

CARNEGIE CLEAN ENERGY BUOYANT WAVE ACTUATOR

Design and Supply

Carnegie Wave Energy Ltd (Carnegie) engaged ICON Engineering Pty Ltd (ICON) to design and supply a commercial scale prototype buoyant actuator for its wave energy conversion project.

The scale prototype consisted of a stand-alone wave energy buoy and a separate subsea hydraulic control module with the primary aim of the project to determine energy output of the unit.

The buoyant actuator is a partially submerged buoy designed to produce focused mechanical energy derived from wave energy. The buoy comprised of an outer structural steel shell encompassing hydraulic and pneumatic components.

- Preliminary design of the specialised mechanical components
- Management of 3rd party vendors in the fabrication of the buoyant actuator
- Plan and co-ordinate integration testing upon completion of the unit

Integration Testing of the Buoyant Actuator

ICON performed an integration test of the buoyant actuator at the Australian Marine Complex in Henderson, to test:

- Dry weight verification
- Ballast testing
- Freeboard verification
- Buoyancy verification
- Decay measurements



The Buoyant Actuator on location



Installing the Buoyant Actuator

Key features of the Bouyant Actuator included:

- A fast-tracked schedule with challenging targets. The buoy was designed, fabricated, tested and delivered within 6 months
- The unit contained internal buoyancy tanks which were flooded for installation, and then were pumped full of air once anchored to seabed to achieve the positive buoyancy required
- Detailed design and procurement of hydraulic cylinder and accumulator bank to achieve the required tension variations
- Hydraulic hook up and commissioning

Detailed Design and Fabrication of the Buoyant Actuator

The Scope of work for the detailed design and fabrication of the buoyant actuator included:

- Detailed design of the structural components of the buoy