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High Frequency Axle Box Acceleration for Early Detection of Squats: Numerical Simulation, Prototype Development and Testing

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Squats are a major type of rail rolling contact fatigue. The associated large dynamic force causes rapid deterioration of track structure. The cracks can lead to catastrophic rail break. It is a main cost drive for many railways worldwide. The existing automatic detection methods can only reliably find squats in the later stages. This paper discusses the detection of squat seeds by measurement and analysis of axle box acceleration (ABA). First a model is developed to numerically reproduce ABA at early squats so that their characteristic responses (signature tunes) can be determined and can be isolated from noise. Based on this a new ABA measurement system is designed and instrumented. Field testing is then performed.

Ключевые слова:

Содержание.

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