

MATERIALS ENGINEERING

SEMINAR

“The Characterization of Magneto-mechanical Properties of Viscoelastic Magnetorheological Elastomers”

By

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ABSTRACT

Magneto Rheological Elastomers or MRE's are a subset of smart materials composed of a bulk elastic matrix, such as silicone, with fixed magneto sensitive particles suspended in the matrix. The response of an MRE to an external magnetic field alters its material properties allowing it to be controlled and manipulated, making MRE's a viable solution for actuators, sensors, biomedical devices, and soft robotics. The research related to MRE's has accelerated in the last decade, including the characterization of MRE's under both mechanical and magnetic loading. This study emphasizes the experiments and constitutive theory by investigating the relationship of the predictable mechanical properties and the external applied magnetic field. The study explores how the MRE will respond to the choice of ferromagnetic particles, the concentration of the particles, and the configuration of the particles used in the experiments. Furthermore, the study discusses current experimental setups in literature used to validate models. Moreover, the study examines the current constitutive theory in literature and proposes options for a more general model. The study presents specific examples of experiments and constitutive theory in order to further the conversation related to the characterization of magneto-mechanical properties of magnetorheological elastomers.

Date: Tuesday, June 6, 2023

Time: 9:00 am

Place: ARMS 1028 or via the link : <https://purdue-edu.zoom.us/my/chelseadavis>