CHAPTER V.

CONCLUSIONS AND RECOMMENDATIONS

Herein have been developed a method of analysis for predicting the capacity of axially loaded piles under horizontal soil movements using structural and geotechnical engineering techniques. This method is based on an incremental finite element formulation for nonlinear elastic static analysis and computer program has been developed accordingly which has the following special features:

i. Nonlinear elastic static analysis of the structures subjected to a number of external causes.

ii. An external cause of specified displacements on the boundaries in the model.

iii. The options for changing in boundary conditions and material properties during the analysis.

iv. The option for limiting shear stress in the element.

v. Computation of pile curvatures.

In obtaining a suitable idealized finite element model for practical problems, the parametric studies of pile behaviour under horizontal soil movements have been made and their advantages and limitations have been discussed. These studies have revealed that the most significant factors affecting the magnitude of movement and curvature developed in the pile are the pile modulus and the

distribution of horizontal soil movement.

In the application of the proposed method to practical problem, some comments on the significant factors have been made and the actual case of a sway pile has been illustrated. In such case, it is obvious that failure of the pile is govern by the sway of the pile prior to the application of the design axial load on the pile head. Therefore, it is recommended that for a site where the soil movements are likely to occur, it is an advantage to use a more flexible pile.

Comparison among the measured pile movements, those predicted by the proposed method and by Poulos method (16) has been made and found to be in good agreement. It has been confirmed by such comparison that the proposed method leads to better accuracy. It can also be concluded that the nonlinear finite element procedure is the best technique presently available for analyzing the nonlinear pile-soil interaction.

Although the proposed method has been developed for a single pile analysis, it is also applicable to the case of a group of piles. The consideration of a single pile will be conservative and give an upper bound to the displacements and moments in any pile within a group, since group action will tend to cause a greater suppression of soil movements than a single pile (16).

Since there is no reported measurement of the pile behaviour representing this problem definitely, it is necessary, if possible, to further conduct such measurements in which sufficient data are

available to enable comparisons to be made between observed and predicted behaviour.