

STUDIES OF INFLUENCE OF RAILHEAD PROFILES ON DYNAMICS OF FREIGHT CAR RUNNING ON CURVED TRACK

The present paper deals with advantages of asymmetric railhead profiles on the curved track. The research under consideration has been aimed at analyzing the influence of introducing changes to railhead profiles of the inner and outer rail on wheel sets rolling and dynamic parameters of the freight car running on the curved track. For this purpose we used a mathematic model of the freight car motion, which took into consideration geometrical parameters of contacting surfaces, with provision for setting various profiles of wheels and rails. The possibility of changing the wheel rolling radius due to shifting the point of the wheel-rail contact is viewed as a mechanism of the influence of the railhead profile on entering the curved track. New asymmetric railhead profiles have been used ensuring the contact of wheels with the outer rail along the maximum rolling radius and with the inner rail along the minimum admissible rolling radius, which allows a better entering the curve. According to the simulation results the functional dependencies of dynamic parameters of the freight car on the speed of its movement along the curved track with two versions of railhead profiles have been derived. The calculations demonstrated that during the freight car movement along the curved track with asymmetric railhead profiles the improvement of the dynamic parameters is registered. The use of asymmetric profiles would allow an increase in differences of the wheel rolling radii while entering the curve, thus positively influencing both wheel/rail interactions and dynamic performance of a freight car.

Keywords: *dynamics of freight car, asymmetric profiles of railheads.*

1. Working Instructions for Ukrainian Railways (in Ukrainian) TsP- 0269 dated by December 22, 2010, 427-Ts- Kyiv, 2011. – 450 p.
2. Instructions for Inspection, Repair and Formation of Wagon Wheelsets: TsV-TsL-0062 (in Ukrainian) – Approved April 1, 2005 by Ukrzaliznytsya. – Government Publishing House – Kyiv : NVP Polografservis, 2006. – 102 p.
3. Design Standards for Russian Railway Cars Operating on Tracks with 1520 mm Gauge (Non-Self-Propelled) (in Russian): Moscow : GosNIIV – VNIIZhT, 1996. – 319 p.