

Press Release

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Cheaper Formula 1 cars

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Carbon is the stuff Formula 1 racing cars are made of, in particular the car body. But carbon is expensive. It can be produced cheaper and more efficient if artificial intelligence (AI) monitors the production process. A camera system combined with AI automatically detects defects in the production of carbon fibres. This makes expensive manual inspection of the carbon fibres obsolete and the production price of the carbon fibre can be reduced in the long term.

For this idea, the young engineer Deniz Sinan Yesilyurt received the second prize of the "Digitalisation in Mechanical Engineering" Young Talent Award on 6 December.

Carbon fibres are sought after because of their good mechanical properties. They are very light - weighing up to 50 percent less than aluminium by the same strength. This offers many advantages. Especially in times of energy transition, lightweight materials like carbon are more relevant than ever. At the same time, carbon fibres are as resistant to external stresses as metals. However, achieving these good properties of carbon fibres is very complex.

Up to 300 individual fibre strands - bundles of individual fibres - have to be monitored simultaneously during production. If carbon fibres

break, it costs time and money to remove the damaged fibres. This is just one example of various defects that can occur in the fibres during production.

Therefore, Mr Yesilyurt attached a camera to the carbon fibre line that takes pictures of various fibre defects during production and collects them in a database. The artificial intelligence in the camera's information technology system evaluates the fibre defects by assigning the images to predefined reference defects. Hence, it recognises various fibre defects with a classification accuracy of 99 per cent. The process developed by Mr Yesilyurt can also be used in other areas that produce chemical fibres.

Deniz Sinan Yesilyurt received the prize from the German Engineering Federation (VDMA) in Frankfurt am Main, Germany. He is a Bachelor's graduate at the Institut für Textiltechnik (ITA) of RWTH Aachen University. The full title of his bachelor's thesis is: "Development of a KI-supported process monitoring using machine learning to detect fibre damage in the stabilisation process". The VDMA awarded the prize to a total of four theses from different universities from Germany, Austria and Switzerland.

Captions:

1. Formula 1 racing car, source: pixabay
2. The lucky winners - first row, far left: Deniz Sinan Yesilyurt, source VDMA

About the Institut für Textiltechnik (ITA) of RWTH Aachen University

The core of the [ITA Group International Centre for Sustainable Textiles](#) is the research and teaching institution, the [Institut für Textiltechnik \(ITA\) of RWTH Aachen University](#). The ITA Group International Centre for Sustainable Textiles focuses its core competence on the goal of ensuring the holistic biotransformation of textile technology and thus the use of biological principles for small-scale value-added processes.

The ITA Group International Centre for Sustainable Textiles is an international research and training service provider for fibre-based high-performance materials, textile semi-finished products and their manufacturing processes with about 400 employees.