Project KLCC: Geology, soils and foundations

TARIQUE AZAM

Laporan (Report)

Ir. Tarique Azam graduated in Civil Engineering from I.I.T. Madras India in 1974 and completed his Masters in Geotechnical Engineering in 1975 from AIT, Bangkok.

He is presently Head of the Geotechnical Department and a Vice President of Ranhill-Bersekutu Sdn. Bhd., which is one of the largest engineering consultancy firms in the country.

Ir. Tarique has been involved in many small and big projects as geotechnical engineer besides KLCC. Some of which are, Tabung Haji building, Bank Negara, LRT 2, Paka Power Station, 2nd bridge between Singapore and Malaysia.

He is the principal geotechnical design engineer for KLCC.

Abstrak (Abstract)

The Petronas's Twin Towers which are currently under construction in the north-west part of the Kuala Lumpur City Centre development when completed will be 450 meters high above road level when completed.

The 400,000 square meter towers are the first phase of 1.7 million square meter complex planned on a 100 acre site at the junction of Jalan Ampang and Jalan P. Ramlee in the heart of Kuala Lumpur which is currently the largest real-estate development project in the world.

The towers will have 88 occupied stories above road level and 5 levels of basement car park.

Each tower has perimeter columns on a 46 m diameter base with an adjacent 21 meter diameter, 45 storey bustle. The towers stand 55 meters apart and are connected by a bridge at the 41st and 42nd floors.

The site is located in a geologically complex contact zone of Kuala Lumpur Limestone and Kenny Hill Formations.

Detailed geotechnical investigation comprising about 400 deep boreholes up to a maximum depth of 200 m and 200 pressuremeter tests and other relevant field and laboratory tests revealed karstic limestone formation at a depth varying from 20 m to more than 200 m below ground level. Limestone is generally overlain by thick Kenny Hill Formation which in turn underlies Alluvium.

Two full scale 30,000 kN instrumented 1,200 mm diameter bored piles were tested and evaluated to determine design parameters.

The detailed analyses of the sub-surface profile and evaluation of various foundation options resulted in a shift of building location by about 60 meters in order to minimize the differential settlement.

Finally a foundation solution comprising a 4.0 m thick raft supported on post-grouted barrette piles varying in depth from 45 m to 105 m was adopted.

The maximum total settlement of the piled raft is estimated to be about 73 mm whereas the maximum differential settlement is of the order of 25 mm.

The speaker presented the complete geological and geotechnical profile of the site, the foundation loads and rationale for selection of design parameters. Detailed analyses of bearing pressure, settlement and heave due to basement excavation and its effect on performance of the foundation were also outlined.

The construction problems in the installation of barrette piles including the treatment of underlying limestone cavities and overlying slump zones was briefly discussed.

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Warta Geologi (Newsletter of the Geological Society of Malaysia), Vol. 22, No. 2, March-April 1996

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