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Turbomachinery Laboratory
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Prediction of Gearbox Windage Power Loss and Coupling Guard Temperature and Pressure

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Windage power loss (WPL) is defined as the power loss due to fluid drag torque generated by the gear rotation in air/oil mist. For high-speed gear transmission, WPL is large and can dominate other losses. Moreover, coupling guard heating and pressure distribution within coupling guard are closely associated with windage effects. According to API 671, the maximum coupling guard temperature should not exceed 60 °C (140°F), the investigation of windage is therefore of practical significance.

In this project, a multivariable regression based code will be developed to predict gearbox WPL and coupling guard temperature, as well as pressure within coupling guard. The development of the code is based on extensive simulations in ANSYS CFX. Parametric studies of factors influencing WPL and coupling guard heating/pressure distribution will be conducted, and guidelines on designing gearboxes and coupling guards will be provided.

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