

Ingrid K. Vilberg



Department of Energy and Process Engineering

2015 - 2018

Consequence and active use of free gas in hydro power

Supervisor:
Torbjørn K. Nielsen
Co-supervisor:
Morten Kjeldsen



Background

This project is motivated by challenges in the hydropower industry, where the demand for more flexible power control of each machine can cause wear and unscheduled shutdowns. This may result from cavitation, vibration and pressure pulsations due to resonances in the water conduit system.

With focus on water quality and gas content, this study will investigate the effect of free gas and cavitation. It will also include flow control solutions with free gas to achieve more favorable operating conditions.



A draft tube water injection system is installed on the unit, in addition to an original air suction system. The visual investigation will be carried out in combination with cavitation intensity measurements. At the same time, the effects of the water injection system and the air system will also be examined, both with regard to cavitation and pressure pulsations in the draft tube.

This is an industrial PhD project with Flow Design Bureau (FDB), supported by The Research Council of Norway.



Plexiglass windows are installed on the draft tube of Svorka power plant (25 MW), operated by Statkraft