JOINT SCCT-HKCI INTERNATIONAL CONFERENCE ON CONCRETE TECHNOLOGIES 2025

Future-Ready Infrastructure: Recent Focus on Innovative Cementitious Composites and Sustainable Construction

面向未來的城市建設：創新水泥物料與可持續建築

12TH DEC, 2025

08:30 - 17:30

Lam Chik Ho Lecture Theatre (Z209)

The Hong Kong Polytechnic University

Standing Committee on Concrete Technology
混凝土科技常務委員會

Hong Kong Concrete Institute
香 港 混 凝 土 學 會

The Hong Kong Polytechnic University
香港理工大學
土木及環境工程學系
Department of Civil and Environmental Engineering

Programme

Morning Session

08:30	*Registration*
09:00	*Welcoming Address* **Prof Jin-guang TENG** President, The Hong Kong Polytechnic University
09:10	*Opening Speech cum Launching Ceremony of Guidebooks on the Use of Ultra-High Performance Concrete for Hong Kong Practice* **Ir Michael FONG, JP** Director of Civil Engineering and Development
09:30	*Group Photo*
	Morning Session: Chaired by **Ir Dr Tommy LO**
09:45	*Pioneering the Application of UHPC in Hong Kong Infrastructure Development by CEDD* **Ir Wallace TAM** Senior Engineer, North Development Office and **Ir Alan HU** Senior Engineer, West Development Office, CEDD
10:10	*Recent Developments on the use of GGBS and other Innovative Materials for Concrete* **Ir Jenny YEUNG** Deputy Head of Geotechnical Engineering Office (Planning & Testing), CEDD
10:35	*Tea Break*
10:55	*Innovative Capsule Technology for High Performance Concrete Materials* **Dr Yanmin WU** Associate Director of Research & Development (Construction), NAMI and **Mr Frank ZOU** Senior Engineer (Construction), NAMI
11:20	*Advancing Urban Infrastructures Through Innovation in UHPC Technology* **Dr Xiaojun ZHOU** Associate Professor of Engineering, Xihua University
11:45	*Synergistic Integration of Resin Chemistry to Restore Integrity of Cementitious Concrete* **Dr Sindhu MENON** ARDEX-QUICSEAL, Member of the South East Asia Drymix Mortar Association (SEADMA) and Singapore Green Building Council (SGBC)
12:10	*Morning Session Panel Discussion*
12:40	*Lunch*

Afternoon Session

14:00	*Afternoon Welcome Address* **Ir Dr Jaime YEUNG** President, Hong Kong Concrete Institute
14:05	*Afternoon Opening Speech* *cum Presentation of Certifcates of Appointment to Members of* *Expert Advisory Panel of the Standing Committee on Concrete Technology* **Ir Dr Raymond CHEUNG, JP** Head of Geotechnical Engineering Office, CEDD
	Afternoon Session: Chaired by **Ir Prof JG DAI**
14:25	*Low Carbon High Performance Lightweight ConcreteGeopolymer Cementitious Composites* **Ir Prof CS POON, JP** Head of Department of Civil and Environmental Engineering, The Hong Kong Polytechnic University
14:50	*Synergize Waste Reduction with Decarbonation:* *A Holistic System Converting Waste into Value-added Construction Materials* **Dr Xiangping XIAN** Assistant Professor, Department of Architecture and Civil Engineering, City University of Hong Kong
15:15	*Rapid-Setting Concrete Solutions for Pavement Replacement* **Ir Gregory SIEDERS** Technical Advisor for Civil Engineering Solutions, Tiger Engineered, Australia
15:40	*Tea Break*
16:00	*Green Lightweight Concrete for Modular Buildings:* *from Material Innovation to Building Simulation* **Ir Prof Hailong YE** Associate Professor, Department of Civil Engineering, The University of Hong Kong
16:25	*Development of Semi-flexible Pavement for Heavily Trafficked Road in Hong Kong* **Mr Vincent KWOK** Senior Engineer, Highways Department and **Prof Zhen LENG** Professor, Department of Civil and Environmental Engineering, The Hong Kong Polytechnic University
16:50	*Afternoon Panel Discussion*
17:20	*Closing Speech* **Ir KK YAM** Co-Chairperson of Organising Committee of the Joint Conference
17:25	*End of Conference*

Supporting Organisations

Welcoming Address

Prof Jin-guang TENG

President, The Hong Kong Polytechnic University

Will be available shortly.

Morning Opening Address

Ir Michael FONG, JP

Director of Civil Engineering and Development

It is my great pleasure to welcome all esteemed speakers, distinguished guests and participants from Hong Kong, Chinese Mainland and overseas to the International Conference on Concrete Technologies 2025. Building on the success of our inaugural event last year, the Standing Committee on Concrete Technology (SCCT) and the Hong Kong Concrete Institute (HKCI) are once again joining hands to unite global expertise and local experience in advancing sustainable concrete technologies.

