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Dynamic Lift of Airfoils STEPHAN BARTH, THOMAS BOHLEN, RENE GRUENEGER, JOACHIM PEINKE, ForWind - Center for Wind Energy Research - University of Oldenburg — We present initial wind tunnel measurements which investigate the dynamic stall effect as it is caused by fluctuations of the wind direction in turbulent wind. In order to quantify this effect, the lift of an FX79-W-151A airfoil is determined by the integral of pressure distribution at the wind tunnel walls while rotating the airfoil with defined angular velocity. The rotation speed is varied by numeric control. The pressure measurement is performed by two sets of 40 pressure sensors. The temporal resolution is in the range of msec. For stochastic analysis the experiment is repeated several hundred times. In contrast to static lift values, there is an increase (overshoot) of lift before flow separation on the suction side occurs. The lift magnitude depends on the rate of change of the airfoil's angle of attack. This knowledge is relevant for the estimation of extreme mechanical loads for wind turbine blades.

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