

## CURVING PERFORMANCE PREDICTIONS: COMPARISON OF A STANDARD AND A MODIFIED CLASS 37 LOCOMOTIVE ON THE WEST HIGHLAND LINE

In 1981 the Class 27 locomotives of the Scottish Region's West Highland line were replaced by Class 37 locomotives. Almost 40% of the route consists of curves of less than 400m radius, the minimum radius on the running line being 200m, and there is little level track, resulting in continuous traction and braking demands.

The three-axle bogie of the Class 37 was not designed as a steering bogie, and its long wheelbase and stiff primary lateral and yaw suspensions are causing unacceptably high wheel and rail wear rates on this route. A project to improve curving performance was started in 1982 and tests with a modified locomotive with steering bogies were planned.

The non-linear curving program was used to calculate creepages, forces and wheelset positions for both the standard and steering Class 37 bogies, at radii from 200m to 800m (above which wear rates are insignificant). The predictions have been made for coefficients of friction between 0.1 and 0.5, with an average value of 0.3.

It is concluded that the modifications to be carried out on the prototype modified locomotive represent the most expedient short-term solution to the high wear rates on the West Highland line. Further steering improvements are possible at the penalty of higher modification costs.

The steering locomotive offers considerable reductions in Wear Numbers, and angles of attack and wheel/rail lateral forces, with improvements increasing with coefficient of friction.

Test work will determine the accuracy of the angle of attack predictions together with the dynamic performance of the locomotive, and longer term work will attempt to correlate Wear Number values with actual wheel and rail wear rates. Further work will examine the effects of cant deficiency, traction and braking demand on the curving performance.