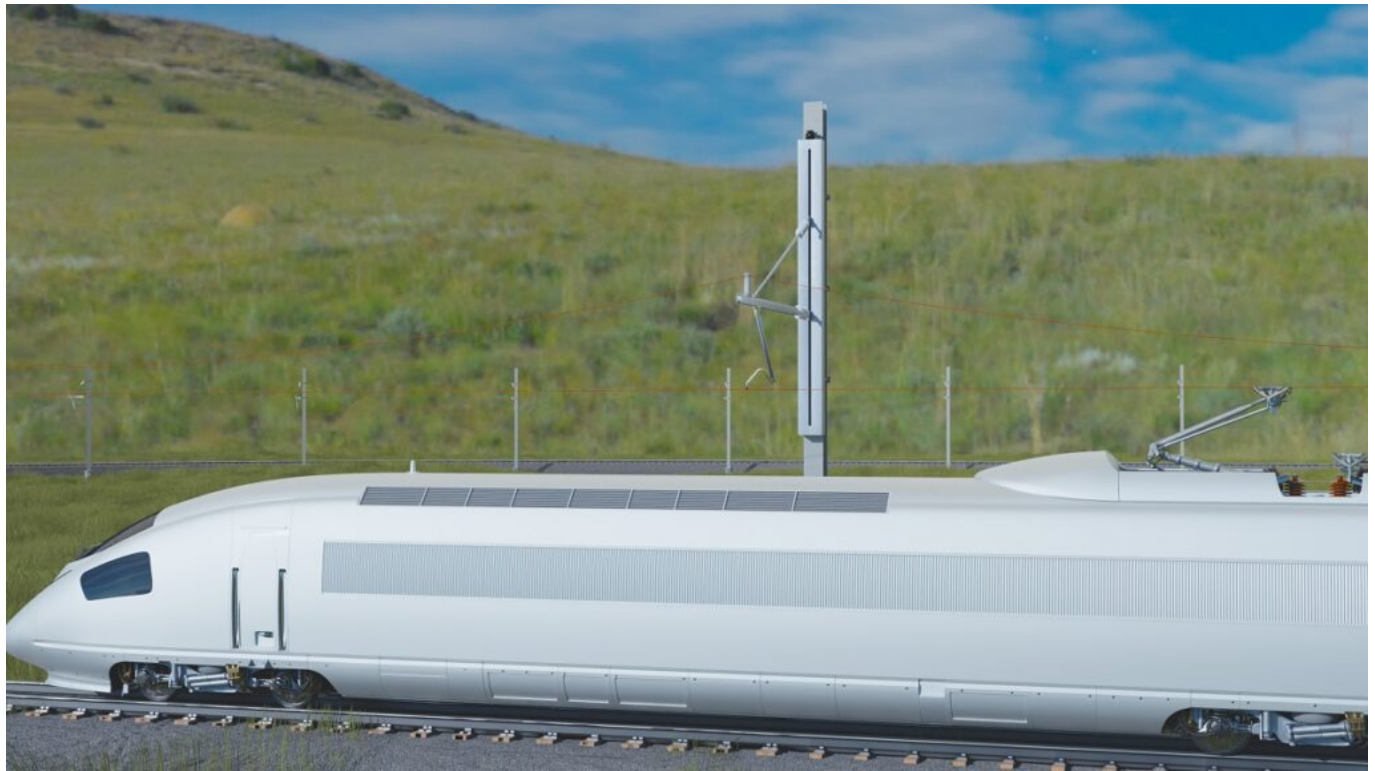


Carbon and cost cutting railway innovations win funding

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Two projects by Furrer+Frey were among 24 to win a share of the first phase of the £7.4m Department for Business and Trade competition ‘Railway Construction Innovation’ delivered in partnership with InnovateUK

One concept could see Furrer+Frey create a world-first test track with rising and lowering electrification equipment at the Global Centre of Rail Excellence (GRCE) site in South Wales.

This would allow operators to test mimics of real-world sections of track with different overhead line gradients, tweaking designs and monitoring performance in real-time.

Real-world testing will help cut costs on bridge lifts and facilitate the review of line speed restrictions.

The other concept will see Furrer+Frey research a composite cantilever for railway masts in partnership with the National Composites Centre – aiming to save cost and carbon versus traditional steels.

As a follow-up to their project last year to develop a composite mast structure, the cantilever would help to move electrification masts beyond metal.

Kicking off in May the two feasibility studies will be completed by the summer. If successful in the second

phase of the competition, the two concepts would be demonstrated at the GRCE.

Noel Dolphin, Head of UK Projects said: “We are delighted with this funding boost for our ideas.

“It’s vital we electrify more of the network to meet net-zero targets and enhance passenger capacity and reliability. Steps like this could potentially revolutionise the industry and boost value-for-money.

On the rising and lowering overhead line equipment, Noel said: “The dynamic testing track would allow railways from all over the world to come to GCRE and work out the most cost-effective solution to their problem.

“If you have a line that passes under a low bridge, for example, you could test multiple variations at the touch of a button at the GRCE track. Ultimately to answer whether that bridge would need to be raised or if line speeds need to be restricted under it and come to the most cost-effective solution.”

On the composite cantilever, Noel added: “In Formula One we see how tiny reductions in mass bring significant energy efficiency savings. The first step was our prototype mast, now we’ll be able to look at the more complicated cantilever structure.”

Gokul Ganesh Murali, Technology Project Lead at the National Composites Centre said: “We are delighted to participate in the project, demonstrating our expertise in composites technology to support Furrer+Frey with providing sustainable solutions to the rail industry, underpinning our focus on developing net-zero solutions that meet environmental, cost and performance requirements for the sector.”

The Projects

Wales could host world-first dynamic electrification test track

Government funding has been awarded to study the feasibility of a rail test track with moveable electrification that would allow greater precision in electrification design.

Such a facility would be the first of its kind and allow multiple differing designs to be tested in the real-world, in one place, rather than relying on computer modelling.

Real-world testing would help engineers optimise their designs with the aim of reducing capital costs, such as bridge lifts, or operational costs, such as line speed restrictions.

By using the facility, rail infrastructure owners and operators could save millions in bridge lifts and other civil works to accommodate electrification.

Reducing electrification costs is seen as a critical by Network Rail and Government. On the Great Western Mainline Electrification project, bridge lifts costs came in at around £385m.

The CODES (COSt-Reducing Dynamic Electrification gradient System) project will kick off in May with a feasibility study due for completion by the summer.

If taken to the next stage, a demonstrator would be installed at the Global Centre for Rail Excellence in South Wales.

A carbon-cutting composite cantilever

Using lighter composites that are self-insulating would do away with the need for ceramic insulators and reduce energy use across the life-cycle of a railway.

The concept aims to build on a successful composite mast prototype developed by Furrer+Frey and partners last year, funded by Innovate UK and the Department for Transport.

The prototype composite mast weighed just 80 kilograms while providing similar strength and durability properties to a steel mast equivalent weighing 750 kilogrammes.

As a result, they are much less energy intensive to manufacture, transport and install. Piling for foundations would be significantly shallower and the masts could be erected much more quickly, using smaller, less energy intensive plant.

Over the length of an electrified railway these would add up to significant savings.

Furrer+Frey and Network Rail have a joint PhD at Cranfield University to develop the mast toward manufacturing.

The new cantilever project 'Innovative CAntilever for Greener Electrification at the Global Centre of Rail Excellence' (ICAGE GCRE) will report on feasibility in the summer.