FRAZER-NASH CONSULTANCY

Rail systems

SYSTEMS AND ENGINEERING TECHNOLOGY

Frazer-Nash

Frazer-Nash's consultants apply their expertise and know-how to develop, enhance and protect their clients' critical assets, systems and processes. We're renowned for our rail systems expertise and our work across the transport, defence, aerospace, power, and industry sectors. We use advanced engineering analysis to improve safety, efficiency and performance. And we provide services that help minimise risks and reduce costs and liabilities.

Our clients know they'll get the very best in strategic planning, project management and technical support, which is why they ask us to solve some of their greatest challenges. We provide independent, impartial advice across the complete life cycle of projects − supporting research and concept studies, design, assessment, assurance, in-service and disposal issues.

With an engineering legacy of over 80 years, we opened our first Australian office in Adelaide in 2010, and have grown significantly since then. We are focussed on continuing to develop our skills, capabilities and offering into the rail market in Australia.

> *"Working from our offices in Adelaide and Melbourne with support from our network of UK locations, we understand what's really important to our clients: a high quality result, complete reliability, value for money and a clear competitive edge."*

Why Frazer-Nash?

We listen, we evaluate, we respond and we deliver – always with integrity and without compromise. At Frazer-Nash we provide outstanding support to the development and operation of rail projects, assets and facilities.

We have a broad portfolio of systems and engineering capabilities. This means we can give our clients the advantage they need to compete and win in their markets.

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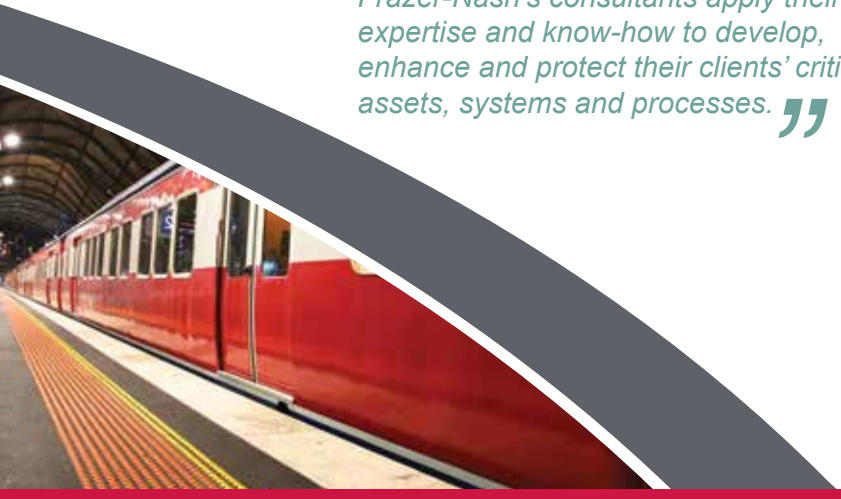

Our clients

We understand the business context of the services we provide and deliver tailored solutions throughout the project life cycle. Our clients include:

- Rolling stock and infrastructure companies
- Train operating companies
- Original equipment manufacturers
- Regulatory bodies

Our areas of expertise

We offer an extensive portfolio of project management, design, engineering, simulation and assessment services and deliver innovative solutions to our rail clients' projects.

This is combined with a pragmatic, hands-on approach to problem solving, supported by advanced analytical engineering assessment techniques. Our core skills include:

Systems assurance

- Safety management
- Environmental management
- Human factors
- Independent safety assessment
- Risk assessment
- Independent technical audit

Systems engineering

- Project concept development
- Requirements management
- Reliability, availability and maintainability
- Technology road mapping
- Supportability engineering
- Business process support

Systems design

- Concept design
- Mechanical and electrical system design
- Structural design and analysis

Systems analysis

- Thermal analysis
- Fluids analysis
- Software development
- Electrical studies
- Noise and vibration assessment

Our core capabilities

Requirements engineering

Frazer-Nash's requirements engineering expertise has been developed through our involvement with public and private sector organisations over many years.

Our experience is based on developing and rationalising requirements from Australian and international standards, technical specifications, state and national standards accredited rail operator (ARO) and customer requirements.

Our systems approach − a process through in which outcomes are captured, analysed, specified, agreed, matured, controlled and communicated to project stakeholders − can add significant value to a project.

We believe that time spent early in the project life cycle understanding and documenting what a project's outcome should be or do is a key risk mitigation activity. And that identifying issues and developing assumptions helps address potential risks before they can impact on the project. This is particularly true of complex projects involving multiple stakeholders, where a high level of stakeholder communication and involvement is critical for a project's success.

Our requirement engineers add value to a project through developing requirements that:

- Provide a project with the means to understand complexity in a product or service before it is built
- Provide a clear, concise and justifiable head-mark for product or service design activity
- Act as a stable and bounded benchmark for testing product or service performance.

Rail systems assurance

We use a systems assurance approach to add value to rail infrastructure projects. Our approach reduces commercial risk and ensures that changes to rail operations and infrastructure are managed systematically, delivered within the scope of the Management of Change process, and complies with rail safety legislation and ARO safety management systems.

Reliability, availability and maintainability (RAM)

Frazer-Nash offers a wide range of design and analysis skills, including the use of reliability analysis and predictive modelling, which can support our clients' reliability, availability, maintainability and safety programmes. We provide RAM support to new and operational equipment.

System safety, environment and risk management

Frazer-Nash offers a full range of independent safety services, from planning advice, to taking on the role of Safety Manager and performance of all safety assessment work. Our independence allows us to act as auditor for clients that have safety management capability.

We can help to bring a practical and integrated approach to environmental issues in projects throughout their life cycle, including specification, procurement, tendering and implementation. We have extensive risk management experience from working within and supporting the rail industry at various phases within the equipment design to decommissioning cycle.

Systems analysis

Building on our expertise developed across a range of sectors, many of our rail clients are benefiting from our design and analysis expertise. Our capabilities include:

- Assessment of emissions, environmental impact and energy efficiency
- Bespoke software development
- Bodyshell and bogie structural design and analysis
- Control system simulation
- Dynamics, ride, handling and stability
- Electrical control and instrumentation
- Electrical systems design and analysis
- Fire and smoke modelling
- Fluids and heat transfer
- Mechanical systems design and analysis
- Noise and vibration assessments
- Technical due diligence and independent technical review
- Vehicle and component structural design and analysis.

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