



## MOISTURE AND TEMPERATURE INDUCED STRESSES AND DEFORMATIONS IN PARQUET FLOORS - An Experimental and Numerical Study

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### Presentation

February 2006

### Report

will be published as report TVSM-5143

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### The work is performed at

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### In cooperation with

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### Background

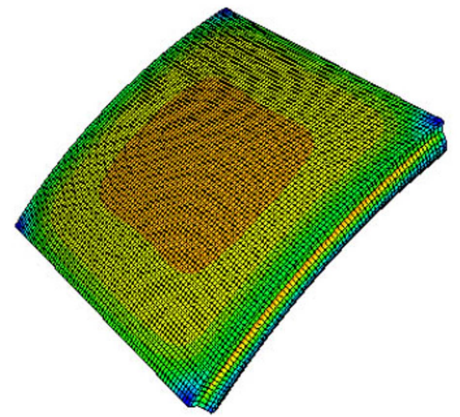
The use of wood flooring in new constructions in Sweden has increased dramatically during the last decade. Today, approximately 80% of the floor area is covered by wood flooring.

At the same time, the use of floor heating systems is becoming more frequent. Parquet floor systems are exposed to large variations in relative humidity and temperatures during normal use. Damages on parquet floors such as delamination and opening of splices of the visible layer have been reported.

The research and development of new products demands simulating possibilities. Finite element modelling can thus be a complement to practical tests in the laboratory.

### Objectives

The project is to be conducted in two main parts, one mainly regarding experimental investigations and one relating to numerical analysis of the parquet. The determination of material constants have been carried out at the Swiss Federal Institute of Technology. Numerical analyses including the effect of non-uniform moisture and temperature conditions is performed at the Div. of structural mechanics in Lund.



### Contents

- Determination of material properties of pine and oak and supplementary tests on parquet elements in changing climate (performed at ETH in Zurich)
- Development of a finite element model in ABACUS. Topics. Parameter study, modelling of floor heating system, hindered swelling and shrinkage
- Development of a hand calculation model for estimation of stresses and deformations in parquet floors and other wood composite products