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WHEEL PROFILE OF A FREIGHT CAR WITH PROSPECTIVE TRUCKS FOR THE COMBINED OPERATION ON THE UKRAINIAN AND EUROPEAN RAILWAYS

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To solve the important problem of speeding up the integration of Ukraine into the European railway transportation, an interest has recently grown in the introduction of automatic car transfer from one track gauge to another using gauge-changeable wheelsets, thus dispensing with truck exchange or transshipment and thereby significantly shortening the delivery time. However, the combined operation of trains on the Ukrainian (1,520 mm gauge) and European (1,435 mm gauge) railways calls for the compatibility of the wheel-rail contact pair on both railways: R65 rails and a cant of 1/20 in Ukraine and UIC60 rails and a cant of 1/40 in Europe.

The goal of this work is to develop a wheel profile for a freight car with prospective 18-7020 trucks for combined operation on the Ukrainian and European railways and predict the ride performance of a car with that wheel profile and its dynamic interaction with rails on both railways.

An investigation was conducted into the wheel–rail interaction indices and the ride performance of a freight car with prospective 18-7020 trucks and wheels with existing profiles. It was shown that it is expedient to develop a new wheel profile to improve the service compatibility of the Ukrainian and European networks. A number of new wheel profiles were constructed, the efficiency of each profile in terms of dynamic stability at service speeds and wheel flange wear on the Ukrainian and European railways was calculated, and a compromise profile, ITM-73ES, was chosen. It was shown that the use of the chosen profile in a car with 18-7020 trucks will offer a high dynamic performance and improved indices of wheel–rail interaction for both truck gauges.

Keywords: *freight car, wheel profile, dynamic performance, interaction processes, wheel and rail wear.*

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