

## ESTIMATION OF THE EFFICIENCY OF USING WHEELS WITH A NEW PROFILE IN FREIGHT CARS IN THE OPERATION ON THE UKRAINIAN AND EUROPEAN RAILWAYS

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To organize railway communication between Ukraine and West-European countries, which have different gauge standards, the most effective way is to use gauge-changeable wheelsets, a system that can change from one gauge to another when moving through special gauge changing facilities. The use of cars with gauge-changeable wheelsets on the Ukrainian and European railways (a gauge of 1,520 mm and 1,435 mm, respectively) calls for assuring a required compatibility of the wheel-rail pair on tracks of both gauges with account for different rail head profiles, R65 in Ukraine and UIC in Europe, and different rail cant, 1/20 and 1/40, respectively. To solve this problem, a new wheel profile, ITM-73EC, was developed at the Institute of Technical Mechanics of the National Academy of Sciences of Ukraine and the State Space Agency of Ukraine. According to forecast data, its use in freight cars with 18-7020 prospective trucks will provide high ride performance and acceptable indices of wheel-rail interaction on the Ukrainian and European railways.

The goal of his work was to estimate the efficiency of using the ITM-73EC wheel profile in freight cars with other home trucks in the operation on the Ukrainian and European railways. Calculations were conducted to assess the dynamic stability of empty and loaded cars at increased speeds up to 140 km/h on tangents and in 300 m circular curves at a speed of 60 km/h for different degrees of rail side wear.

As shown by this study, using wheels with the new ITM wear-resistant profile and the ITM-73 profile, which is an element of the comprehensive retrofit of 18-100 trucks, in freight cars with 18-7020 and 18-9817 prospective home trucks in the operation on the Ukrainian and European railways will provide dynamic stability at operating speeds up to 120 km/h on tangents and improve rail-wheel interaction indices in curves.

**Keywords:** *freight car, wheel profile, dynamic stability, wheel and rail wear.*

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