

LETTER TO THE EDITOR

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Response to article by S. Cooper, "Wind farm noise - an ethical dilemma for the Australian Acoustical Society?", *Acoustics Australia* 40(2), 139-142 (2012)

I wish to respond the strident criticism of Steven Cooper's article published in *Acoustics Australia* Vol. 40, No. 2, pp 139-143 (2012). It is disappointing that the respondents, all senior members of the AAS, seem to have misunderstood Mr Cooper's article and appear to have responded in an ill considered fashion and not in the context of ensuring that the profession ensures that the issue of noise from wind farms is properly and adequately considered in the same manner as noise from other sources has been in the past.

The main points of Mr Cooper's article are:-

- that there has been insufficient study conducted on the effects of wind farm noise to enable the profession to confidently and adequately walk the fine line between balancing the competing needs of the community to have productive industries without paying too high a price in environmental impact.
- and
- that published assessment criteria are being used to make evaluations of community impact which based on the existing available information seem likely to be flawed.

Mr Cooper is also concerned, quite rightly in my view, that the un-certainty in the prediction of human response that results from a shortage of detailed and reliable scientific knowledge is not acknowledged in the assessment documents. If an uncertainty arises due to a lack of scientific evidence it must be considered by the assessors of the application in accordance with the requirements of the Environmental Planning and Assessment Act [1] and the relevance and application of the "Precautionary Principal" must be evaluated. If a technical assessment document does not disclose uncertainty then the planning assessor would correctly accept that there is no significant uncertainty in the outcomes expressed in the technical assessment. In the case of Industrial Wind Turbine farms the acceptance that there is no significant uncertainty would be erroneous at best and there may be some potential for any consent based on such a noise impact assessment to be found to be invalid. Given the nature of the planning review system it is likely that an invalid consent may not be identified or determined by court until after the IWTs are constructed. The consequences of an invalid consent for the client of an acoustician who made the assessment upon which planning consent is invalidated are truly terrifying.

It seems beyond dispute that the community has a high level of concern with wind farm noise. A recent health study by Nissenbaum et al. [2] clearly indicates that there is much work yet to be done in understanding the human response to Industrial Wind Turbines (IWTs).

Participants living near IWTs had worse sleep, as evidenced by significantly greater mean PSQI and ESS scores [Table 3]. More participants in the near group had

PSQI > 5 ($P = 0.0745$) and ESS scores > 10 ($P = 0.1313$), but the differences did not reach statistical significance. Participants living near IWTs were significantly more likely to report an improvement in sleep quality when sleeping away from home.

This study supports the conclusions of previous studies, which demonstrate a relationship between proximity to IWTs and the general adverse effect of 'annoyance', but differs in demonstrating clear dose-response relationships in important clinical indicators of health including sleep quality, daytime sleepiness, and mental health. The levels of sleep disruption and the daytime consequences of increased sleepiness, together with the impairment of mental health and the dose-response relationships observed in this study (distance from IWT vs. effect) strongly suggest that the noise from IWTs results in similar health impacts as other causes of excessive environmental noise. The degree of effect on sleep and health from IWT noise seems to be greater than that of other sources of environmental noise, such as, road, rail, and aircraft noise. Bray and James have argued that the commonly used noise metric of LAeq (averaged noise level adjusted to human hearing) is not appropriate for IWT noise, which contains relatively high levels of low frequency sound and infrasound with impulsive characteristics. This has led to an underestimation of the potential for adverse health effects of IWTs.

It is also clear from the recent Australian experience (there is an active Senate inquiry) that there is a reasonable level of good quality well informed community engagement in the debate.

In the *Acoustics Australia* journal special issue on wind turbine noise, Cooper et al. [3] recommends that AS 4959:2010 [4] be revised as soon as practical because of error inherent in the modelling process specified in the standard.

Articles by Tonin [5] and Evans and Cooper [6] provide information determined from predictive noise models that are only defined over the range to 63Hz to 8 kHz, but Doolan et al. [7], Tickell [8] and Thorne [9] clearly show substantial sound generation below 20 Hz with the BTI frequency in the range 0-5 Hz with multiple harmonics above that.

Despite claims to the contrary, good quality, well informed community engagement is often not truly welcome either by a proponent industry or their consultants as it makes the path to development approval far more testing that it might otherwise be.

I have long been concerned with the effects of low frequency noise (LFN) on the general public and the fact that

there are many areas where there is potential for the impacts to not be adequately recognised or assessed because guideline documents are either too narrow or out of date because science and engineering have moved ahead of the guideline.

