

INTERIM REPORT 2 – ECML TRACK GEOMETRY IMPROVEMENTS

The work is a continuation of the evaluation of the most appropriate methods of improving track quality on all InterCity routes, with the specific aim of achieving the current 225kph track standards on the ECML.

Previous work concluded that the automatic top and track alignment (ATTA) tamping machine was the method most likely to achieve the required track qualities, however this focused only on long (70 metre) and short (35 metre) wavelength vertical track qualities, with the long wavelength data being limited. This work continues the evaluation of ATTA, concentrating on the long wavelength vertical and alignment track qualities. In addition, the potential benefits of weld straightening have also been considered by assessing two weld straightened sites, and by determining the contribution of rail end weld profiles to the track roughness. This was completed, by considering short wavelength vertical track quality, as it is more appropriate than long wavelength quality.

The report concludes that:

- ATTA successfully produced long wavelength vertical and alignment track qualities within the 200kph and 225kph 90% limits at every site.
- Some success was achieved in attaining the 50% standards. At most of the sites where it was not achieved for long wavelength quality, it was not due to the inability of the ATTA to remove most of the long wavelength defects, but to poor short wavelength quality. Thus at some sites a further improvement in long wavelength quality can only be achieved by reducing the contribution of the short wavelengths.
- The “Double Tamping to a Design Lift” method was not as successful as the best ATTA sites, but better than the worst ones.
- The long wavelength vertical quality appears to be inherently stable, and after one application of the ATTA it is unlikely that it will be a problem for some considerable time. Almost all subsequent deterioration is in the short wavelength quality.
- The assessment of the benefits of weld straightening produced no evidence of improvement in long-term, short wavelength vertical track quality, although the sites assessed were not particularly suitable.
- The average rail length harmonic contribution to track roughness (variance) on the InterCity routes is 9.2%, but this only considers the contribution from welds at the standard 18.3m rail length. Nevertheless, this is a small contribution and may explain why it is difficult to detect any benefits of weld straightening. If weld straightening could be shown to be beneficial to track quality, further work would be required to evaluate the cost benefits.