

عنوان مقاله:

An Analytical and Experimental Investigation on Scaling of Flange Couplings

محل انتشار:

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خلاصه مقاله:

Flange couplings have a lot of application in the industries. So, studying dynamic behavior of this type of junctions would be necessary. In this study, dynamic model of a system of two beams and a flange coupling has been extracted. The flange has been modeled as a torsional equivalent spring which is connected two beams. After that, a procedure has been presented in order to calculate the stiffness of the torsional spring. The equivalent torsional stiffness was calculated by using torsional stiffness of joint (summation of stiffness of bolt and flange laps). Then, a summation of equivalent stiffness over all bolts was done. Having full dynamical equation, the main subject of the study which is the scaling, is investigated. An appropriate procedure has been introduced for scaling of flange coupling parameters. In order to examine the indefinite parameters and verify the results of previous calculations, an experimental setup was developed. The setup consists of two separate 1.7 and 2 meters pipes connecting each other with a 9-bolted flange. A scaled model with the proportion of 1/3 was also made and examined. In the scaled model the number of bolts was reduced to 6 in order to evaluate the proposed scaling procedure. Results of modal testing consist of frequency response function and natural frequencies were extracted. Then a comparison has been done between the results of the prototype and scaled model. Result of the scaled model and prototype had good agreement and percent of error remains very low.

کلمات کلیدی:

Natural frequency, Scaling, Flange coupling, Modal test

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