

Fundamental Study of Rail Axial Force Evaluation by Portable X-ray Diffraction Device

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This paper deals with the application of the X-ray stress measurement method to rail axial force evaluation. The X-ray stress measurement method measures the strain of a material having a crystal structure in a non-contact and non-destructive way. When a load is applied to the material, the lattice spacing of the material is changed. The lattice spacing is measured by utilizing the diffraction of X-rays. A simple $\cos\alpha$ X-ray analysis, developed in Japan, measures the stress within tens of seconds and can be used for field measurement. In this study, a lab test using a tensile testing machine and an actual rail is conducted and the fundamental investigation of the rail axial force evaluation by the simple $\cos\alpha$ X-ray analysis was conducted.