



JEWEL IN THE EYES OF ENGINEERS

Located at the strategic doorstep of one of the world's busiest air hubs, Jewel Changi has its iconic lush indoor garden with the world tallest indoor Rain Vortex surrounded by 2,500 trees and 100,000 shrubs. Such engineering marvel not only further exemplified Singapore's position as a garden city, but also demonstrated and showcased our engineering capabilities to the world – from design of the iconic roof dome to erection of massive structural and M&E elements, all made possible by our fellow professional engineers' innovative solutions.

This Seminar is specially prepared for developers, contractors, consultants and engineers to learn from and exchange with our invited speakers from the academic and industry to present on their experiences and relevant topics on the design and construction of Jewel Changi. On top of that, critical safety related topics on foundation design, cabling in tunnel and good practice to mitigate risks from past project experience will also be covered by respective experts.

Keynote Speaker: Mr. Ashith Alva,
Deputy Chief Development Officer



Engaging the Workforce Using Digital and Social Media
By: Ms. Jasmine Nah, Aurcon Group

Date: 24 October 2019, Thursday

Time: 9am to 5.30pm

Venue: Novotel Clarke Quay

Fees: \$160.50 (IES Members)
\$192.60 (CIJC Members)
\$214 (Non Members)

Group of 5 participants: \$749
(Rates above include 7%GST, 2 Tea-Breaks and 1 Lunch)

CPD: STU (Structural) / PDUs (All TBC)



Jewel Changi Airport in Singapore Opens to the World
By: Er. Ong Thiam Guan, Mott Macdonald



Design and Construction of Jewel Changi – a Large Span Diagrid Structure with Oculus (Part 1)
By: Prof. J Y Richard Liew, NUS



Design and Construction of Jewel Changi – a Large Span Diagrid Structure with Oculus (Part 2)
By: Mr. Gunasekaran



Laying of Cables in NSCT
By: Mr. John Brookes, Mott Macdonald



Funan Redevelopment – Singapore's Creative Intersection
By: Mr. Roy Chia



Design of Earth Retaining Structure and Foundation System
By: Dr. Ooi Poh Hai

[Click Here For More Information](#)

Organised by: Civil & Structural Engineering Technical Committee, Special Task Division

SPEAKER SYNOPSIS AND PROFILE

BACKGROUND OF JEWEL PROJECT

The speaker will share the background of the Project, as well as the factors that went into planning a complex project as Jewel.

The talk will cover the key features of the project and share the steps that went into planning and implementing the project. He will also share the key challenges the team faced and how these were addressed.

Mr. Ashith Alva has over 23 years in the industry, of which 18 years are with the Capitaland group. He has worked on various projects, from AEI works to greenfield developments. These include hospitality, retail, commercial, and mixed use.

He was seconded to the JV Company Formed between Capitaland and Changi Airport Group, and has been involved in Jewel as the Head of the Project Team, since the commencement of the project, in mid 2013.

ENGAGING THE WORKFORCE USING DIGITAL AND SOCIAL MEDIA



Engagement is the key to improving health and safety. By demonstrating and communicating positive safety behaviours, you can develop modern methods that will enhance safety practices through the extending reach of personal connection and enhancing innovating thinking.

Ms Jasmine Nah, Health & Safety Manager of Aurecon Singapore has over 12 years’ experience, responsible for quality and environmental management system (QEMS), and occupational health and safety (OHS) management. She is practical and has good analytical skill which resulted in successful partnership with key stakeholders.

Jasmine oversees the implementation of Aurecon health, safety and wellbeing strategy in Asia, taking into consideration compliance to prevailing legislation, standards, and corporate requirements. She has substantial background and indepth knowledge of processes and requirements on ISO standards.

She is currently located in Singapore and manages Aurecon health, safety and wellbeing programmes for Asia offices.

SPEAKER SYNOPSIS AND PROFILE

Jewel Changi Airport In Singapore Opens to the World

Jewel Changi Airport (Jewel), a multi-dimensional tourist destination in Singapore has opened to the world. Mott MacDonald provided building engineering services for the project.

