澳門大學
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INSTITUTO DE FÍSICA APLICADA E ENGENHARIA DE MATERIAIS
INSTITUTE OF APPLIED PHYSICS AND MATERIALS ENGINEERING

# IAPME Seminar

## The improvement of corrosion resistance of wet-cast concrete subjected to early-age ambient pressure carbonation curing

**26 December 2024**

Prof. Xiangping XIAN
City University of Hong Kong

Venue: N23-4018
Time: 11:00 - 12:00
Hosted by: Prof. Binmeng CHEN

**Abstract**

This presentation will mainly discuss the possibility of developing early-age ambient pressure carbonation curing to lower the corrosion risk and improve the resistance by avoiding deep $CO_2$ penetration and chemically and physically densifying the concrete surface layer. In addition to superior $CO_2$ uptake and compressive strength, the effectiveness of ambient pressure carbonation on corrosion resistance of concrete was evaluated by two methods, an accelerated impressed current method and long-term ponding methods (ASTM G109). Due to improved physical properties, carbonation-cured concrete had a lowered current reading, a reduced rebar mass loss, a lessened total or free chloride content, and a decreased chloride diffusivity. In conclusion, ambient pressure carbonation-cured concrete is corrosion resistant while still having the capacity to sequestrate carbon dioxide, which could contribute to sustainability and a circular carbon economy.

**Biography**

Prof. Xian is now working as an Assistant Professor in the Department of Architecture and Civil Engineering at City University of Hong Kong. He 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 under the supervision of Prof. Abir AI-Tabbaa from Cambridge University. His 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, Prof. Xian is also interested in automation construction, 3D printing of green construction materials, the engineering application of durable materials and so on.

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