NATIONAL COMPOSITES CENTRE

CASE STUDY

NCC finds sustainable, cost-effective composites alternative for innovative SME

Magway, innovators of game-changing sustainable transport solutions, were looking to apply their ground-breaking expertise in linear motors and control systems to create a transport network of subterranean pipes, aiming to address the explosive growth in online shopping.

They wanted to find out if the pipes used in the network could be manufactured in a more sustainable and cost-effective way than the current HDPE pipes used in similar subterranean environments and on their current test rig.

Magway had initially engaged with the NCC through an Innovation Workshop, which allows SMEs to explore the feasibility of their innovative ideas and products, facilitated by the world-leading composites research centre's dedicated SME team. Wanting to take their concept to the next level, they returned to the NCC to conduct the project through the SME Boost programme.

The team showed that renewable, biobased flax fibres offered a viable, more sustainable alternative to traditional reinforcement materials, while also reducing the overall cost of the pipeline in comparison to HDPE. The materials identified could represent a potential 50% reduction in material costs, and a 70% reduction in manufacturing costs.

This project was completed as part of the NCC's SME Boost programme, which offers match funding up to £25k to SMEs in the UK to help them develop composites products.
Find out more at nccuk.com/smeboost.

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A team of NCC engineers conducted research into the design and cost modelling of each aspect of the product, starting with a rigorous requirement capture. There was then an assessment of a range of environmental factors including fire and chemical resistance, damage protection, and definition of the design envelope from material, mechanical, and geotechnical data. Combining this with assessment of various manufacturing processes allowed the creation of product, material, and manufacturing process down selection.

A detailed life-cycle analysis of the materials currently used, and those being considered as alternatives, was also conducted to ensure that the gains from removing goods traffic from the roads was not undermined by unforeseen factors in the development of this new method of transport.

The findings have enabled Magway to demonstrate the feasibility and sustainable credentials of their concept, from which they can apply for more funding and investment to support the development of their product. This has also highlighted opportunities within the supply chain that could be developed to further exploit these materials and supply future markets.

> **“Sustainability is at the heart of Magway, so it was important for us to understand the environmental inputs of the system itself as well as the beneficial outputs.**
>
> **“Working with the NCC enabled us to assess the embedded carbon in the HDPE pipes being proposed and offered a comprehensive review of the alternatives. Their report not only showed us how we could save money and reduce our systems carbon footprint, it also offered an opportunity for UK manufacturers to take a global lead in creating more sustainable pipe materials. We are currently looking at how we can partner to best take the recommendations forward.”**
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> **Huw Thomas, Development Director at Magway**

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