It is my great pleasure to welcome all esteemed speakers, distinguished guests and participants from Hong Kong, Chinese Mainland and overseas to the International Conference on Concrete Technologies 2025. Building on the success of our inaugural event last year, the Standing Committee on Concrete Technology (SCCT) and the Hong Kong Concrete Institute (HKCI) are once again joining hands to unite global expertise and local experience in advancing sustainable concrete technologies.

The year's theme, "Future-Ready Infrastructure: Recent Focus on Innovative Cementitious Composites and Sustainable Construction," reflects our shared vision for infrastructure that is not only sustainable and low-carbon, but also resilient and adaptive to a changing climate. The passage of Super Typhoon Ragasa in late September this year, which Hong Kong withstood with minimal and recoverable damages, reflected the critical importance of robust and high-performance infrastructure. The concrete industry plays a pivotal role in safeguarding lives and ensuring our city's continued resilience.

In this regard, the CEDD is spearheading a number of key initiatives. Impressed by the demonstrated benefits of Ultra-high Performance Concrete (UHPC) by Mainland speakers at last year's conference, we initiated its trial use in the public works projects. To accelerate UHPC's application across Hong Kong's infrastructure, we formed a joint task force with the Highways Department and established an Expert Advisory Panel for technical guidance, culminating in the publication of local technical guidebooks. Concurrently, we continue to collaborate with the industry and academia in exploring other novel construction materials such as lightweight high-strength concrete, fibre-reinforced polymer and high strength steel. All these efforts underscore our dedication to advancing the development, standardisation and application of innovative materials in support of Hong Kong's sustainable development.

I am confident that this conference will serve as an effective platform for exchanging knowledge, sharing best practices, and fostering collaboration across disciplines and borders. Together, we will explore how emerging technologies and innovative materials can enhance productivity, cost-effectiveness, safety, and environmental performance, thereby supporting Hong Kong's Climate Action Plan 2050 and our commitment to a zero-carbon future.

Afternoon Opening Address

Ir Dr Raymond Cheung, JP

Head of Geotechnical Engineering Office, Civil Engineering and Development Department

I am delighted to join the SCCT-HKCI International Conference on Concrete Technologies 2025 alongside esteemed speakers, distinguished guests, researchers and practitioners from round the world. This year's theme, "Future-Ready Infrastructure: Recent Focus on Innovative Cementitious Composites and Sustainable Construction," highlights the importance of technical excellence and innovation in shaping resilient and sustainable infrastructure in facing future climate challenges.

The Geotechnical Engineering Office (GEO) has long been dedicated to advancing the science and application of construction materials through our Materials and Testing Division, in particular its Public Works Laboratories. In recent years, we have undertaken a wide range of studies on low-carbon concrete materials through rigorous testing, applied research, and practical applications. These include benchmarking the performance of high-percentage GGBS tremie concrete in piling works, development of advanced concrete materials such as the Vibration Resistant Sprayed Concrete (VRSC) for tunnel and cavern rock support, as well as fibre-reinforced sprayed concrete for slope upgrading works. In addition, we are conducting territory-wide assessments of concrete supply and investigating the potential of underground quarrying to ensure a sustainable source of aggregates for the long-term development of our construction industry.

To facilitate the implementation of these initiatives, an Expert Advisory Panel on Concrete Technology has been established this year, which comprises distinguished academics and professionals from local, overseas and the Chinese Mainland. With strong academic achievements and extensive experiences in concrete technology, Panel Members will provide independent technical advice to address the industry challenges and drive the research and development on innovative and sustainable concrete technologies for adoption in Hong Kong.

I look forward to the fruitful discussions and collaborations on concrete technologies at this Conference. By bringing together research, practice and innovation, I am confident that the outcomes will further strengthen our shared pursuit of sustainable, high-performance infrastructure for the future.

I wish the Conference every success.

Welcome Message

Ir Jenny Yeung

Chairperson, Standing Committee on Concrete Technology &
Deputy Head of the Geotechnical Engineering Office (Planning and Testing), Civil Engineering and Development Department

On behalf of the Standing Committee on Concrete Technology (SCCT), I am delighted to welcome you to the Joint SCCT-HKCI International Conference on Concrete Technologies 2025.

Since its establishment in 1982, the SCCT has served as a central platform for inter-departmental coordination on all matters relating to concrete. In 2005, we launched the Annual Concrete Seminar, which for many years provided practitioners and academics in Hong Kong with a forum to address key topics in concrete technology – from durability and performance to innovation and, more recently, sustainability. Last year, the SCCT joined forces with the Hong Kong Concrete Institute (HKCI) to transform the seminar into an international conference, broadening the exchange of knowledge and experience among a wider spectrum of professionals from around the world. Riding on its success, this joint conference once again brings together distinguished professionals, researchers and industry leaders to share ideas and foster collaboration.

The theme this year, "Future-Ready Infrastructure: Recent Focus on Innovative Cementitious Composites and Sustainable Construction," reflects our shared commitment to advancing concrete technologies in ways that address both sustainability and resilience. For the SCCT, this means ensuring that standards and specifications evolve in step with industry needs, while promoting the wider application of low-carbon and high-performance concrete. In the past year, we have completed a comprehensive study comprising a review of the market situation of the concrete industry and technical studies looking into various aspects of GGBS and other green concrete materials. Useful outcomes of this study will be presented at the Conference, with an aim to encouraging their wider use in Hong Kong's construction industry.

With your support, I trust that the insights and collaborations forged here will inspire new initiatives and strengthen our collective pursuit of future-ready infrastructure. I wish you all a rewarding and fruitful conference.

Afternoon Welcome Address

Ir Dr Jaime YEUNG

President, Hong Kong Concrete Institute

On behalf of the Hong Kong Concrete Institute, I would like to extend my heartfelt gratitude to our co-organizers, the Standing Committee on Concrete Technology and the Hong Kong Polytechnic University, for their invaluable support in making this international conference possible.

I would also like to express my sincere appreciation to our honorable guests for gracing us with their presence, to all the attendees for their active participation, and to the dedicated helpers whose efforts have been instrumental in ensuring the success of this event.

A special thank goes to our esteemed speakers for sharing their knowledge and insights, which have greatly enriched the conference. Additionally, I would like to acknowledge the supporting organizations whose contributions have been vital in bringing this event to fruition.

We are honored to have speakers and attendees not only from the local industry but also from overseas countries such as Germany, Australia, Singapore, Macao, and Mainland China. Their participation has added a valuable international perspective to our discussions and has fostered a global exchange of ideas.

The unwavering commitments of all participants with different capacities in this event to advancing the field of concrete technology are highly appreciated. Their collective efforts have made this conference a remarkable success.

Message from Joint OC Chairperson (HKCI)

Ir Dr Fiona CHAN

Joint OC Chairperson

On behalf of the entire organizing committee, I am extremely pleased to welcome you to the Joint SCCT-HKCI International Conference on Concrete Technologies 2025 co-organised by Standing Committee on Concrete Technology, the Hong Kong Concrete Institute and the Hong Kong Polytechnic University. This year's conference witnessed the innovative concrete technologies including low-carbon and high-performance concretes, capsule-enabled material innovations, rapid-setting solutions for fast pavement replacement, and waste-to-value systems in our infrastructure.

Our sincere thanks go to the brilliant speakers who gave us insightful presentations inspiring everyone in attendance. We are also grateful to our supporting organisations, their belief and support were the foundation upon which this conference was built. And finally, a hearty thanks to the phenomenal organising committee—their tireless work, creativity, and resilience have been nothing short of extraordinary. In all, I am particularly thankful to all participants who graced this conference with their contributions. I wish all of you a pleasant experience and we hope that the conference will be a successful and enjoyable event for all participants.

Closing Speech

Ir KK YAM

Joint OC chairperson

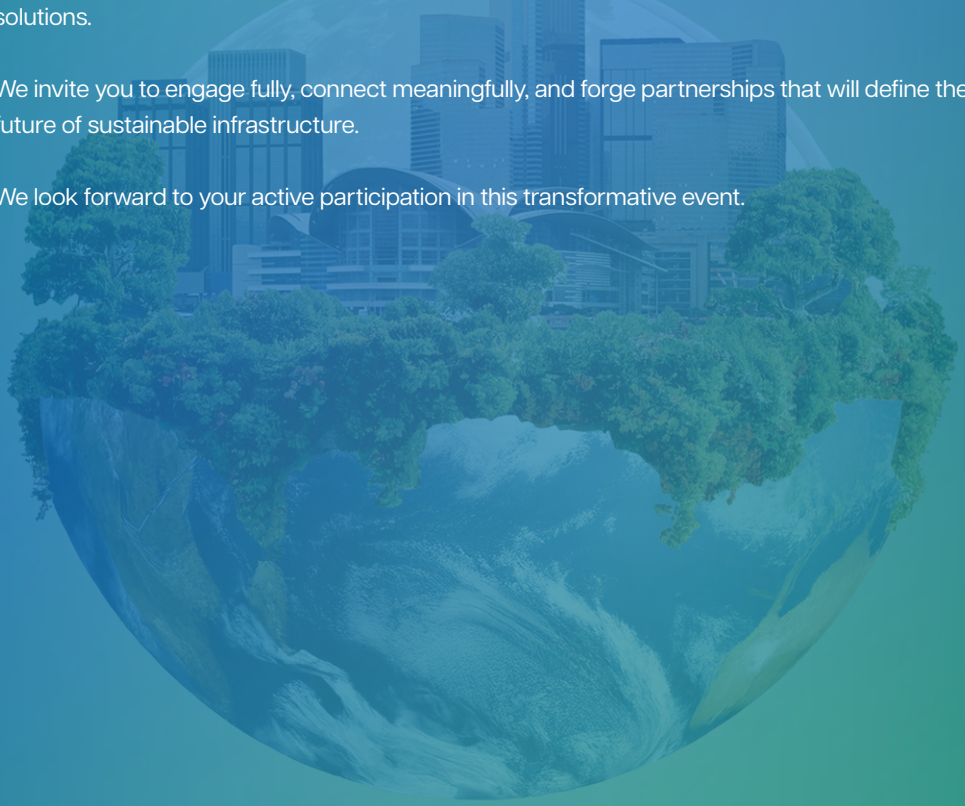
As Co-Chairman of the Organizing Committee, I am delighted to welcome you to the Joint SCCT-HKCI International Conference on Concrete Technologies 2025 – "Future-Ready Infrastructure: Recent Focus on Innovative Cementitious Composites and Sustainable Construction." Your presence, representing global industry leaders, researchers, and policymakers –is vital to the success of our conference.

