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ABSTRACT

FIELD MONITORING OF DIAPHRAGM WALL CONSTRUCTION IN MACAU

by

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Field monitoring was conducted during the construction of the New Terminal Underground Car Park at Taipa, Macau. The site, locating close to the Macau International Airport, consists of fill, marine deposits and alluvium overlying decomposed bedrock. Piles and columns of an adjacent building were built prior to the basement excavation and therefore only minor movement caused by the construction is tolerable. Diaphragm wall which is also used as a permanent load-carrying structure was chosen as the retaining system. The performance of the diaphragm wall was monitored by inclinometers, piezometers, standpipes and settlement markers that were placed around the site; tilt plates located on the existing columns as well as strain gages mounted on the internal supporting struts. The purpose of the study is to better understand the behavior of the slurry wall system constructed in the Macau soft marine clays through field observations. Ground responses during diaphragm wall panel installation and main excavation are of particularly interested. Moreover, the relationship between the magnitude of deformation and settlement is studied and compared to available case histories in other major cities.

Based on the measurements, the maximum lateral deformation and settlement were 45 mm and 14 mm respectively during the panel installation stage; and 63 mm and 32

mm respectively in main excavation. Piezometers and standpipes showed an increase in water pressure during concreting. Water pressure subsequently dropped during main excavation and returned to hydrostatic level. Strain gauge data revealed that the strut load is less than the design load by about 30% to 40%. The maximum relative rotation was 0.103 degree toward to the trench which corresponds to about 1/600 tilting. No significant movements of the existing columns were recorded. The monitoring records comply with the requirement as stated in the Macau Code, but are not up to the standard of neighbor cities.