

Integrated Ballast-Formation-Track Design and Analysis Including the Implications of Ballast Fouling and High Impact Loads (R3.106)

Background

For rail to be the most economic and effective land transport, there is an ever increasing demand for greater reliability of track for heavier and faster trains. Ballast and sub-grade (formation soils) performance is a major contributor to track reliability, hence its degradation is a major detriment affecting railway tracks. There is a need for new technology to identify and remove risks of track deformations and relevant instability ascribed to load condition and ballast fouling.

Objective

The purpose of this project is to achieve technological advancement of rail track design and maintenance in order to eliminate risks of post-construction track deformations and associated instability attributed to high impact load condition and ballast fouling.

Outcomes

The development of an integrated ballast-formation track design and maintenance package, "SmartTool", for the heavy haul rail industry, incorporating:

- ballast degradation under cyclic loads,
- reduced drainage and load bearing capacity due to ballast fouling, with particular reference to coal - fouling by sub grade pumping and ballast fines will also be considered,
- improvements to lateral confining pressures,
- the influence of the properties of the sub grade subject to cyclic loads,
- the role of geosynthetics for enhanced drainage, increased resiliency, reduced particle movement, reduced risk of formation soil pumping and more favourable load distribution in track, and
- effects of high impact loads.

Benefits

The findings from this project will contribute to increased average train speeds, greater track capacity and reliable maintenance planning, especially for heavy haul.

Project timeframe

1 June 2008 to 30 November 2011