

# Main Bearing Failures: A Persistent And Growing Challenge For Offshore Wind

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**Date:** 16<sup>th</sup> March 2026    **Time:** 14:00-15:00    **Location:** SR214

**Abstract:** The main bearing is an operations critical wind turbine component which enables transmission of wind-extracted energy to the generator, while protecting downstream components from harmful fluctuating loads. Operating wind farms are experiencing unacceptable levels of premature MB failures, with cost implications measured in the £100s of millions. As a result, MB failures have been identified as a primary driver of recent wind energy operational-phase cost increases. No principal root cause of main bearing field failures has yet been identified, with observed damage modes including those stemming from surface and subsurface initiation, stray currents, lubrication failures, overloading, and improper bearing assembly. Efforts are therefore ongoing to determine a set of fundamental drivers leading to premature main bearing failures and, in turn, identify strategies to resolve or ameliorate these issues. This seminar will provide an accessible overview of this topic, including key fundamental concepts, recent progress, and necessary future work. Links (actual and suspected) will be established with adjacent research fields, including: atmospheric turbulence and turbine load-response, control, and electrical systems analysis.

**About Speaker:** Dr Edward Hart, a Senior Lecturer at the University of Strathclyde, specialises in the mechanical behaviour and reliability of wind turbine drivetrains. His work focuses on understanding the physical mechanisms that govern main-bearing loads, degradation and failure, combining aeroelastic modelling, structural dynamics, and bearing and lubrication theory. A central theme of his research is the analysis of time-varying main-bearing loads under realistic wind and operating conditions. Dr Hart is the current chair of the European Academy of Wind Energy's Drivetrain Technical Committee. More details at <https://pureportal.strath.ac.uk/en/persons/edward-john-hart/>