



# From Now-enabling to Future-proofing Design of Railway Stations

This programme is jointly designed and presented by MTR Academy and Arup University to share knowledge and expertise with the wider community.



## Language

English

## Mode of Delivery

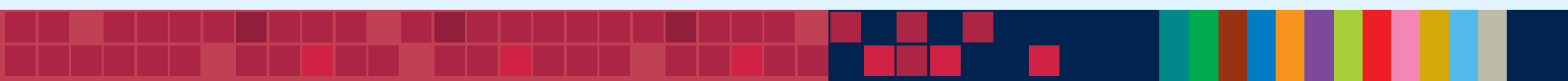
Online. Take advantage of this flexible and convenient way of learning. A live audience in Hong Kong will attend in-person the first six classes.

## Who Should Attend

- ▶ Executives, project managers and young consulting/ E&M/ civil engineers with some project experience.
- ▶ Town planners, architects and transportation planners



Join our experts for an inside look at station design principles and practices specific to mega infrastructure projects.



# From Now-enabling to Future-proofing Design of Railway Stations



A centre of excellence for MTR Corporation's world-class railway operations, MTR Academy also serves as a global training and research hub for the railway industry and related professions to share best practice and create success



Arup University is the powerhouse that keeps Arup – the mastermind behind some of the world's most impactful landmarks – at the forefront of innovation. Arup University turns research into innovations, cultivates talent, fosters best practice sharing, and builds a comprehensive strategic foresight.

## Overview

The topical syllabus starts with a bundle of key railway station facilities design concepts, strategies and applications. Through different topics, the programme participant can gain insights to the inter-relationship between respective system design in enabling a safe travel experience. The programme ends by offering a vision of the station of the future and the path to realising that vision.

## Objectives

- ▶ Deepen your understanding of fire engineering, Environmental Control System design and applications in contributing a safe-to-travel station & tunnel.
- ▶ Understand basic principles of station design and planning and how high-tech based simulation tools and data can assist designer in modelling efficient and safe station pathways under normal and crowd patronage.
- ▶ Widen design concept and applications knowhow from a micro station to a macro TOD in benefiting a sustainability of a city.
- ▶ Stimulate station design initiatives from classic to future for a relaxed journey experience.

## Schedule



Delivery:  
Live online

No.	Topic Title	Speaker	Date	Time(UTC +8)
1	Application of Fire Engineering in Design of Rail Stations and Tunnels	Ir Dr Young WONG and Ir Anny IP	4 Sep 2021 (Sat)	9am-12nn
2	Design & Application of Station & Tunnel Environmental Control System	Ir Gordon CHOI	11 Sep 2021 (Sat)	9am-12nn
3	Station Planning & Design	Mr Karma BARFUNGPA	18 Sep 2021 (Sat)	9am-12nn
4	Crowd Management using Simulation Analysis	Mr Clement HO	25 Sep 2021 (Sat)	9am-12nn
5	Transit Oriented Development in the context of Sustainable Urbanism	Ir Sam CHOW	9 Oct 2021 (Sat)	9am-12nn
6	Emerging Trends in Smart Cities: Intelligent Mobility System	Ir Carmen Chu	16 Oct 2021 (Sat)	9am-12nn
7	Railway Stations of the Future	Ir CS Chang	19 Oct 2021 (Tue)	9am-12nn

# Description of Each Topic

## Topic 01

### Application of Fire Engineering in Design of Rail Stations and Tunnels

- ▶ Fire Engineering (FE) principles, fire science and technical tools deployed in FE
- ▶ Fire safety issues and challenges for different types of railway station and tunnel design, in particular new design features like large atrium voids
- ▶ Components of fire safety strategy including means of escape and access, fire compartmentation and fire resisting construction, fire services installations and fire safety management
- ▶ Acceptance criteria and quantitative assessment of fire safety performance at design stage



## Topic 02

### Design and Application of Station & Tunnel Environmental Control System

- ▶ Air conditioning principles, loading estimation and specific applications in railway station and tunnel
- ▶ Station smoke control principles, design criteria and system arrangement
- ▶ Station mechanical ventilation principles and system arrangement
- ▶ Recent development in ECS application for railway station
- ▶ Tunnel ventilation design principles, parameters, standards and mode of operation
- ▶ Subway Environmental Simulation and CFD modelling in station and tunnel



