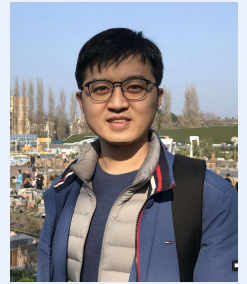# 海岸和近海工程国家重点实验室 学术讲堂

**题　目：** Free vibration of liquid sloshing in a cylindrical container with an elastic cover

**报告人：** 任　康　博士

**时　间：** 2021年12月17日 15:30-16:30

**地　点：** 腾讯会议房间号：681 7974 9019

## 内容简介：

Dr. Kang Ren has been working as a research fellow in the Department of Mechanical Engineering after obtaining the PhD degree from UCL. His current research focuses on fluid-elasticity interaction and its applications in marine engineering, such as the interaction between ocean waves, sea ice and marine structures for the safe navigation of ships on icy waters, and its applications of sloshing dynamics in construction industry, marine engineering, and space engineering. His work has been published in several world-renowned international refereed journals including Journal of Fluid Mechanics, Physics of Fluids, Journal of Fluids and Structures, and Journal of Sound and Vibration.

Abstract: An overview of my previous research on wave-ice-structure interaction in unbounded ocean and confined fluid regions will be briefly introduced first. Then the talk will focus on my recent research on the liquid sloshing and its interaction with an elastic cover in a cylindrical tank. The elastic cover can be modelled as the elastic thin plate (Kirchhoff-Love plate), and the fluid is treated as inviscid, incompressible and motion as irrotational (potential flow theory). In one of the developed schemes, same expansions are adopted for both the fourth-order derivatives of the plate deflection and the velocity potential of the fluid domain. This not only helps to improve the efficiency of the matching procedure, but also provides a convenient means to impose the edge conditions. Through the developed method, an explicit equation is derived for the natural frequencies and extensive results are provided. To verify the obtained results, the problem is also solved through a different method in which the potential is first expanded into vertical modes. Another explicit equation for the natural frequencies is derived. While the equation may be in a very different form, through the residual theorem, it is found that the second equation is identical to the first one.

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