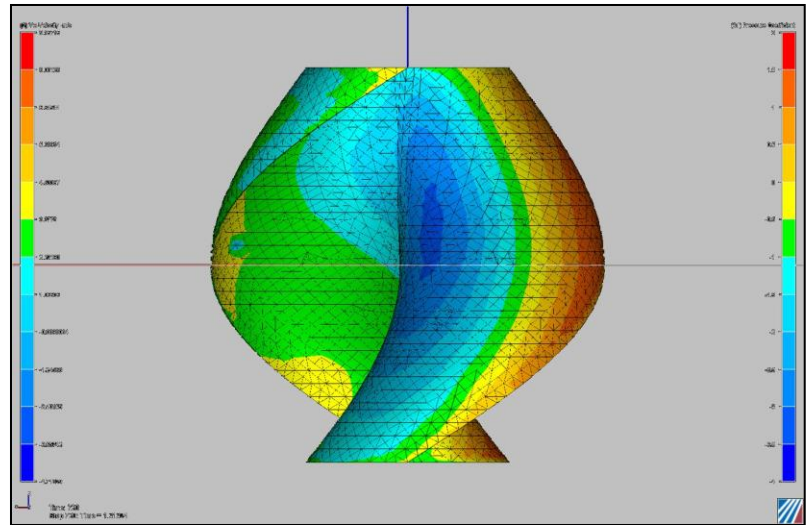


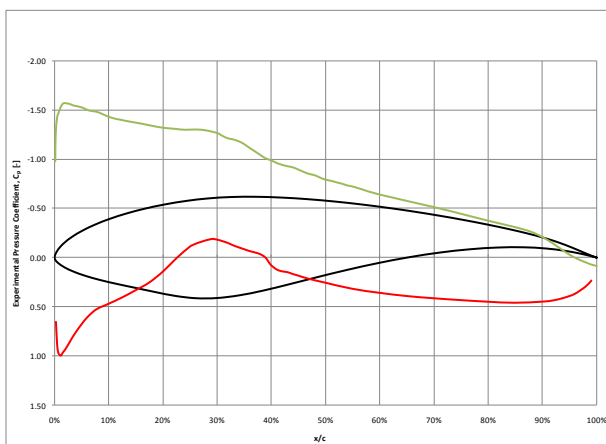
Wind Energy: Aerodynamic Design and Testing

DARcorporation has been offering aeronautical engineering software and consulting services since 1991. In 2004 we designed, built and tested our first Horizontal Axis Wind Turbine (HAWT), which was followed by a Vertical Axis Wind Turbine (VAWT) and many since. Over the years DARcorporation has developed a unique expertise in structural design of wind turbines.

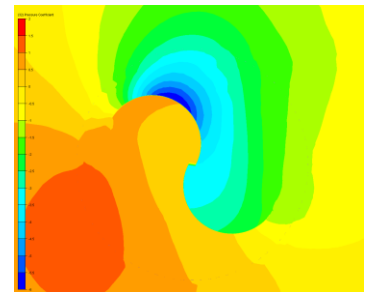


Aerodynamic Design & Analysis

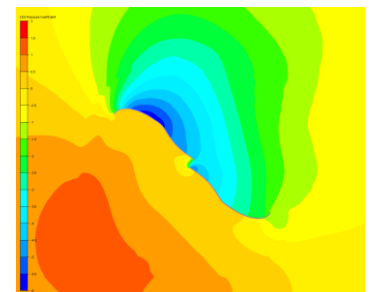
Blade Element Momentum (BEM) theory software is used for the initial aerodynamic design of the wind turbine blades. DARcorporation engineers developed and customized the software to handle any type of wind turbine configuration and blade shape.



Computational Fluid Dynamics (CFD) software tools are used to simulate rotation and



Airfoil design and analysis software is used to analyze and design the airfoils used on the blades. Computational Fluid Dynamics (CFD) software tools are used to simulate rotation and



quantify the full power curve of the wind turbine. Pressure distribution over the blades is calculated and torque (and thus energy) curves are constructed.

Once the aerodynamic design is finalized, a wind tunnel model can be designed, constructed and tested.

Wind Tunnel Testing

The wind tunnels at The University of Kansas (KU) and Wichita State University (WSU) are used to test the wind turbine models. Either a small generator or an electronic brake in combination with a torque sensor is used to measure the power output of the model. When using a generator a resistor box is attached to simulate the load on the generator and to control the RPM. With the different RPM's and the torque a power curve can be constructed. DARcorporation developed a unique wall correction method to correct the data from the wind tunnel for wall effects. Necessary modifications and changes to the design can then be identified.



The DARcorporation Advantage

Experience in the design, detailed analysis and building of prototypes gives DARcorporation a unique advantage over other companies, since we can go from initial design all the way through full size manufacturing. The unique tools developed for design and analysis make DARcorporation the best choice for any new wind turbine development. DARcorporation engineers can advise on what the best materials are for your design and what the best configuration is. We will work with you to design and optimize your wind turbine for performance, manufacturability and cost.