## Topic 03

### Station Planning & Design

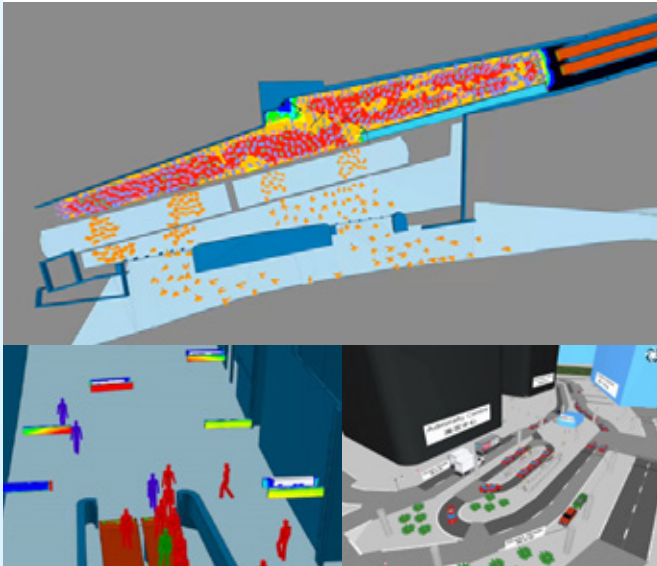
- ▶ Station Planning principles
- ▶ Life safety and operational requirements
- ▶ Design standards and norms in station design
- ▶ Station typologies and international variations. A look at deep, shallow & above grade station design and its characteristics
- ▶ Transport Oriented Development and Stations

# Description of Each Topic

## Topic 04

### Crowd Management using Simulation Analysis

- ▶ Benefits and limitations of crowd simulation and analysis
- ▶ Key crowd simulation modelling elements for station design
- ▶ Crowd control and simulation modelling for Station vs Retail Environment
- ▶ Using crowd simulation model to measure design performance
- ▶ Adopting advanced technology to improve model results, such as big data analysis and video analytics
- ▶ Expanding crowd simulation capability to Virtual Reality (VR) and advertisement space, as well as incorporating human factors to the modelling algorithm



## Topic 05

### Transit Oriented Development in the context of Sustainable Urbanism

- ▶ Background of TOD and types of TOD in various city contexts
- ▶ Applications of TOD in Hong Kong and different cities in Mainland China
- ▶ Ways that TOD could help to achieve the objectives of Sustainability for a city
- ▶ Role of TOD in a city under the trends of evolution from basic mobility needs to smart mobility
- ▶ Integration of TOD with New Transport elements such as Mobility as a Service (MaaS), Connected and Autonomous Vehicles (CAV), Intelligent Mobility and others

## Topic 06

### Emerging Trends in Smart Cities: Intelligent Mobility System

- ▶ Latest Intelligent Mobility (IM) technologies and applications
- ▶ Policies supporting IM deployment in HK
- ▶ HK use cases: automated parking system; connected / autonomous vehicles
- ▶ Other HK use cases on system operation: intelligent traffic signal and free-flow tolling system
- ▶ IM provision in railway station design
- ▶ Mobility as a Service (MaaS) and its potential applications in HK



## Topic 07

### Railway Stations of the Future

- ▶ Functionalities and designs of a railway station
- ▶ Operation of modern railway stations – technologies deployed
- ▶ Advanced technologies for railway stations of the future
- ▶ Station-less railway operation of the future

## Our Speakers



**Ir Dr Young Wong**

Ph.D., BEng,  
FIFireE, MHKIE, CEng, RPE (Fire)

### Application of Fire Engineering in Design of Rail Stations and Tunnels

Young is a Director and East Asia Board member at Arup and served as the firm's East Asia Skill Leader for Fire Engineering.

