

国家重点实验室学术报告

题 目:

Centrifuge model study on onshore, marine
and offshore geotechnical problems
(陆地、海洋、近海岩土工程问题的离心
机模拟模拟试验研究)

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深部岩土力学与地下工程国家重点实验室
力学与土木工程学院

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报告摘要：

土工离心机模拟是研究岩土工程问题的一种强大而实用的工具。本演讲首先介绍离心机模型测试的优势，简要介绍离心模型的尺寸缩放定律，其次介绍新加坡国立大学的离心机模型试验在陆地、海洋和近海岩土工程问题中的应用。以陆地问题为例，研究了地下水位上升对黄土地基浅层地基承载力和沉降的影响；以海洋岩土工程问题为例，研究了集装箱港口服务荷载下重力沉箱码头前沿结构的移动以及破碎波对重力沉箱防波堤结构的影响；以近海工程为例，研究了自升式 SPUDCAN 安装对支撑永久导管架平台的相邻桩基础的影响。通过这三个工程实例，说明了离心机建模技术的优点和可能存在的缺陷。

Centrifuge modelling is a powerful and versatile tool to investigate geotechnical problems. This lecture will first highlight the advantages of centrifuge model testing and briefly cover the centrifuge model scaling laws. This is followed by the applications of centrifuge model testing on sample onshore, marine and offshore geotechnical problems. An example of onshore problem examines the effect of rising ground water table on the bearing capacity and settlement of shallow foundation on loess soil. This is followed by a marine geotechnical problem concerning the movement of gravity caisson wharf front structures under container port service loading and the effects of breaking waves on gravity caisson breakwater structures. The example of offshore geotechnical problem investigates the effects of jack-up spudcan installation on adjacent piled foundation supporting the permanent jacket platform. Through these sample problems, the advantages and possible pitfalls of centrifuge modelling technique are illustrated.

报告人简介：

梁春辉博士是新加坡国立大学土木与环境工程系教授，国际土力学和岩土工程学会（ISSMGE）的岩土物理模拟技术委员会前主席，国际海洋和极地工程学会（ISOPE）的岩土技术委员会主席，英国土工杂志(Geotechnique)和其他几个国际岩土和海洋工程杂志的编委。梁教授 1981 年加入新加坡国立大学土木工程系，从事教学和科学研究工作至今。主要研究方向包括近海、海洋和陆地的岩土工程，特别是在土体-结构相互作用、近海 spudcan 基础和海洋深层水管道和地锚、节理岩体力学。已在国际岩土和海洋工程类期刊上发表了近百篇 SCI 论文。他是新加坡注册岩土工程师和英国特许土木工程师，曾担任新加坡和其他国家的 100 多个大型土木工程项目的岩土工程顾问；担任新加坡工程师学院管理委员会主席，新加坡国家技术委员会土木和岩土工程分会成员。

Professor LEUNG Chun Fai is a professor in the Department of Civil Engineering at the National University of Singapore. Professor Leung has taught courses in geotechnical engineering, pile foundations, rock mechanics and foundation analysis. He has published many technical papers in international journals and conferences covering topics such as centrifuge modelling of geotechnical problems, pile foundations, land reclamation and excavation in jointed rocks. Professor Leung has delivered keynote/invited lectures at many international geotechnical and offshore engineering conferences. He is on the ISO Jack-up foundation panel P4.

Professor Leung is a registered professional engineer (geotechnical specialist) in Singapore and a chartered civil engineer in UK. He has served as a geotechnical consultant for many government and private organisations involving projects in Singapore and the region on pile foundations, land reclamation, seafront wharf structures, anchored retaining wall, centrifuge model testing, slope stability, soil settlement and erosion studies.