香港科技大學
THE HONG KONG UNIVERSITY OF SCIENCE AND TECHNOLOGY

土木及環境工程學系
DEPARTMENT OF CIVIL AND ENVIRONMENTAL ENGINEERING

SEMINAR

STABILIZATION OF HIGH-WATER CONTENT MARINE CLAY SLURRY USING INDUSTRY BY-PRODUCTS/WASTES FOR LAND RECLAMATION

Speaker

Dr. Yaolin Yi

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Abstract

Land reclamation is important for costal countires with limited land resources, like Singapore, to accommodate its economic development and to tackle the challenge of sea-levels rise. Traditional filling materials (e.g. sand) are depleting, urging the discovery of new filling materials. Dredging activities in Singapore generates million tonnes of high-water content clay slurry every year, which can be used as fills in land reclamation after proper treatments. The conventional preloading method has been widely used in soil improvements due to the relatively low cost, but this method is time-consuming. Chemical stabilization can achieve rapid stabilization by mixing clay slurry with binders. However, a relatively large amount of ordinary Portland cement (OPC) is required in slurry stabilization, which would increase the construction costs, and the production of OPC is associated with significant environmental impacts, including high CO2 emission and high energy consumption. Therefore, this study investigates the use of two industrial by-products, carbide sludge (CS) and ground granulated blastfurnace slag (GGBS), as OPC alternatives in the stabilization of high-water content marine clay slurry, aiming to reduce construction costs, enhance the stabilization efficacy, and mitigate the environmental impacts related to OPC production. The study focuses on the physical, mechanical, hydraulic, chemical, and microstructural properties of marine clay slurry stabilized with CS-GGBS and OPC.

Biography

Dr. Yaolin Yi is an Associate Professor in the School of Civil and Environmental Engineering, Nanyang Technological University (NTU), and the Deputy Co-Director of Surbana Jurong-NTU Corporate Laboratory, Singapore. Dr. Yi's research areas generally include geotechnical and geoenvironmental engineering, sustainable construction materials, and waste treatment for civil engineering applications. Recently, his research focus on (1) development of sustainable construction materials by using industry by-products/wastes, (2) durability of stabilized soils in marine environment, and (3) carbonation of solid wastes for CO2 sequestration and heavy metal immobilization. Dr. Yi is the Secretary of ISSMGE technical committee 'Sustainability in Geotechnical Engineering (TC307)' and ASCE Geo-Institute Soil Improvement Committee. He serves Associate Editor for ASCE Journal of Materials in Civil Engineering and Editorial Member for ICE Geotechnical Engineering journal and ICE Ground Improvement journal.

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