Building on the momentum of our inaugural collaboration last year between the Standing Committee on Concrete Technology (SCCT) and the Hong Kong Concrete Institute (HKCI), we are deeply grateful for the unwavering support of our partner organizations and the invaluable contributions of our distinguished speakers.

Together, let us embark on a journey to shape a sustainable built environment. Through insightful presentations and dynamic discussions, we hope this conference sparks inspiration, fosters collaboration, and drives innovation in cutting-edge construction materials and solutions.

We invite you to engage fully, connect meaningfully, and forge partnerships that will define the future of sustainable infrastructure.

We look forward to your active participation in this transformative event.



Morning Session Panel Chairman

Ir Dr Tommy LO

Chairman, Materials Discipline Advisory Panel

Ir Dr Tommy Lo retired from Department of Architecture and Civil Engineering, City University of Hong Kong. Chairman of Materials Discipline and a fellow member of Hong Kong Institution of Engineers. He is also the Fellow of Hong Kong Concrete Institute and Honorary Fellow of Guangdong Institution of Engineer. He was listed as one of the top 2% most highly cited scientists, according to metrics compiled by Stanford University 2021.

Afternoon Session Panel Chairman

Prof JG DAI

Head of Department of Architecture and Civil Engineering and Chair Professor of Structural Engineering, City University of Hong Kong

Ir Professor Dai is Chair Professor of Structural Engineering and Head of Department of Architecture and Civil Engineering at the City University of Hong Kong (CityU). Before joining CityU, he was a full professor at The Hong Kong Polytechnic University. He also had eight years of research and industry experience in Japan. Professor Dai's research focuses on "Emerging Materials and Structural Systems for Sustainable Concrete Infrastructures." His work has garnered numerous academic awards, including the "Best Basic Research Paper Award" from the Journal of Composites for Construction by the American Society of Civil Engineers, the "Outstanding International Collaboration Award" from the Japanese Society of Civil Engineers, the "Structural Excellence R&D Award" from the Hong Kong Institution of Engineers, and the "Second Prize of the Chinese National Technology Invention Award," among others.

Ir Professor Dai is a Fellow of several organizations, including International Institution of FRP in Construction, Hong Kong Institution of Engineers, Hong Kong Concrete Institute, International Association of Advanced Materials, and Asian Concrete Federation (ACF). He is also the Vice President of ACF and Committee Manager of ISO/TC71 SC6. He has published over 290 SCI papers, attracting more than 21,000 citations, with an h-index of 79 according to Google Scholar. He is also listed among Stanford's top 2% most cited scientists. Additionally, Professor Dai is a co-founder of a startup and received a Gold Medal at the Geneva Inventions Expo 2022 special edition. His research on multifunctional coatings for buildings was highlighted by "Science" in its Editor's Choice and has been widely covered by the media.

Presentation

Pioneering the Application of UHPC in Hong Kong Infrastructure Development by CEDD

Ir Wallace TAM

Senior Engineer, North Development Office

Ir Wallace SM TAM is currently a senior civil engineer of the North Development Office of the Civil Engineering and Development Department. He has also been the Secretary of the Standing Committee on Concrete Technology of the Development Bureau. He joined the Public Works Central Laboratory (PWCL) in 2019 focusing on testing of construction materials, and research and development related to concrete technology in the PWCL. In 2019, he completed the study on the feasibility of mitigating ASR effect in concrete made with aggregates from local volcanic rocks. In 2020, he conducted a study under the auspice of SCCT on concreting in hot weather due to climate change. Since 2025, he has been involved in the design and construction of development of Fanling North New Development Area, Remaining Phase.

Ir Alan HU

Senior Engineer, West Development Office, Civil Engineering and Development Department

Ir Alan YM HU is currently a senior civil engineer of the West Development Office of the Civil Engineering and Development Department. Since 2020, he has been involved in the design and construction of site formation and infrastructure works for Northern Metropolis projects, including Hung Shui Kiu/Ha Tsuen and Yuen Long South New Development Areas. He is currently responsible for supervising the improvement works at Tong Yan San Tsuen Interchange of Yuen Long Highways which involves substantial bridge structures and complex geotechnical works.

Abstract

Ultra-high performance concrete (UHPC) has been used for bridge construction in the Mainland. Overseas studies have shown that UHPC not only exhibits ultra-high compressive and tensile strength compared to normal concrete, but also has a significant high level of durability due to its discontinuous pore structure reducing liquid ingress. Given its successful application in infrastructure works worldwide as well as the Mainland, the Civil Engineering and Development Department (CEDD) and the Highways Department jointly established an UHPC Task Force in early 2025 to steer UHPC application through pilot projects, provide technical advice, and recommend the way forward for wider application of UHPC for civil engineering works in Hong Kong.

