

TRACK RECORDING COACH MEASURING PRINCIPLES

This note describes the principles employed by the High Speed Track Recording Coach (HSTRC). The subject is treated theoretically. An attempt is also made to estimate the errors or uncertainties of measurement inherent in the system.

Track parameters can be classified under three headings:

Absolute: These can be defined absolutely at each track position and are independent of other parameters. The absolute parameters are gauge, crosslevel or cant, twist and curvature.

Dynamic: These can only be defined in relation to their value at other positions and hence must be measured in terms of a defined frequency response function. The dynamic parameters are vertical and horizontal profile. The frequency response function required is clearly of a 'high pass' form, and since the spectral components of these profiles rise sharply with wavelength, it was found necessary to use a fifth order filter.

Derived: Linespeed cant deficiency is calculated from crosslevel, curvature and line speed. Dynamic crosslevel is calculated from vertical profiles.

The system differs from conventional recording equipment in that measurements are referenced to an inertial measuring base, that is, a base obtained from double integration of acceleration data. It has the advantage that long wave data corresponding to track design features can be substantially eliminated to provide information that is amenable, by direct reduction, to forming statistical estimates of track quality. These estimates may be used as a basis for maintenance planning and scheduling. Individual defects can also be identified and thus permit 'spot' maintenance.