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The Norwegian University of Science and Technology (NTNU) creates knowledge for a better world and solutions that can change everyday life.

Postdoctor HydroCen WP2.2: Fatigue loads on turbines attached to a conduit system (IV-94/17)

Description

A two-year Postdoctoral position is available at the Department of Energy and Process Engineering, NTNU from 1st September 2017.

The Postdoctoral position will be conducted as a part of the Norwegian Centre for Hydropower Technology (HydroCen), which is a Centre for Environment-friendly Energy Research (FME) established by the Research Council of Norway. Its main objective is to enable the Norwegian hydropower sector to meet complex challenges and exploit new opportunities through innovative technological solutions. The research areas include hydropower structures, turbine and generator, market and services and environmental design. The Norwegian University of Science and Technology (NTNU) is the host institution and is the main research partner together with SINTEF Energy Research and Norwegian Institute for Nature Research (NINA). HydroCen include almost 60 national and international partners from industry, R&D institutes and universities.

The candidate will work on utilizing 1D-models and 3D-CFD to identify dynamic loads on turbines influenced by the dynamic behavior of conduit system.

Turbine performance simulations are performed by CFD, Computational Fluid Dynamics, is a power full tool for optimizing turbine design. Transient simulations can also predict pressure fluctuations caused by stator rotor interaction (synchronous) and draft tube oscillation. These simulations are in its ultimate use, simulation of the whole turbine. However, the time use of such simulations are tremendous because 3D representation of the whole turbine makes it necessary to solve billions of equation simultaneously. Short cuts and simplifications are therefore necessary to make it useful as an engineering tool. Verifications in the laboratory shows, however, a good coherence.

Pressure fluctuations caused by the turbine behaviour will travel and reflect in the conduit system, which again affect the turbine behaviour. The turbine and the conduit system's dynamic behaviour will mutually influence each other. Hence, two identical turbines will behave differently in different conduit systems.

To fully explain the mutual behaviour, the turbine as well as the conduit system must be modelled and solved simultaneously.

For transient simulations of the conduit system, the general experience is that 1D models are sufficient. This has been reported by numerous scientific papers, where simulations have been verified by field measurements.

The core ambition of this project is to make a numeric representation of a power plant combining 3D simulations of the turbine and 1D simulations of the conduit system.

To establish such a model the first step will be modelling the turbine and conduit system in the Water Power Laboratory at NTNU and verify the simulations by laboratory measurements. Later on, verification will be done by measurements in a suitable hydro power plant.

Qualifications

Applicants must hold a PhD (or equivalent) degree in process engineering with focus on transient CFD. The candidate should also be familiar with system dynamics in hydro power plants.

Excellent English skills, spoken and written, are required. Applicants from non-English-speaking countries outside Europe must document English skills by an approved test. Approved tests are TOEFL, IELTS, Cambridge Certificate in Advanced English (CAE) or Cambridge Certificate of Proficiency in English (CPE).

Conditions

Postdoctoral candidates are remunerated in code 1352, and are normally remunerated at gross from NOK 485,700 per annum before tax. There will be a 2% deduction to the Norwegian Public Service Pension Fund from gross wage.

The appointment of the Postdoctoral fellows will be made according to Norwegian guidelines for universities and university colleges and to the general regulations regarding university employees.

The Postdoctoral fellowship is awarded for 2 years.

For further information, please contact Professor Torbjørn K. Nielsen (torbjorn.nielsen@ntnu.no) or Ole Gunnar Dahlhaug (ole.g.dahlhaug@ntnu.no)

Please be aware that applications must not be sent to the above email address(es).

The engagement is to be made in accordance with the regulations in force concerning State Employees and Civil Servants. The positions adhere to the Norwegian Government's policy of balanced ethnicity, age and gender. Persons with immigrant background are encouraged to apply. NTNU's objective is to increase the number of females in scientific positions. Female applicants are therefore encouraged to apply.

The application

The application must contain information of educational background and work experience. Certified copies of academic diplomas and certificates, copies of transcripts and two reference letters should be enclosed. Applications with CV, grade transcripts and other enclosures should be submitted via this webpage at www.jobbnorge.no. **Mark the application with IV-94/17.**

Application deadline is: 18th April 2017

According to the new Freedom of Information Act, information concerning the applicant may be made public even if the applicant has requested not to be included in the list of applicants.

Jobbnorge-ID: 136216, Søknadsfrist: Avsluttet