REVIEW OF DESIGN METHODS OF PILE FOUNDATIONS AND HOW TO ADOPT THEM FOR SOIL CONDITIONS IN SRI LANKA

A Thesis submitted for the partial fulfilment of the Degree of Master of Engineering in Structural Engineering Design

Submitted by
A.H.D NIROSHANA

Supervised by
Prof M.T.R JAYASINGHE
Department of Civil Engineering
University of Moratuwa

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Abstract

In the recent past the demand for construction of tall buildings in Sri Lanka has remarkably increased. For those tall buildings most common foundation type used is pile foundations. In Sri Lanka among those pile foundations, most of the pile foundation type used is bored piles. When ultimate carrying capacities of bored piles are estimated, the skin friction capacity is neglected in most of the times due to following reasons.

1. Use of bentonite slurry in drilling for the bored piles, which may affect the skin resistance of the bored piles.
2. Shallow bed rock encountered in most of the places in Sri Lanka.

But neglecting the skin friction becomes very costly in designing of the pile and if the bedrock is deep the pile becomes unnecessary longer. Therefore it is very important to determine the skin friction capacity component of piles in design stage. In this study different piling sites in Sri Lanka are selected and study the development of skin friction capacities of those piles. In addition the mobilized skin frictions capacities determined by PDA test are compared with those values obtained from different empirical and analytical methods proposed by many researches and organizations for bored piles.

Initially the borehole data relevant to each and every site is analysed and used those borehole data for analysis purpose of the skin friction capacity estimation. The SPT values which are taken from the soil investigation report are used to find different parameters defined by various researches and organizations. To find the parameters, field investigated SPT values are corrected using the energy method suggested by Bowels. Using those parameters obtained from corrected SPT values and borehole data estimate the skin friction capacities for piles using different methods. In addition the mobilized skin friction capacities obtained from PDA results are used to compare

the estimated capacities suggested by different methods to investigate the accuracy of different methods.

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