

WINTUR DEMO - In-situ wireless monitoring of on and offshore wind turbine blades using energy harvesting technology - demonstration

Wind energy is an increasingly important contributor of power within the renewable energy sector. In recent years there have been an increasing number of reports of defective blades contributing towards turbine failure. At present, regular costly inspections are conducted on turbine blades to ensure structural integrity and prevent degradation due to fatigue or impact. Within larger blade designs, there exists a complex composite structure of glass fibre reinforced plastic together with other materials.



The technical objectives that will be achieved by the end of the WINTURDEMO project are:

- Installation of novel light weight and flexible transducers on the blade, able to detect the onset of damage that were the result of fibre breakage due to staged development of a hole-defect.
- Combination of different NDT techniques based on the guided wave ultrasonics such as long range ultrasonics and acoustic emission.
- A sequence of signal processing techniques (FFTs, averaging, amplification) to overcome problems of ultrasound attenuation
- Utilisation of energy harvesting as a system to harness the surrounding environmental energy for the purposes of powering the sensors.
- Use of short-range wireless protocol techniques to transfer data from the pulser/receiver unit to the central control in the nacelle.

Project objective

The WINTURDEMO project will demonstrate the structural health monitoring (SHM) system that was developed successfully in the WinTur Research for the benefit of SMEs project, in order to show that such a system is viable for blade monitoring and can help the wind sector to achieve the kind of energy delivery to business and communities that is desired by reducing operational and maintenance costs.

This will be achieved by increasing efficiency by way of realising the full life-cycle term of blade components and providing maintenance as and when it is required.

For further information, please visit the project website at www.winturdemo-project.com.

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