Jewel features a distinctive dome-shaped façade made of glass and steel, representing the juxtaposition of a park and marketplace. This is exemplified in the lush Forest Valley and majestic rain vortex that take centre stage in the complex, surrounded by over 280 retail stores and eateries.

This seminar gives an insight to the climate control for the horizon garden on level five, below the dome glass roof and key challenges faced from an engineer’s perspective.

Er Ong Thiam Guan is the technical director of Mott MacDonald Singapore Pte Ltd, a global management, engineering and development company. He is a practising Mechanical Professional Engineer for 18 years and also a Registered Inspector with SCDF since 2014. Er Ong has 24 years of experiences in areas of mechanical building services design and has oversees execution of major projects including The Star Vista comprising of 5000-seat auditorium and recently completed JEWEL Changi Airport.

Technically strong with an analytical mind, Er. Ong shares insights for displacement and stratified cooling systems with indoor humidity control under Singapore climate and key challenges faced in the design and construction of JEWEL Changi Airport.

DESIGN AND CONSTRUCTION OF JEWEL CHANGI – A LARGE SPAN DIAGRID STRUCTURE WITH OCULUS



The distinctive feature of the development is the large-span diagrid roof that merges seamlessly into the façade of the building. The steel diagrid roof is approximately 200m in the East-West axis and 145m in the North-South axis with an approximate area of 25,000m2. Near the centre of the roof is the 11.5m wide oculus which features the world’s tallest indoor waterfall.

The roof was constructed using more than 4,300 solid steel milled nodes and almost 13,000 steel beams, each a unique component. We will briefly present the structural features of the roof, construction methodology and challenges encountered during the erection of the roof.

Mr. Guna is currently holding the position of Project Director in Woh Hup (Private) Limited. He is fully responsible for the construction planning and execution of his project.

Started his career as a Site Engineer, Guna has since accumulated 38 years of construction experience in the industry and comes with decorated history in handling various type of projects in private residential, commercial and institutional. He has also continuously challenged and proven his ability in managing large scale and complex projects such as Gardens by the Bay and Jewel Changi Airport.

Some key highlights of the professional affiliations that he has attained includes: BCA certified CONQUAS/QM Manager, BCA certified Green Mark Manager and BCA Certified Construction Productivity Professional.

SPEAKER SYNOPSIS AND PROFILE

LAYING OF CABLES IN NORTH-SOUTH CABLE TUNNEL (NCST)



The North-South Cable Tunnel Project is an 18.5km, 6.6m diameter bored tunnel constructed using 6 Slurry TBM's, including the construction of 7 shafts from 30m to 60m deep with Equipment and Ventilation Building constructed above. Built for SP Group to enable routing of EHV transmissions cables up to 400kV, from Gambas Ave in the north to May Road in the south and was split into three contracts, namely NS1, NS2 & NS3.

Mott MacDonald undertook the role of Superintending Officer providing QPS Site Supervision & Project Management services for all three main contractor's, Samsung, SKEC & Hyundai.

This paper addresses the innovative approach that was used to lay the large quantity of big LV 'branched cables' within confined tunnels environment, overcoming the risks of manual handling of heavy cables, drums and the traditional use of winches and rollers. This innovative approach also negates the need for a large manpower spread along a cable length with communication problems, possible damage to the cable and existing equipment and services so improving the safety and efficiency of this cable pulling operation.

Graduated with Master of Engineering Management, Mr. John Brookes is a project manager with Mott Macdonald Singapore. He is skilled in the development and management of project, management of the co-ordination for E&M, architectural and civil/structural design and implementation.

His selected projects include Jubilee Line Extension Project, North East Line Contract C710, LTA Circle Line Stage 1, Contract C925, LTA Circle Line Stag 4, Contract C855, Downtown line 3 Project C926, Tampines West Station and C927 Bedok Reservoir and associated tunnels and North South Transmission Cable Tunnel, Singapore Power.

