

Abstract Submitted
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An Investigation of the Dynamic Characteristics of Magnetorheological Fluid¹ EDWARD WOLFE², NAVARUN JAGATPAL³, JYOTSNA SAU⁴, Delaware Technical Community College — The investigation of magnetorheological fluid (MR fluid) provides insight into the capabilities and limitations of the next generation of automobiles, machines, and personal devices that will utilize adaptronics. These fluids are ideal for adaptronics because of their ability to change their viscosity in the presence of an applied magnetic field within milliseconds. The purpose of our current research is to show the effects of a static magnetic field on the flow rate of a sample MR fluid from LORD Corporation. Our experimental setup included a demonstration device manufactured by the LORD Corporation, consisting of two syringes coupled together with their MR fluid inside. We incorporated an Atwood machine to apply a constant 2-kilogram vertical load to the plunger of the syringe. The LORD fluid which consists of carbonyl iron suspended in water was subjected to various magnetic field strengths, and we measured the time for the fluid to flow from one syringe to the other. We found that the flow time of the MR fluid was an increasing function of the applied magnetic field strength. In the future we will synthesize our own MR fluid using iron oxide, various surfactants, and hydrocarbon or silicon based oil. We will investigate these MR fluid samples to determine their magnetic and rheological properties.

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