He has a wide range of experience in fire safety engineering with expert knowledge in structural fire engineering and the application of performance-based fire safety design. Young also actively promotes integrated fire safety design coordinating evacuation, structural fire behaviour, fire/smoke behaviour and firefighting operation on a real-time basis.

Young is experienced in multidisciplinary environments as well as large and complex buildings, such as airport terminals, multi-purpose complexes and railway stations and tunnels. His project experience comprises some of the tallest buildings in the region, including Shenzhen Ping'an International Finance Centre, Shanghai World Financial Centre and Landmark 81 in Vietnam. He has also been involved in a number of local MTRC railway projects such as Shatin Central Link, West Island Line and Kwun Tong Line Extension.



**Ir Anny Ip**

MSc, BEng,  
MIFireE, MHKIE, CEng

Anny is an Associate Director at Arup with over 20 years of experience in fire safety engineering consulting. Leading Arup's Hong Kong fire engineering team, she currently advises clients of different building projects – including retail, residential, offices and transport facilities – on fire safety and prevention.

Her experience covers design fire scenario establishment, fire hazard analysis and assessment, fire resistance analysis, building evacuation design and smoke control strategy.

Anny has been involved in many landmark building and infrastructure projects including Hong Kong International Commerce Centre (ICC), the district-wide fire safety strategy for the West Kowloon Cultural District, MTRC Express Rail Link Hong Kong and Shenzhen sections, Eastern District Advanced Medical Centre of Hong Kong Sanatorium & Hospital and more recently Kai Tak Sports Park.



**Ir Gordon Choi**

MSc, BSc,  
MHKIE, MIMECHE, CEng

### Design & Application of Station & Tunnel Environmental Control System

Gordon has over 11 years' experience in design management and mechanical engineering design of infrastructure and industrial projects across Hong Kong, mainland China and Southeast Asia. He is an Associate at Arup, holding key designer roles for a range of mission critical facilities with high HVAC specifications including underground railway stations, data centres and pharmaceutical facilities.

Gordon has worked for various railway clients across Asia including MTR in Hong Kong, Land Transport Authority in Singapore, Mass Rapid Transit Authority of Thailand and the Department of Transportation in the Philippines. Along the way, he has delivered a wide range of HVAC solutions including modular plants, central cooling plants, district cooling, free cooling and smoke control.

With the ever-going emphasis on improving system resilience, sustainability and IoT for railway stations, his knowledge and experience in designing data centres, laboratories and cleanrooms will synthesise innovative solutions for railway stations of the future.



**Karma Barfungpa**

MSc, BArch, HKIA, ARB, MCA

### Station Planning & Design

Karma is a Director of Arup, leading its East Asia Architectural team. He has more than 25 years of experience in architectural design, with majority of this designing stations in various parts of the world.

He has worked on metro projects from preliminary design through to the construction stage, including addition and alternations of existing stations. He has a holistic mastery of station planning, station sizing, life safety, operational requirements and the plethora of other requirements which need to be incorporated to design modern stations.

In Hong Kong, Karma has worked on Nam Cheong and Mei Foo stations on the West Rail Line, Tai Wai Station on the East Rail Line, Tseung Kwan O Station on the Tseung Kwan O Line, HKU and Sai Ying Pun stations on the West Island Line, and Ocean Park and Wong Chuk Hang stations on the South Island Line. Further away, he has worked on various stations on Blue and Orange lines in Bangkok, Riyadh Metro, Macau Seac Pai Van Line and stations in New Delhi.

## Our Speakers



**Mr Clement Ho**  
MSc, BEng, MIHT, CMILT

### Crowd Management using Simulation Analysis

Clement is a Director at Arup, leading its China Transport Consulting business, China Integrated Technology Business Leader, Digital Transport and Transport Infrastructure Resilience development in the East Asia.

He has over 20 years' experience in transport planning, working on projects across Hong Kong, Macau, Mainland China, Southeast Asia, the UK and continental Europe. His project portfolio covers all scales and types, from city-wide transport planning for Xiong'an to airport and railway transport hubs like Beijing Fengtai High Speed Rail Station to theme park arrival experience with metro station study for the Universal Studio in Beijing as well as traffic studies for mixed-use developments such as K11 MUSEA in Hong Kong.

