

## REDUCED BRAKING DISTANCE IN LOW ADHESION CONDITIONS BY HIGH CREEP BRAKE CONTROL

There is a widely accepted theory that the adhesion between the wheel and the rail may be improved, in low adhesion conditions, by wheels operating in high creep. Thus it was decided to conduct a series of tests to establish whether such a phenomenon existed and hence to quantify the improvement.

Two possible modes of adhesion improvement were identified. Firstly, a wheel in continuous high creep may have a conditioning effect on its own tread in much the same way as is attributed to tread braking ('self conditioning'). Secondly, a wheel in continuous high creep may have a conditioning effect on the rail such that the available adhesion is improved for following wheels ('rail conditioning'). All conditioning tests were carried out on naturally occurring low adhesion conditions using the Research Division Tribometer Train.

At a test speed of 9m/s and at slip levels of 10%, 20%, 40% and 60%, self conditioning has been shown to generate significant increases in wheel/rail adhesion when braking under naturally occurring low adhesion conditions. Similarly, rail conditioning increased adhesion at a test speed of 9m/s with two or three axles operating at 20% slip. The increases due to both mechanisms are likely to be cumulative and offer options for the design of future wheel slide protection equipment to optimise the adhesion available.

Rail conditioning was not effective on the extremely low adhesion conditions found on moist leaf film contaminated track. The application of Sandite or other remedy is still required to prevent the build up of such a film.

Further work is required to establish the following:

- The effect of vehicle speed.
- The rate of adhesion increase due to self conditioning and the rate of re-contamination of the wheel tread.
- The number of axles and the level of slip required to optimise the effect of rail conditioning.