Acoustics Bulletin Vol 38, No 5.

Wind turbine noise. Good Practice Guide – 'the good and the bad'

In the last issue of Acoustics Bulletin Richard Perkins reported on the presentations at the meeting in Bristol on 21st May. Regrettably I was unable to attend the meeting in Bristol so I did not hear at first-hand what I am told was a "lively discussion".

I have written at length in this publication and elsewhere of my concern that the IOA should not have taken on the writing of the GPG on the terms agreed with DECC – particularly the ban on consideration of the limits. Richard's comments at the Wind Farm meeting in January 2012 that the work of the group "would be in vain if government did not feel they could endorse it at the end of the day" expresses a position that I do not feel the Institute should be proud of and will leave a perception in some minds that we are not independent. I am disappointed that the Institute does not feel strong enough professionally to take on a technical task that might result in some criticism of government guidance. Indeed I am disappointed that the Institute is not up in the front helping formulate government policy on noise. The noise limits for wind farms are in need of fundamental review. Until they are looked at properly there will be no consensus on how we can progress renewable energy of all kinds in a sustainable way.

But enough of that. What of the GPG and, since there was a lively discussion, some of the criticism?

Technically the document will be very useful and should reduce considerably the number of disputes on technical matters in wind farm applications and at public inquiries. I have already quoted it in several reports dealing with wind farm noise assessments. In two public inquiries, to my knowledge, inspectors have come back after an inquiry is finished and asked for comments from the parties on how the GPG might affect the evidence already given.

2.2 to 2.5 of the GPG provide very helpful clarification of the background noise measurement procedure. In the past this has often been a source of argument at public inquiries. In some cases the background noise levels have been rejected as being unreliable and, in at least one case, a public inquiry has been adjourned to allow for proper background noise levels to be established. These sections should minimise such argument. Section 2.6 gives detail of wind measurement procedures. It is particularly useful in starting to ensure wind measurements are as accurate as the sound measurements. Up till now, there has been no control over the accuracy of the wind measurement and few ways of checking whether it is reliable. 2.7 to 2.9 also clarify the position by tightening up the requirements for data collection.

Section 3.1 expands on ETSU-R-97. In particular it expands the use of directional analysis. This has arisen in public inquiries in the past and this section formalises its use. Section 4 establishs the procedure for turbine noise prediction. This is largely a confirmation and an extension of a procedure already used in most noise assessments – but not all – and it will formalise the position and hopefully reduce debate on specific projects. The one criticism I have is that the matter of "warranted" noise levels should have been better clarified. The use of "warranted" levels was found to be inadequate following the "Bulletin Article Method" in 2009 and though there is some more explanation it is still not adequate.

Perhaps one of the most useful pieces of analysis is section 5 which discusses the contentious area of cumulative noise. Whilst it offers little in the way of solutions that is not a criticism because, as many of us have discovered there is no solution in many cases. Interestingly we may be about to get a policy decision from both Scottish and Westminster governments on this as Harelaw in Scotland is to be decided by Scottish Ministers and Turncole in Essex has been recovered by the Secretary of State because of the importance of the arguments to government policy. The main arguments in both cases were cumulative issues, though not only in the case of noise.

But what of the GPGs deficiences. The biggest is the loose drafting which will inevitably result in arguments about, not the technical content, but the interpretation. At consultation stage I suggested it was far, far too long. Even though it is now half the length it is still far, far too long. The longer it is the more difficult it is to draft it tightly and unambiguously. Let me give a few examples of what I mean:

> The excellent section 2.5 is spoilt by the wording of the first paragraph – "the following guidelines are offered:" Offered? Does this mean "for your consideration"? Why can it not say "We recommend that:" or "Best practice is:"
>
> 3.1.20 says *Where a noise limit is required at higher wind speeds; it should be restricted to the highest derived point*. A dispute as to what this means has already arisen at public inquiry in June 2013. What the GPG says is that the noise LIMIT should be restricted to the highest BACKGROUND NOISE LEVEL – not to background noise plus 5dB. Does it really mean this?
>
> 3.2.4 records current practice in establishing day time limits. Does this mean current bad practice or good practice – it does not say, it only says what current practice is. Indeed some of it is contrary to ETSU-R-97 so presumably it is bad practice. If the GPG is not going to make a positive recommendation then it should say nothing.

Finally, let me deal with what appears to be the main objection. This is the introduction of the "standardised" 10m wind speed instead of the "measured" 10m wind speed for background noise. As I understand it REFs objection to the wind shear method (which was first put forward in the Bulletin Article in March/April 2009) comes from Mike Stigwood's analysis. In principle he argues that the "article" method gives less protection than the "ETSU" method. I'll come to that in a minute but the main point in making the change was to put right something that was technically and scientifically inaccurate.

Turbine noise levels are plotted against standardised 10m wind speed because that is how their sound power levels are described under IEC61400. In other words they are plotted against the hub height wind speed divided by a fixed figure dependent on the hub height. So five or ten years ago, when we plotted turbine noise and background noise on the same graph, the turbine noise was plotted against **standardised** 10m wind speed but the background noise was plotted against **measured** at 10m. In high wind shear conditions, as Mike Stigwood rightly points out, the measured 10m wind speed might be 3m/s but the standardised 10m wind speed might be 5m/s - we had apples and pears on the X-axis – so the two curves simply could not be compared. Hence, the GPG proposes that background noise should be plotted against "standardised" wind speed so that it relates properly to the turbine noise plot and so we only have apples on the X-

axis. Of course the group could equally have changed the turbine noise to measured 10m wind speed and left the background noise at measured 10m so they only had pears on the X-axis.

Mike's argument against this can be found on his website and a summary is at:

http://www.masenv.co.uk/uploads/Summary%20ETSU%20IoA%20article.pdf

Mike perpetuates the original scientific inaccuracy. Let me refer to Fig 3 in his summary. He shows a curve for turbine noise limit plotted against wind speed. Presumably it is 10m wind speed though it does not say. If it is he does not say whether it is measured 10m wind speed or standardised 10m wind speed. That is convenient because the green broken line assumes the X-axis is measured wind speed and the blue broken line assumes the X-axis is standardised wind speed. He has apples and pears on the X-axis so technically and scientifically it is wrong – the green and blue lines simply cannot be compared.

Does the GPG method give worse protection to residents than the "ETSU" method? The situation is that the "ETSU" method understated protection when wind shear was greater than the standard wind shear of about m=0.16. This is just the same as ETSU understating impact when background noise is less than the average background noise. The GPG method understates protection when the wind shear is greater than the **average** wind shear during the monitoring period. In effect the wind shear is averaged together with the background noise level. Whether that is the right or wrong way of doing it is another argument.

In conclusion, as far as it goes, the GPG will make a helpful contribution to good practice in turbine noise assessments. It will prevent some of the commonest arguments at public inquiry – or at least make it clear which party is right. Unfortunately I think the loose drafting will introduce a different set of arguments about interpretation and eventually the question of limits will have to be addressed.