MASTER'S DISSERTATION AT STRUCTURAL MECHANICS

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

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PRESENTATION

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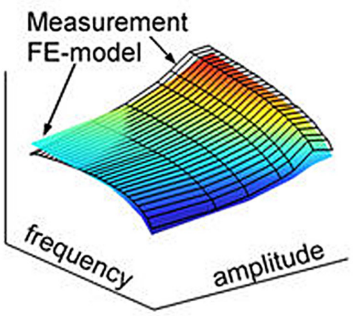
VOLVO CARS

STATIC AND DYNAMIC CHARACTERIZATION OF ELASTOMERS BY A MODIFIED HARDNESS TEST



BACKGROUND

The traditional method of material testing of elastomer is based on a double shear specimen consisting of both rubber and metal parts glued together, and were the external load is applied on the metal parts. The reason behind this method is because homogeneous state must be achieved in the elastomer when obtaining the material parameters, for instance the shear modulus. In practice it is hard to achieve homogenous state why a simpler method, which relies on inhomogenous state, is going to be investigated experimentally, theoretically and by finite element method, namely the modified hardness test.

The experimental part aims at obtaining static and dynamic material parameters for two rubber specimens, one using the modified hardness test and the other using a double shear specimen as a reference. For quasi static loading the Yeoh constants, which are hyper elastic parameters, will be determined and compared between the two different specimens. For the dynamic harmonic loading the dynamic shear modulus and phase angle are extracted from the two specimens and compared. The goal is to find the dynamic shear modulus and phase angle as a function of amplitude and frequency in a simpler and faster way.

AIM AND OBJECTIVE

The aim of the master thesis is to simplify the material characterization of rubber material, where the dynamic and static material parameters is to be used in FE-simulations.

To evaluate the simplified method a literature study is initiated in order to gather information regarding the behavior of rubber material and how it is modelled using the finite element method. Thereafter different elastomers will be tested using both the traditional method and the simplified method, and the results will be compared.

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