

THEORETICAL EVALUATION OF THE EFFECT OF INDEPENDENTLY ROTATING WHEELSETS ON THE CURVING BEHAVIOUR OF CLASS 142 VEHICLES

In a pair of Class 142 vehicles the two inner axles are powered and the two outer axles are unpowered. This study was undertaken to assess the effect on the curving behaviour of these vehicles of replacing the outer (unpowered) wheelsets with independently rotating wheels.

The curving calculation method incorporated in the VAMPIRE package was used. A range of curve radii from 1200m to 200m was taken, and values of wheel-rail friction level (μ) of 0.45 and 0.15 were used.

Although the mathematical model is not yet fully developed, the following conclusions are expected to remain valid:

- The use of independently rotating wheels on the unpowered axles of Class 142 does not appear to improve the curving performance.
- With the independent wheels on the leading axle the wheel-rail wear at the leading outer wheel is increased and that at the trailing inner wheel is unaffected.
- With the independent wheels on the trailing axle the wear at the leading outer wheel is slightly reduced and that at the leading inner wheel is significantly increased.
- Yaw relaxation can significantly improve the curving performance.

Others have predicted that the use of independently rotating wheels on the trailing axle of three-piece freight bogies would significantly reduce wheel-rail wear. The apparent contradiction with the results of this report is explained by differences in key parameters between the vehicles concerned.