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An Experimental Design of Bypass Magneto-Rheological (MR) damper (Conference Paper)

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Abstract

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The magnetorheological (MR) fluid bypass damper fluid flow through a bypass by utilizing an external channel which allows the controllability of MR fluid in the channel. The Bypass MR damper (BMRD) contains a rectangular bypass flow channel, current controlled movable piston shaft arrangement and MR fluid. The static piston coil case is winding by a coil which is used inside the piston head arrangement. The current controlled coil case provides a magnetic flux through the BMRD cylinder for controllability. The high strength of alloy steel materials are used for making piston shaft which allows magnetic flux propagation throughout the BMRD cylinder. Using the above design materials, a Bypass MR damper is designed and tested. An excitation of current is applied during the experiment which characterizes the BMRD controllability. It is shown that the BMRD with external flow channel allows a high controllable damping force using an excitation current. The experimental result of damping force-displacement characteristics with current excitation and without current excitation are compared in this research. The BMRD model is validated by the experimental result at various frequencies and applied excitation current.

Indexed keywords

Engineering controlled terms: Alloy steel, Channel flow, Controllability, Cylinders (shapes), Flow of fluids, High strength alloys, High strength steel, Magnetic flux, Magnetorheological fluids, Pistons

Compendex keywords: Controllable damping, Current excitation, Design materials, Excitation currents, Flux propagation, Magneto-rheological, Magneto-rheological dampers, Steel materials

Engineering main heading: Damping

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