PRESENTATION TITLE

Cement and Concrete Research and Challenges toward Net-Zero Emissions

To achieve net zero by 2050, novel and sustainable low-carbon concrete (LCC) is not an option but is an absolute necessity to be achieved in the near future. In addition, Circular Economy and Waste Recycling are exponentially growing research interests, considering the increasing amount of solid waste that is destined for landfills. LCC can provide an effective way of reducing CO_2 emissions, recycling solid wastes, conserving natural resources, and reducing landfill wastes. Despite considerable research and pressure on developing LCC using waste-derived cementitious materials (WCMs), the industry still lacks confidence in the large-scale application of LCC. This is particularly true for low carbon binder (LCB) with unconventional waste-derived materials (including various types of slags from metal manufacturers, air pollution control residues (APRs), glass wastes, thermally treated soils, mine tailings, etc), where assessing the reactivity and their mechanical and durability performance in LCC requires materials testing for every little change in concrete mix. To promote the viability of these LCCs containing LCB, it is critical to improve the predictability of the performance of LCC and also to develop regulations, standards, and specifications for the newly developed LCC.

BIOGRAPHY

Dr Taehwan Kim is a Senior Lecturer (Associate professor) at the UNSW Sydney, Australia. He received his BS and MS from Korea Advanced Institute of Science and Technology (KAIST), South Korea, and PhD from Purdue University, US. After gaining PhD, Dr Kim worked as a full-time research associate at Oklahoma State University until June 2016. He was involved in and contributed to several interdisciplinary research projects, including an innovative characterization techniques and advancement of the understanding of the hydration mechanisms. After joining UNSW Sydney at 2016, He is branching out to different research areas and collaborating with researchers within/outside civil and environmental engineering. His current research interests are durability of alternative concrete, X-ray imaging, structural build-up of alternative binders, and experimental characterization of cementitious materials.