



News

Consortium to develop environmental and cost-effective industry solution to condition monitoring of noise output from onshore wind turbine machinery

A joint industry project known as CMDRIVE to develop the use of a non-contact microphone array for structural health monitoring of the rotating machinery in the nacelles of wind turbines has been launched by TWI and wind turbine service provider Renewable Technical Services Ltd (RTS).

The project will first establish the feasibility of an in-situ noise capture system then develop an integral condition monitoring and active noise control kit for use onshore. The new diagnostics hardware will have environmental impact in enabling noise levels of machinery to be reduced and allow the industry itself to make a dramatic reduction in the amount of downtime required for maintenance or exploratory investigation if failure arises.

Acoustic sound (noise) caused by vibration in the rotating machinery of a wind turbine is both an indicator and cause of excessive or uneven wear and other structural defects. If these are not corrected they will eventually lead to failure of the gear box or main shaft of the structure. Acoustic sound generated in the surrounding air by vibration, with the same frequency spectrum, will often lead to a need for increased maintenance downtime or extra costs in environmental investigations at a wind farm, which may be requested by the local community.

The rotating machine in the nacelle has shown to be responsible for a large proportion of wind turbine downtime. The project will address this using TWI's expertise in condition monitoring to develop a system that will include a microphone array located in the nacelle. The TWI project team will capture and monitor information about the acoustic sound behaviour in the nacelle, as well as from a healthy wind turbine; together these will determine the signature for healthy machinery. The healthy signature will then be compared with acoustic sound data and form part of the Structural Health Monitoring CMDRIVE system. Moreover an active acoustic sound control will be investigated within the project. RTS will contribute its knowledge and expertise of the wind energy industry, provide a working turbine for experimentation, and host in-field trials.

TWI condition monitoring engineer Silvia Rafael said *'We are confident that a specially designed system located in the nacelle of the structure sampling ambient noise and producing simultaneous condition monitoring data will be a highly effective and valuable method of inspection. CMDRIVE will enable the wind turbine industry to reduce operational costs and to demonstrate a sustainable means of noise control.'*

RTS Managing Director Chris Palmer said *'Our involvement in this important project is part of RTS's commitment to deliver innovative solutions to our clients, to enable them to reduce their operating costs and increase the efficiency of their turbines.'*

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