

## **Prediction of True Compressive Flow Stress of AA 6063 Alloy Through Ultrasonic Attenuation**

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During the compression testing of any material sample, the true compressive flow stress of the material cannot be determined due to the presence of friction between the end surfaces of the specimen and platens (of the compression testing machine) and due to misalignment of the test specimen and platens. Friction causes the barreling of test specimen and material flow at the interface is restrained. However, the material near the mid height position is less restrained by the friction and spreads laterally to a greatest extent. In addition to the compressive stress, a circumferential tensile stress develops as the specimen barrels. Compressive tests are therefore not valid for measurement of bulk elastic or plastic properties of material.

The present research work is based on prediction of true compressive flow stress of AA 6063 alloy through ultrasonic attenuation. AA 6063 specimens were compressed to obtain compressive stress and strain. Ultrasonic attenuation coefficient of the each compressed specimens were measured to correlate the variation of stresses with it. Finite Element Analysis (FEA) was performed to validate the frictional and misalignment effects during compression testing and to obtain true compression flow stress.

The destructive compression testing method will be eliminated by using nondestructive ultrasonic testing method which is cost effective and time saving.

**Keywords:** Attenuation coefficient, Compression flow stress, Friction, Misalignment