

## A BASIC STUDY OF WHEEL / RAIL ADHESION. 10. THE RHEOLOGY OF RAIL CONTAMINANTS CAUSES LOW FRICTION

Slightly wet, contaminated rails are reputed to cause wheel slip. The report examines the physical properties of the rail head contamination, with special emphasis on mixtures of iron oxide and water. The properties are then used to calculate the limiting coefficients of friction on heavily contaminated rail.

The study has shown how very low adhesion can be caused by slightly wet track debris. This acts as a viscous lubricant, partially or fully unloading the wheel from the rail. Track observations have shown that significant debris coverage can occur on mainline track under certain conditions. However, a permanent build-up of track debris is only possible when the contaminating material has specific properties combining both yield strength and pliability. The rheological properties of wet rail debris can change rapidly, with water concentration, misty conditions or light rain being necessary before a severe loss of adhesion can occur.