

Seminar Title : Effect of ultrasonic shot peening (USSP) with varying parameters on pure Ni plates
Speaker : Adarsh Kushwaha
Supervisor : 9937917811
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Abstract : Ultrasonic shot peening (USSP) is a technique that creates a compressive residual stress profile over top sublayers into the substrates to protect against mechanical damages and tries to form nano-sized grains on several metallic surfaces by causing severe plastic deformations. The surface-mechanical and electrochemical properties of 20×20×3mm nickel plates were studied after they were treated with a selected design of experiment under USSP with 2 mm diameter hardened (SAE 52100) steel balls. XRD analysis revealed texturing effects as per relative texture coefficient (RTC) analysis, crystallite size reduction, and inducement of residual compressive stresses up to 850 MPa at extreme parameters causing bending in the 3mm thick Ni plates. Also, more than 125% increase in micro-hardness was observed. Scratch tests and static contact angle studies indicate enhanced abrasion resistance and the hydrophobic nature of the top-peened surfaces. Corrosion studies revealed a significant improvement as a result of USSP treatment, indicating its potential to improve surface properties without significantly increasing surface roughness. Keywords: Ni plates; ultrasonic shot peening (USSP); residual compressive stresses; Scratch tests