Adhesion Test of Wheel / Rail under Low Temperature Conditions

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In cold regions, there is concern that decrease in adhesion coefficient of wheel/rail due to cold rainwater affects acceleration/deceleration performance of railway vehicle. We conducted an adhesion test using a twin disc rolling contact machine to clarify the characteristics of adhesion coefficient in low temperature environment. The test was carried out with three different parameters: surface roughness and temperature of two discs, and the water temperature intervened in the discs. As a result, when the surface roughness is small under low temperature, the adhesion coefficient is small, so that the possibility of causing slipping/sliding is high during the acceleration/deceleration operations. On the other hand, it is found that there is a tendency of increase in the adhesion coefficient (called a re-adhesion phenomenon) as the slip ratio increases due to the slipping/sliding. This is thought to be due to the frictional heat generated at the contact part between the wheel and the rail.