AFRC
ADVANCED FORMING RESEARCH CENTRE
UNIVERSITY OF STRATHCLYDE

University of Strathclyde Glasgow

Macdeck Landscaping

Expertise in materials, structural analysis and modelling secures confidence in innovative garden decking solution

Background

Macdeck Landscaping is a specialist decking company. Its owner approached the AFRC after carrying out basic prototyping on a unique product with global potential.

After working on its Decking Construction System for eight years, the firm wanted to test key structural aspects of its product to inspire further confidence before taking it to market.

Made from composite material and timber, the system is designed to cover previously unusable ground and can be topped with landscaping material, such as lawn, paving or tiles. A sustainable and reusable solution, it does not require heavy machinery and plant, concrete, blockwork or brickwork.

Customer challenge

The product features composite layers because they are durable, light and strong. They sit on a timber frame, allowing for sufficient drainage of the structure, which is load bearing and suspended at height.

Using composite material in this type of construction is truly innovative. Key to the project was understanding how the decking structure would perform under certain stress, for example with an extremely heavy load.

Customer quote

"Interactions with the team at the AFRC and MAE were invaluable– everyone was enthusiastic and knew exactly what we were trying to do. The people doing the testing, those helping me secure the funding, everybody was brilliant."

Anthony McCaffrey, Macdeck Landscaping

How did the AFRC help?

Seeking expert input, the firm used the Interface service, which links up businesses with academics. The AFRC picked up the enquiry in collaboration with the University's Department of Mechanical and Aerospace Engineering (MAE) and the project was funded by an Innovation Voucher from the Scottish Funding Council.

The combination of different materials used in the product, presented the AFRC and MAE with a challenge when investigating how it would respond under certain conditions.

First, the performance of the elements of the decking system was experimentally tested at MAE, where there is significant expertise in materials and structural analysis. This revealed differences between currently and previously used panels and provided valuable information for input into computer simulations that allowed engineers at the AFRC to test more variables.

Full scale testing was performed on the decking system by simulating various product combinations and stresses, these were undertaken at the AFRC using Finite Element Analysis (FEA). Modelling the performance and behaviour of the materials within a virtual environment like this provides significant savings in cost and time compared to physical testing.

In collaboration with MAE, the AFRC successfully helped the customer better understand where damage would occur in the decking system under certain conditions. It also provided data on the sequence of this damage and how quickly it would progress. This information successfully met the client's requirements.

Business impact

The data and test result outputs from the project increased the customer's confidence in the Decking Construction System, encouraging them to take the product to market. They have now secured their first customer. Working with the University has also equipped the firm with valuable know-how that has enhanced its competitive edge and will act as a barrier to entry for rival firms.

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