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DESIGN OF FOUNDATION FOR DIFFERENT TYPES OF SOILS USING BEAM ON ELASTIC FOUNDATION METHOD

A THESIS SUBMITTED TO THE DEPARTMENT OF CIVIL ENGINEERING IN PARTIAL FULFILLMENT OF THE REQUIREMENT FOR THE DEGREE OF

Master of Engineering in

Structural Engineering Design

by

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Abstract

A building is generally composed of a superstructure above the ground and a substructure which forms the foundation below ground level. The foundations transfer and spread the loads from a structure's columns and walls in to the ground; therefore, investigation of behaviour in foundation structure for any type of structure is extremely important.

One of the main purposes of any foundation structure would be to withstand all loads of the structure in a safe manner without causing any damage to the structure. The choice of the appropriate type of foundation is governed by some important factors such as

1. The nature of the structure
II The loads transferred by the structure
III The subsoil characteristics
IV Cost allocation for foundations

Therefore, to decide on the type of foundation, subsoil exploration must be carried out, and then the soil characteristics within the affected zone below the proposed building should be carefully evaluated. The allowable bearing capacity of the affected soil strata should then be estimated.

Different types of foundations are used to suit the type of soil, their characteristics and the bearing capacity. Also the type of foundation depends on the spacing of columns as this has a bearing on the excavation also. Accordingly isolated foundation, strip foundation, pad foundation, mat foundation and many other types are used. When considering the routine foundation design, it is assumed that the foundation is rigid in comparison to the soil, furthermore, soil pressure distribution underneath the foundation is considered as linear; therefore, it is important to

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investigate the soil pressure distribution underneath the strip foundation considering both soil behavior of rigid and linear elastic analysis by varying the spans of the strip foundation.

The research was conducted to investigate above facts using the 3D structural models which included buildings consisting columns to columns spacing of 3 m, 4 m, 5 m and 8 m. These buildings were modelled & analysed for rigid case as well as elastic case of soil pressure behaviour. In elastic analysis springs were fixed to simulate soil behaviour and in rigid case uniformly distributed load is applied as soil pressure for analysis, Structural design software of SAP 2000 [6] was used for computer analysis

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