

## **Structural Seismic Response Suppression Using Magnetorheological (Mr)-Based Smart Devices**

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In the past few years, magneto-rheological (MR) materials and smart devices have been rapidly developed, and have attracted a good deal of attention for their potentials in vibration control. This paper investigates the potential of MR elastomer (MRE) vibration isolator in structural seismic mitigation. To start with, a highly adaptive MRE device is tested under various dynamic excitations. Then, a hysteresis model is designed for capturing the nonlinear behaviour of MRE device, the parameters of which are identified by bird swarm optimisation (BSO) via resolving a global minimum optimisation problem. Based on identified field-dependent hysteresis model, a semi-active control strategy is then developed to control the smart structures embedded with MRE devices in real-time against vibration due to earthquakes. Finally, the performance of proposed control strategy is numerically validated on a five-storey benchmark building model subjected to 4 scaled earthquake excitations. The results sufficiently demonstrate the capacity of the proposed control strategy in diminishing inter-storey drift and floor acceleration of MRE devices-incorporated smart structure.