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Abstract

The article presents the results of theoretical studies of interaction process of a freight car body with a three-piece bogie, which are aimed at solving the relevant problem of increasing the permissible speeds at railways with 1520 mm track gauge under conditions of linear load increase on the wheel set axle. The purpose of the research was to propose such an approach to the study of interaction processes between rolling stock and track, taking into account the interaction model of neighbouring carriages in trains, which will allow more correctly take into account the dynamics of rolling stock and increase traffic safety. The oscillation frequencies of the body, bogie and wheel set are analysed in order to establish a possible resonance phenomenon. The article examines the longitudinal and transverse forces of pseudo-sliding (creeping) arising between the climbing wheel of the front bogie and the rails. The conducted studies can contribute to the replacement of 18-100 bogies with modernised three-piece bogies while maintaining the main most metal-consuming elements of the 18-100 model implementing some modernisation units. The results obtained will make it possible to revise the permissible vehicle speeds with an increased axle load.

KEYWORDS: angle bogie hunting of wheel set, lozenging of bogie side frames, three-piece bogie, train speed