Conducting Organisation: CRC for Rail Innovation

Project Title: Insulated Rail Joints
Project Number: R3.100

Theme: Performance
Website: www.railcrc.net.au/project/r3100

Participants:
• Australian Rail Track Corporation
• Queensland Rail
• Central Queensland University
• University of Wollongong
• Queensland University of Technology

Project Leader:
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Commencement Date:
01/01/2008

Completion Date:
31/12/2011

Status:
Completed

Background Summary:
Insulated Rail Joints (IRJs) are a safety critical component of the rail track infrastructure. IRJs provide the dual function of electric circuit integrity and structural stability to the track. Unfortunately, IRJs also possess the shortest mean service life amongst all railway track components and their service life is found to be highly variable. In order to meet the needs of increased heavy-haul operational throughput on Australian railways, predicting the service life of IRJs to avoid any potential accelerated, undetected, premature failures—and to approach the problem of management of in-service IRJs rationally—was deemed to be more pressing than ever before.
Project Summary:
The project aims to examine the structural integrity of the new generation joint design through lab and field tests. Following testing it is aimed to provide guidelines for revised dimensions and tolerances in manufacturing, installation and maintenance of insulated rail joints. The findings will be used as the basis for reviewing the provisions for manufacturing, sampling, testing, installation and maintenance in AS1085.12 as well as publishing a “Best Practice Manual for Design and Maintenance of Insulated Rail Joints”.

Objectives:
The specific objectives of this project were to:

- Develop a longer-life IRJ technology in the context of maintaining structural integrity, safety, and the operational efficiency of railway systems
- Assess the behaviour and response to fatigues load cycles of a low impact glued insulated rail joint
- Deliver a best practice manual
- Develop guidelines for design, manufacturing, site installation and maintenance of rail joints

Description of Research:
The research was based on field testing of a modified design of the insulated rail joint with extensive instrumentation to understand the failure mechanism of the joint as well as the general track degradation in the vicinity of the joint. This was accomplished through field testing.

Expected Benefits/Results:
The outcomes of this research are aimed at increasing the life of glued insulated joints via small changes and optimisations of the design accompanied with improved maintenance practices.