

# ADVANCED CONCRETE STRUCTURAL DESIGN FOR SPERBOY™ WAVE-ENERGY CONVERTER

## LEAD ORGANISATION

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## PARTNERS

Trafalgar Marine Ltd

## COST AND DURATION

The Carbon Trust contribution towards this project is £150,000. The project started in October 2006 and is due for completion in October 2008.

## PROJECT REFERENCE NUMBER

051-342

## OBJECTIVES

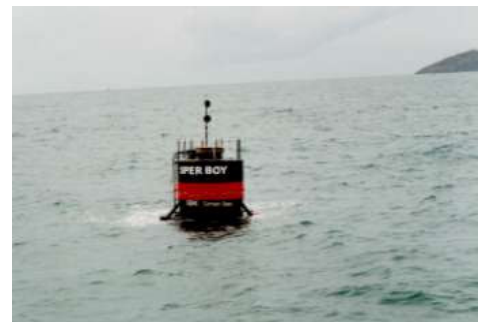
To design a prototype to demonstrate the advantages of using advanced concrete technology in the construction and operation of a wave-energy converter (WEC) and the enhanced energy capturing performance of the device.

## SUMMARY

SPERBOY™ is a WEC, devised by Embley Energy Ltd to produce electrical energy from ocean waves. Embley Energy Ltd took part in the Carbon Trust's Marine Energy Challenge where SPERBOY™ was studied and a best-case, cost-of-energy generation of 5p/kWh was calculated for a commercial wave farm. The planned design will use a concrete structure, low maintenance requirements and a 40-50 year life expectancy.

This project includes laboratory-scale testing and examines the structural design to provide a confident foundation for intermediate-scale testing and prototype deployment, without which a commercial deployment programme is not feasible.

The project partner, Trafalgar Marine Ltd, has been chosen because of a particular interest and ability in advanced concrete technology and its use in marine renewable energy devices. The programme will study conventional reinforced concrete and the use of advanced laminated concrete construction that promises savings in cost and, due to the potential for weight reduction, the design flexibility that is necessary to fully realise the potential of a floating WEC.



Pilot unit working at sea in 2000/01

The programme will last 2 years and will have two phases each lasting 12-months. In the 1st phase, a performance study will be carried out in conjunction with wave-tank trials at 1/50th scale to verify the theoretical performance predictions and to study the structural design. As this study will consider all the expected forces upon the structure, it is likely that the geometry of the machine will evolve and change to some extent, thus necessitating further wave-tank trials, which are included in the 2nd phase.

Following a review of the work carried out in the 1st phase, the programme will continue to the 2nd phase, to include the testing of key structural elements. Also, the energy conversion performance of the evolved design(s) will be assessed theoretically and by wave-tank testing of scale models.

The SPERBOY™ WEC will then be placed, with outline vessel design completed together with verified commercial performance predictions, to continue its development to commercial realisation.