Observation of sinusoidal motion creating harmonic wavy pattern in the rail vehicle wheel flanges

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Abstract

Railway wheels are subject to kinematic oscillation and forces (normal and tangential) which are time and location dependent. The tamping is due to a transverse slope in the tread region and the forces are functions of the vehicle weight, the suspension and braking systems, track geometry and irregularities, and the wheelrail profiles. As a result, a variety of patterns are generated in the wheel surface. An investigation in Iranian Railways was launched to determine the reasons for the high wheel wear rate of rail vehicles which often cause an asymmetric pattern within a wheelset. Therefore, for the purposes of this research six test bogies were marked and equipped with the apparatus for the further measurement of wheel wear. A development of circumferential pattern, for the first time, was observed in the flange region of wheel surfaces acquired by measured patterns created on the test bogies’ wheels. Theoretical aspects of this harmonic pattern are developed and presented in this paper. @ Shiraz University.

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