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

THE GREAT ESCAPE – MECHANISMS AND FACTORS CONTROLLING MUD FLOW FROM BOREHOLES DURING HORIZONTAL DIRECTIONAL DRILLING

Speaker

Prof. Ian D. Moore

Queen's University

Abstract

Horizontal directional drilling is now routinely used to install pipelines that pass below obstructions such as waterways, buildings, highways, railways, and environmentally sensitive sites. During construction, drilling mud is used to remove cuttings from the borehole, cool the drill string, and stabilize the borehole. However, excessive mud pressures can lead to shear failure or tensile failure of the soil surrounding the borehole, allowing the mud to escape and travel up to the ground surface or into the base of the river or whatever obstruction is overhead – a significant problem during construction referred to as 'inadvertent returns' or 'fracout' by people in this industry. Geotechnical assessments are therefore needed in many projects to assess the maximum mud pressures that the contactor can use during construction. The presentation provides an overview of the analysis work undertaken by the author and his collaborators to establish the mud transport mechanisms, and the equations they have developed for use by geotechnical consultants and for implementation in specialist software employed by contractors. The different mechanisms controlling mud loss from boreholes in clay and sand are explained, and testing is described permitting observation of the mud flow paths, providing the physical data needed to evaluate the performance of theoretical calculations, and examining how the mud pressure equations relate to stratified soils.

Biography

Trained in Australia, Dr Moore has been a Professor at Queen's University since 2001. His 370 publications examine conventional and trenchless construction of new and deteriorated water, sewer, and energy pipelines, and have underpinned dozens of contributions to North American and other international codes of buried pipe design practice. Recognition for Dr Moore's work includes best paper awards from the ASCE, CGS, CSCE, ICE, NASTT, and other awards from various learned societies. Dr Moore is an elected Fellow of the Royal Society of Canada (Academy of Science), the Canadian Academy of Engineering, and other learned societies.

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