

Creating a world  
fit for the future



# RAIL & TRANSIT

Experts in critical and complex  
railway systems 





# RAIL SPECIALISTS YOU CAN TRUST

We work with governments, operators, infrastructure managers and manufacturers to ensure railways deliver the highest possible value to their customers and wider communities.

Whether you are looking to develop new regional transport plans, introduce low-emission technologies or improve the journey experience for your customers, we bridge the divide between core engineering disciplines and the economic and environmental challenges of rail transport.

**We offer trusted advice and practical solutions across the entire rail project life cycle:**

## STRATEGY AND PLANNING

Bringing knowledge of the rail domain to the development of sustainable transport networks.

## ASSET OPTIMISATION

Data analysis, modelling and research focused on outcomes.

## INDEPENDENT ASSURANCE

A world-leading portfolio of rail certification and assessment services.

## PROJECT DELIVERY

Expert support for seamlessly integrating your project into the wider rail system.

## REDUCING ENVIRONMENTAL IMPACT

Supporting rail's contribution to a low-carbon world.

# HOW WE HELP

Our service mix of strategic consultancy, in-house engineering, and independent assurance and testing means we can approach your project from a unique vantage point.

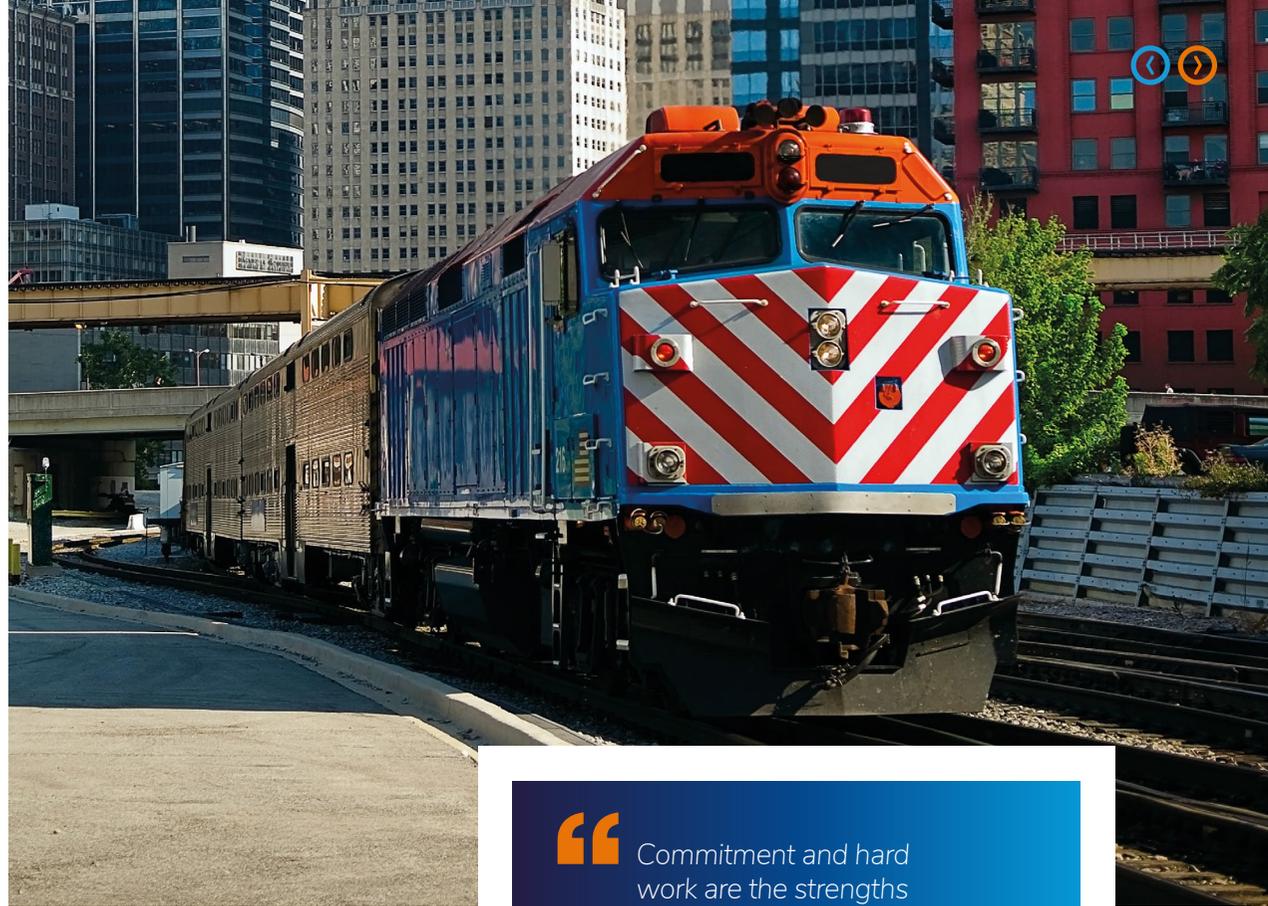
Within our teams are experts who know your expectations, but also understand the rail industry's structures and idiosyncrasies, its complex system interfaces, and the global standards and local practices that underpin day-to-day operations.