In my opinion the ultimate responsibility rests with the professional in the technical field and I am disappointed to note that Dr Tonin's response [10] suggests that an acoustician should simply follow a guideline to adequately assess a noise impact. While guidelines are very useful tools, it will never be the case that guidelines are either completely comprehensive or completely up to date. Also while it may be the case that a planning authority may reject an application because it has not adequately covered the information sought in a planning assessment guideline, it will never be the case that a planning application is rejected because the acoustic assessment examined additional information above and beyond that which is included in the guideline.

It may, however, be the case that the additional information provides a basis on which it may be decided that a development application should not be approved, but that is no reason for a professional to simply ignore that information and only address what a guideline may request.

It would not be the first time that the acoustics profession has become lazy or complacent and followed a flawed guideline only to pay the price in increased claims and insurance premiums. The recent history of changes to the Building Code of Australia comes to mind.

I think it extraordinary that Dr Tonin has so misread Mr Cooper's article that he considers Mr Cooper is accusing consultants of being pro or anti a particular form of development. It is quite clear that Mr Cooper is translating a view he considers is present in the Wind Turbine industry not one that he considers is present in the acoustics industry.

On the other hand Marks et al. [11] have quite clearly grasped the issues that Mr Cooper is seeking to bring to the attention of society members but for reasons that mystify me seek published interpretive guidance from the AAS on how to apply the code of ethics to the practice of environmental noise impact assessment.

In my view the key element of Mr Cooper's concern relates to the diligent compliance by members with Item 1 of the Code of Ethics "Responsibility". The code of ethics already contains a set of explanatory notes as to what this means for members of the society and it is very clear that the "health and welfare and safety" of the community is to be paramount in the conduct of members. If there is any lack of clarity in a members mind as to what this means in their day to day work then I would suggest that they are either already in breach of their ethical duty or are not fit to be full members of the society.

In considering Dr Burgemeister's response [12] I am led to consider that Mr Cooper's concerns may indeed be valid. Dr Burgemeister makes the point that he has never consulted to any part of the industry or community but has conducted a desk top review of the available information. He goes on to make the point that guidelines and criteria are not perfect and that he considers that consultants are doing their best to make a fair and reasonable assessment given the limitations under which they work. He quotes numerous works that provide

information on the assessment of wind farms and makes some technical criticism of Mr Cooper's measurement techniques.

Eventually Dr Burgemeister gets to, what I think is the heart of the problem, and that which Mr Cooper has sought to bring to our attention. That the demographic and psycho-acoustic studies necessary to enable society members to confidently and accurately "protect the "health and welfare and safety" of the community do not presently exist and neither do reliable measurement methods or guidelines.

The situation appears to be as follows:-

- Mr Cooper has identified that some of the submitted environmental impact assessments do not contain an adequate description of the potential impacts on the community (as distinct from a compliance with a guideline that is recognised by all to be imperfect) and neither did they contain a statement as to the level of uncertainty about the impacts brought about by the shortage of the necessary psycho-acoustic studies.
- Dr Burgemeister agrees that the necessary information is not available but believes that consultants and engineers are "trying their best" to get there.
- The Code of Ethics requires that community "health and welfare and safety" is paramount and it requires society members to avoid work that would cause conflict with that that pre-eminent requirement,
- The Planning and Assessment Act in NSW requires the application of the "precautionary principal" which stipulates that "a lack of scientific certainty may not be a premise for granting planning approval for a project"
- Marks et al. do not know what to think and want the society to bail them out, and
- Dr Tonin seems to have completely missed the point.

In reviewing my own work I often ask myself the question:- *If, instead of being an acoustician, I was a structural engineer designing a difficult new bridge in uncertain conditions or an aeronautical engineer designing a new passenger aircraft - am I satisfied that my assessment of the design is good enough to avoid failure?*

I find this question, if answered honestly in the context of a development assessment, can be very enlightening.

In my view the Society is firmly on the horns of a 2000 kg (about the size of a fully grown bull for you city folk) ethical dilemma.

Given that renewable energy in the form of Industrial Wind Turbines is not necessarily something we must have now, it is extremely disappointing that senior members of the society have failed to take up the opportunity to press for greater funding for research into the effects of wind turbines.

The current state of uncertainty surrounding methods of assessment, acceptable sound levels, and human response requires that members involved in the development assessment of Industrial Wind Turbines should ensure that any work they conduct fully examines and documents all of the potential issues, and clearly states any uncertainty or unknowns that result from the work. Acoustic assessment reports should not recommend approval for a development while the situation remains unresolved but should properly describe the known outcomes and discuss the issues associated with the unknowns

or the poorly quantified. The proponents of the developments need to be required to ensure that adequate research work is conducted in this area until the questions surrounding human response and appropriate measurement methods are resolved to a satisfactory level.

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