

## **Improvement of rheological and transient response of magnetorheological grease with amalgamation of cobalt ferrite**

### **ABSTRACT**

The time responsiveness of magnetorheological grease (MRG) towards magnetic field stimulus is crucial in order to ensure the high performance of MR devices. However, due to the thixotropic properties of grease, MRG has been restricted in terms of responding rapidly towards these magnetic fields. Therefore, polygonal shapes made up of 1–3 of cobalt-ferrite ( $\text{CoFe}_2\text{O}_4$ ) particles with different concentrations from 0 to 5 wt.% were introduced to enhance the responsiveness of the MRG. The results revealed that the linear viscoelastic (LVE) region of the modified MRG improved between 29% and 43% during the off-state and on-state conditions, respectively. The absolute MR effect of MRG increased by at least 60% due to the improvement in the particle's chain alignment with that of the applied magnetic fields. In terms of transient responses, particularly within the highly acceptable LVE region (0.05%), the MRG with  $\text{CoFe}_2\text{O}_4$  performed about 5–6 s faster as compared to pure MRG, which was attributed to the improvement in the particle's mobility in the grease medium..