Our role is to bring the expertise you need to navigate the industry's operational, commercial and regulatory challenges, and ensure you have all the resources you need to deliver a safe, reliable and sustainable railway in any part of the world.

## 94%

of our clients choose to work with us again within **two years**\*

\*Measured by value in August 2018



Commitment and hard work are the strengths of Ricardo.

Bangkok Expressway and Metro Public Company Limited

## A trusted partner who understands your priorities

### Global perspectives

Our international network of offices and technical centres supports the transfer of skills and experience from one region of the world to the next.



### Whole-system mindset

We will help your teams apply systematic processes so that your engineering projects deliver a positive contribution to the wider rail system.



### Collaborative approach

We add value by working alongside your teams in an open and constructive partnership, offering balanced and insightful perspectives on the bigger picture.



### An industry voice

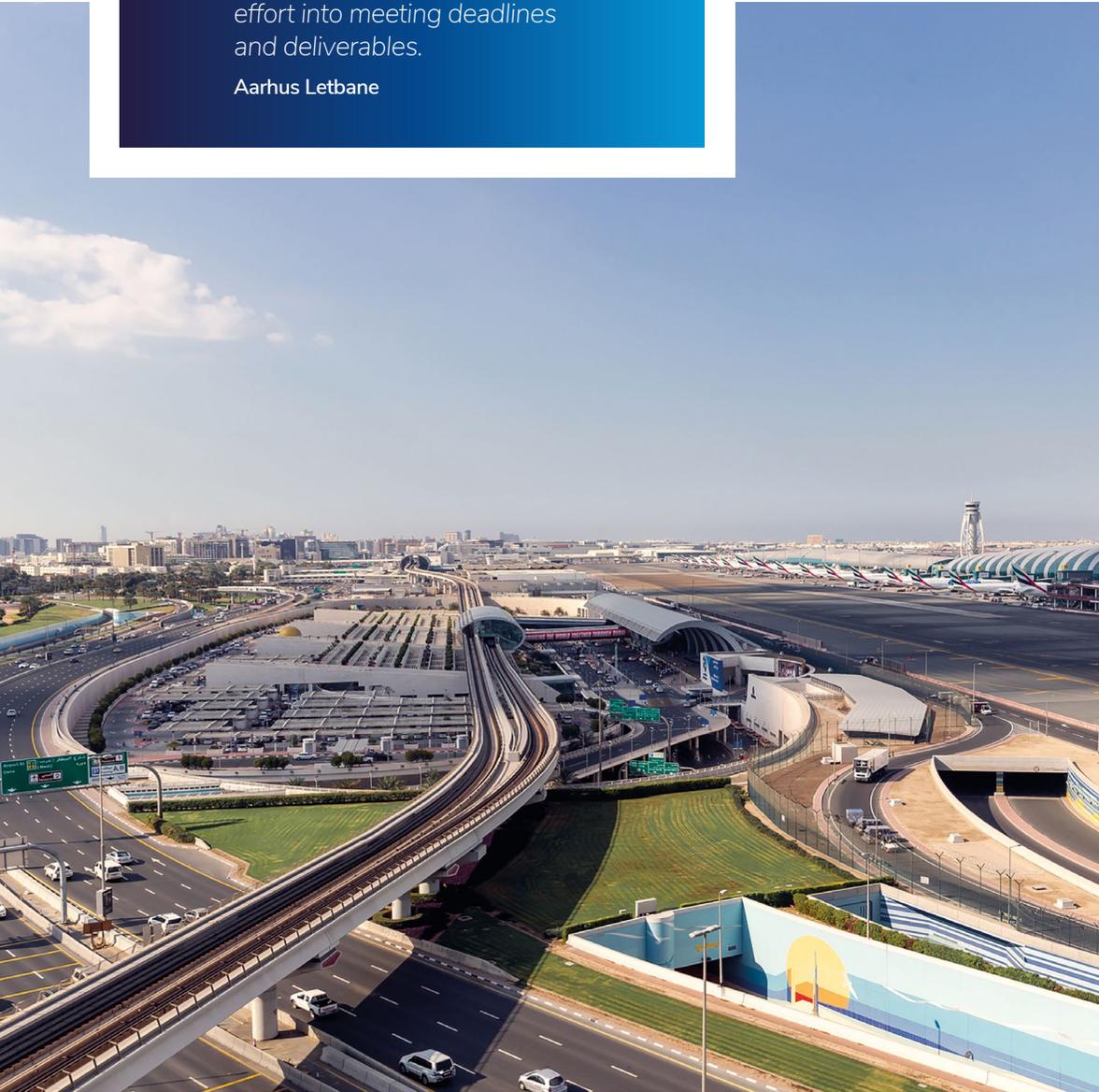
Our experts are leading contributors to the international committees, working groups and professional forums that define the rail industry's technical standards.





