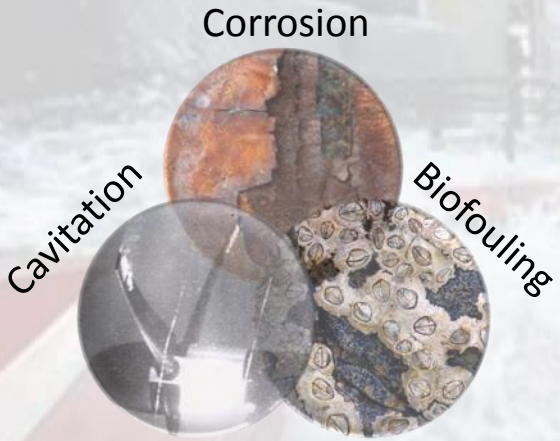
…providing advanced coatings for offshore wave and tidal devices

Offshore renewable energy devices can suffer from a range of damage mechanisms that reduce efficiency and component lifetime. Corrosion and biofouling are major problems and cavitation damage can occur where local water velocity is high. The ACORN project aims to address these three degradation mechanisms through the development of novel coatings.



This project will develop a new and **long-lasting** solution to the problem of **marine biofouling and corrosion**, offering specific advantages for static offshore structures such as wind turbine towers and ocean energy generators, where any maintenance operations are difficult and costly. In addition to this, the project will also develop and prove a **corrosion and cavitation resistant coating** suitable for tidal energy generators.

The ACORN Consortium

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www.acorn-project.eu

DEGIMA

ALPHATEK Hyperformance Coatings Ltd

Wave Dragon

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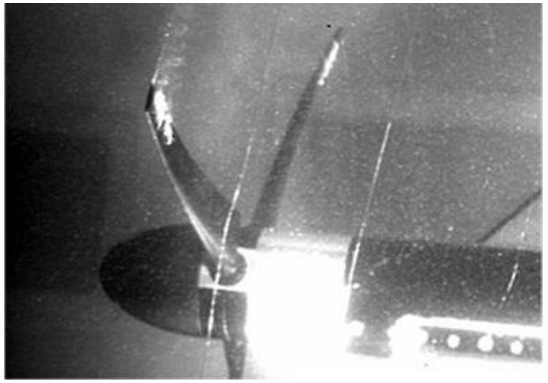
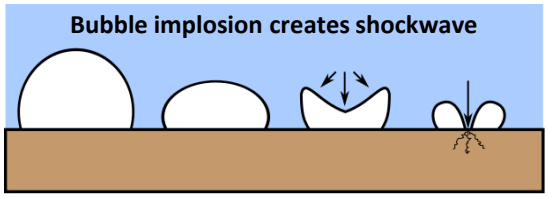
Advanced Coatings for Offshore Renewable eNergy

Cavitation

Fast moving turbine components used in offshore wave and tidal devices are susceptible to damage by *cavitation.*



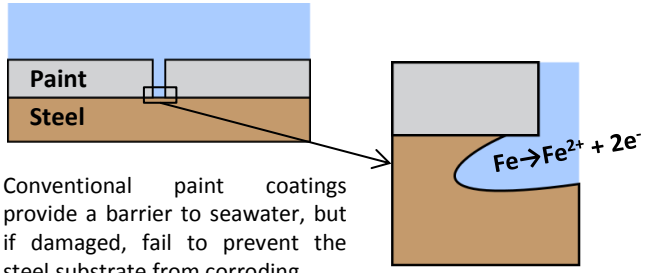
Cavitation damage occurs when bubbles formed by rapidly changing pressures near fast moving turbine blades collapse. As the bubble implodes, an intense shockwave is generated and causes damage to the surface of the component.



The ACORN project will develop a cavitation and seawater corrosion resistant coating to provide increased lifetime for fast moving turbine components.

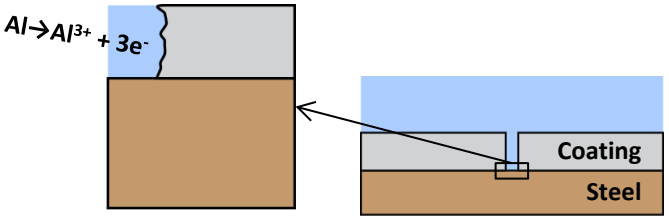
Corrosion

Ocean seawater provides a very harsh environment for steel. Effective protection is therefore needed in order to avoid high corrosion allowance.



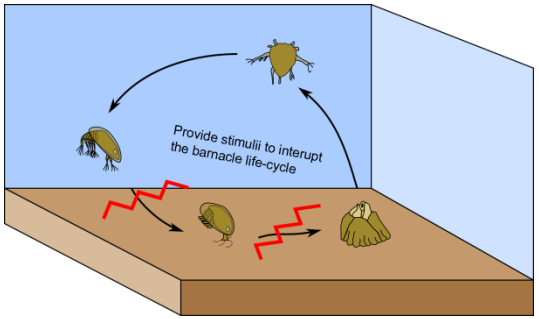
Conventional paint coatings provide a barrier to seawater, but if damaged, fail to prevent the steel substrate from corroding.

Application of a layer of thermally sprayed aluminium (TSA), prevents steel corrosion, even when areas of substrate are exposed. The more electronegative aluminium layer protects the steel through a combination of sacrificial behaviour and the formation of a tenacious barrier layer of insoluble calcareous compounds.



Biofouling

Hard fouling organisms, such as barnacles, readily colonise surfaces in the marine environment and can not only destroy protective coating layers, but increase hydrodynamic drag on the surfaces of wave and tidal devices.



The ACORN coatings will interrupt the barnacle life-cycle using a novel eco-friendly approach, with very low release rates of biocide. Combined with a TSA component, the coating aims to provide both resistance to corrosion and biofouling for a 20 year design lifetime.

These pioneering eco-friendly biocides have been shown to prevent the colonisation of barnacles using concentrations of active compounds as low as 0.1wt%.

The ACORN project will create a composite coating capable of providing resistance to both seawater corrosion and marine biofouling.