

- Title:** A review of design and modeling of magnetorheological valve
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- Abstract:** Following recent rapid development of researches in utilizing Magnetorheological (MR) fluid, a smart material that can be magnetically controlled to change its apparent viscosity instantaneously, a lot of applications have been established to exploit the benefits and advantages of using the MR fluid. One of the most important applications for MR fluid in devices is the MR valve, where it uses the popular flow or valve mode among the available working modes for MR fluid. As such, MR valve is widely applied in a lot of hydraulic actuation and vibration reduction devices, among them are dampers, actuators and shock absorbers. This paper presents a review on MR valve, discusses on several design configurations and the mathematical modeling for the MR valve. Therefore, this review paper classifies the MR valve based on the coil configuration and geometrical arrangement of the valve, and focusing on four different mathematical models for MR valve: Bingham plastic, Herschel-Bulkley, bi-viscous and Herschel-Bulkley with preyield viscosity (HBPV) models for calculating yield stress and pressure drop in the MR valve. Design challenges and opportunities for application of MR fluid and MR valve are also highlighted in this review. Hopefully, this review paper can provide basic knowledge on design and modeling of MR valve, complementing other reviews on MR fluid, its applications and technologies.