

CONTROL 
TECHNIQUES

WAVE ENERGY PROJECT

WAVEGEN | WATER

DRIVE OBSESSED

MAXIMUM TURBINE SPEED ADJUSTED EVERY 30 SECONDS

Wavegen, part of Voith Siemens Hydro Power Generation, is one of the most advanced wave generating companies in the world. When Wavegen developed their facility on the Isle of Islay, they selected AC drives from Control Techniques.

The Challenge

One of two 250 kW counter rotating turbines at the 'Limpet' (Land installed marine powered energy transformer) unit was removed to **provide a test-bed for a new design of small turbo-generator that can be incorporated into breakwaters, coastal defences, land reclamation, port walls & community power schemes.**

Due to this being a development project, flexibility with on-board programming was essential.

The Benefit

"We considered five drives suppliers and Control Techniques proved to be a clear choice for several reasons," explained Dr. Tom Heath, Engineering Manager at Wavegen.

"The over-riding factor was the facility to program the drives in a high-level language, rather than an inflexible block diagram system. It proved to be very easy to adapt the SyptPro control language used by Control Techniques – and their willingness to give us total access to the drive functions proved crucial. I had experience of dealing with Control Techniques previously and again received exceptional support and service throughout this project."

Overview

- **Ethernet connectivity for remote access**
- **High level programming language**
- **Exceptional support & service**

The Solution

Two 32 kW Unidrive SP drives were fitted – one to control the turbine speed, the second running in regenerative mode to feed AC power to the grid. Both were fitted with SM-Applications modules, one also had an Ethernet communications module.

As there is more intensive monitoring on this project than an operational turbine generator installation, additional I/O is provided locally with a Beckhoff unit. As waves roll into the collector, air is driven up the water column. This drives the Wells turbine and is connected to an induction generator. Pressure transducers in the chamber feed the RMS pressure back to a SM-Applications module via the unit.

The Unidrive SP motors the turbine to the optimum speed (calculated by the program) and switches from motoring to generating mode, allowing the low-inertia turbine to drive free with the air pressure but limiting its maximum speed. Using a five-minute moving average of the chamber air pressure, the maximum turbine speed is adjusted every 30 seconds to give optimum output.

