

DAFTAR PUSTAKA

- Adaramola, M. S., dan Krogstad, P.-Å. (2011). Experimental Investigation of Wake Effects on Wind Turbine Performance. *Renewable Energy*, 36(8), 2078–2086.
- Appa, K. (2002). Counter Rotating Wind Turbine System, Energy Innovations Small Grant (EISG) Program Technical Report. California, US.
- Bai, C. J., Hsiao, F. B., Li, M. H., Huang, G. Y., dan Chen, Y. J. (2013). Design of 10 kW Horizontal-Axis Wind Turbine Blade and Aerodynamic Investigation using Numerical Simulation. *Procedia Engineering*, 67, 279–287.
- Bartl, J., dan Sætran, L. (2017). Blind Test Comparison of The Performance and Wake Flow between Two in-line Wind Turbines Exposed to Different Turbulent Inflow Conditions. *Wind Energy Science*, 2(1), 55–76.
- Burdett, T. A., dan Treuren, K. W. V.-A. (2012). Scaling Small-scale Wind Turbines for Wind Tunnel Testing. *Asmedigitalcollection.Asme.Org*, 6, 811–820.
- Burmester, S., Gueydon, S., dan Make, M. (2016). Determination of Scaled Wind Turbine Rotor Characteristics from Three Dimensional RANS Calculations. In *Journal of Physics: Conference Series* (Vol. 753, p. 82003). IOP Publishing.
- Cabezón, D., Migoya, E., dan Crespo, A. (2011). Comparison of Turbulence Models for the Computational Fluid Dynamics Simulation of Wind Turbine Wakes in the Atmospheric Boundary Layer. *Wind Energy*, 14(7), 909–921.
- Cakmakcioglu, S. C., Sert, I. O., Tugluk, O., dan Sezer-Uzol, N. (2014). 2-D and 3-D CFD Investigation of NREL S826 Airfoil at Low Reynolds Numbers. In *Journal of Physics: Conference Series* (Vol. 524, p. 12028). IOP Publishing.
- Chantharasenawong, C. (2008). Axial Momentum Theory for Turbines With Co-axial Counter Rotating Rotors. In *Commemorative International Conference of the Occasion of the 4th Cycle Anniversary of KMUTT, 2008*.
- Concli, F., Gorla, C., Della Torre, A., dan Montenegro, G. (2015). Churning Power Losses of Ordinary Gears: A New Approach Based on the Internal Fluid Dynamics Simulations. *Lubrication Science*, 27(5), 313–326.
- Derakhsahan, S., dan Tavazziani, A. (2015). Study of Wind Turbine Aerodynamic Performance using Numerical Methods. *J. Clean Energy Technol*, 3(2), 83–90.
- Du, Z., dan Selig, M. (1998). A 3-D Stall-delay Model for Horizontal Axis Wind Turbine Performance Prediction. In *1998 ASME Wind Energy Symposium* (p. 21).
- Du, Z., dan Selig, M. S. (2000). The Effect of Rotation on the Boundary Layer of a Wind Turbine Blade. *Renewable Energy*, 20(2), 167–181.
- Dumitrescu, H., dan Cardos, V. (2012). Inboard Stall Delay Due to Rotation.

Journal of Aircraft, 49(1), 101–107.

- Eggleston, D. M., dan Stoddard, F. (1987). Wind Turbine Engineering Design.
- El Kasmi, A., dan Masson, C. (2008). An Extended $k-\epsilon$ Model for Turbulent Flow through Horizontal-axis Wind Turbines. *Journal of Wind Engineering and Industrial Aerodynamics*, 96(1), 103–122.
- Elfarra, M. A., Sezer-Uzol, N., dan Akmandor, I. S. (2014). NREL VI Rotor Blade: Numerical Investigation and Winglet Design and Optimization using CFD. *Wind Energy*, 17(4), 605–626.
