RailBusinessDaily

Helping the rail industry to prepare for decarbonisation

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Richard Penn, managing director of Penn Engineered Solutions, discusses alternative rail propulsion systems – and the importance of upskilling the workforce

The UK rail industry has set itself ambitious targets around decarbonisation, pledging to become net zero by 2050. But is it on track? At Penn Engineered Solutions, we believe that it has a five-to-ten-year window in which to act, exploring new methods of propulsion and ensuring that workforces are prepared for the move away from diesel combustion. If the UK fails to act soon, it risks falling short of its science-based decarbonisation targets – and losing its standing in the global rail industry.

In the following article, I'll introduce some of these alternative propulsion methods, discuss the importance of training and upskilling, and explain how Penn Engineered Solutions is helping businesses to explore decarbonisation.

Award winning advice on propulsion systems

Established in 2016, Penn Engineered Solutions specialises in two key areas: Six Sigma and lean manufacturing, and propulsion system engineering. In fact, we were recently named Best Propulsion System Engineering Consulting Firm 2023 – Derbyshire by SME News. It's our first industry award, and we're really pleased that the value and quality of our content have been recognised. The accolade will strengthen our clients' confidence in us – and, hopefully, help us to win new work.

This work falls into two main areas – propulsion system engineering consultancy and upskilling and training. As consultants to the rail industry, we support TOCS, ROSCOS, OEMs, Tier 1s and 2s, and even learning providers, helping them to understand new and emerging propulsion systems.

Alternative propulsion systems for rail

But what are the alternatives to diesel, which still powers passenger and freight trains on sections of the network that aren't fully electrified? Some experts believe that electrifying everything is the answer – but this would be hugely expensive.

One alternative is so-called biofuels – particularly hydrotreated vegetable oil (HVO). A paraffinic, fossil-free fuel, it delivers a 90 per cent reduction in CO2 when compared to mineral diesel – great for a fleet operator's eco-credentials. Indeed, it could help TOCS to make significant CO2 savings without dramatically overhauling their traction units.

While biofuels are probably the simplest alternative to diesel, hydrogen (which is gaining ground in the heavy-duty and off-highway sectors) has real potential for rail. Trains could be powered by hydrogen fuel cells, with water the only byproduct produced. And projects like HydroFLEX are already making hydrogen-powered locomotives a reality in the UK.

Finally, there are bi-mode or tri-mode traction units, which feature a diesel engine, some level of battery electrification, and perhaps even hydrogen fuel cells.

These are the options we might explore with customers, providing assessments, road maps, and technical advice around decarbonisation. We'd also discuss the pros and cons in terms of cost, implementation feasibility, uptime, and warranty; it's all about understanding what the client needs and helping them to identify the best technical solution.

And the joy of working with consultants like Penn Engineered Solutions is that they're fully independent. We have no agenda; businesses can rest assured that they're receiving impartial advice, rather than being sold a potentially unsuitable solution.

Why training and upskilling is key to decarbonisation

Alongside this impartial advice, Penn Engineered Solutions offers training and upskilling – something for which we've noticed a surge in demand over the last 18 months.

But what's behind this uptick? More and more businesses are recognising that the decarbonisation agenda is an opportunity to win work – and that it pays, not just to promote and accelerate this agenda, but to

build on their own eco-credentials.

Recruitment and staff retention are also key concerns. As the industry moves away from diesel, it must ensure that its workers (many of whom, have a traditional mechanical background) are equipped to develop, install, maintain, and repair new technologies. In practice, this means attracting new blood and upskilling workers.

If it fails to do so, UK rail risks losing a significant proportion of its workforce. Staff will leave the sector because they no longer feel engaged, comfortable, or competent, or find a new employer willing to upskill them – all while the pipeline fails to fill up quickly enough, and the skills gap grows. In order to recruit in a jobseeker's market, retain talented employees, and safeguard the industry, rail businesses must provide adequate training – ideally working with a consultancy like Penn Engineered Solutions, which can tailor its delivery model. And it's worth upskilling non-technical employees, too – think finance or procurement teams, who need to understand the terminology around these new solutions.

The UK has a proud rail heritage. Let's not lose our standing in the industry, leaving all the exciting research and development work to organisations overseas. With great academic institutions and facilities like GCRE, there's nothing to say we can't be at the centre of this work – and Penn Engineered Solutions (which also provides Six Sigma and lean manufacturing training) is on hand to help.