

## ADVANCES IN NON-LINEAR WHEEL/RAIL FORCE PREDICTION METHODS AND THEIR VALIDATION

Improvements were made to the non-linear wheel/rail force prediction method of Elkins & Gostling. These improvements are described, along with the experimental equipment used in order to provide input data for the predictions, and to validate them. A further series of curving tests was carried out, using a Laboratory coach equipped with bogies having variable suspension parameters, and shown to give excellent agreement with the improved theory. The prediction method was used on a regular basis within British Rail, and its use for vehicle design is considered, together with planned extensions to cover calculation of wheel and rail wear, and dynamic behaviour of railway vehicles on curve and switch entry.

In general, the quasi-static curving behaviour of railway vehicles has been shown to agree well with the theoretical predictions being made using the improved wheel/rail force prediction method. However, one area of difficulty remains, that is the practical determination of the coefficient of friction and its effect on Kalker's creep force/creepage relationships.

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