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Study of the friction and vibration characteristics of the braking disc/pad interface under dry and wet conditions

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Abstract: The joint analysis of friction coefficient and time-frequency characteristics of vibration is employed in this study to explore braking behaviours under dry and wet conditions. The results indicate that there is a weak braking period in the braking process under wet conditions, which would last until the effective friction coefficient is achieved. The duration of the weak braking period is dominant at low initial braking velocities and would be prolonged by strong water flow but shortened by a higher braking pressure. A partial transition from wet to dry stage on the front part of braking interface is deduced in the weak braking period, causing an obvious increasing trend of friction coefficient in this period and asymmetric abrasion of braking surface.

Keywords: Brake; Wet condition; Vibration; Time-frequency characteristics

1. Introduction

The brake disk and the brake pad are the basic components of a railway braking system. During the braking process, the huge kinetic energy of the train is turned into friction heat energy, which is dissipated into the environment via the brake disks and brake pads [1]. Under this condition, the transient transformation of energy causes the strong coupling

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