



Assessing the acoustic impact of wind turbines and 'best practice' for conducting noise surveys.

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Assessing the acoustic impact of wind turbines and 'best practice' for conducting noise surveys.

This document aims to provide guidance on how to compare the noise from a wind turbine against the background noise on a particular site. It also proposes wording that might be used by a local authority to set the criteria against which a planning application is assessed.

INTRODUCTION

If a noise survey is required to assess the impact of a wind turbine against the background noise conditions on a particular site, the following guidelines should be followed.

Wind turbines produce low levels of noise at the beginning of their operating range and higher levels of noise as wind speed increases. Background noise levels also increase as wind speed increases. The increase in noise comes as a result of the interaction of wind with all structures and foliage.

The specific noise level of a turbine is therefore less relevant than the increase in noise that can be heard above the background levels.

It is important to measure the background noise levels on a given site at a range of times of day, and during conditions that are representative of the operating range of the wind turbine.

MEASUREMENTS

Background noise levels and wind speed measurements must be gathered in tandem to allow a comparison between background noise and turbines' noise levels at different wind speeds.

Background noise measurements should be taken over a period of time that enables sufficient noise data to be gathered. The range of wind speeds where noise measurements are taken should reflect the operating range of the wind turbine as far as practical. In order to gather background noise levels at higher wind speeds (up to 8, 9 or 10 m/s), sufficient time should be allowed to gather the range of measurements necessary, typically 14-21 days ^a.

Wind turbines models vary in their operating ranges. However undertaking background noise measurements between 3m/s and 8, 9 or 10m/s would be usual. Measurements above 10m/s become increasingly difficult to obtain as typically the number of hours per year at these wind speeds are very small.

a. : 14-21 days is an estimate of the likely time to achieve a range of wind speeds, however it is completely dependant on the weather and longer periods of data recording may be required.

STANDARDS

- BS 4142:1997 ^[1] states that noise measurements are taken in conditions that reflect the operation range of the noise source, i.e. generally at wind speeds between 3 and 8, 9 or 10 m/s for wind turbines.
- For measurement of background noise levels, BS4142:1997 states the components of the measuring system shall conform to type 2 or better of BS EN 61672-1 ^[2].
- Wind speed data should be gathered using an anemometer calibrated to relevant national standards.

NOTE: In practice this means that the measurement time interval should be days not hours, in order to gather sufficient relevant noise data. If the above section of BS 4142 is NOT followed it will render the background noise testing irrelevant.

SUGGESTED PLANNING CONDITION WORDING:

1. Site specific noise measurements are to be taken in accordance with BS 4142:1997, with specific note of section 7.1.4
2. Background noise levels are to be measured over a range of wind speeds that are representative of the turbine operating range, e.g. 3m/s to 9m/s
3. Upon assessment of background noise, wind turbine noise levels should be:
less than or equal to the background noise level as measured at the exterior of a noise sensitive location (e.g. a bedroom window), or, where this condition can not be fulfilled:

less than or equal to 45 dBA as measured at the exterior of the nearest noise sensitive location ^[3].
4. Noise measurement instrumentation to be in accordance with type 2 or better of BS EN 61672-1

REFERENCES

[1] BS 4142: 1997 – *Method for rating industrial noise affecting mixed residential and industrial areas*. Section 7.1.4 states “Measure the background noise level during periods when weather conditions are appropriate to the assessment similar to those which prevail when the specific noise level is determined, or are likely to be similar to those during the operation of a new or modified specific noise source”.

[2] BS EN 61672-1:2003 - *Electroacoustics. Sound level meters. Specifications*.

[3] World Health Organisation “*Guidelines for Community Noise*” 1999.