Under the direction of the UHPC Task Force, two CEDD's bridge construction projects in the new development areas (NDA) in the Northern Metropolis have been selected for pilot application of UHPC. One is a vehicular bridge in Yuen Long South (YLS) NDA project and the other one is a footbridge in Fanling North (FLN) NDA project. An Expert Panel consisting of local, Mainland and international top-notch scholars for the YLS NDA project to offer guidance on design and construction of this first UHPC vehicular bridge in Hong Kong. In parallel, a site trial was conducted under FLN NDA project to identify the challenges and explore local good practice for in-situ concreting across the UHPC lifecycle, including storage, logistics, mixing, concreting, etc., under the local environment. On the basis of findings and experience gained from the pilot projects and selected meritorious elements in the Mainland and foreign standards, design guideline and material specifications for using UHPC in civil engineering works in Hong Kong have been established.

Presentation

Recent Developments on the use of GGBS and other Innovative Materials for Concrete

Ir Jenny Yeung

Chairperson, Standing Committee on Concrete Technology &
Deputy Head of the Geotechnical Engineering Office (Planning and Testing), Civil Engineering and Development Department

Ir Jenny Yeung holds a Bachelor of Engineering in Civil and Structural Engineering from the Hong Kong University of Science and Technology (HKUST) and a Master of Philosophy in Geotechnical Engineering from the University of Cambridge. She is a professional engineer in the civil, structural and geotechnical disciplines. Over the past 30 years, she has dedicated her expertise in various aspects of the Hong Kong Slope Safety System, covering geotechnical control, landslide emergency service, landslip warning, crisis communication, public education and technical development. Ir Yeung has been appointed by the Development Bureau as the Chairperson of the Standing Committee on Concrete Technology since 2023. She oversees the Public Works Laboratories, delivering essential testing services to ensure construction material quality across public works projects. She has also made substantial efforts in facilitating industry-wide dialogue and driving innovation to support Hong Kong's transition to greener infrastructure. Ir Yeung was an awardee of the Secretary for Civil Service's Commendation in recognition of her long-term outstanding service to the Government and the public. She was also awarded the Outstanding Alumni by the Department of Civil and Environmental Engineering of HKUST. Beyond her office work, Ir Yeung's dedication to the Hong Kong Institution of Engineers has earned her multiple prestigious honours, including the Trainee of the Year Award (1997), Young Engineer of the Year Award (2006), and the President Award (2023).

Abstract

Building on the Government's commitment to advancing sustainable and high-performance construction, the GEO of CEDD, supported by our Public Works Central Laboratory, and the SCCT continue to champion innovations in concrete materials through collaborative research, rigorous review of testing standards and specifications, and active engagement with industry stakeholders. This presentation will highlight our recent work on the use of Ground Granulated Blast-furnace Slag (GGBS) and other innovative materials for concrete. The results of a systematic evaluation of GGBS concrete across diverse applications will be presented, underscoring its potential to enhance durability, lower carbon footprint, and support resilient infrastructure. It will also cover preliminary findings on complementary solutions, including ternary blended concrete, waste-glass and lightweight concrete, and emerging decarbonisation technologies. These studies aim to explore practical pathways towards greener construction. Furthermore, our ongoing initiatives also reflect efforts in enhancing durability and structural safety while evaluating feasible applications in construction. These include research into mitigating Alkali-Silica Reaction (ASR) in concrete comprising volcanic rock aggregates with the addition of supplementary cementitious materials (SCMs). To support these innovations, the SCCT has been regularly reviewing local test standards and specification clauses, in consultation with industry stakeholders, ensuring that industry practices remain both robust and adaptable. Collectively, these initiatives chart a forward-looking agenda to shape a more sustainable and innovative future for Hong Kong's built environment.

Presentation

Innovative Capsule Technology for High Performance Concrete Materials

Dr Yanmin WU

Associate Director of Research & Development (Construction), Nano and Advanced Materials Institute Limited (NAMI)

Dr. Wu received his Bachelor and PhD degree from the Department of Civil Engineering at Tsinghua University. After working in Beijing on Modular Integrated Construction (MiC) design and tall building design for two years, he continued his career in Singapore working on large-scale offshore platform projects. Dr. Wu then joined AECOM Hong Kong, responsible for tall buildings, complex steel structures and large-scale development projects. After joining NAMI, as the leader of structural and MiC team, his main responsibility is to manage the structural and MiC related research projects, to establish related testing facilities, and to initiate the advanced structural-materials related R&D core technologies.

Mr Frank ZOU

Senior Engineer (Construction), NAMI

Mr. ZOU Shuai (Frank) is a Senior Engineer at the Nano and Advanced Materials Institute and a Ph.D. candidate at The Hong Kong Polytechnic University. His research centers on the development of sustainable construction materials and technologies—including biochar enabled carbon-negative concrete, high-performance concrete, and 3D concrete printing. Mr. Zou has authored over 40 publications (including two in Nature), holds multiple patented technologies, and has received more than 2,000 citations. He is dedicated to creating scalable solutions for decarbonizing the construction sector. His works have been recognized with awards at the International Exhibition of Inventions of Geneva and the Best Paper Award from HKIE.

