The Institute of Railway Technology (IRT) at Monash University is the premier track and vehicle railway research centre in Australia. IRT is a leading technology and research service provider to heavy haul railway operations and mass transit railway systems. IRT is continuously developing new technologies and building industry capacity to drive productivity increases and safety benefits at the same time as reducing risks and costs for the international railway industry.

Key areas of expertise

- Track and rolling stock infrastructure
- Development of new technologies for railway industry
- Rail management and maintenance
- Rail welding
- Wheel – rail interface
- Dynamic modelling
- Onsite instrumentation of track and vehicles
- Complex data sampling and analysis
- Comprehensive in house laboratory testing facilities
- Component development, testing, failure analysis and quality control auditing
- Development of railway specific and national standards
- Professional training

Research capabilities

The Institute of Railway Technology combines academic distinction with concrete, real-world solutions that are reached by an interdisciplinary team of experts. IRT has highly skilled engineers, scientists and technicians that cover a wide range of mechanical, civil, electrical, metallurgical and general science disciplines.

IRT has a wide range of testing facilities and analysis capabilities including:

- High performance servo-hydraulic machines
- Monitoring tools and methods
- Sophisticated materials examination and analysis facilities
- Data analytics & visualisation
- Dynamic modelling & simulation.

Being linked to Monash University, IRT has the advantage of accessing leading-edge mechanical, electrical, civil, material and data analytics expertise as rail research associates, the latest technologies, computer simulation capabilities and other testing and research facilities.
IRT’s work on instrumented revenue vehicles (IRVs) since 2001 has improved the efficiency and safety of heavy haul rail operations and saved Australian mining businesses tens of millions of dollars.

IRT worked with its industry partners Rio Tinto, BHP Billiton Iron Ore, Vale (Brazil), Fortescue Metals Group and Australian Track Corporation to research, develop and implement IRV technology to improve railway track condition monitoring and maintenance planning. IRT designed and developed instrumentation to attach to existing customer rollingstock during normal operation and a sophisticated set of algorithms for interpreting information about track performance. The key advantage of IRV, as opposed to traditional track recording equipment, is that it monitors the actual response of the rollingstock and provides more regular feedback on track condition, typically daily.

It is estimated that the IRV technology has saved heavy haul railway operators in Australia more than $100 million in annual operating costs by enabling planned, effective track maintenance. Benefits have been fewer derailments, no disruptions from the previous technology, higher operating loads and fewer speed restrictions and more efficient and effective maintenance.

Commenting on the project, general manager of rail at Fortescue, Ron Dagostino, said “Fortescue is proud of its partnership with IRT to deliver strategic research and development projects to ensure the safety and efficiency of its railway and maximum throughput from its operations”.

## Industry Involvement

The Institute of Railway Technology has provided technical support to over 150 national and international businesses within the railway industry. These include mining companies BHP Billiton, Rio Tinto, FMG and Vale (Brazil) that operate heavy haul railways and freight and passenger rail authorities such as V/Line, Metro Trains Melbourne, Australian Rail Track Corporation, MTR Corporation in Hong Kong and SMRT in Singapore.

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Monash Infrastructure (MI) is a virtual institute that facilitates industry and government engagement with Monash University’s extensive capabilities in infrastructure research. MI coordinates interdisciplinary teams from engineering, information technologies, business, design and social sciences. Our researchers provide the expertise, resources and access to international knowledge networks to solve infrastructure problems, develop new technologies, build industry capacity and inform government policy and planning.