

Arcoris MK20 @Mont Kiara

The Proposed Design and Build Foundation on Soil Nailed Slope

(by Ms Yap Fui It, Asst. Design Engineer) (2013 Jan-Mar)

Project Introduction

The development consists of 2 blocks of tower which are hotel and serviced apartment with 5 levels of basement car park. The project site is sandwiched in between existing high-rise building at Eastern side and luxury villa houses at Northern side. The original ground level was at high slope in Eastern & Northern and low-lying area at the other sides. Instead of having high basement retaining wall at the high slope sides, a cut slope is formed and stabilised with multi layers of permanent soil nail and protected with shotcrete surface.

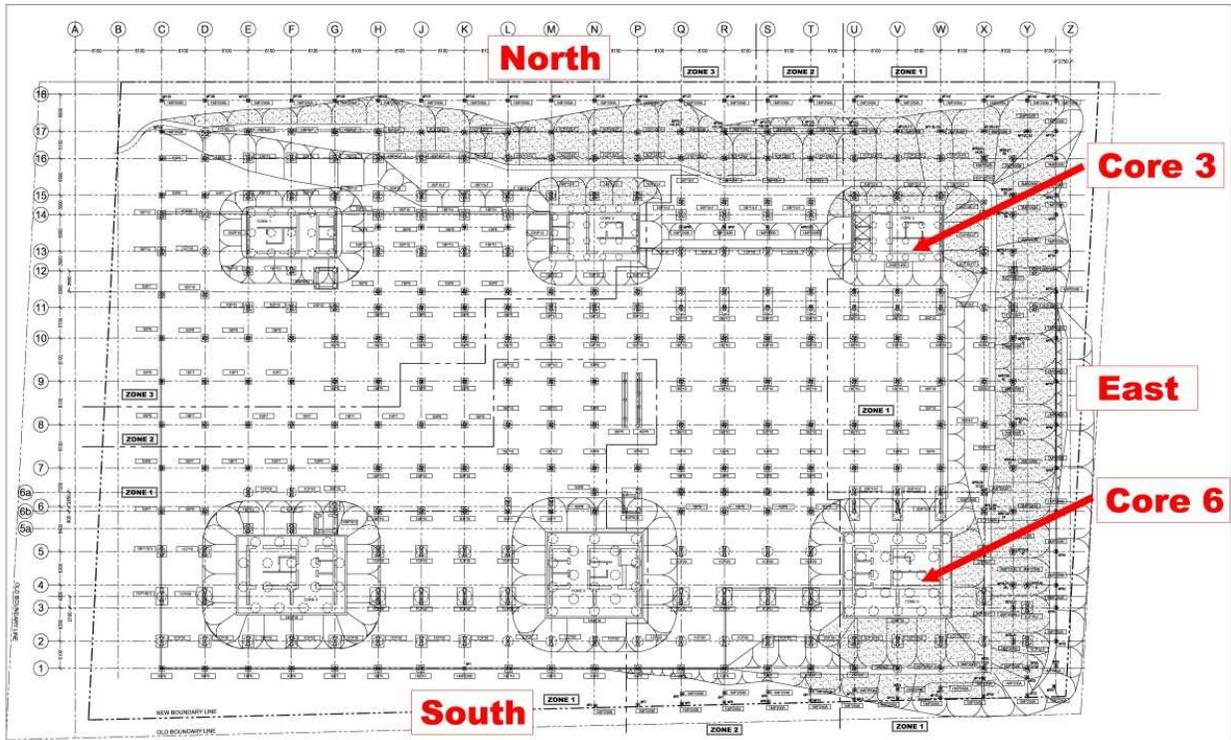


Overall Site View

Alternative Design Proposal

The conforming design of building foundation is formed by micropiles (mainly located on slope), bored pile and spun pile. In order to maximise our resources, we proposed a combination of micropiles (small column loading on slope), caisson piles (on slope and relatively high column loading on flat platform) and bored piles (for boring rig accessible area).

Also, we proposed alternative permanent soil nail slope and temporary soil nail slope cutting in 3 nos. of liftcore areas to facilitate the excavation and construction of liftcore pilecap.



Alternative Piling Layout

Design Challenges



Based on the subsurface investigation (SI) report, the geological profile of the site is granite residual formation with varies of bedrock level and inconsistency of weathering grade of Granite rock over the site. The pile is designed to be founded on rock socket or maximum fixed pile length if no rock was encountered. Due to the deep layer of overburden soil, the soil friction is taken into account for optimisation of rock socket length required.

In view of the high ground water table in proposed soil nail slope area, the best effort has been exercised during the analysis of the overall slope stability, as well as localised slope stability by using SLOPE/W software from GeoStudio 2007.

On the other hand, the design of bored pile and caisson pile which located on slope are required to consider the bending moment induced from the anticipated soil nail slope movement. The soil nail slope design is analysed by using finite element software, PLAXIS, to estimate the slope movement and the bending moment induced to the pile.

Construction Challenges

The overall construction period of 13 months is a very challenging task to achieve, especially with the partial handing over of section 1 in the first 10 months. We are facing a lot of difficulties especially during the caisson excavation and soil nail installation due to high ground water table and unforeseen poor ground condition of clayey soil. This has badly affected the work progress in the slope cutting area where the earthwork excavation needs to be carried out in sequence before reaching to the final platform level. The most challenging part of the work is the construction of 2 nos. of deep lift pits, i.e. Core 3 and Core 6, which are located right at the corner of North-East (just next to the luxury villa houses and high rise building) and South-East (next to high rise building) respectively. This excavation works involved deep excavation coupled with the high-water table seepage from the ground.

Furthermore, our challenges are not only limited to a very strict working time from 8am to 6pm on weekdays and Saturday, but also the abnormally high intensity and frequency of rainfall in the past few months. These factors have badly affected the soil nail slope and pilecap construction progress, as well as overall work progress at site.



Construction Site