

Non-destructive testing of carbon fiber textiles along the value added chain with novel modular Eddy-Current Array technique

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Eddy current testing is well established for non-destructive testing of isotropic electrical conductive materials. The development of high frequency eddy current (HFEC) technology with frequency ranges up to 100 MHz made it possible to extend the classical fields of application even towards less conductive materials like CFRP. It turns out that HFEC technology on CFRP generates a growing number of valuable information for comprehensive material diagnostic. Both conductivity and permittivity of CFRP influence the complex impedance measured with Fraunhofer IKTS EddyCus® devices. When manufacturing multiaxial carbon fiber fabrics with more than two layers, the customer increasingly require an online inspection and recording of quality directly during production to avoid waste and minimize costs. Especially in high-performance applications for which only lower tolerances of semi-finished products are allowed, an inspection of the fabrics on lanes, correct fiber angles, foreign material contamination and measurement of fiber volume of non-visible layers is becoming more important. Therefore, Fraunhofer IKTS has developed a novel sensor demonstrator based on the project “Multisensorline” and the new high frequency device generation EddyCus® Pro II which allows to detect all defects non-destructively with speeds up to 5m/min even in non inspectable layers. The modular built system can be adapted flexible to the required width. It can also be used for incoming goods inspection and sample-inspection by using a handheld device. The lecture will present the system concept and first automated analysis algorithms.