Ricardo put extraordinary effort into meeting deadlines and deliverables.

Aarhus Letbane



# STRATEGY AND PLANNING

Our strategy and planning practice brings our expertise of the rail domain to the long-term development of transport networks.

We support clients ranging from governments and industry regulators to operators and product manufacturers, guiding them through every stage of the project life cycle from initial scoping to implementation and evaluation.

Whether you are preparing an economic impact assessment for a new railway or implementing organisation-wide cyber security, we can help you define your objectives and engage with technical and non-technical audiences with a transparency that builds trust.

## CLIENTS INCLUDE:

- Transport for NSW
- KORAIL
- Manila Metro Rail Transit System
- Crossrail Limited
- Canadian National Railway

## IN ACTION



### Sydney Metro

Shadow Operator

We are acting as 'Shadow Operator' for the construction of two new driverless routes on Sydney's metro. In this role, our experts provide guidance to the construction and design teams on the day-to-day needs of a fully automated railway in terms of operations, safety and maintenance planning.



Working with Ricardo has been very enjoyable. We were kept regularly informed throughout and the document was comprehensive and well-produced.

London & South Eastern Railway Limited



## PROJECT DELIVERY

Our value to clients comes from our belief in a 'whole-system' approach to railway projects.

Even in specialist areas such as design engineering, procurement, RAMS and digital security, we provide experts chosen not just for knowledge of their discipline but also for their understanding of how your project should integrate into the wider system.

It is through these multi-disciplinary teams that we will help you to define your objectives, determine realistic work programmes and schedules, and provide any additional skills you will need to achieve your goals.

### CLIENTS INCLUDE:

- Alstom
- CRRC
- Siemens
- MTR Corporation Limited
- Korea Railroad Research Institute

### IN ACTION



### Amsterdam Metro

*Systems integration support*

We provided systems integration support over a decade of planning, design, construction and testing for Amsterdam's 11km North-South metro. From infrastructure and traction power supply through to the introduction of communications-based train control, we ensured each sub-system was seamlessly integrated into one of Europe's most modern subterranean routes.