Clement is currently a Council Member of the Chartered Institute of Logistics and Transport in Hong Kong and a Member of the Transport Policy team. He also serves as a visiting lecturer on urban planning and transportation in several universities in Hong Kong.



**Ir Sam Chow**  
MBA, BEng,  
FCILT, MHKIE, MICE, MIEAust, CEng

### Transit Oriented Development in the context of Sustainable Urbanism

Sam is an Arup Fellow and Director, leading its Transport Consulting team in East Asia. He is also the firm's global Skill Leader for Transport Planning.

With more than 34 years of experience in delivering visionary transport concepts and projects worldwide, Sam is a recognised leader in urban traffic planning and transit-oriented development throughout the industry and is frequently sought after for engagement clients, governments, academia and potential collaborators around the world.

He served as a Strategy Consultant for the Zhuhai Municipal Government in Urban Traffic Planning (2012-2018) and was a Guest Professor of the School of Civil Engineering and Transportation at the South China University of Technology (2014-2017). He has been actively lecturing at the University of Hong Kong, the Chinese University of Hong Kong, the Hong Kong Polytechnic University, the Hong Kong University of Science and Technology and the National Science and Technology Development Agency in Thailand.



**Ir Carmen Chu**  
MSc (Urban Planning), BEng,  
MIHT, MHKIE, NEC4Reg

### Emerging Trends in Smart Cities: Intelligent Mobility System

Carmen is a Director of Arup and serves as the firm's East Asia Skill Leader for Intelligent Mobility. She has over 20 years of experience in a wide spectrum of transportation studies and land-use planning projects involving transportation planning, highway and railway engineering and sustainable transport strategies.

Her engineering and planning background blend in well, enabling her to appreciate prevailing planning constraints or opportunities, and to apply relevant planning principles of smart cities on transport and traffic engineering design work.

Carmen is currently leading several high-profile Intelligent Transport System related projects in Hong Kong for major infrastructure projects including a free-flow tolling system and a major tunnel connecting outer areas in urban Kowloon. She also pioneers and drives the practical deployment of new intelligent mobility concepts by setting up a roadmap for policy-making and a new regulatory framework.