- Fluent, A. (2017). 17.0 User's Manual, ANSYS Documentation and Fluent and User's Guide-Release 17.0. *ANSYS Inc.*
- Gao, L., Zhang, H., Liu, Y., dan Han, S. (2015). Effects of Vortex Generators on a Blunt Trailing-edge Airfoil for Wind Turbines. *Renewable Energy*, 76, 303–311.
- Habash, R. W. Y., Groza, V., Yang, Y., Blouin, C., dan Guillemette, P. (2011). Performance of a Contrarotating Small Wind Energy Converter. *ISRN Mechanical Engineering*, 2011.
- Herzog, R., Schaffarczyk, A. P., Wacinski, A., dan Zürcher, O. (2010). Performance and Stability of a Counter-rotating Windmill using a Planetary Gearing: Measurements and Simulation. In *European Wind Energy Conference dan Exhibition*.
- Hoang, A. D., dan Yang, C. J. (2013). An Evaluation of the Performance of 10kW Counter-rotating Wind Turbine using CFD Simulation. *EWEA 2013*.
- Hosman, N. (2012). Performance Analysis and Improvement of a Small Locally Produced Wind Turbine for Developing Countries. *Master of Science, TU Delft*.
- Hu, H., Yang, Z., dan Sarkar, P. (2012). Dynamic Wind Loads and Wake Characteristics of a Wind Turbine Model in an Atmospheric Boundary Layer Wind. *Experiments in Fluids*, 52(5), 1277–1294.
- Hwang, B. H., Lee, S. M., dan Soogab. (2013). Optimization of Counter Rotating Wind Turbine using Blade Element dan Momentum Theory. *Journal of Renewable and Sustainable Energy*, 5(5).
- Jung, S. N., No, T.-S., dan Ryu, K.-W. (2005). Aerodynamic Performance Prediction of a 30 kW Counter-rotating Wind Turbine System. *Renewable Energy*, 30(5), 631–644.
- Kanemoto, T., dan Galal, A. M. (2006). Development of Intelligent Wind Turbine Generator With Tandem Wind Rotors and Double Rotational Armatures. *JSME International Journal Series B Fluids and Thermal Engineering*, 49(2), 450–457.
- Koehuan, V. A., Mandala, J. M., Rizal, A., Buana, S. W., Sugiyono, dan Kamal, S. (2016). Komparasi Model Turbulen Simulasi CFD terhadap Performance dan

- Wake Rotor Turbin Angin Poros Horizontal. In *Proceeding National Symposium on Thermofluids VIII 2016* (Vol. VIII).
- Krogstad, P.-Å., dan Eriksen, P. E. (2013). “Blind Test” Calculations of the Performance and Wake Development for a Model Wind Turbine. *Renewable Energy*, 50, 325–333.
- Kubo, K., Hano, Y., Mitarai, H., Hirano, K., Kanemoto, T., dan Galal, A. M. (2010). Intelligent Wind Turbine Unit with Tandem Rotors (Discussion of Prototype Performances in Field Tests). *Current Applied Physics*, 10(2), S326–S331.
- Kubo, K., dan Kanemoto, T. (2008). Development of Intelligent Wind Turbine Unit with Tandem Wind Rotors and Double Rotational Armatures. *Journal of Fluid Science and Technology*, 3(3), 370–378.
- Kumar, P. S., Abraham, A., Bensingh, R. J., dan Ilangovan, S. (2013). Computational and Experimental Analysis of a Counter-rotating Wind Turbine System.
- Kumar, P. S., Bensingh, R. J., dan Abraham, A. (2012). Computational Analysis of 30 kW Contra Rotor Wind Turbine. *ISRN Renewable Energy*, 2012.
- Lee, S., Kim, H., dan Lee, S. (2010). Analysis of Aerodynamic Characteristics on a Counter-rotating Wind Turbine. *Current Applied Physics*, 10(2), S339–S342.
