An experimental Investigation of process parameters and its effects by Magnetorheological Finishing of Ferromagnetic (Structured Steel) and Non Ferromagnetic (Copper) material workpiece

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Abstract- In any machining process, apart from obtaining the accurate dimensions, achieving a good surface quality is also of utmost importance. Finishing plays a vital role in effective working of any component and imparting compressive residual stress for a surface improves the fatigue structural integrity of components, which is particularly important to components used in such critical applications as high-pressure gas or liquid piping systems. A machining process involves many process parameters which directly or indirectly influence the surface quality of the product Magnetorheological finishing (MRF) utilizes magnetorheological (MR) fluid, which consists of magnetic particles, nonmagnetic abrasives, and some additives in water or other carrier to polish the materials. An experimental study is conducted to predict the effect of process parameters (concentration of magnetic particles and abrasive particles and tool speed) on surface roughness and machining time in MRF of Ferromagnetic (stainless steel) and Nonferromagnetic material (copper). The final surface roughness value in terms of arithmetical mean roughness (Ra) obtained is as low as 30 nm from the initial value of 800 nm for Nonferromagnetic material and 50 nm from the initial value of 1300 nm for ferromagnetic material. In this project we have investigate the parametric dependencies of different abrasives on magnetorheological finishing process. We have also investigated the effect of concentration of magnetic particle and abrasives on surface roughness of Ferromagnetic (stainless steel) and Nonferromagnetic material (copper).

***Keywords*:** MR Polishing fluid; Magnetorheological finishing (MRF) Ferromagnetic (stainless steel) and Nonferromagnetic material (copper);