



**Talk on “ Ground Consolidation and Waterproofing in Underground Structures ”  
presented by Mr. Paulo Henrique Tsingos**

by Ir. Neo Boon Kheng and Dr Boon Chia Weng



Ir. Neo Boon Kheng is currently a co-opted member in Tunnelling and Underground Space Engineering Technical Division (TUSTD).

Dr Boon Chia Weng is currently a committee member in Tunnelling and Underground Space Engineering Technical Division (TUSTD).

The Evening Talk on Ground Consolidation and Waterproofing in Underground Structures was organised by the Tunnelling and Underground Space Technical Division (TUSTD) on 19 July 2018 at the Tan Sri Prof. Chin Fung Kee Auditorium, Wisma IEM. The talk was delivered by Mr. Paulo Henrique Tsingos from TPH. A total of 21 participants attended the evening talk.

In the beginning of the talk, Paulo shared various common water proofing solutions with the audience, such as adhesive membranes, hydrophilic strips, and injectable grout tubes.

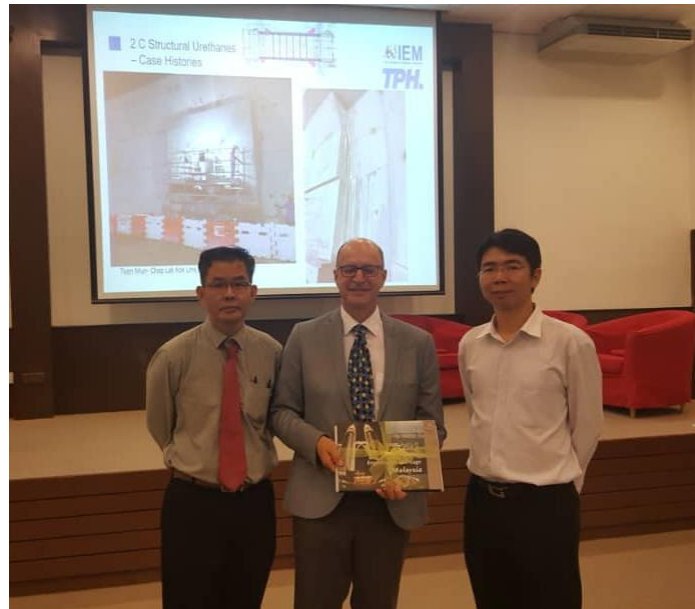
Paulo then discussed the need to adopt other types of grouting materials depending on the permeability of the ground and the width of the structural cracks, where the effectiveness of Ordinary Portland Cement grout is limited.

One of the key highlights of the talk was on the chemical reactions of polymer resin as a grouting agent, namely:

1. Poly-addition, with male-female components reacting together
2. Poly condensation, where the polymer meets water and expands
3. Polymerisation, which involves chain reactions, such as methacrylate gels requiring a starter and catalyst

Different applications and types of urethanes were discussed, such as single component closed-cell urethanes, dual component urethanes, and structural urethanes.

At the end of the talk, Paulo was presented with a token of appreciation



Mr. Paulo Henrique Tsingos together with TUSTD Chairman, Ir. Khoo (right) and the Organising Chairman, Ir. Neo (left).