Tangential Force Characteristics of the Wheel/Rail Interface with Fine Unevenness on Wheel Tread

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According to our previous study, the shape of the contact patch of the wheel/rail interface may not be a complete ellipse, because actual wheel tread profile has a fine unevenness due to wheel-turning or wear of wheel tread profile. Under such conditions, it is difficult to estimate a tangential force of the wheel/rail interface correctly by using usual method; accordingly the dynamic characteristics of railway vehicles cannot be estimated with sufficient accuracy. Therefore the authors proposed a numerical method to estimate tangential forces under such contact condition. In this study, we took notice of both cases with/without fine unevenness on the wheel tread profile first. And the relation between the fine unevenness on a contact surface and the tangential force characteristics was investigated by tangential force measurement tests for cylindrical specimen and actual wheels. As a result, the tangential force is greatly affected when fine unevenness exists under low relative humidity and the validity of the proposed numerical method is confirmed.