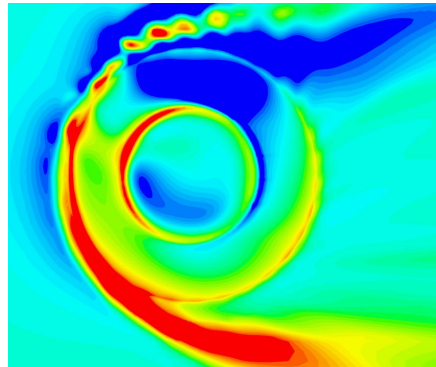
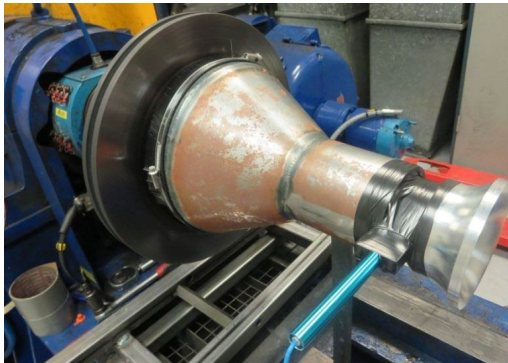


Master thesis project: Parametric CFD Design Analysis of Brake Discs



Project description:

CFD simulation is widely used early in product design. The main aim of this thesis is to define a simplified aerodynamic model that could be used in the design process of brake rotors. The pumping performance of a rotor is one of the main parameters to validate the CFD simulation. It normally is measured by using a flow measurement equipment. The flow measurement equipment consists of a plenum and a rotating vane flowmeter.

The thesis starts with modelling the test rig and the flow measurement equipment. The next step is to assess the combination of flow and design parameters such as nominal speed, disc temperature as well as the disc vanes geometry. Regarding the numerical simulations steady RANS simulation will be carried out using the moving reference frame (MRF) method to simulate the rotation. This part focuses on examining three different turbulence models, i.e., k- ϵ , k- ω , Shear Stress Transport (SST) model, with the purpose of determining which is the most appropriate to apply when modelling the air flow pattern.

Tasks:

- Create a CAD model of the test rig with mass flow measurement equipment.
- Perform CFD investigations of the different brake disc design and examine different turbulence models.

The tools used are ANSA/CATIA for pre-processing and STAR-CCM+ for meshing, solving, and post-processing.

Number of students: 1-2, please apply with CV and cover letter

Starting date: January 2022. The duration of the thesis work is 20 weeks

Location: VEAS division, M2

Contact: Samaneh Rouina, Postdoc, M2 Department, samaneh.rouina@chalmers.se.