

# MASTER'S DISSERTATION AT STRUCTURAL MECHANICS

DEPARTMENT OF CONSTRUCTION SCIENCES | FACULTY OF ENGINEERING LTH | LUND UNIVERSITY



**BJÖRN PEDERSEN**

## PRESENTATION

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## EXAMINER

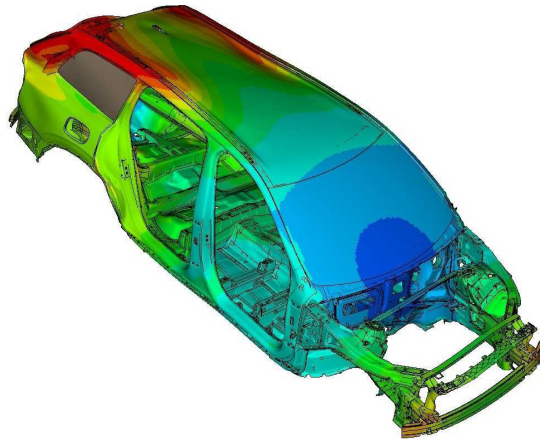
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**THE WORK IS PERFORMED AT**  
**DIVISION OF STRUCTURAL**  
**MECHANICS, LTH and**  
**VOLVO CARS, GÖTEBORG**

**IN COOPERATION WITH**  
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## CONCEPTUAL DYNAMIC ANALYSIS OF A VEHICLE BODY



### BACKGROUND

The noise, vibration and harshness (NVH), and body dynamic performance of automotive vehicles is highly dependent of the components included in the body structure and compartment since they add mass, stiffness and damping to the overall structure. Today, the noise levels in the compartment are predicted using complex and detailed computational models during both early and late stages of the vehicle development process. However, detailed information regarding the vehicle structure is limited during the concept phase, which makes the predictions unreliable. It would be desirable to use simpler and more robust measures to describe the NVH performance in the concept phase. Possible measures include eigenfrequencies of the body without trim items, or the vibrational response in its structural frame. In order to decide on appropriate measures, the correlation between the NVH performance of the finalized vehicle body and the results of the simpler measures needs to be evaluated.

### AIM AND OBJECTIVE

The long-term aim of the Master's dissertation is to create an understanding of how different objective measures correlate to the overall NVH performance of the vehicle. More specifically the dissertation will contribute with an evaluation of objective measures suitable for evaluating the NVH performance in an early concept development phase. Objective measures used on the finalized vehicle body also needs to be examined in order to correlate the findings from the concept development phase with the actual NVH performance. Thus possibly streamlining the working process in the concept phase of automotive development by offering a set of different objective measures.

To evaluate the adequacy of different objective measures, they need to be tested for a breadth of different vehicle bodies. A theoretical basis for the different objective measures will be compiled through a literature study and subsequently evaluated through numerical models. The numerical analysis will be performed using finite element models in a commercial software.

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