# ASSET OPTIMISATION

We add value by focusing on achieving your project's outcomes – we don't just implement a technology simply because it has worked elsewhere. We have no vested interest in championing specific solutions.

Instead, real-world domain knowledge informs our data analysis, modelling, research and development, and safety assurance. A whole-system mindset means we ensure each project positively contributes to the full operational railway.

We can also bring insights and best practice from beyond the rail domain, drawing upon Ricardo experts from the automotive, manufacturing, energy and environment sectors on asset optimisation strategy.

#### CLIENTS INCLUDE:

- NS Group
- Network Rail
- Government of South Australia
- HTM (The Hague)
- Iarnród Éireann

#### IN ACTION



#### Infrabel

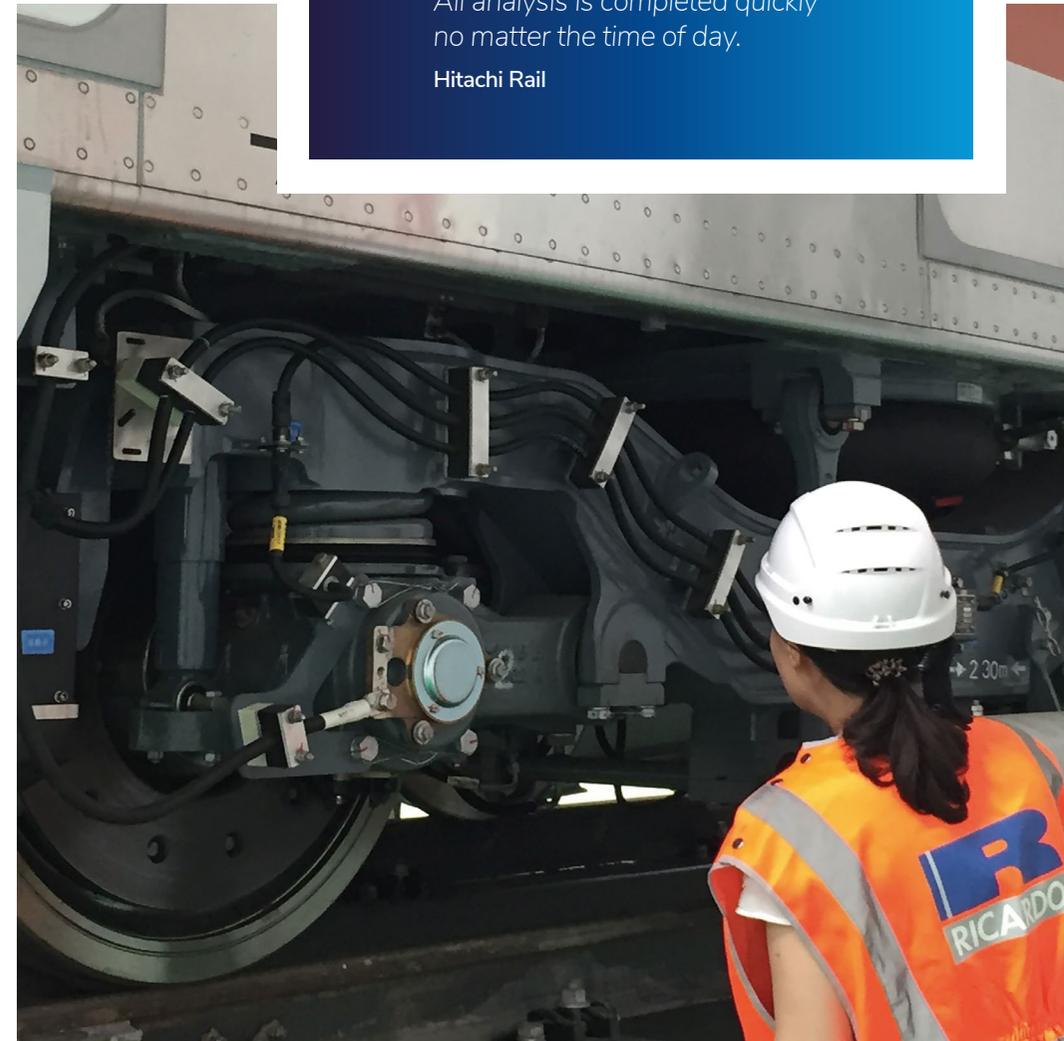
##### Pantograph monitoring

Ricardo's pantograph monitoring units have been installed in the Brussels area to prevent faulty units causing costly damage to the overhead catenary. According to Belgian infrastructure manager, Infrabel, "The systems have identified damaged pantographs that needed immediate actions to avoid possible overhead wire breaks."



Great response every time.  
All analysis is completed quickly  
no matter the time of day.

Hitachi Rail



# REDUCING ENVIRONMENTAL IMPACT

We can help your organisation reduce the environmental impact of its operations and, in turn, gain competitive advantages and efficiency improvements.

Notable projects include a partnership role in the world's first solar-powered railway and providing technical support during the conversion of diesel rolling stock to hybrid-battery or hydrogen power.

