

## Analyzing the Feasibility of Low-Cost Composite Wind Turbine Blades for Residential Energy Production

**Authors :** Aravindhnan Nepolean, Chidamabaranathan Bibin, Rajesh K., Gopinath S., Ashok Kumar R., Arun Kumar S., Sadasivan N.

**Abstract :** Wind turbine blades are an important parameter for surging renewable energy production. Optimizing blade profiles and developing new materials for wind turbine blades take a lot of time and effort. Even though many standards for wind turbine blades have been developed for large-scale applications, they are not more effective in small-scale applications. We used acrylonitrile-butadiene-styrene to make small-scale wind turbine blades in this study (ABS). We chose the material because it is inexpensive and easy to machine into the desired form. They also have outstanding chemical, stress, and creep resistance. The blade measures 332 mm in length and has a 664 mm rotor diameter. A modal study of blades is carried out, as well as a comparison with current e-glass fiber. They were able to balance the output with less vibration, according to the findings. Q blade software is used to simulate rotating output. The modal analysis testing and prototype validation of wind turbine blades were used for experimental validation.

**Keywords :** acrylonitrile-butadiene-styrene, e-glass fiber, modal, renewable energy, q-blade

**Conference Title :** ICWESEA 2021 : International Conference on Wind Energy Systems Engineering and Applications

**Conference Location :** Dubai, United Arab Emirates

**Conference Dates :** June 29-30, 2021