

Renewable Energy Devices Model Basin Testing

WOLFSON UNIT

FOR MARINE TECHNOLOGY AND INDUSTRIAL AERODYNAMICS

Background

The Wolfson Unit has considerable experience in the field of renewable energy offering a diverse array of services to the industry. We work with clients to develop new ideas or optimise tried technologies.

The towing tank and wind tunnel are only two of the many research facilities available to the designer. We can also offer design analysis, innovative research, computational fluid dynamics (CFD) and numerical simulations. In addition, by working through the Wolfson Unit, the designer has access to the wide range of academic staff within the University specialising in such disciplines as mechanical engineering, aerodynamics, electronics, materials and structures.

The Wolfson Unit engineers, who are employed full time on consulting work, have built up a wealth of experience in overcoming aerodynamic and hydrodynamic problems for their clients. This experience helps them to adapt test techniques or design special tests to match the specifications and budgets of the client.

All work is carried out in secure conditions and full confidentiality is maintained at all times. No details of, or results from, any test programme are ever published without the express permission of the client.

Model Testing

Model testing offers the ability to:

- Optimise the device performance
- Measure the power output
- Determine the efficiency
- Measure forces in 6 axes



Marine Current Turbines (MCT) model testing

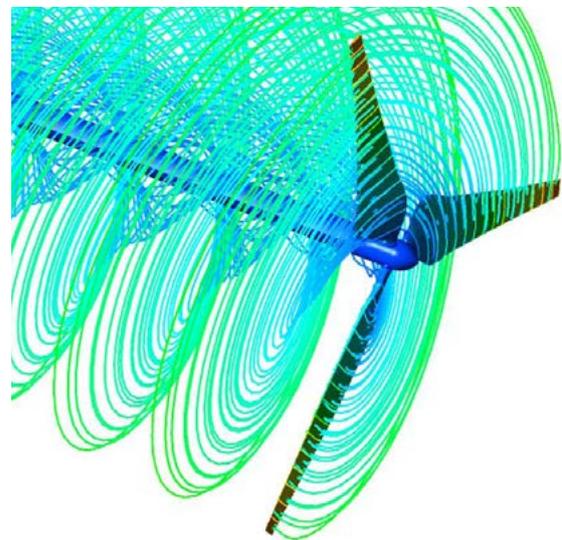
Wolfson Unit engineers can quickly make theoretical calculations and design suggestions based upon experience and fundamental fluid dynamic theory, from which more in-depth assessments and analysis can be made.

The Wolfson Unit is experienced in working with novel processes and equipment, and the engineers pride themselves on being quick to adapt either the equipment or the overall test programme if results indicate an unexpected phenomenon occurring.

Computational Fluid Dynamics (CFD)

As well as experimentally based methods the Wolfson Unit's range of consultancy services encompass Computational Fluid Dynamics (CFD). We have developed our CFD capabilities in order to compliment the experimental testing and other services we provide. Wolfson Unit engineers have had experience of, and been using, CFD since the early 1990's. This experience ranges from having conducted academic research to assisting designers on best practice to incorporate CFD within their design development, and using a variety of CFD codes to evaluate fluid flow in variety of problems.

Using the open source OpenFOAM® CFD Toolbox CFD solver on the University of Southampton's latest supercomputer, Iridis 4, allows us to provide a fast turn around on a full matrix of simulations for detailed models. Combined with the large historical database of experimental testing that the Wolfson Unit have conducted, we are well placed to offer high quality results built on validated methodology.



CFD Simulation of wind turbine

Device Installation Problems

The installation and maintenance of energy capture devices can often introduce significant problems and limitations upon the overall design due to the environment and the presence of the energy sources to be captured. In addition, these parameters vary around the world, and site specific problems can be encountered. For example, the long swell waves of the Pacific produce a very different loading compared to the extreme tide and shorter waves found on the Normandy coast.

With the increase in size of individual structural elements, the installation can often require novel solutions and greater understanding of the loads and motions involved.

The Wolfson Unit can assist by collating environmental conditions, conducting experimental testing or performing numerical simulations of the installation process.