

Abstract:

A simplified MBS vehicle model is developed to investigate the influence of the wheelsets' relative kinematics of railway vehicles on wheel/rail wear in curved track. The objective is to provide a model on which different vehicle configurations can be mapped. Rigid body contact and therefore multipoint contact are taken into account. To determine wheel/rail wear, a wear model based on Fleischer is applied. The steady state behaviour of the vehicle model in curved track is calculated in a standalone application. The leading bogie of a six-axle vehicle is mapped on the model. The results of the developed model are compared with transient dynamic MBS simulations of the overall vehicle, which demonstrates a very high level of correspondence. A wear map is calculated using the relative kinematics of the wheelsets of a two-axle vehicle, and the differences in wheel/rail wear between a radial-aligned vehicle and the optimal-aligned vehicle are outlined.

Keywords: steady state behaviour of railway vehicles in curved track; MBS vehicle model; wheelset relative kinematics; wheel/rail wear