

## FDRG Seminar

# Experimental tests of wind turbine main shaft motion on a laboratory test rig

presented by

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This research studies the failure modes of gearboxes in wind turbines. These gearboxes fail in general after five years which is far below the expected design life of twenty years of a wind turbine. The research is taking a more holistic approach towards finding typical behaviour of the main shaft. In this research, a small scale wind turbine test rig has been designed and manufactured with displacement sensors installed to observe the displacement of the main shaft at specific points, namely the main bearing locations of the forward framework of a wind turbine nacelle, where the main shaft is installed. The experimental data measured from the test rig is being analysed with common beam bending, statistical and fatigue theories to draw conclusions for long term loading in service. Aspects of the turbulent nature of the wind driving the wind turbine have been taken into consideration as being part of the aerodynamic loading onto the rotor and eventually the gearbox, transmitted through the main shaft.

As this presentation is only focusing on the main shaft movement which was the first goal of this research, there are more additions of sensors planned in the experimental set up. For example, strain gauges have already been installed on all three blade roots and two encoder wheels with optical switches have been installed on the main shaft which provide further concurrent experimental data to give a broader picture of the effects that take place during operation. It is also intended to install more sophisticated blades as compared to the crude ones which are currently fitted to the hub.

Date: Friday 2<sup>nd</sup> August  
Time: 4pm – 5pm  
Location: 216:207  
Curtin University, Bentley Campus

No RSVP required. For queries, please email:

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