



Exponent[®]
Engineering & Scientific Consulting

Sam Kim, Ph.D.

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Professional Profile

Dr. Kim is a civil engineer specializing in geotechnical engineering. His expertise centers on stability analyses of earth structures such as foundations, retaining walls, and slopes under static and seismic loading. In addition to traditional methodologies, Dr. Kim has utilized advanced engineering plasticity theory and numerical methods to investigate how fundamental soil behaviors, specifically dilatancy and plastic flow rule, govern the potential collapse mechanisms of earth structures. By integrating these theoretical principles with numerical simulations and experiments, he has solved complex soil-interaction problems where simplified design assumptions may be insufficient.

Prior to joining Exponent, Dr. Kim did his Ph.D. study at the University of Michigan, where he performed research that addressed limitations in traditional stability analysis. His research focused on the impact of “non-associative” plastic flow, a realistic soil behavior often simplified in standard engineering practice, on the safety margins of geotechnical structures. Dr. Kim developed advanced kinematic limit analysis framework to quantify how these specific flow rules influence slope factors of safety, bearing capacity and retaining wall loads.

Dr. Kim also possesses specialized expertise in geotechnical earthquake engineering and physical modeling. He has conducted large-scale dynamic centrifuge testing to evaluate the seismic performance of maritime infrastructure. His research investigated the mechanisms of liquefaction induced deformation and the dynamic interaction between gravity-type quay walls and backfill soils. This work provided insights into predicting how port facilities and waterfront structures respond to earthquake loading and potential ground failure.

In addition to his research, Dr. Kim has applied his technical skillset to industrial challenges in the energy sector, by contributing to foundation designs for battery energy storage systems (BESS). His professional approach combined rigorous site characterization with advanced theoretical analysis to mitigate risk and assess the stability of the foundations.

Academic Credentials & Professional Honors

Ph.D., Civil Engineering, University of Michigan, 2025

M.S., Civil and Environmental Engineering, KAIST, 2020

B.S., Civil Engineering, Chung-Ang University, 2012