Correlation between Ultrasonic Attenuation and Hardness of Tool Steels

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Abstract

Theory of propagation and reflection of ultrasonic waves in metals in used to locate the internal defects of engineering components. It is observed that the energy absorption of ultrasonic waves (attenuation) in a metal depends on the physical and mechanical properties of metals. In this work efforts are made to find the correlation between attenuation and hardness of metals using ultrasonic waves. Commercially available Ultrasonic Flaw Detector has been used to measure the attenuation of the ultrasonic waves of tool steel (DF2) which has been heat treated to change its hardness. The experimental curve is compared with theoretical equation and it was observed that the experimental values confirm the theoretically proven co-relationship.