

Coreto - Adapted composite repair tooling for in-situ wind turbine blade structural rehabilitation

The wind turbine industry is the fastest growing market area for the use of composite materials. Current state-of-the-art turbines are increasing in size, providing multi-megawatt power output. To generate such power, turbine rotor blades with diameters exceeding 100m, along with nacelle heights of 120m are becoming standard.

As turbines grow and their deployment becomes more widespread and remote, it is becoming increasingly important that systems are put in place to monitor their condition in real time. Such monitoring offers significant cost of ownership savings through condition based maintenance, reduced downtime and a reduced likelihood of catastrophic failure.



Project objective

The project will develop novel tooling, complying with wind turbine requirements (easily and rapidly mounted, lightweight and robust), enabling the onsite performance of the three major composite repair steps: non-destructive inspection (NDI), surface preparation and hot bonding.

The developments include:

- NDI: Existing ultrasonic testing equipment will be adapted to enable fast reliable tracing of the nature and boundaries of the damage with minimum infrastructure requirements.
- Surface preparation: A fully automated portable laser system will be developed to remove the flaw and prepare the surface prior to repair. This system will be placed on the blade area to be processed and will create the required geometry of the damaged area by entering the desired dimensions into the laptop control computer.
- Hot bonding + vacuum bagging: especially designed heating blankets and vacuum holders will be developed for easier simultaneous application of heating and vacuum on site in order to simplify and accelerate the repair process.

The system will bring about large reductions in the cost of repair itself and will enable on-site repair of turbine blades for 90% of cases. Consequently, down-time costs and costs related to those of disassembly of blades and transportation to the repair shop for rehabilitation will be reduced.

For further information, please visit the project website at www.coreto-project.eu.

This project has received funding from the European Union's Seventh Framework Programme for research, technological development and demonstration under Grant agreement number 283292.