Technologies that provide better fuel economy, reduced emissions and great performance – BorgWarner makes it possible. As a leading automotive supplier, we develop innovative powertrain solutions. Our products can be found in efficient gasoline, clean diesel, hybrid and pure electric vehicles as well as in commercial and on/off-highway applications. Through our ongoing commitment to innovation, BorgWarner delivers environmentally friendly solutions that improve driving comfort, performance and reliability.

The BorgWarner Turbo Systems business unit develops and manufactures innovative exhaust gas turbochargers. We produce turbocharging systems that play a crucial role in improving the driving comfort, fuel consumption and environmental friendliness of vehicles all over the world.

Student (m/w/d) for a Master Thesis

Forced response simulations for radial turbines

You have completed the first steps of your studies and are now ready to enter the broad field of product development? Then we have the next challenge for you! By working directly on projects, you will have an attractive opportunity to get an insight into the daily work of our simulation engineers. To enhance our turbine development, we are looking for a Master student to perform forced response simulations for the dual-volute and variable-geometry (VTG) turbocharger. You will conduct steady-state and transient Computational Fluid Dynamics (CFD) simulation as well as Finite Element Analysis (FEA) using ANSYS. A Fluid-structure Interaction (FSI) simulation model is expected to be established for the High-cycle Fatigue (HCF) analysis by taking into consideration the forced response due to the interaction between volute (or guide vanes) and turbine blades. You will be placed in the Department of Structural Mechanics under joint supervision with the Department of Turbine Aerodynamics.

Thesis Content:

- Conducting transient CFD simulation for dual-volute turbines to get fluctuating pressure loads on turbine blades
- Performing Fast Fourier-transform (FFT) to transform the pressure loads from time domain to frequency domain
- Performing modal analysis for the turbine wheel
- Applying the established model to an existing turbine wheel portfolio for standard operating conditions
- Extending the application to a VTG turbine to study the influence of the minimum radial distance between turbine wheel and guide vanes on the HCF of turbine wheel
- Documentation and proposing a plausible evaluation criterion

Your Profile:

- Student (m/w/d) in Mechanical Engineering or a related field
- Good knowledge of Fluid Mechanics, Mechanics and Turbomachinery required
- Knowledge of Windows and Linux
- Good team player and communication skills

Do you want to play a decisive role in shaping the future of the automobile?

Then apply now, stating your earliest possible starting date, by e-mail to hr-engineering@borgwarner.com

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