

THE RELATIONSHIP BETWEEN WEAR NUMBER AND WHEEL/RAIL WEAR IN THE LABORATORY AND THE FIELD

The report pulls together historical work on wheel /rail wear by comparing predicted wear numbers with measured wear rates from a wide variety of track locations. Wheel wear is also considered although the volume of service wear data is limited. In all cases wear numbers have been computed using the extension to the theoretical model which allows for the simultaneous existence of two points of contact on the same wheel. The influence of important parameters such as curve radius, effective co-efficient of friction, wheel and rail profiles are discussed and suitable input values or ranges are suggested.

The report concludes that:

- A general graphical relationship of measured rail wear rate in service conditions against track curvature has been produced. The relationship does not take into account vehicle type or prevailing friction and this is reflected as a fairly wide scatter band in wear rate.
- Using the mean wear rate, curves of rail life against curve radius have been produced for various traffic densities as an aid in planning for rail replacement programmes.
- A more accurate picture of wheel and rail wear which takes into account vehicle and track features can be obtained by calculation of the wear number T_Y , using non-linear curving theory. The measured wear rates agree well with the predictions from the laboratory rig tests at full scale.
- The wear number prediction method allows comparison of vehicle and suspension types and can be used to estimate the potential for reducing wear by suspension modifications or efficient lubrication