CoE Technology Domain Workshop (Part 3) on Urban Solutions & Resource Resilience

Date:     Friday, 11th Mar 2016
Time:     2:00pm –5:30 pm (Registration starts at 1:30pm, refreshment will be provided)
Venue:    LT 19, Block N2, Level B2, N2-B2A-01  (view map, floor plan with nearby carparks)

Program

2:00pm - Opening Address by Professor Wang Rong, Chair, School of Civil and Environmental Engineering, Nanyang Technological University

2:05pm - Keynote Lecture - “Sustainable Mobility and Urbanism: TOD, Public Transport Reforms, and Active Transport” by Professor Robert Cervero, University of California, Berkeley

2:50pm - Keynote Lecture - “Sense-City, Smart technologies for sustainable cities” by Dr Bérengère LEBENTAL, IFSTTAR (French Institute of Science and Technology for Transport, Development and Networks)

3:35pm - Tea-Break

4:00pm - Keynote Lecture - “Ground Deformation Control for Underground Construction In China” by Professor Zheng Gang, Tianjin University, P.R. China

4:45pm - Keynote Lecture - “Civil engineering system monitoring with fibre optic sensors” by Professor An-Bin Huang, National Chiao Tung University, Taiwan

5:30pm - End of Program

Free Admission

PDU/STU POINTS

will be accredited

Click here to register by 9th Mar 16
Title 1: Sustainable Mobility and Urbanism: TOD, Public Transport Reforms, and Active Transport

Abstract: This presentation draws on international experiences that reveal social, environmental, and economic benefits from integrating urban and public transport development, at multiple geographic scales — neighborhoods, corridors, and city-regions. Many strategies and approaches fit within the "ASI" framework of urban development and transport investment choices that Avoid, Shift, and Improve urban mobility. Successful models of transit-oriented development (TOD) that promote sustainable mobility, economic development, urban regeneration, green urbanism, conservation, and place-making will be reviewed. International experiences with bus transit organizational and service reforms will also be discussed, including experiences with creating regional transit federations and bus priority schemes (including Bus Rapid Transit). Ways of advancing active transport -- walking and cycling -- to promote mobility and connectivity (e.g., first/last kilometer problem) as well as public health (e.g., active living) will then be assessed, again drawing from international case experiences and empirical research. The talk closes with reflections on how lessons might be put to use in a vibrant, dynamic setting like Singapore wrestling with the challenges of accommodating significant population growth in coming decades.

Professor Robert Cervero is the department Chair and Professor of City and Regional Planning at the University of California, Berkeley, where he also holds the post of Friesen Chair of Urban Studies and directs the University of California Transportation Center (UCTC). Professor Cervero’s research examines the nexus between urban transportation and land-use systems. He chairs the International Association of Urban Environments and serves on the Advisory Board of the World Economic Forum’s Future of Urban Development Initiative and the American Planning Association’s Emerging Issues Task Force. He was a contributing author to the recent IPCC (International Panel on Climate Change) Fifth Assessment and UN-Habitat’s Global Report on Sustainable Mobility. In 2013 he was ranked among the top 100 City Innovators Worldwide by UMB’s Futures Cities.

Title 2: Sense-City, Smart technologies for sustainable cities

Abstract: While today’s galloping urbanization weighs heavily on both People and Environment and while Climate Change increases natural risks worldwide, Internet of Things Technologies stand at the forefront of the efforts toward Greener Cities. But progress is slow, because beyond enhanced connectivity, what our Cities really need are Decision-Support Tools, Smart Technologies that can detect events, analyze their impacts on urban sustainability and propose mitigation solutions. Here, we present two French R&D initiatives aiming at fostering Smart Technologies for Sustainable Cities. Within the 2011-2019 Sense-City project funded by the French “Investment for the Future Program”, we propose massively distributed networks of micro and nanosensors for environmental monitoring, structural health monitoring, energy performances monitoring and people exposure monitoring. Aiming at shortening the time-to-market of innovative technologies, Sense-City also offers a large scale urban test space under climatic conditions to assess performances in real-life, systemic conditions. Our work within Sense-City is emphasizing the need for new urban technologies to be highly stable and robust, while the use of nanotechnologies often creates new challenges in terms of reliability. Within the PLATINE project funded by Paris Region SESAME program and started in September 2014, we offer a platform for reliability assessment and optimization of nanodevices. Coupling an in-situ thermo-mechanical characterization bench, ex-situ multi-scale imaging and spectroscopy techniques and advanced modelling techniques, we propose materials and methods to assess and optimize device life time for urban operation.