- Lee, S., Kim, H., Son, E., dan Lee, S. (2012). Effects of Design Parameters on Aerodynamic Performance of a Counter-rotating Wind Turbine. *Renewable Energy*, 42, 140–144.
- Lee, S., Son, E., dan Lee, S. (2013). Velocity Interference in the Rear Rotor of a Counter-rotating Wind Turbine. *Renewable Energy*, 54, 235–240.
- Liu, S., dan Janajreh, I. (2012). Development and Application of an Improved Blade Element Momentum Method Model on Horizontal Axis Wind Turbines. *International Journal of Energy and Environmental Engineering*, 3(1), 30.
- Make, M., dan Vaz, G. (2015). Analyzing Scaling Effects on Offshore Wind Turbines using CFD. *Renewable Energy*, 83, 1326–1340.
- Massouh, F., dan Dobrev, I. (2014). Investigation of Wind Turbine Flow and Wake. *Journal of Fluid Science and Technology*, 9(3), JFST0025-JFST0025.
- Merchant, S., Gregg, J., Gravagne, I., dan Van Treuren, K. (2009). Wind Tunnel Analysis of a Counter-rotating Wind Turbine. In *Proceedings of the 2009 ASEE Gulf-Southwest Annual Conference Baylor University*, Copyright© 2009, American Society for Engineering Education.
- Mituleț, L.-A., Oprina, G., Chihaiia, R.-A., Nicolaie, S., Nedelcu, A., dan Popescu, M. (2015). Wind Tunnel Testing for a New Experimental Model of Counter-rotating Wind Turbine. *Procedia Engineering*, 100, 1141–1149.
- Mo, J. O., dan Lee, Y. H. (2012). CFD Investigation on the Aerodynamic Characteristics of a Small-sized Wind Turbine of NREL PHASE VI Operating

- with a Stall-regulated Method. *Journal of Mechanical Science and Technology*, 26(1), 81–92. <https://doi.org/10.1007/s12206-011-1014-7>
- Moghadassian, B., Rosenberg, A., dan Sharma, A. (2016). Numerical Investigation of Aerodynamic Performance and Loads of a Novel Dual Rotor Wind Turbine. *Energies*, 9(7), 571.
- Moriarty, P. J., dan Hansen, A. C. (2005). *AeroDyn Theory Manual*. National Renewable Energy Lab., Golden, CO (US).
- Newman, B. G. (1983). Actuator-disc Theory for Vertical-axis Wind Turbines. In *Wind Engineering 1983, Part 3C* (pp. 347–355). Elsevier.
- No, T.-S., Kim, J. E., Moon, J. H., dan Kim, S. J. (2009). Modeling, Control, and Simulation of Dual Rotor Wind Turbine Generator System. *Renewable Energy*, 34(10), 2124–2132. <https://doi.org/10.1016/j.renene.2009.01.019>
- Oggiano, L. (2014). CFD simulations on the NTNU Wind Turbine Rotor and Comparison with Experiments. *Energy Procedia*, 58, 111–116.
- Ozbay, A., Tian, W., dan Hu, H. (2014a). A Comparative Study of the Wake Characteristics behind a Single Rotor Wind Turbine and Dual Rotor Wind Turbines. In *32nd AIAA Applied Aerodynamics Conference* (p. 2282).
- Ozbay, A., Tian, W., dan Hu, H. (2014b). An Experimental Investigation on the Aeromechanics and Near Wake Characteristics of Dual Rotor Wind Turbines (DRWT). In *32nd ASME Wind Energy Symposium* (p. 1085).
- Ozbay, A., Tian, W., dan Hu, H. (2016). Experimental Investigation on the Wake Characteristics and Aeromechanics of Dual Rotor Wind Turbines. *Journal of Engineering for Gas Turbines and Power*, 138(4), 42602.
- Rosenberg, A., Selvaraj, S., dan Sharma, A. (2014). A Novel Dual Rotor Turbine for Increased Wind Energy Capture. In *Journal of Physics: Conference Series* (Vol. 524, p. 12078). IOP Publishing.
