

CFD simulation of vortex aeration for blue algae prevention and elimination

Background

An underwater impeller can be used to aerate water in order to counteract or prevent blue algae formation. Such an impeller creates a hyperbolic vortex through which air is sucked into the water where it partly dissolves, thereby increasing the oxygen content (see Fig. 1).

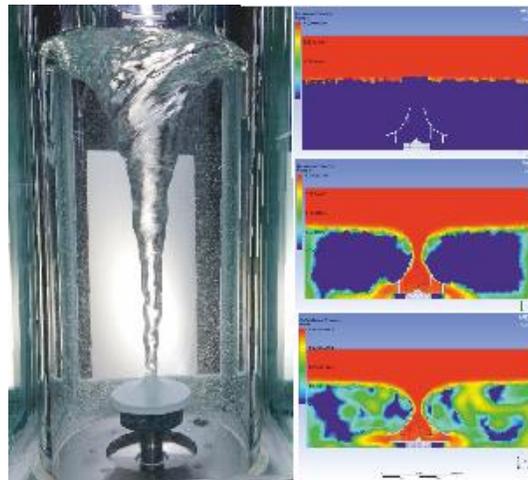


Fig.1: Impeller creating a vortex (left); preliminary CFD simulation (right)

Preliminary results have shown that this system can be properly simulated using state-of-the-art CFD software (see Fig. 1, right). The goal of this internship is an extension of the model to include gas solubility, different reservoir sizes, depths, number and types of impellers in order to simulate in which configuration the impellers could be used most efficiently to counteract or prevent blue algae contamination. These results will be compared to measurement results obtained from practical tests of the devices provided by other participants of the Wetsus' Applied Water Physics research theme.

Requirements

The ideal candidate has had previous experience with (computational) fluid dynamics (CFD) and some theoretical knowledge in this field. Taking initiative and good communication are important.

Starting date: ASAP

Duration: At least 3 months

Research institute

his project is a cooperation of the Fluid dynamics of energy systems team at TU Delft and Wetsus, Centre of Excellence for Sustainable Water Technology, located in Leeuwarden. The institute employs people from very different fields and backgrounds and combines this knowledge for the best results. This project is part of the Wetsus Applied Water Physics theme. Wetsus has an international environment where the working language is English, so fluency in this language is required. The researcher will be located at TU Delft under direct supervision of Prof. Dr. René Pecnik and will be required to travel once a month to Wetsus.

Application

If you are interested in this project, please contact Dr. Elmar C. Fuchs at Wetsus (elmar.fuchs@wetsus.nl) or Prof. Dr. Rene Pecnik at Delft University of Technology, r.pecnik@tudelft.nl for more information or directly apply by sending your CV to the same address. The internship/MSc thesis includes a reimbursement for living expenses of 350 euro per month.