

PHYSICAL EVENT

TECHNICAL TALK ON “REDUCING EMBODIED CARBON WITH GREEN CONCRETE TECHNOLOGIES”

Date: 23rd November 2023 (Thursday)

Time: 5.30pm - 7.30pm

Venue: Malakoff Auditorium, Ground Floor, Wisma IEM

CPD : 2.0

REF. NO.: IEM23/HQ/504/T



Presented by:
Dr. Wang Su

IEM Students: FOC
IEM Members: RM 15
Non-IEM Members: RM70

SYNOPSIS

In the built environment, the emphasis on reducing operational carbon has often overshadowed an equally important need to reduce embodied carbon. Operational carbon refers to the carbon emissions associated with the day-to-day use of the building while embodied carbon refers to carbon emissions associated with the manufacturing, transportation and disposal of building materials used in the construction of a building. Once a building is completed, embodied carbon is "locked in" and irreversible.

Without targeted actions, embodied carbon is projected to surpass the operating emissions of buildings in the coming years. According to Architecture 2030, embodied carbon will likely account for 57% of the emissions from new constructions between 2020 and 2040, up from 49% today.

Building developers are looking at ways to reduce the carbon footprint in the building life cycle. Many are also taking the bold step to increase the use of Ground Granulated Blast-furnace Slag (GGBS) to replace Ordinary Portland Cement (OPC), which is currently responsible for 8% of global CO₂ emissions. Additionally, the market is going through a green transition with the adoption of Carbon Capture & Utilisation (CCU) technology that embeds waste CO₂ in concrete to produce CO₂ mineralised concrete with the same durability, workability and performance.

With the increasing urgency to fight climate change, industry players can do their part to decarbonise the built environment through the adoption of low-carbon building materials such as CO₂ mineralised concrete.

ABOUT SPEAKER

Dr. Wang Su is a Senior Scientist at Pan-United Concrete, a wholly-owned subsidiary of Pan-United Corporation Ltd (Pan-United). He has over a decade of experience conducting research on concrete and cementitious materials. At Pan-United, Dr Wang utilises the latest technology to innovate and develop specialised low-carbon concrete for the built environment. He also plays a pivotal role in studying and exploring the viability of using novel ingredients to enhance Pan-United's suite of concrete solutions. Currently, Dr Wang is a Co-Principal Investigator of a project sponsored by Singapore's national water agency, PUB, on the applications of carbon-negative minerals recovered from waste streams in concrete.

Dr. Wang has published many high-quality Science Citation Index (SCI) research papers, on topics such as lightweight concrete, ultra-high performance concrete, the application of nano-materials in concrete, the thermal properties of concrete, the long-term durability of concrete, the structural performance and numerical modelling of concrete structures, carbon curing technology for concrete and the effect of temperature on concrete.

Prior to joining Pan-United, Dr Wang worked on R&D projects related to nano-technological ultra-high performance concrete, lightweight concrete, as well as the usage of carbon nanofibers to enhance fire resistance at the underground caverns. While based in China from 2012 - 2014, his research project was on the concrete durability of composite cementitious materials based on the coastal environment of North Jiangsu Province in China.

Dr. Wang holds a PhD and a Master of Science from the School of Civil and Environmental Engineering at the Nanyang Technological University in Singapore, during which, he was awarded a full scholarship for his PhD candidacy. His thesis is on the topic of engineering properties of carbon nanofibers enhanced lightweight cementitious composite. He graduated from the China University of Mining and Technology with a Bachelor's Degree in Civil & Structural Engineering, and was also ranked first in his cohort. During his bachelor studies, Dr Wang was awarded the National Scholarship of China twice and named the cohort's 'Outstanding Graduate of Civil Engineering' upon graduation.