

عنوان مقاله:

An Approximate Method for the Evaluation of the Normal Force Acting on a Flexible Plate Normal to the Wind Flow

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خلاصه مقاله:

The purpose of this paper is to develop an approximate method for the evaluation of the normal force acting on a flexible plate normal to the wind flow and the deformation of the plate. A theoretical modelling is firstly proposed to predict the relationship between the normal drag coefficient of a rigid curved-plate and the configuration of the plate with the aid of a series of numerical analyses of structure and fluid dynamics. Then, based on the theoretical modelling, an approximate method for the evaluation of the normal force acting on the plate and the deformation of the plate is constructed using only the iteration of structure mechanics analysis, instead of conventional complex iterations of fluid-structure coupling analysis. Simulation tests for ۳D flexible plates with different lengths and different material moduli are conducted. Also a comparative simulation test of a ۳D flexible plate used in a previous experiment is performed to further confirm the validity and accuracy of the approximate method. Numerical results obtained from the approximate method agree well with those obtained from the fluid dynamics analysis as well as the results of the .previous wind tunnel experiment

کلمات کلیدی:

Flexible plate, Wind flow, Normal force, Approximate method, Fluid, structure interaction

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