Enhancing the damping of wind turbine rotor blades, the DAMPBLADE project - DTU Orbit
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A research programme enabling the development of damped wind turbine blades, having the acronym DAMPBLADE, has been supported by the EC under its 5th Framework Programme. In DAMPBLADE the following unique composite damping mechanisms were exploited aiming to increase the structural damping: tailoring of laminate damping anisotropy, damping layers and damped polymer matrices. Additional objectives of the project were the development of the missing critical analytical technologies enabling the explicit modelling of composite structural damping and a novel ‘composite blade design capacity’ enabling the direct prediction of aeroelastic stability and fatigue life; the development and characterization of damped composite materials; and the evaluation of new technology via the design and fabrication of damped prototype blades and their full-scale laboratory testing. After 4 years of work a 19m glass/polyester damped blade was designed, manufactured and tested using the know-how acquired. Modal analysis of this blade at the testing facility of CRES showed a nearly 80% increase in the damping ratio of both the first flap and lag modes compared with the earlier, standard, design practice. Copyright © 2005 John Wiley & Sons, Ltd.