Analysis of fixed Oscillating Water Column Under Various Wave Conditions

Janhavi Deshpande
Bachelor of Technology,
Department of Mechanical Engineering
Veermata Jijabai Technological Institute, Mumbai

Abstract

The study aims at analysis of fixed Oscillating Water Column under different wave conditions. An Oscillating Water Column is a device that consists of a fixed hollow structure that holds oscillating water and creates an air chamber above it. The top part has an orifice that drives air through the vertical oscillating motion of water column below. The air is passed on to the turbine where it generates electricity. To do so, energy of water waves is converted to kinetic energy of air through orifice. During the analysis, the frictional losses because of chamber walls are neglected. The results are validated with the experimental results from the **Applied Ocean Research Paper.**

The geometry is constructed in Salome using *Extrusion 3D* algorithm and a uniform mesh size of 0.04 to create hexahedral mesh. The mesh is imported in OpenFoam using *ideasUnvToFoam*. The case is an example of multiphase case and *interFoam* solver is used. The wave is a *cnoidal* wave having a laminar flow. The results are analyzed using *paraView.*

Two major cases are listed below, other cases were used to compare various factors.
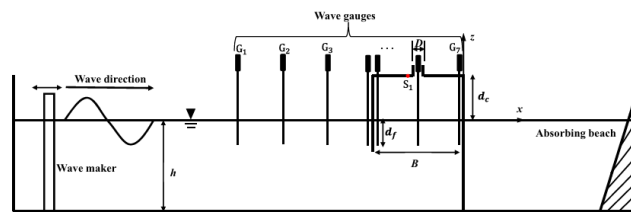
(a) Side view
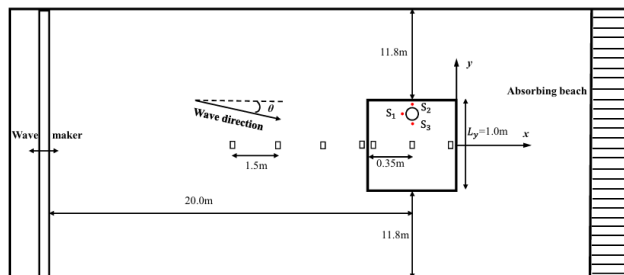
Case	Amplitude	df(submerged length)	dc(length above water)	Time Period
2D	0.03	0.15	0.2	2.6
2D	0.03	0.15	0.2	1.8