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The Early Stage Wheel Fatigue Crack Detection Using Eddy Current Pulsed Thermography

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The in-service wheel-set quality is one of critical challenges for railway safety, especially for the high-speed train. The defect in wheel tread, initiated by rolling contact fatigue (RCF) damage, is one of the most significant phenomena and has serious influence on rail industry. Eddy current pulsed thermography (ECPT) is studied to compensate the Ultrasonic Testing (UT) method for detection these early stage of fatigue cracks in wheel tread. This paper proposes several induction coils, such as linear coil, Yoke coil and Helmholtz coils, based ECPT method to meet the imaging of multiple cracks and irregular surface in wheel tread through numerical simulation and experimental results. Some features are extracted and studied also to quantify the fatigue crack in term of UT and ECPT. The proposed method greatly enhances the capability for cracks detection and quantitative evaluation compared with previous Non-Destructive Testing (NDT) method in railway.

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Reference:

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