FEM Analysis for Construction of Rail Head Transverse Defect Detection System Using Guided Wave

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Simulations of ultrasonic wave propagation in cracked rails have been carried out to investigate a method of detecting transverse rail head cracks using guided waves. The results show that 100~150 kHz input frequencies are suitable for detecting rail head cracks, and that the intensity of the first few waves in the received signal waves decreases with the degree of cracking. Further investigation shows that transverse cracks greater than 20 mm that have grown below horizontal cracks can be detected by checking the intensity of the first 3 waves in the received signal waves at the 100 kHz.