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Experimental Investigation on Small-Scale MR Damper With Frequency Variation for Seismic Resistant Structure

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Abstract

The magneto-rheological (MR) damper is one of the most sophisticated applications in the field of semi-active control devices. Its popularity is growing on a daily basis as a result of its numerous benefits and diverse applications. When the viscosity of the MR damper's internal MR fluid is changed, the force delivered by the MR damper changes. Most MR damper modeling and simulation have been completed without much experimental study, which has been accomplished by taking fundamental factors into account. The performance of a small-scale MR damper designed and manufactured was tested experimentally using an MTS Servo Hydraulic 311.31 system. To accurately characterize the MR damper behavior, it was tested experimentally for two different displacements at different excitation frequencies. The forces developed by the MR damper, as well as the relationship between governing frequency, velocity, displacement, and maximum energy dissipation by the MR damper, have been studied and presented in this paper based on experimental findings.

Keywords: MR damper, MR fluid, Displacement, Frequency, MTS Suite