Calibration Procedure for Gaussian-based Analytical Wake Model Using SCADA Data[1] JIAN TENG, Brown University, COREY MARKFORT, University of Iowa — Wind turbine wakes are responsible for the reduction of wind farm power generation. Many studies have been done using experimental and computational methods to model wind turbine wakes. However, the industry favors the analytical model for wind farm wake modeling because it can provide reasonably accurate results without the need for extensive simulation and experiment. In analytical wake modeling, using existing parameters from previous studies may cause inaccurate predictions due to differences of wind turbine specifications and specific wind farm variation. Calibrating the analytical model based on the specific wind farm setting can improve the prediction accuracy. We propose a procedure for wind farm wake modeling using a Gaussian-based analytical wake model and SCADA data. The wake growth rate varies across the wind farm based on the local streamwise turbulence intensity. A case study at a wind farm in Iowa will be presented. The wake model was calibrated by using the proposed procedure with turbine pairs selected from the wind farm. The results were compared with the industry standard wake model. This is the first time SCADA data was used to calibrate the Gaussian-based analytical wake model.

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