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Tangential force variation due to the bogie direction reversal procedure

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Abstract

A range of tangential forces is generated within the contact patch when a wheelset moves on the rail. These forces are intensified when incorporating curved tracks and motored axle rail vehicles [Arrus, P., de Pater, A.D. and Meyers, P., 2002, The stationary motion of a one-axle vehicle along a circular curve with real rail and wheel profiles. *Vehicle System Dynamics*, 37 (1), 29-58]. The wheelset is subject to flange contact if an unbalanced force remains in a curve towards the high rail gauge face. The resultant force in the transverse direction includes the lateral force, the radial force, and the creep forces in addition to the effect of the frequent wheelset displacement due to the kinematic oscillation [Iwnicki, S., 2003, Simulation of wheel-rail contact forces. *Fatigue Fracture Engineering Material Structure*, 26, 887-900]. This article has focused on a potential variation in some of the forces cited when the wheelset is subject to backward and forward movements. A severe wear rate observed within the wheel flange region in Iranian Railways was investigated by operating a test bogie on a curvaceous track. An obvious improvement in the wear rate and wear pattern of the wheels was attained when the second test bogie encountered a bogie direction reversal procedure. This enhancement is considered in this article from the force analysis standpoint.

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Bogie direction reversal (BDR); Tangential forces; The wheel/rail interface; Wheel flange wear

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Engineering controlled terms: Bogies (railroad rolling stock); Railroad tracks; Vehicle wheels; Vibrations (mechanical); Wear of materials
Engineering uncontrolled terms: Bogie direction reversal (BDR); Contact patch; Vehicle System Dynamics
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