Seminar on Deep Excavation

By Ir. Lee Peir Tien

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The Seminar on Deep Excavation was organised by the Geotechnical Engineering Technical Division on 19th November 2015 at Four Points Hotel, Puchong. The seminar was delivered by the 6 speakers with different background such as consultant, contractor, academic etc. A total of 190 participants attended the seminar.

With the phenomenal increase in population in urban areas, construction works are now often carried out in close proximity to existing buildings and geotechnical structures. As such, many soil-structure interaction problems exist and examples of such problems include the effects of deep basement or tunnel excavation on adjacent infrastructures. In this seminar, the speakers shared their valuable experience from past projects with the participants.

The contents of the seminar can be summarised as follows:

a) Lecture 1 - Basic Understanding on Deep Excavation by Ir Dr Chin Yaw Ming

   Deep excavation is one of the major geotechnical works. In this lecture, the speaker shared with the participants on the fundamental of deep excavation. He also discussed the pros and cons of each types of retaining walls such as sheet pile wall, CBP wall, diaphragm wall and etc. He presented some important criteria that need to be considered in deep excavation design.

b) Lecture 2 - Deep Excavations in Urban Areas of Hong Kong – A Few Cases for Experience Sharing by Ir Dr Chiu Sing Lok

   In view of rapid development and space constraint, deep excavations are very common in urban area of Hong Kong. Generally, the deep excavations are very closed to nearby existing structures such as high rise buildings, existing MRT stations and etc. In this lecture, the speaker shared with the participants on few cases of deep excavation in Hong Kong. He presented the design methodology for a deep excavation near to an existing highrise building. Subsequently, he discussed the instrumentation results such as lateral movement to demonstrate the effectiveness of the retaining system.

c) Lecture 3 - MRT Line 1 – Design and Constructions of Deep Excavation in Limestone Formation by Ir Tan Yean Chin

   The speaker started his lecture with detailed explanations on basic of deep excavation such as basal heave, hydraulic failure, lowering of groundwater level and etc. Subsequently, he shared with his experience in design and construction of a deep

excavation up to 40m in Limestone formation. In view of karstic nature of Limestone formation such as cavities, solution channels, steep limestone bedrock profiles, localised deep bedrocks and etc. The speaker highlighted several key considerations such as fissure grouting, vertical cut of Limestone in his presentation. He also presented on temporary ground anchor Lastly, he shared with the participants on several construction issues such as localised deep bedrocks and cavities.

d) Lecture 4 - Effects of Dewatering of a 7m Deep Abandoned Excavation Site in Kuching City Centre by Ir Dr Dominic Ong

   Constructions of deep excavation always involve dewatering works in order to ensure dry working condition within the excavated pit. If the dewatering works are carried out without necessary precaution measures such as recharge wells and groundwater level monitoring, it may end up with lowering of groundwater level of adjacent area. This will result in settlement of surrounding area and distressed to nearby buildings. In this lecture, the speaker shared his experience on effect of dewatering of a 7m deep excavation in Kuching City. He also presented the instrumentation results.

e) Lecture 5 - Deep Excavation, Diaphragm Wall and Novel Design Techniques by Ir S. Chandrasegaran

   In deep excavation construction works, diaphragm walls are usually utilised as the retaining wall system especially at the area with high groundwater level. The speaker presented the design methodology on diaphragm walls from contractor's point of view and the construction methodology. He also presented 3 cases histories to demonstrate the effectiveness and superiority of diaphragm wall. Subsequently, he further elaborated the issues encountered during construction and the method of solution. Lastly, he shared the instrumentation results of the above mentioned 3 cases histories.

f) Lecture 6 - 2 Typical Watertight Rigid in-situ Structures and its Lateral Supporting System for Deep Excavation Works in Urban Area by Ir Au Yong Yoke Lin

   Lowering of groundwater level always is one of the main concerns in deep excavation construction works especially in urban areas. Lowering of groundwater level will result in distresses to surrounding buildings especially those are founded on shallow foundation such as footings. Therefore, water tight retaining wall systems such as diaphragm walls and secant piled walls are preferred options when encountered sandy and highly permeable subsoil. The speaker presented 2 case histories on the watertight retaining system and shared with the participant on the design methodology and construction control. He also presented on the lateral support systems such as temporary ground anchor, temporary strut such as diagonal, inclined strut and etc.

Before the end of each lecture, the speakers fielded a number of questions from the audience. As a token of appreciation, souvenirs were to each of the speakers. The seminar ended at about 5.30 p.m. with applause from the floor.