

THEORETICAL CREEP COEFFICIENTS DERIVED FROM MEASURED WHEEL AND RAIL PROFILES

Forces are generated between wheels and rails due to their relative movement, known as creepage. These 'creep forces' form an important input in the plan view dynamics of railway vehicles, and thus have an effect on ride quality, ability to negotiate curves, wheel and rail wear, suspension component life, etc.

Therefore a knowledge of these creep forces is essential for vehicle design. 'Creep coefficients' are used as input data for several of the standard vehicle dynamic response programs, and are defined as the slope of the creep force/creepage graph at low levels of creepage. These values may be calculated theoretically once the wheel and rail profile geometry is assumed. However due to different assumptions about the profiles there has been no accepted standard for the values used.

This document takes a sample of measured wheel and rail profiles which represent the likely range to be experienced on BR, and computes their associated creep coefficients. The resulting statistical mean values represent the best data that is available until the measurement of actual creep coefficients is complete. Values used in the present Vehicle Dynamics Modelling Programs are shown to be 5-10% higher than those calculated using measured profiles.