

عنوان مقاله:

Numerical Validation of Experimental Tests Conducted on a Fixed Offshore Oscillating Water Column

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خلاصه مقاله:

Supplying world future energy is tied with renewable energies and wave energy is one of the biggest resources of renewable energy which is somehow untapped. Oscillating Water Column (OWC), one of the most familiar devices in harnessing wave energy, is still not being properly commercialized due to the complicated hydrodynamic behavior. Offshore OWCs are exposed to higher wave energy; however, the researches on this kind of OWCs is limited. Hence, in this paper, a fully nonlinear two phase flow model of a fixed offshore OWC is developed using Ansys Fluent. Unlike the previous studies, the developed numerical model has the merit of being validated against a relatively large scale physical model (1:15). The results of the model are compared by those obtained in experimental campaign conducted by the authors. Results of both free surface elevation and air pressure in the OWC chamber are compared. Generally, the results showed an admissible accordance between numerical and experimental model. Some discrepancies could be detected in the free surface elevation in the chamber especially for short wave period. This can be attributed to the increase of nonlinear effects in the chamber by increase of wave steepness. The developed model can be applied for further researches on OWCs such as optimization or improving OWC performance.

کلمات کلیدی:

OWC, numerical simulation, wave energy, CFD, experimental

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