

Honda 3s Center @Melawati

The Proposed Design and Build Cantilever Caisson Wall At Honda 3s Center for Weststar Auto, Melawati, Ulu Kelang

(by Ms. Yap Fui It, Senior Design Engineer) (2011 Apr-Jun)

Project Brief:

The site is located on sloping terrain, ranging from approximately RL70.00 to RL55.00 with basement excavation level at RL51.20 and the entrance is fronting the existing highway, MRR2 with road level of about RL54.00. The caisson pile wall was introduced at three sides of the boundary and act as permanent basement wall to facilitate the basement excavation. Due to the steep gradient terrain and sensitivity to the surrounding neighbourhood (close proximity to National Zoo), the original design of contiguous bored pile wall and bored pile building foundation may not be a cost effective and environmental friendly approach as compared to the alternative proposal.



Technical Challenges:

In order to have the cost effective of wall design, semi-top-down construction method was proposed, except a corner of the wall portion with lower retained height is designed as cantilever wall and normal down-top basement construction is allowed. The proposed caisson wall consists of caisson piles spaced at 1.8m interval, and finishing of 150mm thick R.C. skin wall at the exposed surface. A temporary passive earth berm at RL59.40 was formed as a temporary support to the wall during excavation to lowest basement level. Subsequently, the ground floor slab will act as permanent wall support to the caisson wall with the maximum exposed height of 14.6m.

Finite Element method by using PLAXIS software is used to model and analyse the interaction between the soil and the retaining system to study the effects of the excavation to the surrounding ground and adjacent buildings. The predicted wall displacement on the pile top is limited to 75mm against the maximum exposed height of 14.6m. During excavation, weekly monitoring on the

ground settlement and wall displacement is being carried out on the pre-installed settlement markers and inclinometers.

Construction Challenges and Constraints:

- a) Limited working time from 8.00a.m. to 6.00p.m. on weekday and 8.00a.m. to 5.00p.m. on Saturday.
- b) Raining season badly affected the progress of earth excavation and subsequently delayed the piling progress which commence at the lowest platform level.
- c) Continuous dewatering of project site also posed great challenge especially during raining season.
- d) Close coordination with the earthwork excavation is very crucial in order to ensure the sequence of excavation work complies to the design requirement in stage excavation.
- e) A close monitoring on the wall displacement and ground settlement along the retaining wall is being carried out by a team of independent specialists.

Achievement:

- 1. At the moment, the caisson pile wall is completed and supported by the temporary passive earth berm. The foundation caisson piles, plunge-in columns construction and earthwork excavation are still in progress. After 1 month of excavation, the 5 nos. of inclinometers showing the pile top reading are ranging from 2.42mm to 16.56mm, and the settlement markers reading are recorded from 0.68mm to 11.23mm. The wall displacement is still well within the allowable limit of 75mm.
- 2. We can concur that hand-dug caisson is an ideal solution for hill slope development and the work progress can be as fast as by using the boring machines. The proper planning of construction sequence and method are also the key factors to ensure the successful completion of the overall project.