

Mott MacDonald's railway systems and safety assurance engineers provide a service that is fundamental to any railway project – delivering an operable and maintainable system that meets its intended purpose. We firmly believe in delivering an integrated system design that meets the needs of the end user, with safety risk as low as reasonably practicable. We have considerable experience in the successful application of systems and safety assurance engineering and associated key processes throughout the complete life of complex multi-disciplinary projects.



Systems engineering and safety assurance



Mott MacDonald has considerable experience in the application of systems and safety assurance engineering on complex multi-disciplinary projects.

Systems engineering

The application of systems engineering is essential to the selection of an appropriate combination of processes at each phase of a project to support the client's expectations for the timely delivery of a cost-effective project.

Mott MacDonald's approach to systems engineering avoids over-engineering, with its associated higher costs, and unnecessary complexities. We streamline designs, enabling easier constructability. As a natural part of our approach to systems engineering in the project design phase, we carry out requirements engineering – using tools such as DOORS – and design reviews, in addition to verification and validation processes. These design reviews are particularly important in the early identification of problems which could, if undetected, lead to time delays and cost overruns.

Our engineers have extensive experience of top-level functional, non-functional and performance modelling and provide support in related disciplines such as reliability, availability and maintenance (RAM) and human factors.

A common cause of project failure is the lack of definition and functionality at interfaces. Through the application of effective systems engineering and validation activities, we deliver interfaces that are properly defined and considered during the design so that the technical functions will perform according to the specification. In addition, we assess RAM and electromagnetic compatibility (EMC) system performance characteristics so that they meet the applied standards.



With our extensive experience, Mott MacDonald is the ideal choice to carry out systems engineering and safety assurance consultancy work for clients.



Our railway safety assurance professionals have passed the RSSB engineering safety management course, confirming their ability to deliver best practice.

Safety assurance

An intrinsic part of systems engineering is safety assurance, which ensures that the project will satisfy the requirements of safety authorities. Mott MacDonald's firm recommendation to clients is for the safety assurance process to commence as early as possible in the project as this minimises unnecessary design work and higher costs. Safety assurance is part of the project plan of work prepared by our management team at the commencement of the project design programme in accordance with our quality assurance system.

A railway operator is required to demonstrate that the safety risks associated with the railway are acceptable in the country of operation to secure a license to operate their railway service. For this purpose, documented evidence of safety assurance – such as a safety case – is required to demonstrate that the proposed railway meets the safety criteria prescribed by the safety authority.

Our railway safety assurance professionals bring experience from many industries and have passed the Rail Safety and Standards Board (RSSB) engineering safety management course (Yellow Book), which confirms their ability to deliver best practice. Our extensive experience in the preparation of safety plans means that we can identify and execute the necessary safety assurance activities for the successful development of a safety case.

Independent safety assessment

In accordance with national and international standards, independent safety assessments (ISAs) are required to provide further assurance that the required level of safety has been achieved in the design and function of the railway. ISAs are often carried out on important railway sub-systems, any safety-critical equipment component, and safety cases that have been prepared on behalf of the operator.

Mott MacDonald has extensive experience in carrying out ISAs for clients covering a wide range of systems and products used in the building of a railway, and we have corporate accreditation from Network Rail (UK) to undertake ISA work. We are a fully independent company and not associated with any contracting or manufacturing industry. This, combined with our extensive railway experience, make us the ideal choice to carry out ISA consultancy work for clients.

Our early involvement in ISA work provides a number of benefits to clients and adds value to projects. It enables us to establish efficient integration of the acceptance criteria into the project, checking that the safety case covers all likely normal and emergency conditions and identifying the constraints required for safe operation. We can also make all relevant parties aware of their responsibilities in the safety regime thus avoiding any misunderstandings with regard to scope of responsibilities and interface management.

Contact us

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