Abstract

Concrete is responsible for nearly 8% of global CO2 emissions, playing a key role in global carbon neutrality. Different from traditional cement-centered carbon reduction of concrete, this technology introduces an innovative capsule technology—core-shell aggregates—to develop high-performance, bio-based carbon-negative concrete. By encapsulating lightweight and carbon-sequestering materials such as biochar within a dense cementitious shell using cold-bonding techniques, the developed aggregates overcome biochar's inherent limitations of high water absorption and low strength. This design enables high-volume biochar incorporation while achieving exceptional mechanical properties, including crushing strength up to around 8.0 MPa and low density of approximately 800 kg/m3. The optimized formulation, incorporating substantial industrial by-products like GGBS and fly ash as shell materials, significantly reduces cement consumption. The resulting bio-based structural carbon-negative concrete not only meets structural requirements but exhibits a negative carbon footprint, achieving carbon negativity through biochar's inherent carbon sequestration capability. With a potential to sequester up to 412 Gt CO2 by 2100, this technology successfully transforms conventional concrete into a gigaton-scale artificial carbon sink, paving the way for a carbon-neutral construction industry.

Presentation

Advancing Urban Infrastructures Through Innovation in UHPC Technology

Dr Xiaojun ZHOU

Xihua University

Dr. Zhou Xiaojun is an Associate Professor of Engineering at Xihua University and a Sichuan Province Academic Leadership reserve candidate. He specializes in high-strength concrete materials and durability enhancement for mountainous environments. Dr. Zhou has directed eight major research projects funded by national and provincial foundations. His achievements include nine provincial/ministerial science and technology awards, ten national invention patents, two monographs, over 40 academic publications, and contributions to ten local standards.

Abstract

Ultra-High Performance Concrete (UHPC), with its high strength, durability, and lightweight characteristics, is reshaping the future of urban infrastructure. This presentation will focus on how UHPC technology drives urban development through material innovation, and analyze the advantages of UHPC in terms of technological innovation, green environmental protection, and economic benefits through typical case studies. UHPC can significantly extends the lifespan of structures, reduces maintenance costs，and reduce interference with urban operations due to its rapid construction. It combines economy and sustainability, and is expected to become a key engine for the renewal and upgrading of urban infrastructure.

Presentation

Synergistic Integration of Resin Chemistry to Restore Integrity of Cementitious Concrete

Dr Sindhu MENON

ARDEX-QUICSEAL, Member of the South East Asia Drymix Mortar Association (SEADMA) and Singapore Green Building Council (SGBC)

Sindhu Menon, PhD is a seasoned technical leader currently serving as the Regional Technical Director (R&D / QC) for ARDEX Group in Asia based in Singapore since 2024. She leads cross-functional teams in developing and optimizing advanced construction materials, with a particular focus on cementitious systems and resin chemistry. With a strong background in R&D and quality control, Sindhu plays a pivotal role in driving innovation, ensuring product excellence, and supporting strategic growth across the region.

Prior to joining the ARDEX Group, she has served in various positions within BASF in Germany, China and Singapore spanning R&D, Technical Services and Product Management for 13 years. She holds a PhD in Chemistry from the University of Illinois, Urbana-Champaign, USA and a post-doctoral stint with the University of Basel, Switzerland.

Abstract

Concrete repair solutions are indispensable to ensuring the continued structural integrity, service life and durability across varies industries. During the operational phase, the concrete structures are subjected to harsh conditions like constant heavy loads, water ingress and saltwater / chemical exposure. Restoration efforts require tailored approach to rectification that balance safety, functionality and longevity with cost and compliance. Product design that draws on the synergy between resin and cement chemistry provides significant flexibility to industry practitioners. Incorporation of resin chemistry into repair solutions has multi-faceted effects - superior substrate adhesion, built-in movement accommodation in dynamic structures, resistance to freeze thaw cycles, chloride ingress and carbonation to name a few. A systems-based approach that combines related product solutions is the most effective way to leverage these benefits and is actively practiced in Southeast Asia by ARDEX Group with our Quicseal range. In the talk, I hope to share my excitement on this topic and look forward to an interesting exchange with you.

