European Wheel Tread Profile Evolution for Combined Block Braking and Wheel-Rail Contact by Dynamometer Experiment

Katsuyohi IKEUCHI Kazuyuki HANDA

Wheel treads damage, such as wear, thermal cracks and plastic deformation, cause changes in the tread profile of the wheel, which necessitates frequent wheel reprofiling in order to maintain the ride comfort of the vehicle. In this study, a series of full-scale tread braking experiments, including those of wheel-rail rolling contact, were conducted to clarify the factors influencing the wheel tread profile evolution. The results obtained from the experiments on European wheel and brake block showed that the maximum tread indentation at the rolling contact area is larger than that in the case of Japanese wheel and brake block. This was caused by the plastic deformation of the wheel tread, due to the high contact pressure and material softening from high temperatures due to tread braking. The results were supported by the observed tread protrusions observed near the rolling contact area and the hardness measured in the rolling contact area.