Application Story

World's first commercial wave power plant chooses Novotechnik 'touchless technology' non contacting angle sensors supplied by Variohm EuroSensor

Towcester – UK – January 2012: Voith Hydro Wavegen, the Inverness based marine renewable wave power specialists recently completed installation of the world's first commercial wave power plant. Located in Mutriku in Northern Spain the 300 kW plant is based upon Wavegen's Nearshore Oscillating Water Column (OWC) technology which employs Novotechnik RFC4800 series 'touchless technology' non contacting angle sensors supplied by Variohm EuroSensor.

Recognising the considerable benefit of this renewable and abundant energy source, the Basque Energy Board (EVE) commissioned Wavegen's Nearshore OWC to be built into a new breakwater that was required to provide sea defence protection for the harbour at Mutriku. The technology has enormous worldwide potential for ocean facing coastlines and small islands.

The civil structure at Mutriku has 16 integrated Wells turbines that are located above a large chamber with an opening that is submerged under the water. As the ocean swell rises and falls so does the water level in the chamber. Rising water compresses the chamber air which is forced through the turbine generator. The falling water then sucks the air back through the turbine into the chamber. The Wells turbine is driven in the same direction irrespective of the air direction. The electricity generated is conditioned and exported to the grid – enough to power 250 homes.

The RFC4800 angle sensor is used to provide position feedback for a large butterfly damper located between the chamber and the turbine. Driven by an electrical actuator (painted blue in the photograph of the turbines), the damper is used to isolate the turbine for shut down purposes as well as throttle the turbine airflow in extreme sea states .

The RFC4800 uses a magnetic field to determine measurement angle. With no moving parts, the completely non contacting design includes a magnetic position marker typically attached to the customer's shaft that interacts with the sensor electronics, providing an analogue output proportional to angle position.

For the Wavegen application, the position sensor element is fixed to the turbine frame and the corresponding magnetic position marker is located directly on the end of the actuator shaft. This arrangement, with no bearings to wear and with each element IP69 sealed allows extremely high reliability and long working life – the MTBF rating for the electronics is 50000 hours. The magnet and sensor elements are easily installed and as the 12-bit resolution (0.09 degrees) analogue output is absolute, there is no need to recalibrate the valve position after a power shutdown.

"It's a critical piece of equipment as the butterfly position is inherent to the safe operation of our turbine." Says Adam Young – Wavegen's Business Development Engineer. "As you might imagine, given the conditions in which this equipment operates (salt laden air, cyclic positive and negative pressure) and in a commercial plant, it's imperative that the equipment is robust and functions reliably."

Novotechnik's RFC4800 series angle sensors are used widely for extreme environment applications in agricultural and construction equipment as well as

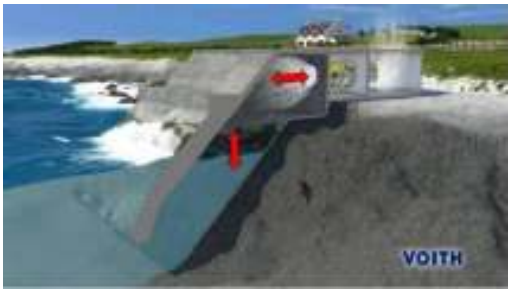
marine and automotive areas. With very high resilience to shock and vibration, the sensors are well suited to space restricted installations in moving vehicles, and the transmissive properties between magnet and sensor means that operation can be possible through non-magnetic barriers such as gearbox casings.

A choice of three models is available for supply voltages of 5 VDC, 12 VDC or 12/24 VDC. Optional output formats include 0 – 10 VDC, 0.5 – 4.5 VDC, a ratiometric voltage based upon a pre-calibrated percentage of the input, and 4 – 20 mA. The standard electrical angle is 360 degrees but optional 30 to 360 degree specials can be supplied as well as redundant output versions. IP67 environmental protected models are also available.

Voith Hydro Wavegen’s other successes in marine renewable energy include the world’s first commercial scale grid connected wave energy plant on the island of Islay, off the Scottish west coast. Called LIMPET, it was commissioned in 2000 and is still operated today as a test facility for Wavegen's research and development work. It has clocked up over 70,000 operating hours delivering electricity to the grid.

END

1) The Mutriku wave power plant in Northern Spain.*



2) Wavegen's Nearshore Oscillating Water Column (OWC) technology*

3) Inside the turbine hall – showing the Wells turbines*

4) Novotechnik's RFC 4800 'touchless technology' angle sensor

* Image Courtesy of Voith Hydro Wavegen Limited

High resolution images and full text available from Tactical MarComms website using this link http://www.tacticalmarcomms.com/clients/13/Variohm

For technical information and advertising opportunity enquiries, contact Graham Pattison:

Variohm Eurosensor Limited
Williams' Barn
Tiffield Road
Towcester
Northants
NN12 6HP
Tel: +44 (0) 1327 351004
Email: graham@variohm.com
Website: www.variohm.com

For editorial information, please contact Eddie Palmer:

Tactical MarComms Limited
Unit 16, Blythe Road
Corfe Mullen
Wimborne
Dorset BH21 3LR
UK
Tel & Fax +44 (0)1202 699967
Email: eddie.palmer@tacticalmarcomms.com
Web: www.tacticalmarcomms.com