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Project title: TwistRunner – Development of a twist compensation module for in-line elimination of twists in reinforcement fiber rovings

Partner: Gebrüder Klöcker GmbH
Institut für Textiltechnik of RWTH Aachen University

Project period: 01.04.2020 to 31.03.2022

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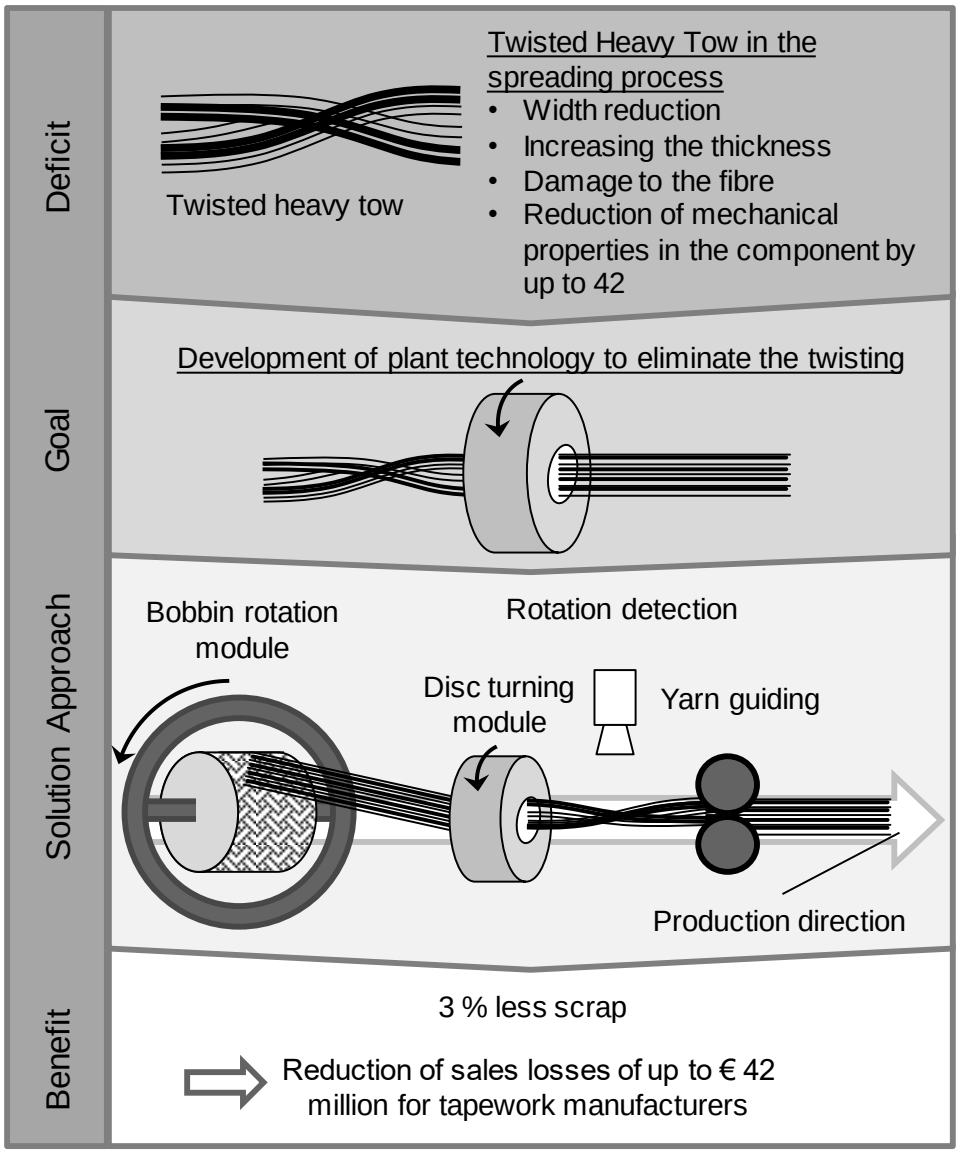
Mission Statement

The use of fiber-reinforced plastics (FRP) is already enabling major weight savings in the automotive, aviation and wind power sectors. The high lightweight construction potential of FRP results from its outstanding mechanical properties combined with low material density. However, due to the high component prices, FRPs have so far only been used selectively. The high prices result from the high material costs as well as the complex and multi-step process chain for the production of FRP components. Therefore, research is currently being carried out into approaches to reduce material costs and make the fibre composite process chain more efficient. One possibility to reduce material costs is the use of so-called heavy tows. Heavy tows are reinforcing fibres (e.g. carbon and glass fibres) consisting of over 24,000 individual fibres. Compared to conventional reinforcement fibres with up to 24k individual filaments, heavy tows are cheaper, have lower mechanical properties and a higher weight per unit area. In order to be able to use heavy tows specifically for lightweight construction applications, they must first pass through the fiber spreading process. In the spreading process, the filaments are mixed, parallelized and fanned out in the heavy tows. This reduces the basis weight and improves the mechanical properties. One obstacle to successful spreading of the heavy tow is twisting in the starting yarns. Twisting reduces the spreading, which can mean a reduction of up to -32% of the mechanical properties in a component.
The **goal** of the TwistRunner project is to develop machine technology for the automated elimination of twists before the spreading process.

As the **solution approach**, torsion compensation modules are being developed which can be retrofitted to conventional creels for spreading systems. For this purpose, the requirements for the system technology are first defined. On the basis of these requirements, a disc turning module including yarn guiding elements and a bobbin rotation module are developed. Parallel to this, a camera system including image evaluation software for the detection of twisting is developed. Subsequently, the modules will be integrated into the ITA spreading system in order to validate the functionality of the system technology. An overview of the TwistRunner project is shown in the following figure.



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