

# Dynamic Simulation of Magnetorheological Fluid Using COMSOL Multiphysics® Software

J. Thanikachalam<sup>1</sup>, P. Nagaraj<sup>1</sup>

<sup>1</sup>Mepco Schlenk Engineering College, Sivakasi, India

## Abstract

The present work deals with dynamic simulation of magnetic particles present in the carrier fluid when subjected to external magnetic field. Magneto rheological fluid comes under classification of smart materials, which contain pure CI iron particles, silicon oil as carrier fluid and additives. The yield stress of the magneto rheological fluid can be controlled by varying the external magnetic field. The calculation approach of interaction between carrier fluid and magnetic particles in a non-steady magnetic field, based on Stoke's and Maxwell's equation model was considered for this work. Concentration of solid particles varied by 10-50% of its weight in the carrier fluid. The characteristics of dynamic simulation of MR fluid was studied using COMSOL Multiphysics®. In the COMSOL Multiphysics®, AC/DC module was used for the present analysis. The numerical result shows that formation of chain like structure for different concentration of solid particles (in milliseconds) present in the carrier fluid.

## Figures used in the abstract

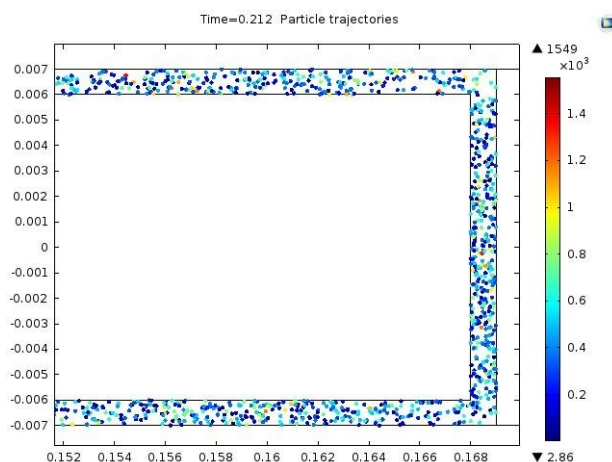


Figure 1: Particle Trajectories in the carrier fluid.