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Innovative research partnership aims to improve ground engineering for the rail sector

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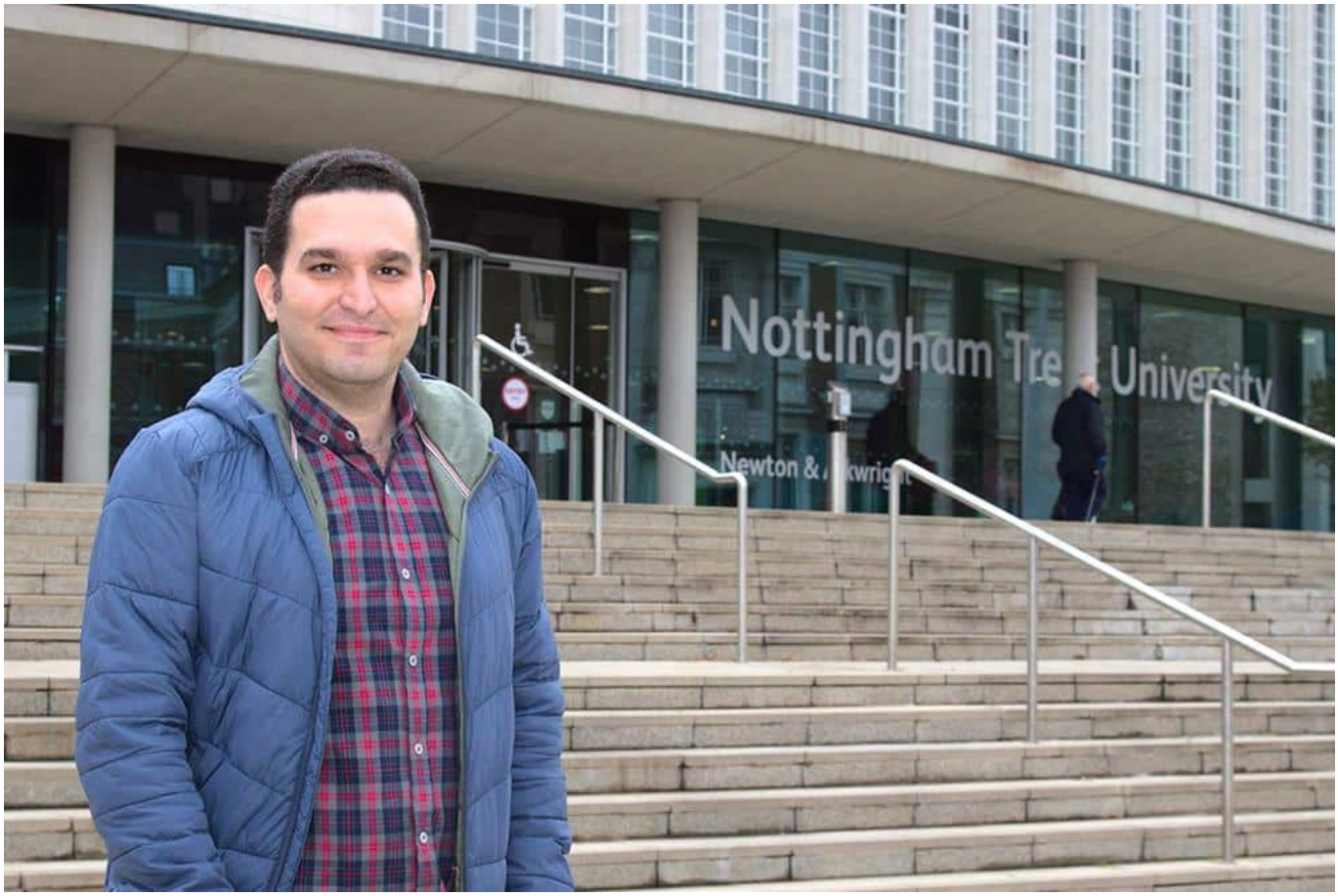

A partnership between a University and a leading UK ground engineering contractor is paving the way for major innovation for geotechnical engineering in the rail industry.

Van Elle, Nottingham Trent University and Innovate UK have entered into a Knowledge Transfer Partnership (KTP) to devise a new system which could simplify the design process for ground engineering in the rail sector.

The three-year project, led by Dr Koohyar Faizi, will help contractors to put the right solution in first time making lines safer, provide value engineering and reduce whole-life costs.

Dr Faizi said: “In this project we’re looking to optimise the design process for the track bed stabilisation system which is already developed by Van Elle.

“We are developing two packages: One is purely geotechnical engineering where we use numerical analysis and software to simulate the behaviour of piles based on different scenarios such as types of soils, speeds, weights and so on. Meanwhile, we’re using something called vision-based technology, which uses

cameras to monitor the rail deflection and gives us information to use in our designs.

“The idea is to combine these two packages to inform better decisions about the type of engineering required, the exact type of pile needed for various points on the line and the length of the pile needed at precise points. At the end of the project we will develop some user-friendly software so that everyone can use it without any specialist knowledge.”

The Knowledge Transfer Partnership between NTU and Van Elle is co-funded by the UK’s innovation agency, Innovate UK, which is dedicated to developing new ideas for the benefit of businesses across the country.

John Allsop, Director of Rail Engineering at Van Elle, said: “It’s brilliant to be working with Nottingham Trent University to enhance a product which we’re already really proud of. The work Koohyar is doing along with the team from NTU and Van Elle has a benefit for Engineers all over the world potentially. It’s really exciting.

“Our track bed stabilisation system is an innovative product in itself, so this partnership is further evidence of the importance we put on new techniques that can drive the industry forward.”

Professor Ming Sun, Associate Dean for Research at the School of Architecture, Design and the Built Environment at Nottingham Trent University, said: “We are delighted with the opportunity to collaborate with Van Elle during this KTP project. Our academics will support the company in developing innovative solutions for rail track piling with their knowledge and expertise in non-contact vision-based monitoring and geotechnical numerical modelling.

“This collaboration demonstrates the relevance of our research to real world problems and the impact that we can make by working with an industry partner. I hope that this is the start of a long term relationship between NTU and Van Elle.”

Van Elle’s track bed stabilisation system enables refurbishment of degraded track bed by installing smart-piles through the ballast layer of the track and into more competent soil beneath, strengthening the ground which has become soft or can no longer support the load above. The piles go through the track and between the sleepers, with most work completed during off-peak hours so there is little disruption to rail services.

Dr Faizi is working across NTU and Van Elle to develop the technology from small scale laboratory conditions through to real world scenarios over the course of the project.

He said: “At Nottingham Trent University we have access to a geotechnical and civil lab where we can set up some small-scale loads and do some testing with the vision-based technology. In the next stage I will repeat the process with Van Elle’s test track facility and play with a larger scale and see what difference it makes in different scenarios and see what results we get.

“Finally, once we have this information we will go to sites and re-do all these experiments in a real-life scenario based on different loads, speeds. We’ll repeat this until we have a good package to show

everyone.”

For more information on Van Elle’s Track Bed Stabilisation system, visit www.van-elle.co.uk.

Photo credit: Van Elle

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