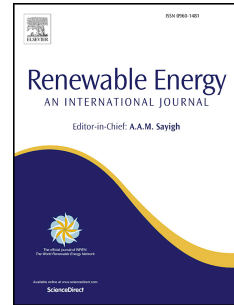


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Design and manufacture of a bed supported tidal turbine model for blade and shaft load measurement in turbulent flow and waves

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1 Design and manufacture of a bed supported tidal
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8 **Abstract**

9 Laboratory testing of tidal turbine models is an essential tool to investigate
10 hydrodynamic interactions between turbines and the flow. Such tests can be
11 used to calibrate numerical models and to estimate rotor loading and wake
12 development to inform the design of full scale machines and array layout.
13 The details of the design and manufacturing techniques used to develop a
14 highly instrumented turbine model are presented. The model has a 1.2m
15 diameter, three bladed horizontal axis rotor and is bottom mounted. Partic-
16 ular attention is given to the instrumentation which can measure streamwise
17 root bending moment for each blade and torque and thrust for the overall
18 rotor. The model is mainly designed to investigate blade and shaft loads due
19 to both turbulence and waves. Initial results from tests in a 2 m deep by 4
20 m wide flume are also presented.

21 *Keywords:* tidal stream turbine, experimental testing, instrumentation,
22 turbulence loading

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