Presentation

Low Carbon High Performance Lightweight Concrete

Ir Prof CS POON, JP

Department of Civil and Environmental Engineering, The Hong Kong Polytechnic University

Ir Prof. Chi Sun POON is currently the Michael Anson Professor in Civil Engineering and Distinguished Research Professor in the Department of Civil and Environmental Engineering, and Director of Research Centre for Resources Engineering towards Carbon Neutrality, The Hong Kong Polytechnic University. He is also one of the Directors of PolyU-NAMI 3D Concrete Robotic Printing Research Centre. He was awarded the title of Changjiang Chair Professor by the Ministry of Education in 2017. Ir Prof. Poon specialises in the research and development of environmentally friendly construction materials, waste management, waste recycling technologies, concrete technologies and sustainable construction. He is a Fellow of the Hong Kong Institution of Engineers and the Hong Kong Concrete Institute, and has been serving actively in various professional and government bodies and committees. He is a pioneer in the research on valorizing different types of wastes as construction materials. His extensive publications in the area makes him one of the leading scholars in this field. He has a Google Scholar H-index of >150, and has been listed among the World's Top 2% Scientists released by Stanford University and ranked 4th globally in the field of Building and Construction. Ir Prof. Poon has been an Editor of Construction and Building Materials from 2014 to 2024. He has also been an Editorial Board Member of Cement and Concrete Composites since 2017. He was awarded the State Technological Innovation Award 2017 (2nd Class).

Abstract

Modular Integrated Construction (MiC) is gaining increasing importance in Hong Kong. However, concrete MiC manufacturers and users suffer from low assembly efficiency and lifting difficulties due to the use of conventional normal-weight concrete. Traditional lightweight concrete is typically limited to non-load-bearing elements. Therefore, developing high-performance lightweight concrete (HPLC) capable of carrying structural loads is essential. Hong Kong PolyU has developed a low-carbon HPLC and successfully applied this technology to MiC projects in Hong Kong. The adoption of high-strength lightweight aggregates and supplementary cementitious materials contributes to reducing the embodied carbon of the HPLC. The combined use of ultra-high-performance concrete binder (UHPC) with lightweight materials has been demonstrated to be able to produce durable HPLC, characterised by low density, ultra-high strength, and superior durability. Apart from the structural grade HPLC, the PolyU has also developed high-performance foamed concrete with superhydrophobic properties, incorporating waste CO2 in the foaming process. CO2-foamed concrete can be used for non-structural elements, offering high strength and excellent thermal insulation.

Presentation

Synergize Waste Reduction with Decarbonation:
A Holistic System Converting Waste into Value-added Construction Materials

Dr Xiangping XIAN

Assistant Professor, Department of Architecture and Civil Engineering, City University of Hong Kong

Dr. Xiangping XIAN started his research career at Shenzhen University, attained his Master degree and Ph.D. in Civil Engineering from McGill University in 2017 and 2021, respectively. In 2023, he was also one of the Marie Sklodowska-Curie Future Roads Fellow recipients from Cambridge University. Before joining the Department of Architecture and Civil Engineering (ACE) at CityU, he worked as a full-time postdoctoral researcher at McGill University for more than 2 years, supervised by Prof. Yixin SHAO. In the meantime, he was also a part-time postdoctoral Research Associate at the University of Toronto.

Dr. Xian's research is mainly about producing green and functional cement-based products made from OPC, industrial waste (i.e., steel slag), municipal solid waste incineration (MSWI) residues, concrete waste, etc., through Carbon, Capture, Utilization, and Storage (CCUS), aiming to make contributions to both environmental protection and sustainable development. Beyond that, Dr. Xian is also interested in the engineering application of durable materials and so on.

Currently, he also serves as one Technical Committee for both Code for Practice for Structure Use of Concrete and Code for Practice for Dead and Imposed Loads under the Building Department in Hong Kong. He is also a Fellow of the Hong Kong Concrete Institute (HKCI) and three Technical Committees of Asian Concrete Federation (ACF).

Abstract

Concrete is the most commonly used man-made construction material. As two main components, ordinary Portland cement (OPC) has been used as the primary cementitious material, and aggregates have been applied as the major skeleton for decades. However, the cement and concrete industries contribute to more than 8 % of the total global CO2 emissions. On the other hand, Hong Kong is under enormous pressure to deal with its waste and achieve carbon-neutralization targets. Therefore, this presentation will briefly talk about applying carbonation to convert waste materials including recycled concrete waste, plastic waste, municipal solid waste incineration bottom ash, and steel slag into valuable construction materials, which can not only improve the green concrete properties but also capture CO2, making contributions to decarbonation, environmental protection, and sustainable development in Hong Kong, mainland China, and all over the world.

Presentation

Rapid-Setting Concrete Solutions for Pavement Replacement

Ir Gregory SIEDERS

Technical Advisor for Civil Engineering Solutions, Tiger Engineered, Australia

Greg Sieders is the Technical Advisor for Civil Engineering Solutions at Tiger Engineered.

Previously Greg Sieders was the Regional Business Manager – Asia and Americas of Bluey Technologies and was with the company for close to 13 years.

Since completing his education, Greg has had a work history spanning more than 20 years in large civil engineering and building projects. Through his employment by major technology suppliers including BASF, EWS and Bluey, Greg has gained a wide range of product development and site application experience. His knowledge includes cement and resin based systems, corrosion protection and various types of ground support.

The combination of his experience and knowledge has prepared Greg to be instrumental in the development of new cable rock bolt designs for tunnels and also the increasingly prevalent use of GRP systems for permanent ground support applications. Greg worked closely with both in-house Bluey Engineers and external consultants to ensure new design solutions developed by Bluey can be adopted on site with practical application advantages.

