a software computer program for designing the braced excavations to be constructed in soils. The program uses recent design practices to achieve improved speed as well as reliability of calculations.

The program is coded with a high degree of user friendliness through an easily followed format and explicit data prompts. Primary emphasis in developing the software is placed on assessment of the effect of complex as well as nonuniform soil conditions in order to achieve the safest and most economical design of braced excavations. Finite elements were used in the program, and the nonlinear stress-strain behaviour of the soil was utilized. Spring type (lateral subgrade reaction) interface elements were adopted to model the soil-diaphragm wall contact surface.

This thesis presents a comparative study between result of the nonlinear finite element analysis and the field measurements which had been compiled during construction of one of the subway stations of the Greater Cairo Underground Metro, line 2.

An extensive parametric study was also carried out to evaluate the sensitivity of the utilized numerical model and the effect of the different factors concerning the soil-wall interaction on the behaviour of the diaphragm wall.

Key words: Braced excavation, computer program, comparative study, diaphragm wall, lateral subgrade reaction, spring, nonlinear analysis, Finite element.

the 1990s, the number of people in the UK who are employed in the public sector has increased by 1.5 million, from 2.5 million in 1980 to 4 million in 1995 (Department of Health 1996).

There is a growing emphasis on the need to improve the efficiency of the public sector, and to ensure that the public sector is able to deliver the services that are required by the public. This has led to a number of initiatives, including the introduction of competition, the restructuring of public services, and the introduction of new management practices. These initiatives have led to a number of changes in the way that public services are delivered, and have led to a number of improvements in the efficiency of the public sector.

One of the main reasons for the need to improve the efficiency of the public sector is the increasing demand for public services. The population of the UK is growing, and the demand for public services is increasing. This has led to a number of challenges for the public sector, including the need to find ways to deliver services more efficiently, and the need to find ways to raise the revenue that is required to fund public services.

One of the main ways in which the public sector has been able to improve its efficiency is by introducing competition. This has led to a number of changes in the way that public services are delivered, and has led to a number of improvements in the efficiency of the public sector. For example, the introduction of competition has led to a number of improvements in the quality of public services, and has led to a number of improvements in the efficiency of the public sector.

Another way in which the public sector has been able to improve its efficiency is by restructuring public services. This has led to a number of changes in the way that public services are delivered, and has led to a number of improvements in the efficiency of the public sector. For example, the restructuring of public services has led to a number of improvements in the quality of public services, and has led to a number of improvements in the efficiency of the public sector.

Finally, the public sector has been able to improve its efficiency by introducing new management practices. This has led to a number of changes in the way that public services are delivered, and has led to a number of improvements in the efficiency of the public sector. For example, the introduction of new management practices has led to a number of improvements in the quality of public services, and has led to a number of improvements in the efficiency of the public sector.

These initiatives have led to a number of improvements in the efficiency of the public sector, and have led to a number of improvements in the quality of public services. However, there is still a need to continue to improve the efficiency of the public sector, and to ensure that the public sector is able to deliver the services that are required by the public.

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