Master Thesis Project - Tracking and measuring tyre dust

Title: Numerical investigations of the flow around rotating tyres with the purpose of tracing the tyre dust

Background

With tightening environmental regulations for vehicle manufacturers, tyre particle emissions are becoming a growing concern for society. When braking, accelerating or cornering, microplastic particles are released by the tyres. Also, when the vehicle uses the brakes, the discs and pads lose some material, referred to as brake dust. All these particles pollute the environment and are becoming a significant concern for health. They are also deposited on the car, contaminating sensors, thus affecting the performance of autonomous driving systems. Moreover, due to the fast transition to electrical drives, the tyre particle emissions are predicted to grow in the near future. The reason for this is that electrical vehicles (EVs) are typically heavier than their conventional counterparts, hence, they require larger tyres (and brakes).

Scope

The overall aim of the thesis work is to investigate the ways to trace and measure tyre (and brake) emissions. The airflow around the wheels and wheel-house will be investigated numerically, using Computational Fluid Dynamics (CFD), to determine the best way of measuring and capturing the dust. The students are expected to:

- Develop the numerical procedure,
- Propose designs for measuring equipment, and compare those,
- Propose designs for capturing the particles, and compare those,
- Propose designs for the wheel-house shape and wheel-arch opening.

Prerequisites

- Master student in Mechanical/Automotive engineering.
- Ability to take initiatives and work independently

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

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

For more information please contact:

Thomas Hult, Senior Engineer, (+46) 731 44 18 98, thomas.hult@cevt.se
Andrew Dawkes, Senior Engineer, (+46) 729 88 87 59, andrew.dawkes@cevt.se
Examiner at Chalmers: Alexey Vdovin, Researcher, alexey.vdovin@chalmers.se

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(Last application date: 2021-10-29)