

Novel torque sensors aid tidal turbine work

Novel non-contact torque sensors are playing an interesting part in the development of commercial-scale tidal turbines being built by Irish marine technology firm OpenHydro.

The firm is using Sensor Technology devices, based on surface acoustic wave (SAW) technology, to measure rotational speed and frictional forces for the turbine bearings in its simulator.

Since OpenHydro's turbines are intended for deep submersion, they use open-centre designs that can be deployed on the seabed. However, mechanical engineer Kevin Harnett explains that reliability is then a prime consideration.

Hence the evaluation work, which, for the bearings, means determining how frictional forces vary with loads and rotational speeds. And hence also the measurement of torque in a shaft from



the motor that drives the bearing itself.

That's hard to do with conventional sensors, but Harnett says that Sensor Technology's TorqSense RWT320 is providing a solution. "We chose the RWT320, because of its wireless operation and because it was easy for us to fix in line with an existing shaft in

our experimental set-up," he states.

"In addition, this model of sensor has integral electronics and a serial output, which means that we can link it directly to a laptop in our test laboratory. This is a very straightforward and convenient arrangement," he adds.

OpenHydro is also using Sensor Technology's TorqView software, which provides dial, digital bar and chart graph displays for torque, rpm, temperature and power – as well as facilities for real-time plotting and data recording.

"We have found both the sensor and the software very easy to work with," comments Harnett. "And the sensor has proved itself able to withstand the tough operating conditions in our laboratory. Overall, we're very happy with product and the service we've received. The sensor is providing invaluable data for our development work."

United Utilities trials new pumps

Two of NOV Mono's recently introduced EZstrip progressing cavity pumps have been installed at United Utilities Fairbourne wastewater treatment works in Wales to improve process efficiency.

Mary Alexander, senior mechanical engineer at Imtech Process, the project contractor, explains that they are reducing downtime on a critical site process.

Fairbourne WwTW was constructed in 2003 and treats flows from Fairbourne and Bryn Coch pumping stations. Flows to the works pass through a two-stage screening process into an anoxic zone and then into a submerged membrane bioreactor plant before final effluent is pumped out to sea.

The two new pumps replaced conventional maintain-in-place pumps on the return activated sludge (RAS) loop from one membrane bioreactor cell to another at 55m³/h.

Alexander says that, due to the critical nature of the process, the pumps must operate continuously, so an additional EZstrip pump has been supplied as a spare to United Utilities Operational Services, the site operator.

"We specified the Mono EZstrip pumps, because, as well as offering a massive reduction in downtime for maintenance and repair, they eliminate the requirement for stator dismantling space, allowing the installation to be kept compact," states Alexander.

And she continues: "The Mono pumps are reliable and have been operating smoothly since their installation. We are very happy with their performance."



Aeropak handles high viscosity

Aeropak in Great Yarmouth reports success with three MasoSine sanitary pumps, mixing mainly aqueous and oil-based medicines.

Graham Abraham, projects manager, says that the pumps (from Watson-Marlow Pumps) have helped facilitate a five-year phase of growth at the plant.

"The pumps are used to help recirculate bulk product in mixing vessels through homogenisers," explains Abraham. They are also used to transfer product from the mixing vessels into bulk storage containers and Abraham says the secret of their success is their gentle, low shear operation.

That is due to the sinusoidal rotor integral to both the SPS and MR series models, which results in a wave-like action. The single rotor design also means very low propulsion, while the large pumping chambers help preserve product integrity.

Abraham gives the example of high viscosity products, such as Aeropak's Doublebase emollient gel. "The viscosity of such products is not a problem for the MasoSine pumps," he says. "They work away without any issues. Because of their simple design [one rotor, one shaft, one seal], economical in-line maintenance and cleaning is also achieved easily."

And he adds: "When we need to change product on one of the production lines, stripping the pumps, cleaning them down, testing and re-assembly are both quick and straightforward."

