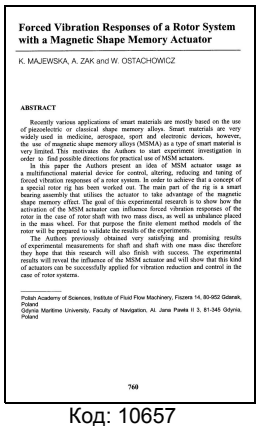
Forced Vibration Responses of a Rotor System with a Magnetic Shape Memory Actuator

K. MAJEWSKA, A. ZAK and W. OSTACHOWICZ

ABSTRACT

Recently various applications of smart materials are mostly based on the use of piezoelectric or classical shape memory alloys. Smart materials are very widely used in medicine, aerospace, sport and electronic devices, however, the use of magnetic shape memory alloys (MSMA) as a type of smart material is very limited. This motivates the Authors to start experiment investigation in order to find possible directions for practical use of MSM actuators.

In this paper the Authors present an idea of MSM actuator usage as a multifunctional material device for control, altering, reducing and tuning of forced vibration responses of a rotor system. In order to achieve that a concept of a special rotor rig has been worked out. The main part of the rig is a smart bearing assembly that utilises the actuator to take advantage of the magnetic shape memory effect. The goal of this experimental research is to show how the activation of the MSM actuator can influence forced vibration responses of the rotor in the case of rotor shaft with two mass discs, as well as unbalance placed in the mass wheel. For that purpose the finite element method models of the rotor will be prepared to validate the results of the experiments.

The Authors previously obtained very satisfying and promising results of experimental measurements for shaft and shaft with one mass disc therefore they hope that this research will also finish with success. The experimental results will reveal the influence of the MSM actuator and will show that this kind of actuators can be successfully applied for vibration reduction and control in the case of rotor systems.

Polish Academy of Sciences, Institute of Fluid Flow Machinery, Fiszera 14, 80-952 Gdansk, Poland
Gdynia Maritime University, Faculty of Navigation, Al. Jana Pawla II 3, 81-345 Gdynia, Poland

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Код: 10657

K. Majewska, A. Zak, W. Ostachowicz

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Ключевые слова:

Содержание.