INDIAN INSTITUTE OF TECHNOLOGY GUWAHATI
SHORT ABSTRACT OF THESIS

Name of the Student	:	Shilpi Jain
Roll Number	:	196123113
Programme of Study	:	Ph.D.

Thesis Title: Study of Linear Water Wave Scattering by a Floating Structure in the Presence of Porous Breakwaters for Different Types of Sea-bed: Pattern of Scattering and Wave Force Mitigation

Name of Thesis Supervisor(s)	:	Prof. Swaroop Nandan Bora
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SHORT ABSTRACT

Due to globalization and shortage of land, a significant challenge in this century is to create spaces suitable for various human activities including habitation. Therefore, there arises a great necessity for utilizing the available ocean space for accommodating numerous activities. Subsequently, the study of the impact of water wave interaction with very large floating structures (VLFS in short) has become an important and practical issue. It has been observed that many floating structures have collapsed due to various natural hazards such as floods, cyclones and tsunamis. It is, therefore, necessary to investigate a variety of parameters with suitable values so as to bring the hydrodynamic forces acting on floating structures under reasonable control in addition to studying the scattering pattern.

In this thesis, we address five problems on water wave scattering with floating structures in the presence of different types of porous breakwaters, such as thin vertical barriers, thick porous structures, and bottom topographies, such as porous bottom, uneven bottom. We emphasize on the fact that porous breakwaters can mitigate wave-induced forces on the floating structures. The study is carried out to examine the effect of the porous structures and the bed topography in the whole scattering phenomenon and in mitigating the wave forces acting on the floating structure. We analyse the patterns of reflection, transmission and wave forces. In all the works, the results are validated against available results for verifying the effectiveness of each model presented so that these models can be used for problems involving floating structures in oceans.