RAIL HEADS AND THEIR EFFECT ON VEHICLE RIDE

This report concentrates on the problem of conicity, whereby the mutual fit between the rail crowns and the wheel treads may cause the vehicle to 'hunt', seriously degrading the ride. It expands on many comments which have been made in the past on the factors which contribute to this phenomenon. Conicity is the equivalent cone angle of a particular wheelset/track combinations, and it is assumed that keeping conicity within the region that gives stable running is a fundamental aim.

It is concluded that the permanent way makes very little contribution to the occurrence of very low conicity and its associated problems, except when the track gauge is allowed to become very wide. Hence the emphasis is on avoiding high conicity.

Tight gauge can give high conicity, and flat railheads can give very high conicity. Rails laid vertically can give high conicity, and the length of vertical rail through points and crossings should be minimised. The reduction in crown radius implemented in the 113A rail profile from 1988 gives more acceptable conicity conditions.

There is no noticeable change in rail head profile during the relaying process or due to the initial traffic, so any observed high conicity on recently laid rail is due to the rails being supplied with an excessively flat head, or of the track gauge being excessively tight.

On straight track two different patterns of wear have been observed. On high speed lines a combined head and symmetric sidewear gives a reduction of conicity with time. On lower speed lines head wear alone gives a tendency of conicity to rise with time.

Turning, transposing and cascading of rails without reference to the old gauge face all lead to a very high conicity and some extension of the transposing ban would be desirable. Also depot re-profiling of cascaded rail is desirable.

Grinding, planing and milling all reveal a new rail surface that may wear more rapidly with traffic and evidence suggests this has a detrimental effect on conicity. This requires further investigation.

Tamping and other vibrating maintenance techniques can substantially influence the track gauge, and better control of post-tamping gauge would be desirable.

There is an urgent need for a reasonably accurate train-mounted conicity measuring system, to identify high conicity areas of track, and to monitor the performance of rail profile correction machines.

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