



CALIFORNIA STATE SCIENCE FAIR 2012 PROJECT SUMMARY

Name(s) Joshua M. Arreola	Project Number S0304
Project Title Well, Blow Me Down! Re-engineering Tesla's Turbine to Create a More Efficient Wind Turbine	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals In the early 1900's, an engineer known as Nikola Tesla designed an engine that, he claimed, was able to operate at around 90% efficiency. Today, engineers are trying to apply Tesla's concepts on traditional wind turbines. The objective of this experiment was to discover if it is at all possible to take Tesla's designs and ideas, and alter them, in order to create a more energy efficient wind turbine. I hypothesized that there was a method for doing so.</p> <p>Methods/Materials Five original designs were brainstormed and sketched, all based on the aerodynamic forces of adhesion and viscosity, and the resultant boundary layer effect, as Tesla intended. However, they were adapted to work in environmental wind conditions, instead of with high-pressurized fluids. Prototypes were created out of poster board, cardboard, and straws. A box fan was used as the wind source in the apparatus. A laser photo tachometer was to be used to measure the RPM of each prototype. Each prototype was to be tested 10 times for 30 seconds each, and the RPM readings would be recorded. After attaining results, larger-scale models of each turbine were to be made and tested for energy efficiency, which would be found by using the wind power formula. These efficiencies would be compared to that of a traditional turbine's efficiency in order to prove my hypothesis valid or invalid.</p> <p>Results The results of this experiment have been inconclusive thus far. The prototypes have been unable to turn in low-pressure wind conditions, thereby producing no recordable data.</p> <p>Conclusions/Discussion My hypothesis has not been supported thus far. Tesla's turbine has proven to be difficult to adapt to working in environmental wind conditions. The boundary layer effect created on the prototypes was not strong enough to spin the disks, and no viable data was able to be attained from the experiment. The next step that I shall take in order to achieve viable data will be to discover which of the designs is the most efficient, when used with a high-pressure fluid (as Tesla designed his turbine to work). After this data is attained, the most efficient design will further be tested and altered in order to discover if it can indeed work like a traditional wind turbine, under low-pressure fluids. After these tests are conducted, conclusive data should be reached, and my hypothesis will be either supported or disclaimed.</p>	
Summary Statement This project was conducted to determine if it was possible to utilize Nikola Tesla's turbine designs, and alter them in order to create a more energy efficient wind turbine.	
Help Received My dad advised me on the tools to use to create my apparatuses. My good friend, Dr. Richard Chapleau, provided me with useful information on the aerodynamic principles and physics behind the Tesla Turbine.	