Young Members

Erosion and subsequent failure of river dykes

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I am Muhammad Umer Afzal from Pakistan. It is my great privilege to share my academic journey, work experience, and ongoing research activities for IPA Newsletter. I enroll in the Master of Engineering program at the Department of Civil and Environmental Engineering, Saitama University, Japan. I hold an Undergraduate degree in Civil Engineering from the University of Engineering & Technology (UET) Lahore in 2014, one of the top engineering institutes in Pakistan. My first professional stint was in October 2014 with National Engineering Services Pakistan (Pvt.) Ltd. (NESPAK), the premier engineering consultancy firm in Pakistan. It served as a stepping stone for my career, and professionally, I have benefitted immensely from my work at NESPAK. Before starting my graduate degree at Saitama University, Japan, I was employed as a Senior Geotechnical Engineer in the Geotechnical and Geo-environmental engineering Division of NESPAK. Here I worked in a broad spectrum of geotechnical design applications ranging from geotechnical investigations, design of foundations, seepage and slope stability analysis, and geotechnical design of dams and hydropower projects.

Earlier in my career, I developed a keen interest in geotechnical engineering and wanted to pursue higher education in this field to broaden my knowledge base in my chosen field. Japan, being home to a diverse, multicultural academic community involved in innovative research activities, was ideal for realizing my goals. Japanese Higher Education Institutes are among the world's leading research centers with state-of-the-art laboratories.

Considering my academic achievements and passion for higher education, I was awarded an ADB-JSP scholarship to pursue my graduate degree at Saitama University, Japan, where I work with the Geotechnical and Geosphere Research Group (GGRG) under the supervision of Prof. Jiro Kuwano. As part of my graduate education, I am working on my research titled "Experimental Study on Erosion Control of River Dyke Slope with Geosynthetics Surface Cover by Overtopping Flow". Dykes are earthen embankments along river flood plains that essentially confine the river to a guided channel, protecting agricultural lands and built-up areas from flooding. Typically, earthen dykes are very long structures along the river channel and can sometimes go kilometers in length. Every year, an increasing number of earthen dykes fail or are seriously damaged due to heavy rainfall events. Recent climate change and global warming phenomena are exacerbating the problem with erratic rainfall patterns and cloud bursts. Usually, earthen dykes are not designed to resist overtopping river flows, and consequently, they are sensitive and vulnerable to overflow conditions causing monetary and human losses all around the world. As part of my research, a series of model tests were conducted to investigate the effects of different particle sizes and different slope inclinations on the erosion process due to overtopping. Additionally, the application of geosynthetic surface cover to river dyke slopes was evaluated to avoid the failure of dykes

Although not a part of my ongoing research, I am well aware of several previous studies that advocate press-in technologies for stabilizing river dykes. It is especially true for the construction of dykes on soft ground susceptible to settlement and lateral displacement, as press-in piles have been found to be very effective in such ground conditions. The efficiency and effectiveness of press-in piles depend upon the spacing and penetration depth of the piles. Furthermore, dyke reinforcement with sheet piles is an effective measure to protect river dykes. In addition to being reliable, adaptable, efficient, and economical, this technique is considered to have minimal environmental impacts.

With complete certainty, I can say IPA is a highly professional platform to learn about the latest developments of press-in technologies in the construction industry worldwide. I look forward to sharing my research work in the coming future.

The Posterity of press-in piling method in Singapore

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I am Jian Wei from Singapore; I am a bachelor's student of Civil Engineering at Newcastle Australia Institute of Higher Education (a wholly-owned entity of The University of Newcastle, Australia – Patenered with BCA Academy), Singapore. I have completed the course requirements and will soon complete (expected date: April 2023) the Industrial attachment with Woh Hup Private Limited as a site engineer (intern). During my course of studies, I developed a great interest in geotechnical engineering and, eventually, chose geotechnical as my topic for my final year project under the supervision of Dr. Kar Winn. I was given the topic, “Tunneling in Close Proximity of Major Infrastructures in Singapore”, focusing on past LTA Thomson-East Line (TEL) projects, contracts T225 and T216. These two projects focus on deep excavation up to 55m, where the geological profile predominantly comprises Fluvial Clay and Marine Clay.

Recently, I had the opportunity to attend the IPA 15th Anniversary Seminar in Singapore. It was truly an eye-opening experience to see numerous usages of GIKEN Silent Pilers worldwide. IPA conducted a live site demonstration in which three sheet piles were installed (Press-in method) in a short span of 15 minutes in close proximity (zero clearance) to the neighboring terrace house by Guan Chuan Engineering Pte Ltd, site located at Begonia Road. The press-in method is truly revolutionary and is a solution that fits the current global issues of environmental sustainability, climate, and geopolitical changes. The press-in method was used for several Deep Tunnel Sewage Service (DTSS) projects in Singapore. I hope to see more applications in future projects locally and globally because it’s revolutionary and a solution that fits the current global issues of environmental sustainability, climate, and geopolitical changes.

Understanding the failure modes of screw pile

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I am Dwe Nge Oo from Myanmar. In 2020, I completed my Diploma in Civil Engineering from the Building and Construction Authority (BCA) of Singapore. I am a final-year Bachelor of Civil Engineering student at the Newcastle Australia Institute of Higher Education, Singapore (a wholly-owned entity of The University of Newcastle, Australia – Partnered with BCA Academy).

Throughout my academic career, I was driven by a strong desire to further my education in Civil Engineering. During my final year project, I had the opportunity to do research on the screw pile (installed with the rotary press-in method) failure modes. And thanks to the assistance of my supervisor, Dr. Adnan Anwar Malik, I was able to learn and analyze the significance of the screw pile inter-helix spacing ratio. The study titled " A review on the influence of inter-helix spacing on screw pile failure modes" was primarily concerned with optimizing the inter-helix spacing ratio based on published literature and its effect on screw pile axial bearing capacity. It is critical to appropriately identify the inter-helix spacing ratio that separates the failure modes, i.e., Cylindrical Shear Mode and Individual Bearing Mode. Otherwise, the design will be either overestimated or underestimated, which will have an impact on the project's safety and cost, with considerable changes required during the construction phase. IPA is a fantastic platform for students because it provides detailed insight into the latest technologies being used worldwide in deep foundations.