Design and Construction of a Modulating Wind Turbine

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Devices created to harness the power of wind have been used for centuries to perform a variety of different tasks from milling to pumping. In modern times the wind turbine, a device that converts the energy of the wind into usable electricity, shows significant promise as a supplementary solution to creating renewable energy. However, horizontal axis wind turbines fit for residential or small scale use frequently face undesirable meteorological conditions that diminish their capabilities and the variable nature of wind makes them unfit for certain applications. Our project aims construct a mechanically viable wind turbine with a radius of 20 inches that possesses the capability to alter its blade pitch and blade width, then ascertain the performance of the turbine using different combinations of blade pitch and blade width at various wind velocities. When combined with performance data the turbine would be capable of modulating its blade pitch and blade width to maximize performance, maintain a particular rate of rotation, feather in adverse conditions to prevent damage, and potentially aid in turbine startup.

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