

Development and Validation of Non-Destructive Ballast and Formation Condition Assessment (R3.102)

Background

Traditional railway track foundation or substructure has become increasingly overloaded in recent years, due to the introduction of safer, faster and heavier trains. A lack of substructure reengineering has resulted in maintenance cycles becoming more frequent and increasingly expensive. Early and accurate assessment of track substructure components will facilitate cost effective maintenance. The current assessment is usually time consumable, expensive and not accurate enough.

Objective

The main goal of this project is to achieve a robust and cost effective assessment technique for rail substructure maintenance. The non-destructive devices that can assess ballast and formation conditions, including ground penetrating radar and similar technologies, will be investigated.

Outcomes

This project is expected to produce an experimental rig suitable for validating field results against conditions in various ballast samples and use image processing technique to define appropriate indices associated with the conditions. Outcomes include:

- new guidelines for non-destructive monitoring of rail tracks, including step by step procedures for rail industry practitioners,
- the development of a diagnostic tool for assessing ballast layer condition and identifying poor subgrade, to develop track condition indices based on GPR diagnoses, and
- the development of a computer program to manage data processing, interpretation and reporting.

The findings will be fed into a decision support “SmartTool” system for predicting ballast renewal, formation renewal and track geometry maintenance.

Benefits

The project will produce maintenance guidelines through a cost effective track assessment that will establish efficient targeting of track maintenance and renewal. This will in turn reduce required track possession time with associated cost savings.

Project timeframe

1 June 2008 to 31 May 2011