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NON-DESTRUCTIVE STRESS MEASUREMENT OF CIVIL STRUCTURAL STEEL USING MAGNETIC ANISOTROPY SENSOR

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ABSTRACT

Recently, non-destructive stress measurement method using magnetic anisotropy sensor has been applied to the construction site such as steel bridges and steel pipes. In addition, steel rib used in the tunnel construction site was found to be possible to measure the stress by non-destructive method. In this study, steel loading experiments using magnetic anisotropy sensor and strain gauges were conducted to derive stress sensitivity curve for general structural rolled steel SS400 that is commonly used in civil engineering structures. As a result of laboratory experiments, stress sensitivity curves for general structural rolled steel SS400 were derived using output voltage measured by magnetic anisotropy sensor and average of stress measured by strain gauges depending on the measurement location. In addition, for the field application test of the magnetic anisotropy sensor, field experiments were conducted for the two most loaded places, H-pile and inclined struts, in the temporary structure of the construction sites. The field experiment results show a similar trend in the measured values by the magnetic anisotropy sensor and by the strain gauge, with an error of about 10% between the two methods, which is a sufficient resolution for engineering compared with the yield strength of general steels.

KEYWORDS: Magnetic Anisotropy Sensor, Non-Destructive, Stress Measurement, Civil Structural Steel, Temporary Structure

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