

Track Stability Management to Improve Safety and Track Capacity (R3.112)

Background

The stability of track, as influenced by changes in rail temperature, is a significant safety and business risk to railways. Hence, an accurate predication and/or correct measurement of rail surface temperature based on meteorological conditions is essential for track stability analysis and safety management.

Objective

If track buckles or a rail breaks due to inadequate rail stress adjustment the outcome can be, and often is, derailment. Managing of the risk typically involves the use of temporary speed restrictions that can be imposed over whole networks (eg capital city, metro or corridors) which has a major impact on train transit times and customers operating "just in time" supply chain arrangements. This study aims to develop a thermodynamic model for predicting rail surface temperature and review and harmonise existing rail knowledge and standards on rail stress management.

Outcomes

A thermodynamic model will be developed based on balancing the conductive, convective and radiative contributions of heat to the rail. Further modelling and usage of weather data will enable rail temperatures to be forecast for the entire diurnal cycle for up to 24 hours ahead and at a variety of synoptic conditions. The project will also produce a thorough review of the state of existing standards, knowledge and systems with the view to identifying a practical combination of methods to manage track buckling risks and speed restriction settings.

Benefits

Key benefits of the work are increased knowledge and mathematical modelling to aid in management of rail stability and improved methodology for speed restriction settings when required to reduce track buckling risk. The rail authorities with large track networks will benefit from the outcomes of the project. The project will also benefit railway customers with less speed restrictions required for track stability management - improving transit times.

Project timeframe

1 January 2009 to 31 March 2011