- Sanderse, B. (2009). Aerodynamics of Wind Turbine Wakes. *Energy Research Center of the Netherlands (ECN), ECN-E-09-016, Petten, The Netherlands, Tech. Rep.*, 5(15), 153.
- Saravanan, P., dan Parammasivam, K. M. (2010). Experimental Investigation on Small Horizontal Axis Wind Turbine Rotor using Winglets. In *Proceedings of the 37th National dan 4th International Conference on Fluid Mechanics and Fluid Power* (pp. 159–164). Chennai, India.
- Sezer-Uzol, N., dan Long, L. (2006). 3-D Time-accurate CFD Simulations of Wind Turbine Rotor Flow Fields. In *44th AIAA Aerospace Sciences Meeting and Exhibit* (p. 394).
- Sharma, A., Taghaddosi, F., dan Gupta, A. (2010). Diagnosis of Aerodynamic Losses in the Root Region of a Horizontal Axis Wind Turbine. *General Electric Global Research Center Internal Report*.
- Shen, W. Z., Mikkelsen, R., Sørensen, J. N., dan Bak, C. (2005). Tip Loss

- Corrections for Wind Turbine Computations. *Wind Energy*, 8(4), 457–475.
- Shen, W. Z., Zakkam, V. A. K., Sørensen, J. N., dan Appa, K. (2007). Analysis of Counter-rotating Wind Turbines. In *Journal of Physics: Conference Series* (Vol. 75, p. 12003). IOP Publishing.
- Snel, H., dan Schepers, J. G. (1995). *Joint Investigation of Dynamic Inflow Effects and Implementation of an Engineering Method*. Netherlands Energy Research Foundation ECN.
- Sørensen, J. N. (2011). Aerodynamic Aspects of Wind Energy Conversion. *Annual Review of Fluid Mechanics*, 43, 427–448.
- Sørensen, J. N., dan Shen, W. Z. (2002). Numerical Modeling of Wind Turbine Wakes. *Journal of Fluids Engineering*, 124(2), 393–399.
- Sprague, M. A., Moriarty, P. J., Churchfield, M. J., Gruchalla, K., Lee, S., Lundquist, J. K., Purkayastha, A. (2011). Computational Modeling of Wind Plant Aerodynamics. In *Scientific Discovery through Advanced Computing Program 2011 Conference, Denver, CO, July 10* (Vol. 14).
- Sutikno, P., dan Saepudin, D. B. (2011). Design and Blade Optimization of Contra Rotation Double Rotor Wind Turbine. *International Journal of Mechanical dan Mechatronics Engineering IJMME, Volume 11*, (1).
- Sutrisno, Prajitno, Purnomo, dan Setyawan, B. W. (2016). The Performance dan Flow Visualization Studies of Three dimensional (3-D) Wind Turbine *Blade* Models. *Modern Applied Science*, 10(5), 132.
- Sutrisno, S., Deendarlianto, D., Indarto, I., Iswahyudi, S., Bramantya, M. A., dan Wibowo, S. B. (2017). Performances and Stall Delays of Three Dimensional Wind Turbine Blade Plate-models with Helicopter-like Propeller Blade Tips. *Modern Applied Science*, 11(10), 189. <https://doi.org/10.5539/mas.v11n10p189>
- Taha, Z., Sugiyono, dan Sawada, T. (2010). A Comparison of Computational and Experimental Results of Wells Turbine Performance for Wave Energy Conversion. *Applied Ocean Research*, 32(1), 83–90. Retrieved from <https://www.sciencedirect.com/science/article/pii/S0141118710000246>
- Tian, W., Yuan, W., Ozbay, A., dan Hu, H. (2013). An Experimental Investigation on the Effects of Turbine Rotation Directions on the Wake Interference of Wind Turbines. In *51st AIAA Aerospace Sciences Meeting including the New Horizons Forum and Aerospace Exposition* (p. 607).
