Design and test of box girder for a large wind turbine blade

This report is covering the structural design and full scale test of a box girder as a part of the project “Demonstration of new blade design using manufacturing process simulations” supported by the EUDP program. A box girder with a predetermined outer geometry was designed using new inventions, which create an inner structure in the box girder. With a combination of advanced FEM analysis and the inventions it was possible to reduce the material thickness of the cap by up to 40%. The new design of the box girder was manufactured at SSP Technology A/S, where it was demonstrated that the manufacturing process could include the new inventions. Subsequently the box girder was transported to the blade test facility at DTU Wind Energy.

A series of test was performed with the blade to investigate the behaviour during loading, and finally the girder was loaded to ultimate failure. The report includes the description of the test setup, the test and an overview over the results from the test performed on the box girder. During the final test the box girder failed at 58 % of the expected ultimate load. Unfortunately, no definite conclusion could be made concerning the failure mechanism.

General information
State: Published
Organisations: Department of Wind Energy, Wind Turbines, Composites Mechanics and Materials Mechanics
Number of pages: 221
Publication date: 2012

Publication information
Publisher: DTU Wind Energy
Original language: English
Keywords: DTU Wind Energy E-0010 (EN), DTU Wind Energy E-0010, DTU Wind Energy E report 0010
Electronic versions:
Research output: Research › Report – Annual report year: 2013