



## ACRI Rail Knowledge Bank update

Developed and maintained by the ARRB Group under the National Interest Services (NIS) program, the ACRI Rail Knowledge Bank is a managed online resource for the rail industry.

For more information, visit the ACRI website at [www.acri.net.au](http://www.acri.net.au), or you can [click here](#) to visit the Rail Knowledge Bank page directly.



### New to the ACRI Rail Knowledge Bank

*If you would like your name/organisation added to the ACRI Rail Knowledge Bank alert list, simply email [rail@arrb.com.au](mailto:rail@arrb.com.au) with your request.*

The primary, although not exclusive, focus is material relevant to an Australasian audience and is updated monthly. The Rail Knowledge Bank has grown in a range of subjects, including:

#### **Innovation**

Communicating transportation: government social media trends in the United States (ARRB Group, Australia)

The National Interest Services (NIS) program has organised a free webinar with presenter Lloyd Brown, Director of Communications for the American Association of State Highway and Transportation Officials (AASHTO), who will provide insight into current communications practices in US transport agencies, especially the use of social media and new technologies. Due to Lloyd Brown's schedule and time zone differences, the webinar is scheduled for 9am on Thursday 22nd October AEST.

[Click here to register for the webinar](#)

## Research

Australasian Centre for Rail Innovation (ACRI)

### [Testing the limitation of sighting distances in the AS1742 Part 7 Standard](#)

Examination of the judgement of sighting distances and train speed at level crossings to determine how drivers' judgement is affected by train distance and speed. It will feed in to the ongoing review of standard AS1742.7.

### [Broken rail detection without insulated rail joints: literature review](#)

New alternative traffic technologies such as Communication-Based Train Control (CBTC) and Positive Train Control (PTC) are emerging that do not require the existing track circuits-based signalling systems. A solution is required to enable Broken Rail Detection without IRJs (that is without traditional signalling track circuits). This research seeks to determine a cost-effective method to detect broken rails, which will provide the option to remove track circuit-based signalling altogether, eliminating a significant component of per-kilometre maintenance costs. Different technologies for detecting broken or damaged rails are discussed and their suitability assessed. Possible directions for future research are discussed.

### [End of train devices](#)

This project reviews the network requirements, types and usage of both conventional and ECP EOTs in Australia and abroad to the extent possible. Interviews with heavy haul operators are conducted to glean data on their current and future EOT usage and requirements. The document concludes by discussing the feasibility of potentially engaging manufacturers to develop alternative radio EOT and ECP EOT for the market.

### [Moving vehicle rail foot flaw detection](#)

This report delivers a comprehensive review of state-of-the-art technologies relevant to rail foot flaw detection, giving emphasis to their use in detection of rail foot flaw defects at practical inspection vehicle speeds. The review not only looks at the research being carried out but also investigates the commercial products available for rail flaw detection and their applicability for a moving vehicle rail foot flaw detection system.

## Conference papers

International Heavy Haul Association (IHHA) *Capacity building through heavy haul operation*, New Delhi, India, 2013

Below is a random selection of [papers](#): Click on the above link and open IHHA\10th, 2013, to view all.

### [Bearing condition monitoring using wireless technology to reduce the risk of bearing failures](#)

A system developed by IONX for railroad operations is designed to monitor rail car bearings to detect potential burn-off conditions before they arise and before they become destructive. This system is comprised of a Central Monitoring Unit (CMU) and Wireless Sensor Nodes (WSNs) which continuously monitor bearing temperatures as well as the current ambient temperature. For this pilot study, a total of ten freight cars and fifteen locomotives were equipped, operated, and monitored for an initial three month period. This paper presents preliminary operational results for these tests demonstrating the benefits of predictive condition monitoring systems in real-world applications.

### [Design and maintenance experience for heavy haul turnouts including feedback on the use of austenitic manganese steel for fixed and swing-nose crossings](#)

This paper describes the experience which has been gained by various subsidiaries of the Vossloh Cogifer Group of companies in the design and operational performance of their turnouts for heavy-haul applications particularly in Australia, but also in North America, Sweden and Mauritania. Following the Australian experience, the paper will feature High Axle Load – Heavy Haul (HAL – HH) considerations, particularly in relation to the design and performance of switchblades, and of both fixed and swing-nose crossings using both austenitic manganese steel and other materials.

### [Effect of axle load on track and foundation resilient deformation under heavy haul conditions](#)

In this research, field testing using remote video monitoring (RVM) and multi-depth deflectometers (MDDs) were used to investigate track foundation behaviour. The measurements were used to determine how increasing axle loads affect the deflection of the track as well as the track modulus. These results are compared to the design standards and a prediction is made on what the track structure can support. The results of the research will enable railway engineers to predict whether the current infrastructure

### [External pre-stressing of existing open web steel girder \(under-slung\) bridge for upgrading axle load](#)

Indian Railways have applied successfully the technology of external pre-stressing in strengthening one of the important steel bridges for upgrading the axle load. The bridge has been strengthened with pre-stressed cables in tension flange, extra steel in compression flange and upgraded floor system. This paper presents the methodology of external pre-stressing of the existing steel girder bridge along with the detailed measures adopted for upgraded loading & gauge conversion and monitoring of bridge in real time.

### [Life cycle cost estimation for railway bridge maintenance](#)

This study predominantly aims to reduce uncertainty and increase the accuracy of maintenance cost estimation for effective life cycle management. Analysis of maintenance intervention costs is included by employing subsystem and element information from the bridge asset register, condition reports, and an application of a maintenance intervention decision model using data from the respective databases. Consequently, a whole of life cost model is developed in this study.

### [Recording assisted RCF-treatment gains ground](#)

This paper presents some examples of RCF-treatment assisted by head check recordings during grinding and reports on the results. First experiences with the Eddy-current technology in heavy-haul environment are also discussed.

### [Towards sustainable heavy haul traction energy: a review](#)

The paper examined arguments for minimising energy consumption and emissions, versus continued use of fossil fuels, for heavy haul traction. The former suggested that electric traction within an open system including a smart grid supported by bulk electricity storage is an ideal, while the cost of electricity distribution infrastructure, continued availability of diesel fuel, and the challenges of upscaling electrically hauled throughput tonnage impede achievement. It concluded that the outcome will likely reflect the risks associated with the respective investments.

#### **TIP**

- "Double inverted commas" around a phrase searches the exact phrase e.g. "project 82" – e.g. finds six records.
- Without commas, the search defaults to a search on each word; (i.e. Boolean AND search) - e.g. finds >2000 records.

- Also try a NEAR search [bogie NEAR friction] – e.g. finds 160 records.



The ACRI Rail Knowledge Bank is maintained by ARRB Group through the National Interest Services (NIS). It gratefully acknowledges the support of rail sector bodies including the RTSA. The Rail Knowledge Bank was originally funded by the CRC for Rail Innovation.

### [National Interest Services supporting an informed land transport community](#)

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See the [Rail Knowledge Bank Charter](#) for more information on its objectives and structure, and the [Rail Knowledge Bank Collection Development Parameters](#) for resource coverage.

