

Designing for reliability in the rail industry

The renowned management consultant W Edwards Deming once wrote: “To improve quality is too late, ineffective, costly. When product leaves the door of a supplier, it is too late to do anything about its quality.” This neatly sums up why Network Rail has adopted a product acceptance process which assures that products accepted for use on or around its infrastructure are safe, compatible, reliable, fit for purpose and do not pose any risk to its infrastructure. The process is called DFR – Design For Reliability – and applies to new or modified products, materials, equipment and systems. In the simplest terms, the purpose of DFR is to design out faults before the product is made.

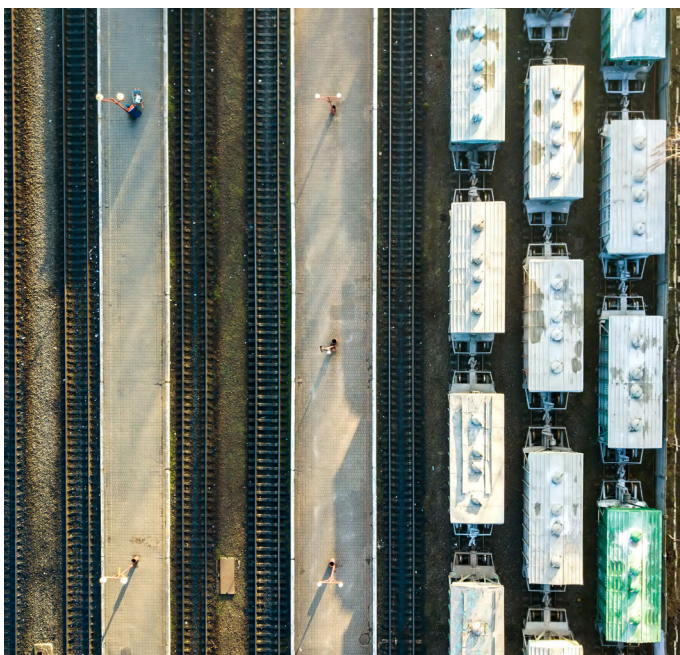
Why is product acceptance so important?

Network Rail introduced DFR as a proactive element of its Structured Continuous Improvement process, because, although delay minutes had gradually improved since 2000/2001, they had plateaued then shown a slight



rise due to greater delay times per incident. Its aim was therefore to introduce an approval process for new products that would see greater reliability, less repetition of past issues, easier processes for effective installation, less asset-related train delay and lower whole life costs.

“The railway is vital to Britain’s economy,” Network Rail said. “It’s a team effort between us, the rest of the rail industry and our contractors to help keep the economy on track... The more efficient we are, the more we can invest for passengers. We’ve been entrusted public money and it’s our duty to spend it wisely by pursuing better value and doing more for less.” Part of providing an efficient service, value for money and supporting the economy is reducing the number of delays and cancellations caused by failures, repairs and unplanned maintenance.



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IP rating, thermal protection and vandalism

For a company such as Rainford Solutions, that designs and manufactures enclosures for trackside applications, Network Rail product acceptance includes ensuring that cabinets are IP rated, enable thermal management and provide vandal proof features. This is to safeguard the installed equipment against outdoor environmental conditions and to limit the risk of intruder attacks.

Network Rail's DFR process has specific requirements regarding anti-vandalism of trackside location cases. Documents must be submitted that meet requirements for BRS SC-31/32 Small/Large Equipment Enclosure foundations, BS EN 12320 Building hardware – padlock and padlock fittings, BS EN 60297-3 Mechanical structures for electronic equipment. And there are tough physical tests to pass to prove resistance to vandalism, including a true-to-life simulation where a 'vandal' is given a set of tools and 20 minutes to break into the cabinet.

Enclosures must also pass a series of tests for electromagnetic capability and shock and vibration under the multi part document BS EN 60068 – environmental testing. In addition, they must meet strict requirements regarding thermal management to protect the contents from 'cooking' as a result of solar gain. This occurs when the heat inside the cabinet is magnified by the sun's rays.

Dust is also a constant danger to reliability in the rail sector. A regular discharge of brake dust from axles and brake mechanisms can penetrate the working parts of active equipment and stop fans from working.



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To prevent this, Rainford's enclosures for signalling equipment are IP54 rated – the highest possible rating for enclosures with fans and ventilation – to protect against dust and also water ingress.

The requirements above are only samples of a far wider list, but the rewards of improved efficiency for Network Rail and its customers are great.

Rainford Solutions is already designing its enclosures using the Network Rail DFR process and is in a strong position to gain acceptance of its portfolio of enclosures for the rail industry following previous PADS-approval of its three-bay temperature controlled location (TCL) case. The PADS approved Rainford TCL is already installed on the Ferriby to Gilberdyke route in Yorkshire. It is IP54 rated and uses a forced air, active cooling system above 22°C to maintain a suitable working environment for signalling and telecommunications equipment. This reduces the likelihood of equipment failure and improves reliability.

The TCL comprises a ventilated location case designed to host signalling equipment of different types, including power supplies, relays and various signalling



components as an alternative temperature controlled environment with a smaller footprint than an REB. The TCL can house both a BRS SM440/867 framework and standard 19inch racking, allowing the installation of both new and legacy equipment. Rainford Solutions specialises in developing enclosures that meet such challenges as heat and cold, electro-magnetic fields, shock and vibration and vandalism. Its Consult, Design, Make and Protect process delivers right first-time solutions offering high performance, low maintenance, durable and reliable enclosures for the rail network.



The failure of just one component can cause huge disruption but by using products that have passed a strict acceptance process, Network Rail can minimise the number of times parts fail, extend maintenance intervals and prevent interruptions to the rail network.

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