Greg was instrumental in the growth of Bluey Technologies which has rapidly expanded to become a reputable construction material supplier throughout Australia, New Zealand and South-East Asia.

Abstract

This presentation explores lightweight cellular grout (LCG) as a sustainable, cost-effective alternative to conventional construction materials. The focus is on three key applications:

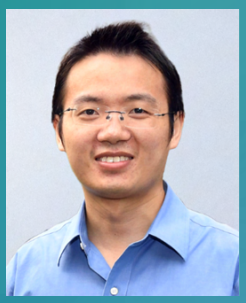
1. Retaining Walls for Slope Stabilization – Replacing no-fines concrete with LCG to reduce material usage, improve workability, and enhance drainage performance.
2. Road Pavement Subbase – Utilizing LCG as a lightweight, stable subbase to minimize settlement and improve load distribution.
3. Reinforced Earth Walls – Substituting compacted soil with LCG for faster installation, reduced labor requirements, and improved cost efficiency.

Presentation

Green Lightweight Concrete for Modular Buildings: from Material Innovation to Building Simulation

Ir Prof Hailong YE

Associate Professor, Department of Civil Engineering, The University of Hong Kong



Ir Professor Hailong Ye is the Leung Cheuk Tong Outstanding Young Professor and an Associate Professor of Structural Engineering at The University of Hong Kong (HKU). He holds a Ph.D. in civil engineering from The Pennsylvania State University, specializing in cement chemistry and sustainable concrete technology. Prof. Ye' has authored more than 150 journal papers and holds 10 patents in this area. His work has been cited over 7,000 times and was recognized with prestigious awards, including the Natural Science Award from The Ministry of Education of China and the R&D Award of The HKIE Structural Division.

Abstract

Modular integrated construction (MiC) is transforming the construction industry by enhancing productivity, safety, and sustainability. This study delved into the potential of using low-carbon lightweight structural and insulation concrete, including foamed glass-based ultra-high-performance concrete (UHPC), lightweight two-stage concrete composites, and cement-free GGBS-based foamed concrete, for enhancing the life-cycle sustainability of MiC buildings. Their impact on both the embodied and operational carbon emissions of MiC high-rise residential buildings was investigated, in which the integrated analysis of material-structure-building interactions was emphasized. The integrated analysis revealed that the use of lightweight concrete could reduce the life-cycle carbon emissions of residential buildings by at least ~7%. Without any use of Portland cement, the GGBS-based foamed concrete can achieve superior mechanical and thermal insulation properties, while lowering the embodied carbon emission by about 80%.

Presentation

Development of Semi-flexible Pavement for Heavily Trafficked Road in Hong Kong

Mr Vincent KWOK

Senior Engineer, Highways Department

Ir Vincent KWOK obtained his first degree on civil and structural engineering in the University of Hong Kong in 1996 with further postgraduate study on the Master of Science in Infrastructure Project Management in 2009. He had been involved in various infrastructure projects including Central Reclamation Phase III and Wan Chai Development Phase II when working in the Civil Engineering and Development Department. He currently works as Senior Engineer of the Research and Development Division of the Highways Department overseeing development of bituminous pavement materials, and has been involved in various collaborative studies with tertiary institutes on bituminous pavement materials over the past 10 years.

Prof Zhen LENG

Professor, The Hong Kong Polytechnic University

Dr. Leng is a Professor and Associate Director of the Research Centre for Resources Engineering towards Carbon Neutrality at The Hong Kong Polytechnic University. His research mainly focuses on sustainable and smart pavement materials and technologies. He has served as the President of Academy of Pavement Science and Engineering (2023-2025), the President of ASCE Greater China Section (2021-2022), a Council Member of the Hong Kong Institution of Highways and Transportation, and the Chair of the Asphalt Pavement Discipline of World Transport Convention. He is also the EIC of Journal of Cleaner Materials, an Executive Editor of Journal of Cleaner Production, and an AE of ASCE Journal of Materials in Civil Engineering, and Journal of Transportation Engineering, Part B: Pavements.

Abstract

Semi-flexible pavement (SFP) is a composite material that synergizes the flexibility of bituminous pavement and the high strength of concrete pavement. It presents a promising solution for mitigating prevalent bituminous pavement distresses, such as rutting and potholes, under intense traffic conditions while maintaining a good riding quality and easy-to-maintain characteristics. This presentation outlines a recent collaborative study by the Highways Department and The Hong Kong Polytechnic University. The study aims to evaluate the technical feasibility of using locally available highly modified friction course (HMFC) materials as the skeletal matrix for filling of cement-based mortar grouting material to develop SFP for heavily trafficked roads in Hong Kong.

Initial laboratory results are highly encouraging, demonstrating that the local HMFC can form a suitable skeleton for successful grouting of fast-set cement-based mortar. These promising findings pave the way for field trials, which further validate the performance of SFP and establish comprehensive practical guidelines for application of SPF in Hong Kong, thereby contributing to a more durable and sustainable road network for Hong Kong.

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