**Ir CS Chang**  
BSc(Eng) MBA CEng FIET  
FHKE F.I.R.S.E.RPE

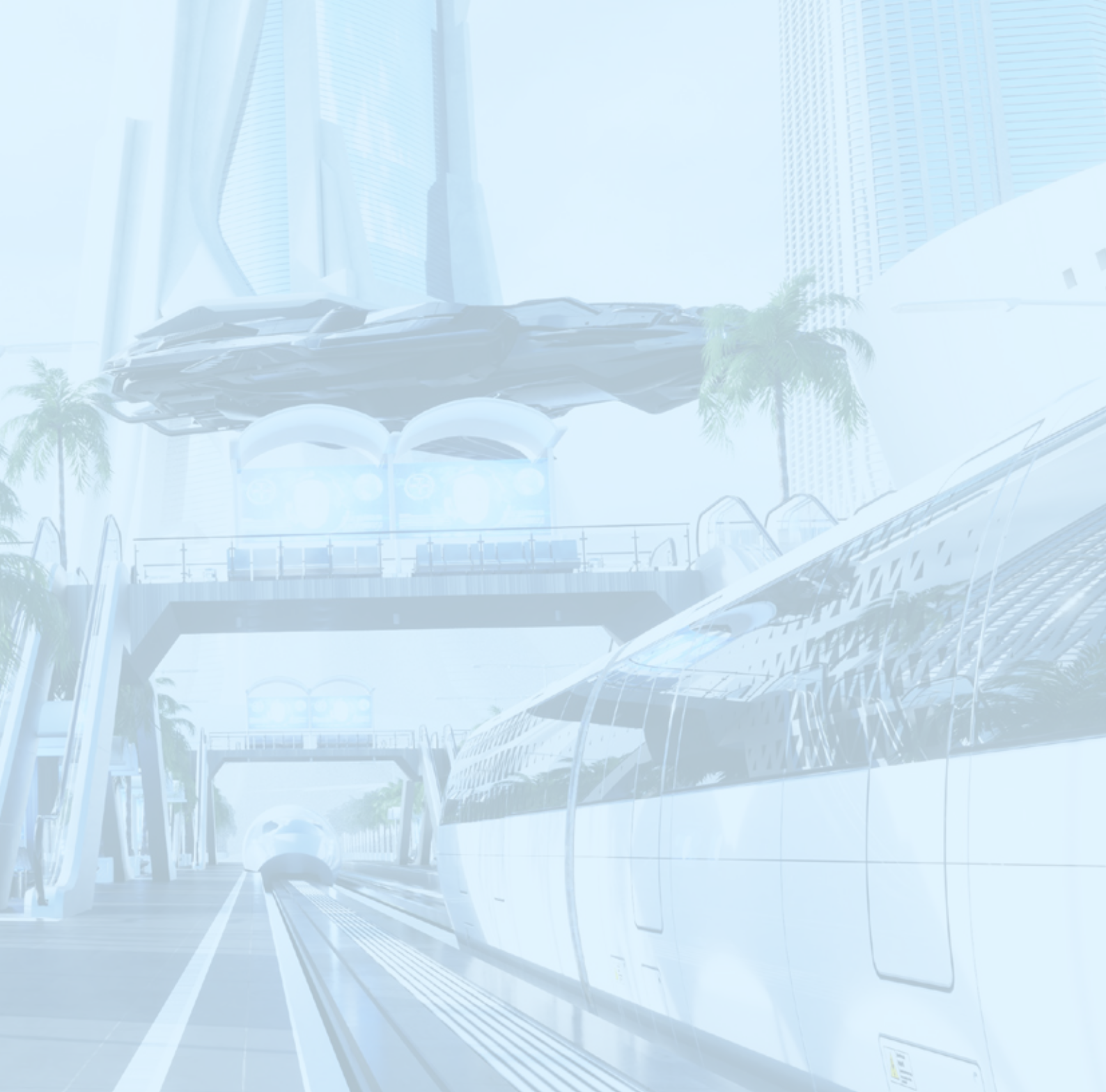
### Railway Stations of the Future

CS is a Fellow of MTR Academy and an Associate Faculty of Land Transport Authority of Singapore. He is currently a Part-time Lecturer in the Chinese University of Hong Kong, an Adjunct Lecturer in the Singapore Polytechnic and the Adjunct Faculty of Asian Institution of Technology in Thailand.

A professional railway system engineer with over 36 years of international project experience, CS has been involved in managing projects in Europe, Middle East, South East Asia and Australia including the West Coast Main Line in the UK, Mecca Hajji Metro in Saudi Arabia, various railway projects in Hong Kong and KVMRT SBK and SSP Lines in Malaysia.

CS's career in railway engineering started as a software engineer for the development of the train control software in France and subsequently progressed into both brownfield and greenfield railway projects in Hong Kong. Between 1985 and 2008, CS was a project manager on various multi-disciplinary control, communication and signaling projects for MTR and KCRC railway lines.

CS is currently the Executive Chairman of Key Direction Limited, the CEO and Executive Director of Pypun-KD & Associates Limited, Executive Chairman of Tres Engineering Consultants Sdn Bhd, Executive Chairman of Tres Engineering Consultants Pte Ltd and Executive Chairman of Pypun-KD Consultancy (Macao) Ltd.



## System Requirements

For the system requirements and test link, please refer to the registration form. Details are listed in the reverse page.

Computer and Internet Connection: High speed broadband access (LAN, Cable or DSL) is required for an optimal learning experience. Your organisation's broadband network is recommended. Use of a mobile phone, such as a smartphone or tablet, is not recommended for joining the virtual classes. network is recommended. Use of a mobile phone, such as a smartphone or tablet, is not recommended for joining the virtual class.

## Intake Scheme and Programme Fees

For details, please [click](#) here to download the Registration Form.

## Programme Enquiry

Please contact Ms. Ng at [slng@mtr.com.hk](mailto:slng@mtr.com.hk) or call +852 2520 3453.

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