

MASTER'S DISSERTATION AT STRUCTURAL MECHANICS

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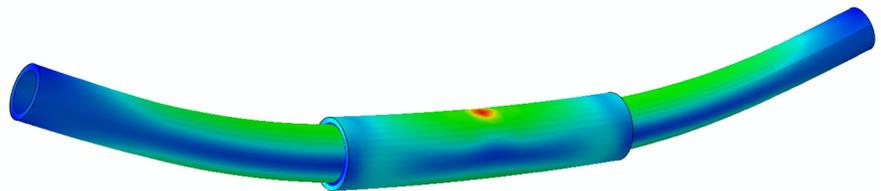
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**THE WORK IS PERFORMED AT
STRUCTURAL MECHANICS, LTH**

**IN COOPERATION WITH
WINFOOR AB**

NUMERICAL ANALYSIS AND TESTING OF CONNECTION IN WIND TURBINE ROTOR BLADE



BACKGROUND

To increase the share of energy from renewable sources the global interest in wind turbines has increased. However, to reduce the cost of wind turbines and increase their produced power there is a need for making their blades larger and lighter. The company Winfoor AB develops a new design of wind turbine rotor blades called Triblade together with Lund University. A Triblade is built up by simple small blade parts and struts to form a three dimensional truss structure in fibre composite materials. The new technology alludes to drastically reduce the weight of the blade. The design of the blade allows the blade to be manufactured in a number of smaller components, that can be connected on site. Transportation, which can be crucial for very long blades, is hence simplified. Compared to traditional blades a Triblade can provide an increased blade length while the cost can be lowered.

PURPOSE AND METHODS

The purpose of the project is to investigate a connection element in the blade and design it to transfer the arising forces in an efficient manner. A first design of the connection element will be made based on a numerical analysis by use of the finite element method. Subsequently, the suggested design will be constructed and subjected to an experimental test in a laboratory. Based on the results from the numerical analysis and the experimental testing, changes in the design of the connection element can be suggested. The goal is to determine a design of the connection element that is lightweight with sufficient strength.



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