

Design of high-speed turnouts and crossings

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Abstract. Recently, the new ways to improve the railway switches and crossings have been sought, as the railway transport increases its operating speed. The expectation of these adjustments is to decrease the dynamic load, which usually increases together with velocity, and this influences the comfort of the vehicle passage, the wear of the structural parts and the cost of maintenance. These adjustments are primarily the turnout elements such as the optimized geometry of the turnout branch line by means of transition curves application, which minimizes the lateral acceleration during the vehicle passage through the track curve. The rail inclination is solved either by means of inclination in fastening system, or by machining of the rail head shape, because this ways of adjustment retain the wheel-rail interaction characteristics along the whole length of the turnout. Secondly, it is the crossing with movable part, which excludes the interruption of the running surface and optimization of the railway stiffness throughout the whole turnout length as well. We can see that the different stiffness along the turnout influences the dynamic load and it is necessary to optimize the discontinuities in the stiffness along the whole length of the turnout. For this purpose, the numeric modeling is carried out to seek the areas with the highest stiffness and subsequently, the system of stiffness optimization will be designed.