

A STUDY OF THE NEED TO CONTINUE GAUGE WIDENING IN CURVES

Non-linear steady-state curving theory is used to examine the need for continued gauge widening in sharp curves. This is done by consideration of derailment proneness, flange and rail wear, and lateral forces on track and vehicle.

It is concluded that reducing gauge widening at radii below 110m is undesirable because of performance limitations of older three-axle and four-axle locomotive bogie designs. In the radius range 200-140m there are no strong arguments for or against retention of the present 7mm of widening as far as vehicle-track system performance is concerned. Gauge widening can be eliminated here if this allows significant economies in civil engineering costs. Between 140m and 110m radius there are again no strong arguments for or against complete removal of the 13mm of gauge widening on curves set to nominal gauge and curvature. However there could be problems with older three-axle bogies if the alignment of curves without gauge widening is allowed to deteriorate such that there are kinks where the effective radius measured over the bogie wheelbase becomes less than 100m. To reduce the chances of damage to such bogies it is suggested that 7mm of widening is retained in the 140-110m radius range until such bogies have disappeared.

At a later date, when all three-axle locomotive bogies are of the current design with high centre axle bearing float, it will be possible to make further reductions in the amount of gauge widening, restricting this to curves below about 100m radius and to 7mm only.