071-ST

Experimental and Theoretical Determination of Rotor Critical Speeds

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The rotor critical speeds are the speeds accompanied by a great dynamic load, and maximum vibration. The critical speeds of rotation coincide with the natural frequencies of transverse vibration of the non-rotating shaft disc system. These speeds should be determined carefully. In this paper, the critical speeds of a shaft-discs system are calculated using several methods. Firstly, Raleigh's method, and transfer matrix method are used to calculate the first and the second critical speeds using MATLAB software. Secondly, the critical speeds are calculated by finite element method using ANSYS package. Finally, an experimental investigation is done to determine the values of critical speeds. The experimental results are presented in comparison with the calculated values.