

Continuous monitoring of tack during AFP production of fiber composites

Reference No: B80153

CHALLENGE

One of the most important processes for manufacturing components made of fiber-reinforced plastic (CFRP/GFRP etc.) is Automated Fiber Placement (AFP). In this process, the component geometry is created additively, by depositing pre-impregnated tapes in layers on a mold surface. The control of all process parameters is crucial, since the quality of the laminate has a massive impact on the component's operational stability. In addition to the exact placement, the processing temperature, the deposition speed and the compaction of the layers all affect the quality. An essential feature of process control has so far remained unconsidered: the tack. To date, no technology exists to monitor the tack of the tape online during the deposition process. This is necessary, however, because even small changes in temperature, humidity, resin quality and layer thickness dramatically alter the value, and laminar delamination (incomplete bonding) poses enormous risk of structural failure. Quality control is therefore carried out retrospectively in elaborate tests or qualitatively in preliminary tests without reference to the actual conditions at the time of deposition.

INNOVATION

At the Chair of Carbon Composites at the Technical University of Munich, a team of scientists developed an online measuring system that monitors the tack during tape deposition and enables immediate adjustments. It is located inside the depositing head or in the creel. The tape is applied in a defined way to a rotating steel belt and peeled off for measurement, with the tack being determined by the amount of peeling force measured when the tape is detached from the steel belt.

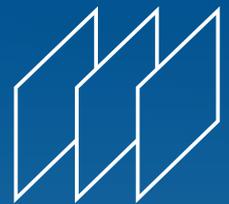


COMMERCIAL OPPORTUNITIES

- Online detection of defective raw material (tape)
- Optimization of process parameters according to the current tack
- Improvement of the product quality

DEVELOPMENT STATUS

The proof of concept was successful: a stationary prototype system exists that reliably determines values for the tack. This serves as an excellent basis for transforming the process into a depositing unit.



BayPAT



Technology from
**TECHNICAL
UNIVERSITY OF
MUNICH**

IP rights:
EP filed in 2021

Contact:
Stephan Ottmar
+49 (0) 89 5480177-37
sottmar@baypat.de

**Bayerische
Patentallianz GmbH**
Prinzregentenstr. 52
80538 München
www.baypat.de