

A Study on the Diagnosis of Internal Defects in Railway Rails Using Ultrasonic Technique According to the Coating Thickness of Thermal Insulation Paint Coating

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Railway rails are infrastructures that support the load of trains and enable stable operation. Rail management can lead to major accidents and significant casualties. To ensure the stability of the rail, regular inspection of the rail condition is performed using various inspection methods. Frequent heat waves that occur in the summer due to the recent abnormal climate cause a rapid rise in rail temperature. This ultimately increases the possibility of train derailment due to rail buckling. One way to solve the problem of rapid rail temperature rise is to apply thermal insulation paint. Although this method has been confirmed to have thermal insulation performance due to paint coating, such as temperature reduction effect and durability, sufficient review of the effect on the rail internal and defect diagnosis is also required for field application. In this study, the ultrasonic propagation characteristics according to the thickness of the thermal insulation paint coating were confirmed and the rail internal and defect diagnosis characteristics were evaluated by applying various ultrasonic techniques. An experiment was conducted to diagnose the inside of the rail and its defects using ultrasonic techniques by producing specimens with various coating thicknesses and placing defects inside them. As a result of the experiment, ultrasonic diagnostic characteristics were confirmed according to the thickness of the insulating paint coating on railway rails, and these results are expected to contribute to improving the maintenance ability of rails to which insulating paint is applied in the summer.