COMPARISONS OF BALLASTED TRACK AND SLAB TRACK FOR HIGH SPEED RAILWAYS: PREDICTIONS, MEASUREMENTS AND THE USE OF EMBODIED ENERGY CALCULATIONS TO INFORM THE CHOICE OF TRACKFORM.

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ABSTRACT

Recent advances in numerical modelling, such as 3D dynamic finite element analysis, and real-time video capture of track deflections under train loading enable direct comparisons of ballasted and slab track to be made. Results are presented for high speed and slower speed installations. Using embodied energy and CO2 emissions as key sustainability indicators, detailed calculations are presented for an as-built piled slab and an alternative embankment-supported high speed railway over very soft ground. These calculations can be extended into the maintenance regime, to permit detailed life cycle analyses to be made. The explicit use of sustainability indicators, in conjunction with numerical modelling, can enable rational decisions on track form to be made.