THE UNIVERSITY OF HONG KONG

DEPARTMENT OF CIVIL ENGINEERING

SEMINAR

Bearing capacity of soils - new insights from advanced finite element analysis

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Date: January 23, 2026 (Friday)
Time: 3:30 p.m. to 4:30 p.m.
Venue: Room 612B, 6/F Haking Wong Building, The University of Hong Kong

Abstract
The bearing capacity of soils are critical for the design and analysis of foundations. The classical solutions derived from methods of characteristics and bound theories are based on the rigid plasticity and associated flow rule, which may not be realistic for natural soils. The undrained shear strength of soft clays exhibits strain-softening, anisotropic, and rate-dependent behavior in the lab tests, which creates complexity to choose appropriate strength parameters in conventional design process. The behavior of sand depends on the stress level and void ratio. In addition, the stress-strain characters of soils are non-associative and path dependent, which also affects the bearing capacity of soils. This seminar investigates two classical stability problems (i.e. deeply embedded pile/pipe section, and rigid strip footing) using finite element analysis and advanced soil models, and demonstrates the effects of stain-softening, strength anisotropy, and loading rate on the undrained bearing capacity of clay, as well as the effects of void ratio and footing size on the drained bearing capacity of sand. These findings have strong practical implications to predict the bearing capacity of foundations and interpret insitu tests.

About the Speaker
Yuepeng Dong is currently an Associate Professor in Geotechnics at the Technical University of Denmark (DTU). His research mainly focus on computational geomechanics (e.g. finite element analysis, constitutive modelling of geomaterials) and underground constructions (e.g. excavations, tunneling, foundations). Before joining DTU, he worked with Prof. Andrew J. Whittle as a Postdoc Associate, based at Singapore-MIT Alliance for Research and Technology (SMART). He obtained DPhil in Engineering Science from the University of Oxford supervised by Prof. Harvey J. Burd and Guy T. Houlsby, and BEng in Civil Engineering from Shanghai Jiao Tong University.

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