Investigations on the porous resistance coefficients for fishing net structures

The porous media model has been successfully applied to numerical simulation of current and wave interaction with traditional permeable coastal structures such as breakwaters. Recently this model was employed to simulate flow through and around fishing net structures, where the unknown porous resistance coefficients were adjusted by fitting the available experimental data. In the present paper, a new approach was proposed to calculate the porous resistance coefficients based on the transformation of Morison type load model. The transformation follows the principle that the total forces acting on a net panel from Morison type load model should be equal to the forces obtained from the porous media model. In order to account for the interaction effects in-between the twines, two coefficients were introduced, and they were calibrated by minimizing the least square error function. Extensive validation cases were carried out to examine the performance of the numerical model. This includes steady current flow through plane net panels and circular fish cages, and wave interaction with plane net panels. A variety of fishing nets with different solidity ratios were used in the validation cases, from which it was seen that the overall agreement between the numerical and experimental results is fair.

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