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THE CONTROL OF BEARING STIFFNESS USING SHAPE MEMORY

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ABSTRACT
The problem addressed in this paper is the control of the effective stiffness of a bearing pedestal by means of a series of shape memory alloy wires. The bearing is mounted on elastomer O-rings whose preload (and hence stiffness) is controlled by a set of shape memory allow wires. In the first part of the paper a discussion of the rig design is given together with the predictive calculations of performance. These predictions are then compared with measurement taken from the rig. Steady state and transient solutions are examined in order to ascertain the likely requirements in terms of heating and cooling rates. The theoretical background is given together with the results of initial laboratory testing.
Having established the viability of this technology, options for extending the design to control stiffness in both orthogonal directions are discussed together with an assessment of the future problems and potential benefits of extending this study.

Keywords:
Vibration, Control, Shape Memory, Elastomer