Advanced topics on rotor blade full-scale structural fatigue testing and requirements - DTU Orbit (23/12/2018)

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Full scale fatigue test is an important part of the development and design of wind turbine blades. Testing is also needed for the approval of the blades in order for them to be used on large wind turbines. Fatigue test of wind turbine blades was started in the beginning of the 1980s and has been further developed since then. Structures in composite materials are generally difficult and time consuming to test for fatigue resistance. Therefore, several methods for testing of blades have been developed and exist today. Those methods are presented in [1].

This report deals with more advanced topics for fatigue testing of wind turbine blades. One challenge is how to fatigue test blades under realistic conditions. In order to study this topic a finite element based multibody formulation using the floating frame of reference approach is used to study fatigue loading under different external conditions.

An important purpose of full scale testing is to give valuable information to the designers on how the blade behaves in the test situation and which structural details that are important and should be included in the structural models for design. In order to be able to see the blade behaviour advanced measuring methods are needed.

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