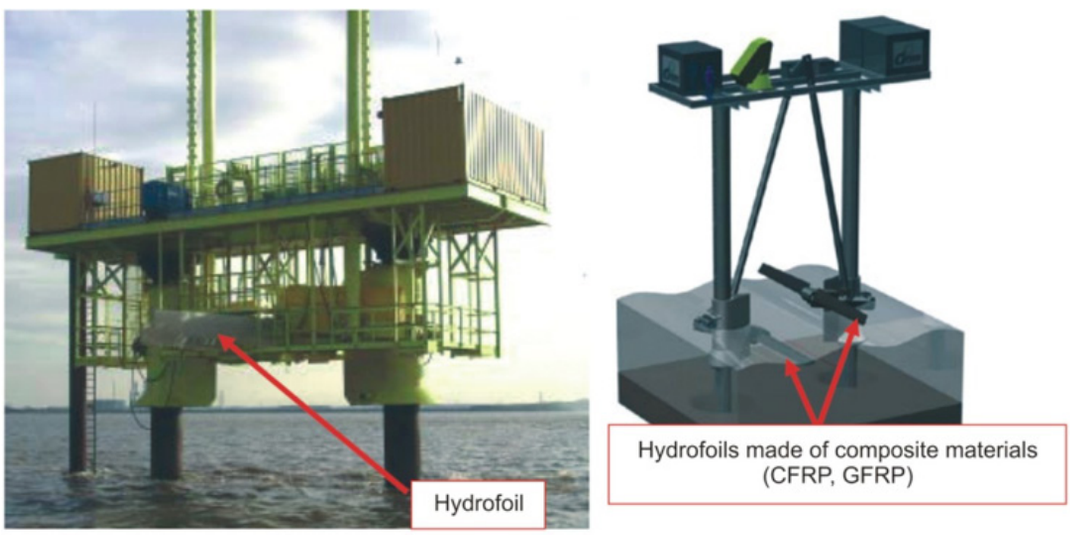
Development of a Condition Monitoring System for Tidal Stream Generator Structures / TIDALSENSE

the objective of the project

Is to develop a technique for structural health monitoring for tidal stream generators using combination of long-range guided waves and acoustic emission and develop a novel transducers and array of transducers with integrated acoustic emission and long-range ultrasonic capabilities.



The object of investigation (Tidal Power plant PS100)

ultrasound institute

Has investigated the capabilities to inspect and/or to monitor the structural integrity of hydrofoil using ultrasonic guided waves:

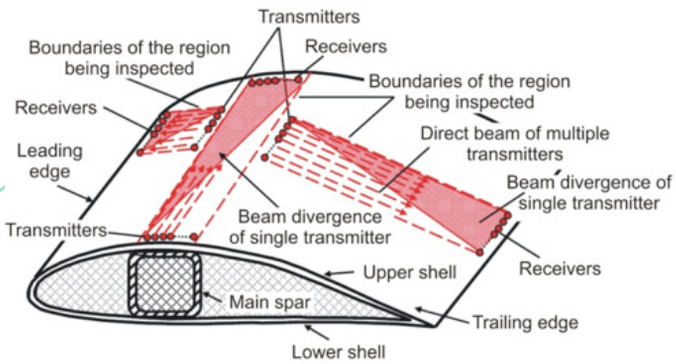
Modeling of the guided waves in the selected components was performed;

The different wave modes were identified and the most suitable ones for inspection were selected;

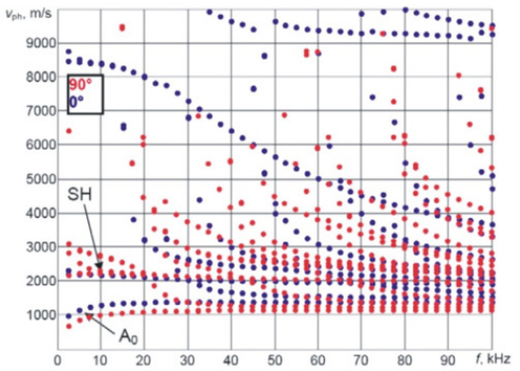
The configuration and arrangement of the transducers for optimal generation and reception of guided waves was determined.

The technique of automatic classification of the defect-free and the defective regions of the hydrofoil was developed.

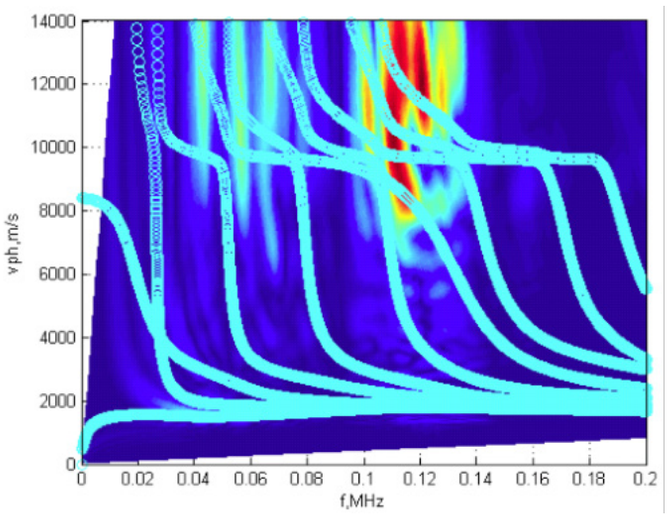
Ultrasound Institute of Kaunas University of Technology
http://ultrasound.ktu.edu



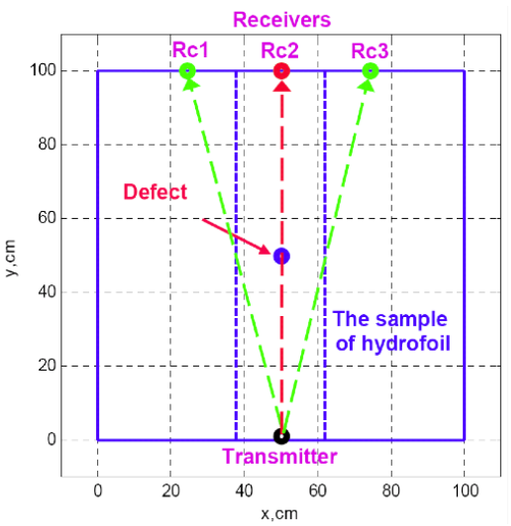
The optimum arrangement of transducers (measurements along and across the sample)



Calculated dispersion curves in structure of hydrofoil using SAFE method (skin and main spar, total thickness up to 40mm, number of layers up to 130)



Dispersion curves of phase velocities of guided waves propagating along the mock-up of hydrofoil: experiment (2D FFT) and calculated (SAFE)



Analysis of the guided wave signals and identification of defects in composite sample of hydrofoil

project partners

TWI Ltd (UK), TidalSails (Norway), IT power, IKH (Greece), iKnowHow Informatics S.A. (Greece), InnotecUK (UK), IT Nardoni (Italy), EnerOcean (Spain), Kaunas University of Technology (Lithuania), Cereteth (Greece).

project homepage

http://www.tidalsense.com/

related publications

1. R. Raišutis, E. Žukauskas, L. Mažeika. Application of analytical and semi-analytic modelling methods for investigation of ultrasonic guided waves propagation in composites, Ultrasound, 2011, Vol. 66, No. 3, p. 28-31.