

# Examensarbete vid Byggnadsmekanik



## MOISTURE DYNAMICS IN CORRUGATED BOARD BOXES

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### Presentation

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### Rapport

kommer att utges som  
report TVSM-5120

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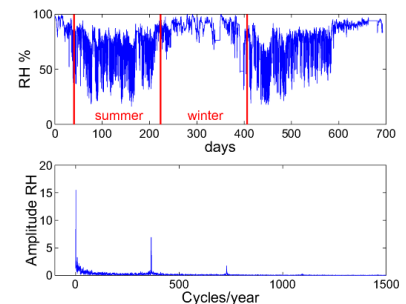
**LUNDS TEKNISKA  
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In this master thesis work the moisture transport in corrugated board boxes is analyzed. Corrugated board, which is a structural core sandwich material, is extensively used as a packaging material. The strength of corrugated board is largely influenced by the amount and distribution of moisture in the material. Therefore, the assessment of moisture is of large importance for the load carrying capacity of corrugated board boxes.

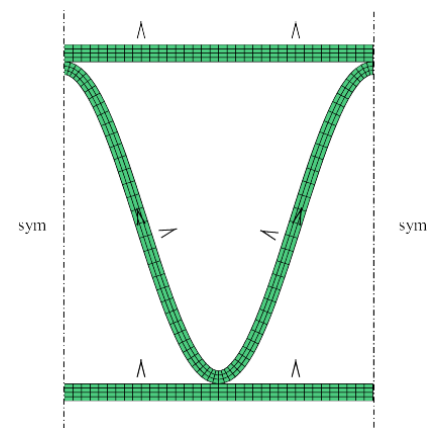
Earlier work at SCA Research shows that the moisture flux is suitably modelled by a two-phase system of differential equations, describing the moisture concentration isotherms in the voids and in the fibres of the material and a convective boundary layer at the surface of the material. The modeling of moisture transfer can with favour be done by using the periodic properties of corrugated board, for example using a two-dimensional finite element implementation of the governing equations.

The analysis will cover the following issues:

- Finite element formulation of the two-phase diffusion model.
- The numerical solution of transient diffusion in the board
- Comparison of simulations and measured results of moisture transport in boxes.



Measured RH/spectral density over two years.



Moisture transport in periodic cell of corrugated board.

The work may be completed with testing and analysis of hygroexpansion properties. The work will be performed by the use of the finite element package ABAQUS and/or MATLAB, at the Div. of Structural Mechanics, LTH.