

**6th International Conference on Case Histories in
Geotechnical Engineering
and Symposium in Honor of Professor James K. Mitchell**

**August 11-16, 2008
Mariott Crystal City . Arlington, Virginia**

Conference Theme Number: 5

**HARMONY OF RETAINING SYSTEMS TO VARIOUS LOCAL
SUBSOIL CONDITIONS – A CASE STUDY**

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ABSTRACT

Deep excavations and retaining structures are constructed in the city of Istanbul at different locations of the city due to recent demand for the construction of high-rise structures and shopping malls having various basements. An interesting case study is presented in this paper for the utilization of various retaining systems for different subsoil and groundwater conditions encountered, within a given site. The project is known as “BJK Fulya Complex” consisting of two high rise residential towers, an 18-storey hospital building and a 30-storey office building covering approximately 170 thousand squaremeter floor area including hypermarket, technomarket, cultural center, entertainment facilities and underground parking area. The project is located at a very prestigious district of the city, therefore maximum underground space gain were desired. As a result 16.0 m of excavation is planned to be performed partly under groundwater. In addition the site has a very rugged topography having about 25 m difference in elevation in perpendicular direction to the covered old creek located at the bottom of the valley. Due to unique topography and geology, subsoil and groundwater conditions at various faces of the excavation differs considerably. Furthermore, again due to unique topography, at the hill side in addition to 16.0 m of temporary retaining structure, permanent retaining structure of about 20-25 m high had to be constructed over the temporary wall. Istanbul is located at a very seismically active region and a major earthquake magnitude of $M_w > 7.0$ are expected to occur with a 65 % probability within the next 30 years. Due to complicated geology and the high seismicity of the site, it was compulsory to employ, various retaining structures such as flexible and rigid retaining systems at various locations within the site including permanent and temporary soil nailing, permanent tied-back cast in-

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situ RC wall and tie-back, cast in-situ diaphragm wall consist of soldier cast in-situ piles with jet grout columns in between.

The performances of various systems are closely monitored by means of inclinometers throughout the construction. Displacement data and experience obtained from this case study serves an excellent source of data and example for future applications in similar conditions within the city.