Aeroelastic Analysis of B49 blade-Blatigue Project

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Summary:
This report is part of the EUDP Blatigue project, Fast and efficient fatigue test of large wind turbine blades. In the study the Siemens B49 blade loads are computed using HAWC2 aeroelastic code. The blade is coupled in a generic wind turbine tower and nacelle structure within HAWC2. Furthermore the basic DTU WE controller is used. The aim is to evaluate the blade fatigue and ultimate loads based on the IEC 61400-1 ed.3 standard. The results are further used in the project for the set-up and testing of the real blade at the DTU Risø Large Scale Facility.

In the first part the model properties are summarized. Then the IEC load cases are simulated using the HAWC2 code and the analysis is focused on the blade performance. A blade load comparison between HAWC2 and the Siemens results is presented together with a summary of the uncertainties related with the present analysis. Finally, an analysis is performed on a potential way to compute the blade lifetime fatigue damage based on few time series instead of running the full design load basis.

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## Contents

1 Introduction 4  
1.1 Wind Turbine Model .............................................. 4  
1.2 Component Structural Properties ................................ 5  
1.3 Blade Geometry ...................................................... 5  
1.4 HAWC2 Simulation Parameters .................................... 7  

2 Eigenvalue Analysis 8  
2.1 WT structure natural frequencies and damping .................. 8  
2.2 Blade natural frequencies and damping ............................ 8  

3 Normal Power Production Simulations 9  

4 Blade Section Stresses-Strains 11  

5 Blade Lifetime Fatigue Damage 14  

6 Ultimate Load Analysis 24  

7 Uncertainties in the Load Analysis 28  

8 Simplified Fatigue Target approach 29  

9 Acknowledgements 31  

10 References 32  

Appendices 33  

A WT component structural properties 33  

B DLC 1.2 Blade section - statistics and 1Hz equivalent loads 39  

C Blade lifetime fatigue 45  
C.1 Section Moments .................................................... 45  
C.2 Section Strains ....................................................... 45