

Build your turbine rotors

Introduction

Wind turbines produce electrical power when the wind turns their rotors. These rotors are connected by a shaft to a generator. The shaft transfers the rotational energy of the rotors to the generator, which then transforms it into electrical energy.

The efficiency with which a wind turbine produces electrical energy depends largely on the number and design of its rotors.

The instructions below show you how you can design and build different rotors and see which is most efficient.

What you need

- A small direct current (D.C.) motor
- A voltmeter
- Jumper leads and crocodile clips
- A small rubber bung
- Paper clips or thin, stiff wire
- Thin, stiff card
- Sticky tape
- A pin or other sharp point
- A desk fan

Building the wind turbine rotor test rig

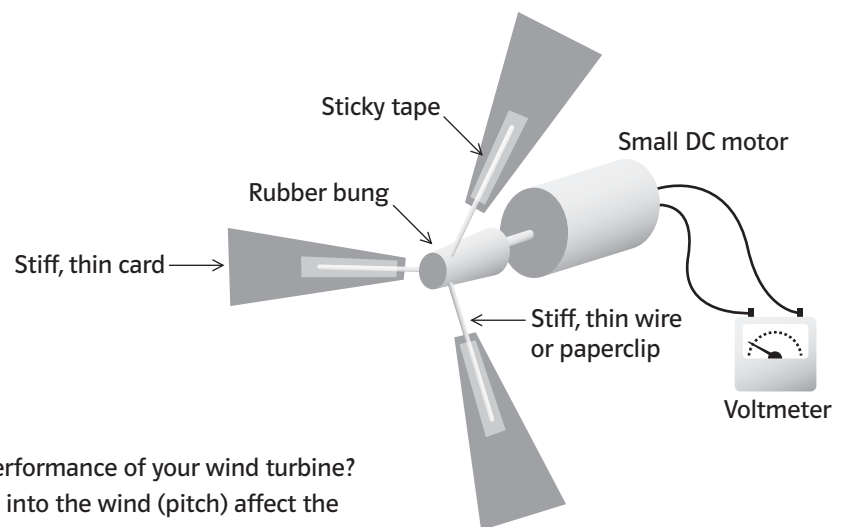
The diagram below shows how to put together the main parts of the wind turbine rotor test rig.

Individual rotor blades can be made by cutting pieces of stiff card to the shape you want to try and then taping them to a straightened paper clip. Use the pin to make a small hole in the side of the rubber bung and then push the end of the paper clip in to hold the rotor in place.

Using the distribution system

Once you have your rotors fixed, start up the desk fan and read off the voltage.

Try different designs to see what shape and position of rotor give you the highest voltage.



Extension tasks

- How does the number of rotors affect the performance of your wind turbine?
- How does the angle at which the rotors face into the wind (pitch) affect the performance of your wind turbine?
- Could you ever design a rotor which would transform 100 per cent of the wind's kinetic energy into rotational kinetic energy in the rotor and shaft?