

The following document contains information about the test facility and experimental setup.

Experiments were performed in order to establish a correlation between the noise generated by a typical Savonius-type wind turbine and the noise produced. Fig. 1 & 2.

### **Equipments:**

The height of the Savonius wind rotor was 2.2 m with a diameter of 0.5m. The overlap distance between the two blades was 80 mm.

A Bionic M-112 microphone array by CAE systems was used for the acoustic measurements. More information about this can be found [here](#).

The rotor was supported by an additional structure. A 1kW generator was mounted in the lower half of the rotor assembly, along with the torque meter. This was then connected to a loading device which allowed for regulating the amount of power being withdrawn from the rotor. This allowed measurements of performance efficiency and noise over the complete range of operations.

The experimental facility chosen for this experimental Campaign was the [Open Jet Facility \(OJF\)](#) at Delft University of Technology.

### **Experiments:**

The experiments were performed in two parts:

**Case 1:** Dependence of rotor noise on the rotor.

**Case 2:** Dependence of rotor noise on varying wind speeds- with no power being withdrawn from the wind turbine.

For each of these cases, the sound/noise signal was recorded by triggering the microphone at the same time at which the performance characteristics were being registered (acquisition time: 30 seconds) with a sampling frequency of 48128 Hz.

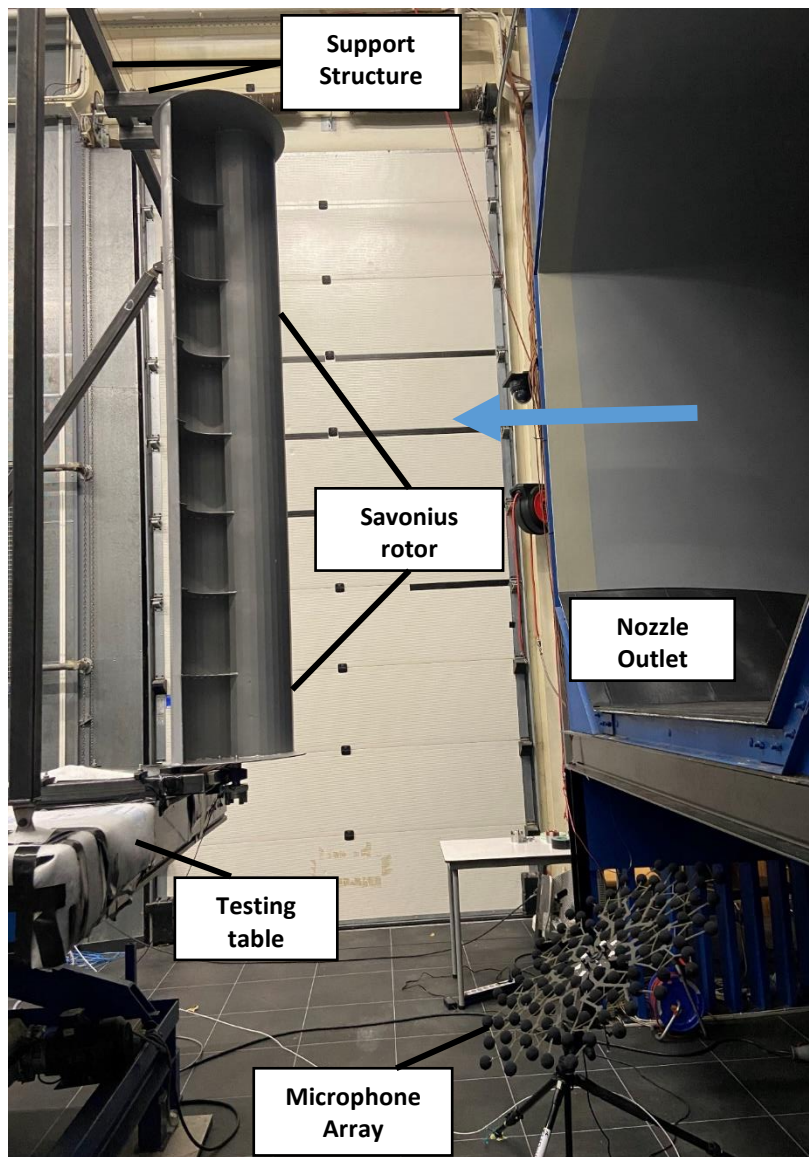


Figure 1: Experimental setup

The Power Spectral Density (PSD) of the signal is computed by applying the Pwelch method using a window size of 8192\*2 and an overlap of 50%. The noise levels in dB/ hz and their corresponding frequencies are available in the data files attached.