FUNAN REDEVELOPMENT – SINGAPORE'S CREATIVE INTERSECTION



Formerly known as [Funan DigitaLife Mall](#), Funan The IT Mall and once, Funan Centre and now as **Funan**: It is an 887,000 sq ft integrated development comprising a retail component, two office blocks and lyf Funan Singapore, a co-living serviced residence under The Ascott Limited. From groundbreaking, Funan construction took about 19 months for structural completion and 30 months for mall opening.

This presentation will include construction strategies – Top Down construction methodology, hybrid construction by using precast reinforced concrete columns with steel structures for superstructure. It also provides an overview on the key changes faced during construction – underground obstructions, sensitive neighbourhood and tight construction access. In addition to the challenges, greater emphasis is placed on key factors of success by appropriate choice of construction method in early stage, good selection of construction material and avoided cumbersome temporary staging works. Finally will brief the audients on the enhanced productivity by using adopting Building Information Modelling (BIM) and Visual Design and Construction (VDC) for Façade Works, Tree of Life and Underground Pedestrian Linkway.

Mr. Roy Chia graduated with Bachelor Degree of Civil Engineering in National University of Singapore. Started career as site engineer in Woh Hup (Private) Limited, he is currently holding the position of Deputy Project Director. He is responsible for all the phases of the project, including working with contract department at tender stage, designing and implementing project plans to ensure timely project delivery within budget

Roy Chia has more than 15 years of experience of strong foundation in project planning and construction management. His past projects include The Shaughnessy, Jurong Point Extension 2 (The Centris), The Interlace, Three 11, 1919 residence, Cairnhill Nine Ascott Orchard, Cocopalms, Funan Mall, Royalgreen and Piermont Grand etc.

The projects that he was in charged mostly won the BCA Construction Excellent Award, BCA Green Mark Award, BCA Quality Mark(QM) for good workmanship and MOM Safety and Health Award .

SPEAKER SYNOPSIS AND PROFILE

JEWEL CHANGI AIRPORT – DESIGN OF EARTH RETAINING STRUCTURE AND FOUNDATION SYSTEM

This presentation will provide an overview on the design of earth retaining structural system and foundation system for the Jewel at Changi Airport development. The earth retaining structural system for the construction of deep basement and complex ramps networks is challenging due to the close proximity of the excavation to critical existing structures such as the control tower and monorail viaducts. Some viaducts were underpinned. An innovative foundation system with permanent drainage blanket was implemented to minimize the needs of permanent tension piles. The presentation will cover the design analysis, impact assessment and instrumentation as well.

Dr. Ooi Poh Hai graduated from University of Technology Malaysia (UTM) in 2001 with 1st Class Honours bachelor’s degree in civil engineering. He has then pursued his post graduate studies in National University of Singapore (NUS) and graduated in 2007 with doctorate degree specialised in Geotechnical Engineering. In year 2014, Dr Ooi has obtained practising certificate as Professional Engineer (Civil) and Specialist Professional Engineer (Geotechnical) in Singapore.

After his graduation from NUS, Dr Ooi has worked in consultancy sector until to date. He has more than 10 years of practising experience ranging from project management, planning, analytical, design and problem-solving skills in the field of foundations, deep excavations, tunnelling in Singapore as well as overseas.

He is experienced in deep excavations especially strutless excavation system using soil nailing and ground anchor. He has designed and supervised various soil nailing excavation in Singapore. Besides, he has vast experiences in the design of deep excavation works within Railway Protection Zone that required extensive analyses and evaluation of damage assessment.

He is also experience in foundation especially in design and supervision experiences in various types of foundation system, ranging from shallow raft / footing foundations to bored pile foundation, driven piles and jacked-in spun / RC piles. He has interest with the application of bi-directional and rapid load tests.

Dr Ooi has been actively involving in technical committee and technical working group with local authorities and professional body such as BCA and IES in developing various design guidelines for local practise. Since 2016, Dr Ooi is a committee member for Geotechnical Society of Singapore.