

Evaluation of Plastic Deformation for Steel Coupons Using Thermography

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ABSTRACT

The construction industry is experiencing significant technological shifts with high-tech advancements such as infrared thermography and non-destructive testing. Research focuses on using thermal cameras to measure thermal changes during plastic deformation to improve safety and streamline inspection processes. A recent study confirmed that thermal data can be used to detect plastic deformation. The theoretical premise suggests thermal energy is generated during deformation when a steel member is loaded. Building upon this theory, several studies are working towards developing a thermal camera system to measure thermal changes during plastic deformation. This study aims to estimate the degree of deformation using thermal data. A tensile test was conducted using a thermal camera to measure thermal changes resulting from plastic deformation. The experiment utilized passive methods, and the results were compared with thermocouple data and thermal data. Additional parameters, including temperature, humidity, and illuminance, were collected to enhance objectivity and reliability. The study findings confirmed that thermal data can indeed confirm plastic deformation.

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