Dr Bérengère LEBENTAL (F) graduated from Ecole Polytechnique (Paris Saclay University, France) Engineering Program in 2006, received two MSc in Physics and Nanotechnology from Ecole Polytechnique in 2007 and her PhD from Université Paris-Est, France, in 2010 (ENPC-Paritech PhD award in 2011). Since 2010, she is research scientist at IFSTTAR (French Institute of Science and Technology of Transport, Development and Network) and at LPICM (Laboratory of Physics of Interfaces and Thin Films, a joined research team between Ecole Polytechnique and CNRS). A physicist specialized in the nanoelectronics of carbon-based nanomaterials, her research focuses on the development of reproducible and reliable nanosensors for applications to urban sustainability, with a focus on micromechanical and chemical sensing. She coordinates the 9M€ French Equipment Program Sense-City and the 4M€ European research project Proteus on water quality monitoring.
Title 3 : Ground Deformation Control for Underground Construction In China

Abstract: This lecture will cover five topics: 1) Deformation monitoring data from several large-scale projects in China, including ground settlement, adjacent buildings, tunnels, piles of viaducts; 2) Numerical analyses, centrifuge tests, model tests of the impact of underground construction and tunneling on ground deformation; 3) Countermeasures to reduce the impact of deformation induced by underground construction and tunneling; 4) Progressive failure of tunnels and deep excavations and the impact of the progressive failure on surrounding ground; and 5) Countermeasures to prevent progressive failure of tunnels and deep excavations.

Professor Zheng Gang is a Professor at Department of Civil Engineering at Tianjin University, P.R. China. He serves as the Dean of School of Civil Engineering of Tianjin University and was the Head of Department of Civil Engineering from 2003 to 2009. He is the vice president of the Chinese Institution of Soil Mechanics and Geotechnical Engineering (CISMEG). He is the member of TC204, ISSMGE (Technical Committee of Underground Construction in soft ground) and was the member of TC17, ISSMGE,2007-2011. He received his Master degree in 1992 and Ph.D. degree in 2000 in Civil Engineering from Tianjin University. He was a visiting scholar to Cambridge University from 2004 to 2005. Prof. Zheng's research and practical experiences has specialized principally in deep excavation, ground improvement, pile foundations, shield tunneling. Prof. Zheng has co-authored one technical books, edited one ASCE Geotechnical Special Publications, and published more than 180 peer-reviewed journal papers and about 30 conference papers, including more than 30 international journal papers and international conference papers. He has been invited more than 20 times as keynote speaker of national conferences and three times as keynote speaker or invited lecture speaker of international conferences. Prof. Zheng received the 2013 R.M. Quigley Award by the Canadian Geotechnical Society for the best paper in the Canadian Geotechnical Journal in 2012. (“Excavation effects on pile behavior and capacity” by G. Zheng, SY Peng, CWW Ng and Y Diao). He also received the Award of Young Geotechnical Expert of Mao Yisheng Soil Mechanics and Geotechnical Engineering in 2010. He won Chinese National Award for Science and Technology Progress in 2015.

Title 4 : Civil engineering system monitoring with fibre optic sensors

Abstract: When probably made and installed, the fibre optic (FO) based sensors are durable, immune to electromagnetic interference, short circuit and lightning, and thus are ideally suited for field monitoring of civil engineering systems. Over the past few decades, many FO sensing techniques have been developed. Available techniques include fully distributive sensing method such as the Brillouin Time Domain Reflectometry (BOTDR) that allows the entire optical fibre to function as a strain/temperature sensor. The optical fiber Bragg grating (FBG) is another popular partially distributive FO sensing technique where multiple, discrete FBG's can be connected via a single fibre. With their unique capabilities, FO based sensors can be used for long distance profile measurements or for localized high resolution and/or differential measurements, deployed above or below ground/water. A wide variety of FO based sensor cables and transducers for strain, temperature, force, pressure, displacement and acceleration measurements have been developed. Techniques for the field deployment of FO based sensors have gained maturity through decades of research and field experiments. The presentation provides a brief background of FO sensing and the design concepts behind the BOTDR and FBG based sensors. Cases of field monitoring using the FO sensors are presented, implications in their future developments and challenges are discussed.

Professor An-Bin Huang (Ph.D., P.E.) is a professor at the department of civil engineering of National Chiao Tung University, Hsin-Chu, Taiwan. With a BS degree in civil engineering (National Taiwan University, Taipei, Taiwan), MS (Northwestern University, Evanston, Illinois, USA) and Ph.D. (Purdue University, W. Lafayette, Indiana, USA) in geotechnical engineering, Prof. Huang embarked on his research efforts in fiber optic sensing about 15 years ago. He established the first fiber optic sensing laboratory (the Optic Lab) in Taiwan that has been dedicated to geotechnical/civil engineering applications. Among the many available techniques, Optic Lab has been concentrating their research efforts on optical fiber Bragg grating (FBG) sensor developments. The Optic Lab under the leadership of Prof. Huang has been developing a series of FBG techniques and successfully implementing them in the field for cases such as landslide, ground subsidence, bridge foundation scouring, and dike safety monitoring, among others. Prof. Huang has been publishing extensively on the subject of FBG sensing and its applications in geotechnical engineering, giving numerous invited lectures on fiber optic sensing at various international conferences, seminars or short courses.