GEOTECHNICAL FINITE ELEMENT ANALYSIS OF DIAPHRAGM WALL CONSTRUCTION

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JANUARY 2011

ACKNOWLEDGEMENT

In the name of Allah, the compassionate, the merciful and all praises are due to Allah. We would to express our deeply sincere gratitude and thank to Allah, the Generous, for giving us opportunity, strength and courage to complete this research in one year time. We would like also to express our deepest gratitude and credit to our Head of Faculty of Civil Engineering, UiTM Pulau Pinang, Pn. Janidah Eman for giving idea to us in completing this research. Not to mention, our Head of EC110, 111, and 112 programs, En. Abdul Manaff Ismail for his guidance in helping us finishing our research. We also would like to thanks Research Management Institute (RMI), Universiti Teknologi MARA for the commitment given in helping us in every aspect of this research work. Last but not least, we would like to thank all our colleague and family that involves directly or indirectly in making this report a success.

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ABSTRACT

Diaphragm wall are preferred types of wall for construction of Mass Rapid Transit (MRT) viaduct columns, underground train station and tunnels Conventional construction of diaphragm wall is based on analytical analysis. Analytical analysis leads to unpredictable phenomenon, due to limitation of the analytical analysis. Method by Janbu (1956) and Boussinesq (1885) calculate stress and stiffness separately which the stress in soil body cannot be predicted simultaneously with deformations, and vice versa. It is very important to predict deformation of soil body together with correct applied stresses. In this study, determination of the effect of the ground movement by using finite element analysis can predict the movement of the ground surface during the real construction works. The relevant of using finite element in this research is due to the size and the location of the diaphragm wall which make it impossible to conduct laboratory experiments.

This report shown different soil properties do have influence to the horizontal displacement. Kaolin clay recorded the highest soil movements compared to Hostun sand. Apart from that, diaphragm wall construction stages will cause the maximum deflection occurred after concreting process is completed rather than after trenching process is completed. Simulation with drained and undrained analysis has a big impact on horizontal soil movement. The highest horizontal displacement occurred after concreting process is completed is compared to after trenching process is completed.