



## Advances in Component Reliability Testing for Offshore Renewable Energy

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### ABSTRACT

Being placed in highly energetic environments Offshore Renewable Energy (ORE) technologies are facing hostile environmental and operational conditions. The engineering challenge is formidable as the system and component design has to be reliable and cost-effective compared to the cost of energy of other technologies. At the same time raising the required capital investment for project implementations or technology developments is fraught with difficulty [1], as risk averse investors are faced with medium-high risk investments that bear additional uncertainties. One of the dilemmas is that investors understandably demand a proven track record and demonstrated reliability in order to provide capital. One way to resolve this dilemma is specific component reliability testing that not only satisfies investor expectations but holds the potential to improve and de-risk components for ORE.

This presentation gives a brief overview to different component reliability test approaches for marine renewable energy and presents the most recent advances. There has been notable activity in the research community to develop and use dedicated component reliability test rigs [2,3] allowing the investigation and demonstration of component reliability under controlled, yet representative conditions. The presentation also describes the service simulation test approach using the Dynamic Marine Component test rig (see Fig 1) as an effective approach to utilise existing field load experience for reliability tests.



Figure 1: Dynamic Marine Component Test rig (DMaC)

### REFERENCES

- [1] Offshore Renewable Energy Catapult. (2014). Financing solutions for wave and tidal energy. November 2014. <https://ore.catapult.org.uk> (accessed on 08/01/2015).
- [2] M. Healy, T. Lewis and R. Alcorn. (2012) "MARINET–Streamlined, free-of-charge access to test facilities: How world-class research centres are joining forces to accelerate the development of marine renewable energy. 4th International Conference on Ocean Energy, 17 October, Dublin.
- [3] P.R. Thies, L. Johannig, T. Gordelier, A. Vickers and S. Weller (2013) Physical component testing to simulate dynamic marine load conditions. Proc. of 32nd ASME Int. Conference on Ocean, Offshore and Arctic Engineering (OMAE), Nantes, France, 9th - 14th Jun, Vol. 2B: Structures, Safety and Reliability, DOI:10.1115/OMAE2013-10820.