

LETTER TO THE EDITOR

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Wind Farm Noise - The Debate

The debate in Acoustics Australia has quite rightly continued; rightly because the debate has not reached a conclusion matching all the available information. In drafting this I found it easier to set it out as numbered points for which I hope readers will forgive me.

1. As an Applied Physics student I was taught that theory and practice always agree - if theory and practice do not agree then it is the theory that must be modified. In conformity with this concept we should not declare a design or calculating procedure as correct until community subjective responses agree with predicted response.
2. That we have people who benefited financially from their agreement to allow wind turbines on their land abandoning their homes because they could not stand the noise strongly indicates that the theory used to predict a noise climate acceptable to residents needs modification.
3. I note there are AAS Members who, at hearings, are happy to advise that compliance with legislated or established design criteria will be safely achieved (and undoubtedly will); but do not comment on the likely actual acoustical amenity potentially affected residents are likely to have to live with.
4. I note that the noise climate that matters most is that at the resident's ears when he/she goes to sleep. This noise level is dependent on the sound insulation of the home; and highly dependent on room geometry and location of the bed. I have measured very high low frequency sound levels at trihedral corners of rooms, and in the middle of small rooms like toilets relative to centre of room noise.
5. I believe that when an AAS Member is giving expert evidence, he or she should advise the court or panel not just of the external noise level to residences when calculated in accordance with recognised procedures relative to established limits, but also on the likely noise inside the residence(s), and the likely response disinterested people would have if they lived in the potentially affected residences.
6. A "Sound Jury" has been successfully and rightly used to establish relationships between subjective response and character and magnitude of noise, such as car drive-past, or office air conditioning, etc. The results of such experiments are relatively easily replicated by others and a consensus reached as to what constitute acceptable design noise limits for those circumstances.
7. The sound jury approach cannot be used to establish acceptable noise limits as regards the limits of acceptable character and magnitude of noise wind turbines as received inside and outside homes cannot be easily done because:-
 - a. The assessment as regards acceptability of the potentially disturbing noise is a judgement of what can be lived with and needs time for assessment relative to the various normal home activities and conditions such as windows open or closed, occupants studying, sleeping or other activities.
- b. The sound level and character vary significantly from room to room and with position in the room, generally having much higher low frequency sound levels at the bed head position in the corner of the bedroom; thus assessment should not be based on a single position in a room.
- c. Existing residents are not disinterested and hence likely to be biased if used as part of the sound jury, if alternatively non-residents were to act as members of the sound jury, they would need to live in a potentially affected "test" houses for a time (2 weeks?, 6 weeks?) for acclimatisation before the turbines run and a similar time? for acclimatisation with the wind turbines running.
- d. The sound source (the wind turbine noise) cannot be altered in sound output magnitude, and character in a controlled manner; excepting by pitch angle changes and braking to some or all of the turbines.
8. Having established acceptable internal noise character and magnitude limits it would be necessary to establish by test on various home designs and constructions how the free field external noise relates to the internal sound levels.
9. AAS Members may have noticed The "Weekend Australian" for February 9-10 2013 had a prominent article in the centre of page 9 titled "Wind-weathered residents await turbine test"; and a bigger article on page 17 titled "World's eyes will be on Waterloo as turbines go on trial". The text informs of the forthcoming investigations by the South Australian EPA of noise associated with wind turbines, perhaps for the first time measuring sound levels at low frequencies and with it organised that wind turbines can be turned off and on so as to distinguish turbine generated sound from other environmental noise under various wind conditions.
10. Measurements necessary to assess compliance or otherwise in accordance with standardised or legislated procedures may take a month or more of multi-band recording and analysis perhaps during more than one season but would allow potentially excessive noise to be measured where it is heard. One difficulty may be the need for absolute silence by the residents
11. The work proposed above might hopefully give us all a better idea of what aspects, characteristics and magnitudes of noise from wind turbines, as heard inside dwellings, is disturbing.
 - a. Just imagine that we had a large enough sample and

enough measurements and analysis to reasonably say what was unreasonably disturbing to 1%, 2%, 4% and 8% of people living in their home and exposed to 'Wind Farm' noise within their dwelling.

- b. Further imagine that from the large sample we, as acousticians, did establish what measurable magnitudes and attributes of wind turbine noise contributed to a resulting 1%, 2%, 4% and 8% of the potentially affected population.
- c. Finally imagine the responsible body established noise measuring and analysis procedures and limits for assessment of compliance of wind turbine noise that was directly and only related to the assessment of wind turbine noise within dwellings.

In summary I believe that it behoves us as acousticians and AAS Members when acting as experts to be

- a. Clear and candid in our evidence and admit the facts that many residents have complained bitterly about the adverse effect of the noise from the wind turbines

when located at distances and circumstances so as to be in accordance with currently established procedures.

- b. It also behoves the member to state that the current state of acousticians' knowledge does not guarantee freedom from disturbance to all potentially affected residents at some or the most of the time.

Finally an AAS Member should be wary of relying on their own judgement as their hearing may be much dulled by city living, they should remember the story of an investigation into intrusive noise by a Melbourne consulting firm; the two acousticians being totally unable to hear any disturbing noise conducted a test with one acoustician in the factory and the other in the house; the dear old lady could tell the acoustician the machine is on or off as the case was before radio contact was made; such can be the difference in the acuity and "tuning" of ears.

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