



The Institution of Engineers, Malaysia

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Talk on "Advancement in Tunnel Lining Monitoring using Fibre-Optic Distributed Sensing"

Organised by: Tunnelling & Underground Space Technical Division, IEM

BEM Approved CPD/PDP Hours: 2 Ref. No. : IEM16/HQ/172/T

Date: 25 May 2016 (Wednesday)

Time: 5.30pm– 7.30pm (Refreshment will be served at 5.00pm)

Venue: C&S and TUS Lecture Room, 2nd Floor, Wisma IEM

Speaker: **Ir. Assoc. Prof. Dr. Hisham Mohamad**

SYNOPSIS

A crucial part of any underground construction work is monitoring, either to provide important information about ground deformation or the behaviour of tunnel support during construction or in service. Various instrumentation scheme has been adopted inside the tunnel such as Automated Total Stations, Accelerometers, crackmeters, tilt beams and strain gauges, where the system is limited to discrete or localised sensing. A large number of instruments have been developed in recent years incorporating Fibre Optics technology. This talk presents a novel approach of monitoring tunnel lining deformation and crack detection in a distributed manner, where a single optical fibre cable can potentially replace hundreds of point-wise sensors and able to detect tunnel movements of kilometres long in a cost effective manner. The technology is called Brillouin Optical Time-Domain Reflectometry (BOTDR) or Brillouin Optical Time-Domain Analysis (BOTDA). Examples of recent implementations of BOTDR/A fibre optic tunnel lining monitoring in UK, Japan and Singapore are described in this talk.

BIODATA OF SPEAKER



Ir. Dr. Hisham Mohamad is an Associate Professor at Civil & Environmental Engineering Department, Universiti Teknologi PETRONAS (UTP). Hisham obtained his bachelor degree in Civil Engineering from Universiti Teknologi Malaysia in 2002, Masters degree in Soil Mechanics and Environmental Geotechnics at Imperial College, London in 2004 and Doctoral degree in Geotechnical Engineering at University of Cambridge, in 2008.

Hisham specializes in the area of Geotechnical Engineering and an expert in fibre-optic distributed sensing for smart infrastructure. Examples of construction monitoring projects using innovative fibre-optic sensing include monitoring tunnel deformation at London's Channel Tunnel Rail Link (CTRL) and Singapore's Mass Rapid Transport (MRT) Circle Line. In 2013, Hisham joined Geotechnics Division, Ministry of Mobility and Public Works in Belgium and was involved in monitoring ground excavation and construction project of the world's largest shipping lock in Antwerp. He served as the Technical Committee Member of ASTM F36 OFSS Global Task Group, a corporate member for IEM and Malaysian Geotechnical Society, and a registered Professional Engineer (BEM).

Ir. Andrew Yeow

Chairman

Tunnelling & Underground Space Technical Division, IEM

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- All contributions will be deeply appreciated by IEM.
- Student Members are however exempted.

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