As a member of the Ricardo group, we can also draw on specialists from other sectors, such as experts in low-emission technologies within the automotive sector or environmental analysts who advise governments on sustainability targets.

## CLIENTS INCLUDE:

- Hitachi Rail
- Porterbrook
- Edinburgh Trams
- European Investment Bank
- Province of Friesland

## IN ACTION



### HydroFLEX

Safety and certification expertise

We provided safety and certification expertise for the first hydrogen-powered train to operate on the UK's network. The vehicle was fitted with hydrogen fuel tanks, a fuel cell and a battery pack and can operate with zero carbon emissions. The aim was to demonstrate a safe transition to hydrogen power on track sections where electric power is not provided.



“ Professional yet adaptable in the ever-changing production environment.

Eurostar International Limited

# INDEPENDENT ASSURANCE

Like many safety-critical sectors, railways have influential stakeholders – governments, regulators, financial institutions and passengers – who expect a degree of third-party oversight on issues related to safety and quality.

Whether we are assessing new signalling products against international standards such as EN 50126, or the construction of entire rail systems, we offer an extensive portfolio of assurance services. These include accredited Notified Body, Designated Body and Assessment Body services, as well as Independent Safety Assessment, Independent Verification and Validation, and Product Certification.

We also support clients with test and measurements services, including type testing for the authorisation of new or refurbished fleet and infrastructure.