- Tran, T.-T., dan Kim, D.-H. (2015). The Platform Pitching Motion of Floating Offshore Wind Turbine: A Preliminary Unsteady Aerodynamic Analysis. *Journal of Wind Engineering and Industrial Aerodynamics*, 142, 65–81.
- Tran, T. T., Kim, D.-H., dan Nguyen, B. H. (2015). Aerodynamic Interference Effect of Huge Wind Turbine Blades with Periodic Surge Motions using Overset Grid-Based Computational Fluid Dynamics Approach. *Journal of Solar Energy Engineering*, 137(6), 61003.

- Troldborg, N., Sorensen, J. N., dan Mikkelsen, R. (2010). Numerical Simulations of Wake Characteristics of a Wind Turbine in Uniform Inflow. *Wind Energy*, 13(1), 86–99. <https://doi.org/10.1002/we.345>
- Ushiyama, I., Shimota, T., dan Miura, Y. (1996). An Experimental Study of the Two-Stage Wind Turbines. *Renewable Energy*, 9(1–4), 909–912. Retrieved from <https://www.sciencedirect.com/science/article/pii/0960148196884278>
- Usui, Y., Kubo, K., dan Kanemoto, T. (2012). Intelligent Wind Power Unit with Tandem Wind Rotors and Armatures (Optimization of *Front* Blade Profile). *Journal of Energy and Power Engineering*, 6(11), 1791.
- Vermeer, L. J., Sørensen, J. N., dan Crespo, A. (2003). Wind Turbine Wake Aerodynamics. *Progress in Aerospace Sciences*, 39, 467–510. Retrieved from <https://www.sciencedirect.com/science/article/pii/S0376042103000782>
- Wang, Z., Ozbay, A., Tian, W., dan Hu, H. (2018). An Experimental Study on the Aerodynamic Performances and Wake Characteristics of an Innovative Dual-Rotor Wind Turbine. *Energy*.
- Wang, Z., Ozbay, A., Tian, W., Sharma, A., dan Hu, H. (2015). An Experimental Investigation on the Wake Characteristics behind a Novel Twin-rotor Wind Turbine. In *AIAA SciTech, 33rd Wind Energy Symposium*, (Vol. 1663).
- Wang, Z., Tian, W., Ozbay, A., Sharma, A., dan Hu, H. (2016). An Experimental Study on the Aeromechanics and Wake Characteristics of a Novel Twin-rotor Wind Turbine in a Turbulent Boundary Layer Flow. *Experiments in Fluids*, 57(9), 150.
- Wang, Z., Wei, T., dan Hu, H. (2016). An Experimental Study on the Wake Characteristics of Dual-Rotor Wind Turbines by using a Stereoscopic PIV Technique. In *34th AIAA Applied Aerodynamics Conference* (p. 3128).
- Wu, Y.-T., dan Porté-Agel, F. (2011). Large-eddy Simulation of Wind-Turbine Wakes: Evaluation of Turbine Parametrisations. *Boundary-Layer Meteorology*, 138(3), 345–366.
- Yuan, W., Tian, W., Ozbay, A., dan Hu, H. (2014). An Experimental Study on the Effects of Relative Rotation Direction on the Wake Interferences among Tandem Wind Turbines. *Science China Physics, Mechanics dan Astronomy*, 57(5), 935–949.
- Yulistiyanto, B. (2009). Vorticity Fields on Flow with Vortex System, 16(2), 83–94.
- Zhang, W., Markfort, C. D., dan Porté-Agel, F. (2012). Near-wake Flow Structure Downwind of a Wind Turbine in a Turbulent Boundary Layer. *Experiments in Fluids*, 52(5), 1219–1235.
- Sutrisno, Wibowo, B.S., and Iswahyudi, S. (2018). Numerical Research on the Vortex Center on the Forward-Swept 3-Wind Turbine Blades at Low Rotational Speed, *Modern Applied Science*, 12(12), 80-89.