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Comparison of Solid and Hollow Torque Transducer Shaft Response in a High Alloy Stainless Steel¹ CHRISTOPHER L. MILBY, BRYAN G. HECOX, JOSEPH L. WIEWEL, MARK S. BOLEY, Western Illinois University — Recent investigations of the torque transducer response function (ambient field signal versus applied torque or shear stress) have been conducted in a 13% chromium and 8% nickel stainless steel alloy in both the hollow shaft and solid shaft configuration. An understanding of both is needed for applications with differing yield strength and hardness requirements. Axial hysteresis measurements conducted before and after heat treatment exhibited little difference in coercivity and retentivity between the two sample types. However, the field mapping and transducer sensitivity studies showed the hollow shaft configuration to have a far superior degree of polarization in the sensory region and to exhibit an enhanced sensitivity, especially after heat treatment. This is most likely due to its more efficient provision of closed circumferential geometry for the field lines and improved grain alignment during heat treatment.

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