## CLIENTS INCLUDE:

- Banedanmark
- Etihad Rail
- Metro de Madrid
- Stadler
- Thales Group



## Taiwan High Speed Rail

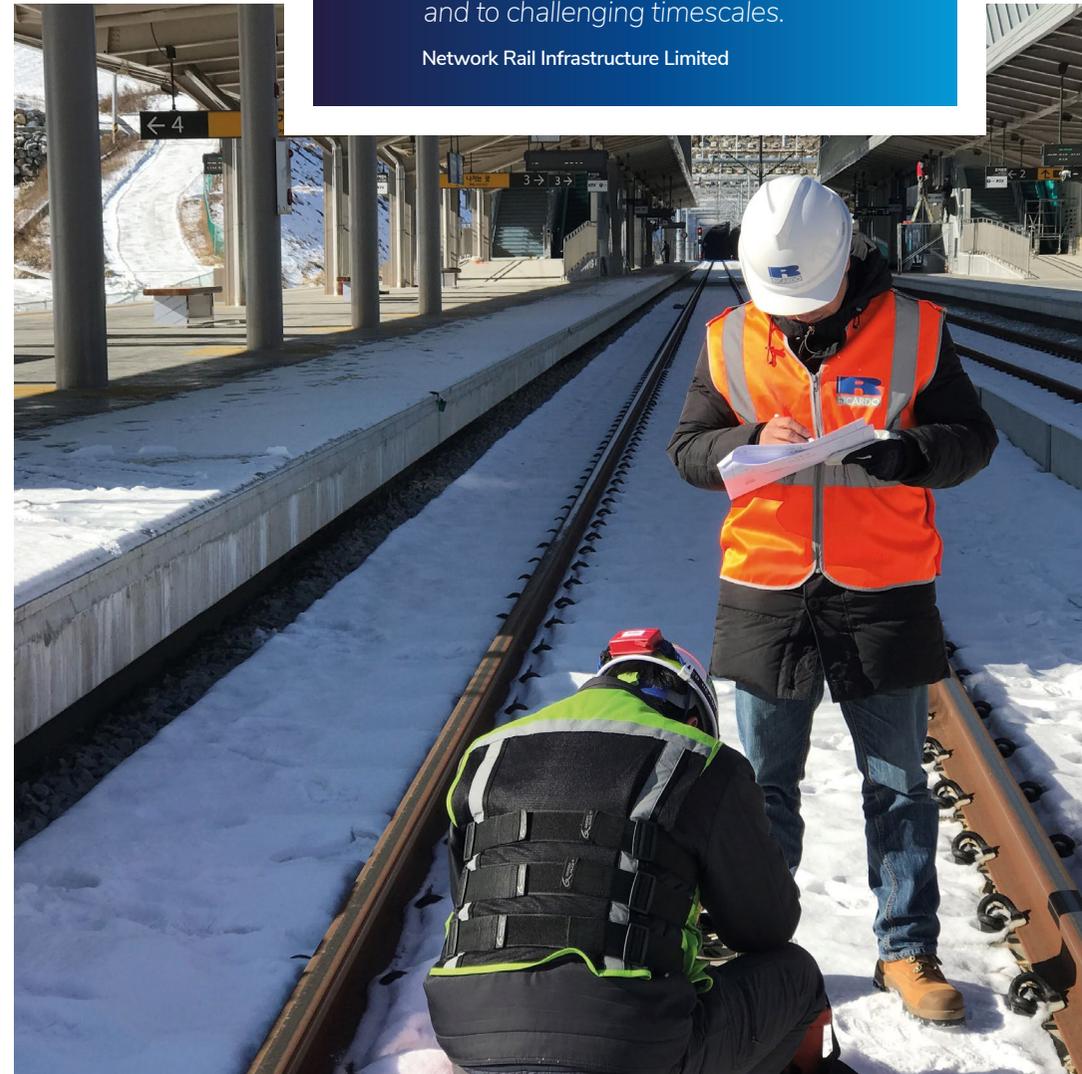
*Independent Verification and Validation services*

We provided independent verification and validation services for the extension of Taiwan's high-speed network, with our remit extending across functionality, quality, maintainability and safety. Our relationship with the railway extends further back to 2000, when we provided similar assessment services during the construction of the inaugural high-speed network, the first international use of Japanese bullet train (Shinkansen) technology.



Ricardo have been flexible in terms of reviewing the documents at short notice and to challenging timescales.

Network Rail Infrastructure Limited



# THE RICARDO GROUP

## Maximise efficiency. Eliminate waste.

Our work extends across a range of market sectors – including commercial vehicles, rail, defence, motorsport, power generation and government – and our client list includes transport operators, manufacturers, energy companies, financial institutions and government agencies.

Through our multi-industry knowledge, we are uniquely positioned to handle our clients' toughest strategic and operational challenges, with assignments that have included strategy development, cost reduction, safety management, regulatory compliance and environmental impact assessments.

Our in-house engineering capabilities also enable us to provide high-quality prototypes and low-volume manufacturing of complex products and assemblies, including engines, transmissions, electric motors and generators, battery packs, and fuel cell systems.



Sir Harry Ricardo,  
1885–1974

And in everything we do, in every assignment we undertake, we remain committed to the ethos of our founder, Sir Harry Ricardo, one of the most innovative mechanical engineers of his time, who in 1915 set out on a mission to maximise efficiency and eliminate waste.



Over **3,000** engineers,  
consultants and scientists  
across **20** countries



## Contact Ricardo Rail

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#### Other office locations

##### UK

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