

Determination of the Angle of Attack on a Research Wind Turbine

overall:

this manuscript is not easy to read and would need a structuring in the chapters, due to lack of missing overviews of the setup and issues from the previous experiment which is not mentioned appropriately. (by accessing the references i can get the picture)

The authors have not performed thorough literature review covering the aspects from testing research turbine/wind tunnel test on models.

Also scaling is not mentioned as a source for uncertainty in experimental tests.

The neglect of measuring sideslip in velocity measurements may be intentional or not. This is not clearly communicated, nor documented.

The damping characteristics of the used acoustic tubing setup is not appropriately documented and the results bear footprints of undocumented or missing research

Rotor Blade Using Surface Pressure Measurements

Abstract: may be rephrased due to conclusions, based on editorial issues.

Introduction:

L16: please make it more clear why is AoA a challenge? There are practical solutions to measure inflow, but is it AoA?

The sentence/question should be open up for some reflections essential for the motivation.

It would be great for the reader to have a (table) listing of available methods.

L31 At Risø (DTU) inflow measurements on a real turbine was conducted already in 90ties by Risø Nat. labs, and NREL around same time

L46 it depends on the blade length and scaling; a 20mm pitot tube in comparison with a 60m blade-please adjust this against windtunnel testing

L48 no references given

L51 unclear sentence: with a pitot pressure sensors you know the position geometrically.

2: Experimental setup

Figure 2 is missing definitions (U_t , U_n , U_{rel}), as well as t/c

L109: explain 'on a comparable level', e.g. what is the implicit effect of Turbulence (1.5%) ??

The choice for using Clark Y is not clear (high drag airfoil), see for example DOI: 10.2514/6.2006-33 Conference: 44th AIAA Aerospace Sciences Meeting and Exhibit

L113: Model Blockage and consequences for interpretation of results?

L115: is the turbine yaw fixed or free?

L124: the statement of placement of pressure taps is not constant = 0.45 - why straight line placement? / why is it in this small scale experiment not following constant radius?

L126: what is the max frequency (3 dB limit) of the detectable signal

L129: specs?

L134: A miss why the use of flaps with consensus on title / intro & science objectives

L157: using a 3 hole probe - no side slip detection. What about the flow conditions when the turbine is in yaw?

L171: what is the explanation behind seeing the 1P in the signal for the interpretation?

L174: This is a surprising statement about resonator box system that doesn't damp frequencies. 30 Hz filter? The cited reference (Berg) offers fig 21 (assuming small tubes) with considerable amplitude and phase lag properties. This needs clarification

Fig 8: What is the difference between the black-dashed and red points around $x/c=0.3$.. and onwards?

L237: the discussion of cross flow (sideslip) for the 2D probe is missing. Or may be your statement is to use a 2D probe in the 3D inflow as a representation of the normal (tangential) velocity components? Clarification and error calculation is needed..

L253: temperature increases in the flow during experiments effects on the pressure sensors (standard calibration at 25 deg nom)? As I recall the HCL's have $\pm 0.25\%$ FS nonlinearity & hysteresis. So i would assume higher uncertainty on AoA ..

Table 1 needs to state that uncertainty is [fraction/%] of FSR

4.1 Pressure distribution

the question is if yaw affects the pressure in the dynamic inflow field, observed here with a 2D-probe.

The results are expressed in Pascal, may be it is more clear to show it relative(normalisation), speaking of uncertainty and also from a point of measurement range.

Figure 11: add of result for 0 yaw missing

Figure12: Odd..with the 2-2½P variations(L316), except for the tower influence... Check!

L334: Could this be the damping effects from the resonating tubes characteristic ?, same P VARIATION ISSUE AS ABOVE

conclusion: may change in details.