

CASE STUDY

Quality Control during the Manufacture of Fiber Composite Components

How to benefit from ultrasonic leak detection during the vacuum infusion process using the example of rotor blade production

APPLICATION

Composite materials are becoming increasingly important in the industrial sector due to their material properties. The manufacture of components from CFRP and GFRP often uses the vacuum infusion process. An example of a component produced on this way is the rotor blades used on wind turbines.

Modern wind turbines are being fitted with larger and larger rotor blades, in order to increase energy generation and optimize the plants. The rotor blades must be able to withstand heavy loads. This requires an efficient production process that also meets the high quality requirements.

CHALLENGE

During the manufacture of rotor blades, the structural mold is lined with composites and reinforcement materials. In a subsequent process, the mold is sealed with film, the vacuum is applied (evacuation) and the mold is filled with resin while the vacuum is maintained. Any leaks in the film during this process can lead to structural

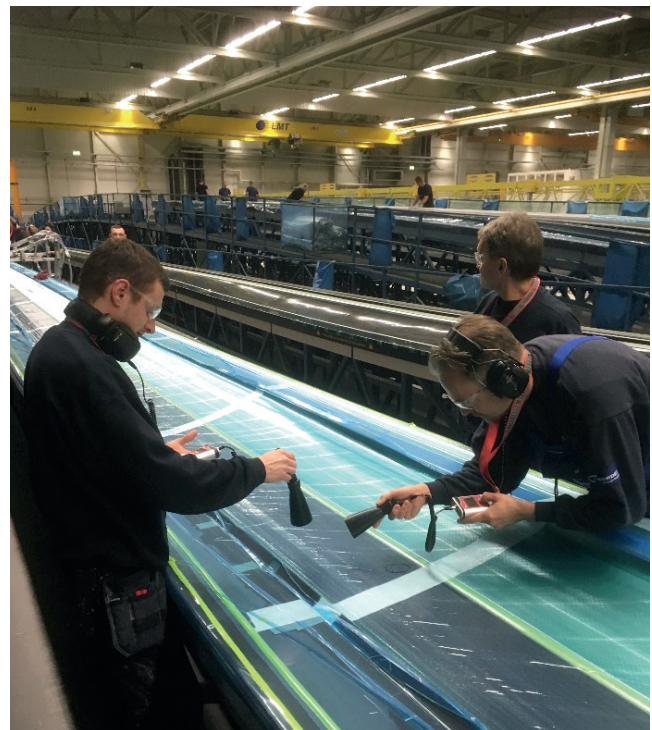


Figure 1: Leak localization using ultrasound testing technology during the filling process

faults. For example, any areas that are not impregnated can have a negative impact on the durability of the rotor blade. Leaking areas create detectable noises in the ultrasonic range through the ingress of air.

SONAPHONE Pocket: Makes ultrasound signals audible in narrow band range of 40 kHz | Digital display of the ultrasound level

L55 parabolic probe: High range and large scanning area | Red dot sight for orientation purposes

L50 airborne sound probe + acoustic horn or directional tube with tip:

Acoustic horn: Detects the ultrasound source in short distances

Directional Tube with tip: Shields against other ultrasound sources and enables exact localization of the leak



Figure 2: Sealing a leak after precise localization

Therefore, using ultrasound testing technology, these leaks can be found during the filling process and be eliminated before the resin is hardened. Costly reworking or follow-up damage during operation is avoided.

ADVANTAGES

The SONAPHONE ultrasound testing devices from SONOTEC help manufacturers to detect leaks and provide:

- Quick inspection through scanning of the entire component
- Exact localization of the leak
- Prevention of non-impregnated areas and costly reworking
- Consistent component quality thanks to process optimization by means of ultrasonic leak testing

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