

Volvo Cars Thesis Work Proposal

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Title		
Engine bay air flow CFD simulations of an XC90		
* Location Göteborg	* Category/SubCategory Produktutveckling Komplet Bil/Product Development Vehicle - - Environment and TASE/Contamination and Water Tightness	
Description of thesis work		
Background: To be able to predict temperatures of components in the engine bay area is an important task for the CFD thermo department at Volvo Cars. In order to calculate surface temperatures for different components it is important to accurately predict the air temperature and velocity distribution in the engine bay for different driving cases. The aim of this thesis work is to perform underhood simulations for an XC90 vehicle and analyze simulation results of the air temperature distribution in the engine bay. Corresponding data from complete vehicle testing are available to compare with the CFD results.		
Description of thesis work: Create a CFD model for an XC90 vehicle with a detailed engine bay. Analyze existing wind tunnel test data in order to obtain boundary conditions for CFD simulations. Set up and perform CFD simulations in Fluent for different driving cases, e.g. caravan towing and top speed driving. Evaluate simulation results and compare with test data. Work includes investigating different ways to model the electrical cooling fan (pressure jump models, moving frame of reference) and the effect of this on engine bay air flow. When the engine bay air flow is accurately predicted the next step is to investigate actual component temperatures. Typically these problems are dominated by heat radiation.		
Suitable Student background Good knowledge and interest in fluid mechanics/thermodynamics and CFD computations.		
Starting date 07- 09- 01	Number of students 2	
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