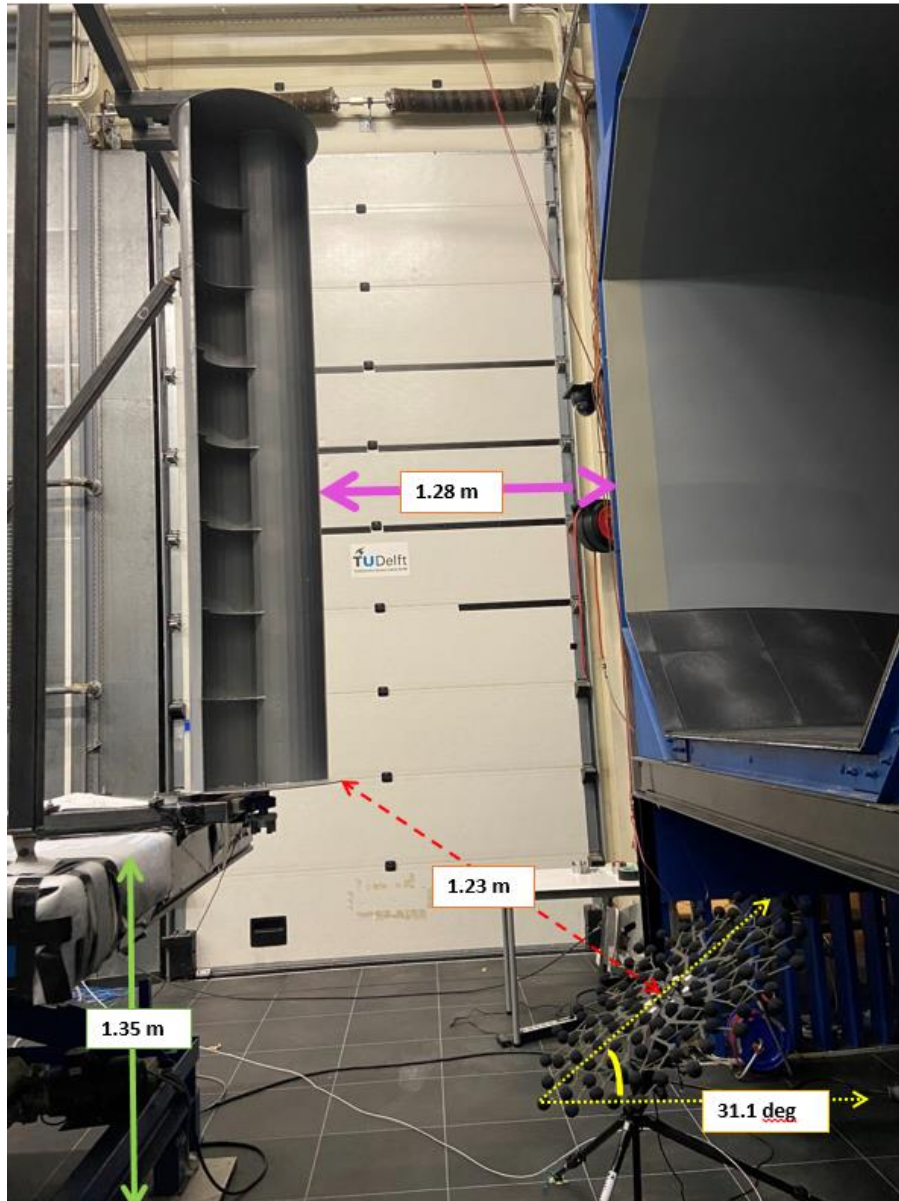


Figure 2: Relative positioning of equipments.

The results of the power characteristics and noise levels recorded have been uploaded as separate files. Data related to the background noise measured has also been attached. Refer to ReadMe file for an explanation of file names.

