cussons
TECHNOLOGY

P3110 Wells Turbine

Provisional Sheet

- Lift and drag from an Aerofoil
- Relative Velocity and Angular velocity
- Energy from an airstream

INTRODUCTION

The Wells Turbine was created to provide a means of using the energy available from an air stream that is oscillating between two directions of movement with time. The classic example of the source of such a wind is from an oscillating column of air driven by the rise and fall of sea waves in a submerged chamber. (See Cussons Wave Absorbing Product P6340).

A conventional wind turbine generator is provided with blades to extract energy from a unidirectional source of wind and are totally unsuitable for wind coming from the opposite direction.

The Wells Turbine rotating disc uses the principle of a symmetrical aerofoil, spinning at a high angular velocity, to generate a forward component of lift, on the blade, pulling the blade forwards and converting the energy to torque.

EXPERIMENTAL CAPABILITY

Experiments can be conducted to determine torque output over a modest range of rotational and wind speeds. This unit is at the smallest range of viable Wells Turbines and it is primarily a valuable demonstration of the complex principles.

The following engineering principles are involved:

DESCRIPTION

The Wells turbine module comprises of a high speed rotating disc with four symmetrical aerofoil blades. At operating speed the lift generated by the blade provides a greater forward element on the blade than the drag and a resultant torque is applied to the shaft.

Product P3110 provides the disc and blades, suitable for mounting on Cussons Wind Generator Module P3100 and suitable guide ducts to be used within Cussons Flow Channel P3105 to guide the air flow onto the aerofoil sections.

A range of different aerofoil sections can be fitted and Cussons P3112 provides two sets of blades each with different symmetrical aerofoil profiles.

Should the user not have the P3100 and P3105 products a standalone kit P3111 is available to allow the operation of the Wells Turbine rotor. In essence P3111 has a Wind Generator module mounting the disc on a shaft, (free to slide axially within ball bearings), and a variable speed motor is configured to run the turbine up to speed and then be switched to act as a power absorber. The unit is provided with a control box that displays current, voltage and wind generator speed. Speed is measured with a magnetic pick up probe. The module is located within a wind channel that is mounted on a movable trolley carrying the wind generating fan.

An oscillating wind direction is obtained by repeatedly reversing the direction of the fan through its controller.

Cussons Technology Ltd.
102 Great Clowes Street, Manchester M7 1RH, England
Tel. +(44)161 833 0036 Fax. +(44)161 834 4688
E-mail: sales@cussons.co.uk Web: www.cussons.co.uk