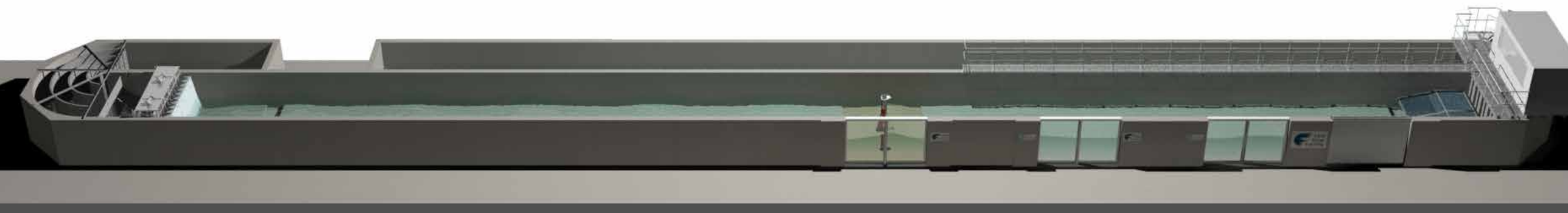
HR Wallingford
Working with water

HAPPY FIRST BIRTHDAY!

ON 30 OCT 2015 IT'S EXACTLY ONE YEAR SINCE WE OPENED THE

FAST FLOW FACILITY

The year in summary...



Shifting sands

The energy of waves and currents can create a layer of suspended sediment above the seabed, but, while much research has focused on this area, we still don't fully understand very near-bed wave-current-sediment interactions. Researchers from the National Oceanography Centre at Southampton used our Fast Flow Facility to investigate sediment dynamics and entrainment over sand ripples. The data collected will ultimately be used to improve the way we model sediments in numerical models. This research is part-funded by HR Wallingford.

November 2014

December

January 2015

February

March

April

May

June

July

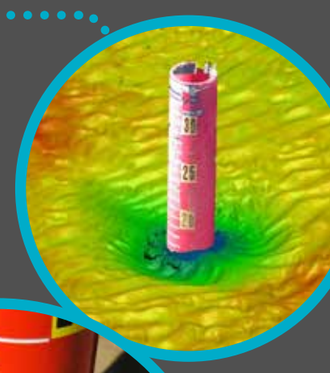
August

September

October

Building traction for tyres

Using detailed data collected in the Fast Flow Facility, we evaluated Norfolk Marine's innovative approach to scour protection for the offshore wind industry: tyre-filled nets. Could they be a viable alternative to the rock dumping typically used for scour protection? Using the Fast Flow Facility's wave-current-sediment capabilities, we built a scale model of a monopile foundation, complete with 1:15-scale tyres, and ran tests that simulated the strong tidal flows and challenging storm waves typically experienced at wind farm sites around the UK. We also looked at deployment strategies for the tyre-filled nets.



Our analysis of short-term impacts showed that the nets were effective in preventing and reducing scour around monopile foundations. Results from the Fast Flow Facility gave Norfolk Marine the data they needed to move on to full-scale field-testing with confidence.

Hands-on river science

Using the Fast Flow Facility as a river in the laboratory, hydrometrists from the UK Environment Agency and across Europe descended on the Fast Flow Facility to compare the performance of some of the leading ADCPs under controlled laboratory conditions.

Next generation foundations

As offshore wind farms move into ever deeper water, developers are exploring alternatives to the traditional monopile foundations in order to reduce costs and keep the technology competitive. We are helping DONG Energy to develop the next-generation of wind turbine foundations.

Research in the Fast Flow Facility is informing the design of a novel suction bucket foundation, and will ultimately lead to more cost effective seabed foundation solutions for the renewable energy industry. Our work to determine how these structures interact with, and impact upon, the hydrodynamic conditions and the seabed will be completed in early 2016.

"The ability to have novel designs tested by physical modelling is crucial for development of our foundations. We can observe how the seabed responds to the foundation in the extreme conditions found in the North Sea. The new Fast Flow Facility at HR Wallingford is tailor made for this purpose."

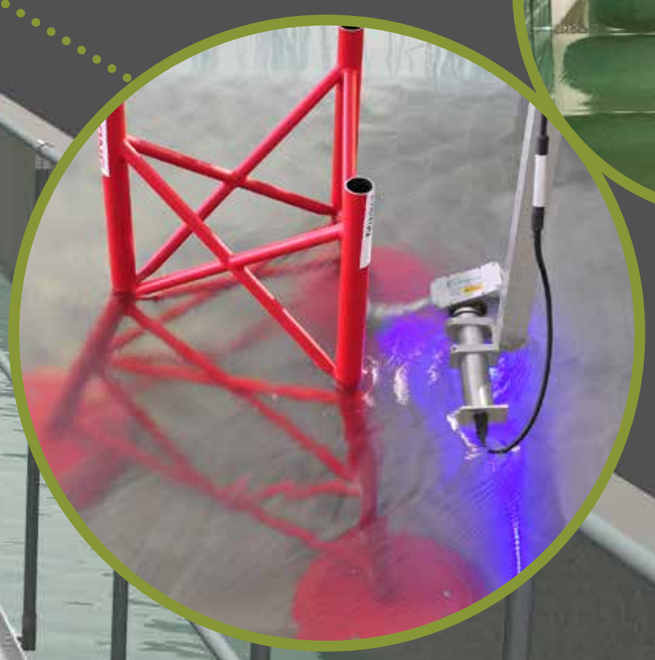
Andreas Roulund,
Lead Oceanographic Engineer, DONG Energy Wind Power

Firm foundations for tidal energy

By the early 2020s, MeyGen intend to deploy up to 398 MW of offshore tidal stream turbines. These will, by necessity, be located in regions of strong currents and therefore need anchoring securely to the sea bed.

Our research for MeyGen and the Carbon Trust used the Fast Flow Facility to investigate the impact of combined strong tidal currents and large waves on foundation stability and the stability of seabed cables.

We completed tests with waves and currents flowing together and in opposing directions to simulate changes in the tide.



Fast Flow Facility

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Find out more at www.hrwallingford.com

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