The fence experiment – full-scale lidar-based shelter observations - DTU Orbit (30/09/2019)

The fence experiment – full-scale lidar-based shelter observations

We present shelter measurements of a fence from a field experiment in Denmark. The measurements were performed with three lidars scanning on a vertical plane downwind of the fence. Inflow conditions are based on sonic observations of a nearby mast. For fence-undisturbed conditions, the lidars’ measurements agree well with those from the sonics and, at the mast position, the average inflow conditions are well described by the logarithmic profile. Seven cases are defined based on the 5 relative wind direction to the fence, the fence porosity, and the inflow conditions. The larger the relative direction, the lower is the shelter. For the case with the largest relative directions, no shelter is observed in the far wake (distances >6 fence heights downwind of the fence). When comparing a near-neutral to a stable case, a stronger shelter effect is noticed. The shelter is highest below ≈1.46 fence heights and can sometimes be observed at all downwind positions (up to 11 fence heights). Below the fence height, the porous fence has a lower impact on the flow close to the fence compared to the solid fence. Velocity 10 profiles in the far wake converge onto each other using the self-preserving forms from two-dimensional wake analysis.

General information
Publication status: Published
Contributors: Pena Diaz, A., Bechmann, A., Conti, D., Angelou, N.
Pages: 101-114
Publication date: 2016
Peer-reviewed: Yes

Publication information
Journal: Wind Energy Science
Volume: 1
ISSN (Print): 2366-7443
Original language: English
Electronic versions:
wes-2016-8
DOIs:
10.5194/wes-2016-8
Source: FindIt
Source ID: 2303362818
Research output: Contribution to journal › Journal article – Annual report year: 2016 › Research › peer-review