

AIR-WATER FLOW IN HYDRAULIC ENGINEERING

Speaker

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Abstract

Understanding air-water interactions is important in many areas of hydraulic engineering. For example, the air-water mass transfer between gas bubbles and water is important for artificial aeration and oxygenation. The over-saturation of dissolved gases during dam spill events can lead to high dissolved gas concentration and subsequent fish kills (known as gas bubble disease). The more frequent reporting of sewer odor issues in urban sewer systems and storm geyser events also highlights the need to better understand the air flow movement and the air-water dynamics in sewer systems. In this talk, I will first focus on the dissolution of air during dam spills, and the subsequent de-gasification in the river downstream of the dams. I will then talk about the air flow modeling in sewer systems with deep gravity sewers where air can be dragged in by the falling water in dropshafts. Various structural modifications will be discussed to reduce air pressurization in sewer headspace and prevent potential sewer odor issues. The last part of this talk will discuss storm geysers in Edmonton, Alberta. During a storm event, rapid change in flow rate can lead to the entrapment of air pocket in sewer systems and subsequent geyser events.

Biography

Dr. David Zhu is a Professor at Ningbo University in China. He is a Professor Emeritus in the Department of Civil and Environmental Engineering at the University of Alberta, Canada where he was a faculty member for 25 years. He is a Fellow of Canadian Academy of Engineering, the Canada's NSERC Industrial Research Chair in Urban Drainage. His research focuses on sustainable urban drainage and sustainable hydropower power. He has published over 250 SCI journal papers, and received a number of national and international awards for his research work: including ASCE 2022 Hydraulic Structures Medal, 2018 Karl Emil Hilgard Prize, and 2017 Samuel Arnold Greeley Award, as well as CSCE Dagenais Award for outstanding contributions in hydrotechnical engineering in Canada. Dr. Zhu completed his PhD at the University of British Columbia and his BSc at Shanghai Jiaotong University in China. More information at <https://apps.ualberta.ca/directory/person/dzhu>.

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Room 6573
(Lift 29/30)
HKUST

Registration:

