NINTH INTERNATIONAL CONFERENCE ON WIND TURBINE NOISE

REMOTE FROM EUROPE - 18TH TO 21ST MAY 2021

POST CONFERENCE REPORT

Well, a very different conference this year. The first Wind Turbine Noise Conference in remote format, though not the first in that format that INCE/Europe has done.

Of course, it goes without saying that its not the same as a physical conference. There are no meetings in bars and coffee shops and introducing colleagues to old friends over a meal. The time differences can be challenging for some of you. In spite of that, comments from you have been overwhelmingly positive and enthusiastic. Yes, there are downsides, but there are advantages as well. Many people came who would otherwise have been unable to and many of those were young people just starting up in the industry.

We were part of the International Year of Sound which, because of the pandemic, is now extended to 2021. There are still lots of meetings that are part of International Year of Sound that are still to come. Most immediate as I write this, the ASA conference this week and ICBEN2021 next week.

A few statistics. 190 delegates from 27 countries. Those outside Europe were dominated by the Americas, perhaps in part at least because we made the decision early on to do the sessions in the afternoon to reflect the fact that there were many authors from that part of the world. It was very encouraging to see so many people attending each of the sessions; we had expected that the proportion of delegates would be quite small because everybody had the opportunity of watching recordings at a time more convenient to themselves; however we had generally between 120 and 150 of the delegates attending in each session.

Source Noise

Not so many papers this year on source noise perhaps in part this was because the pandemic has disrupted research in some universities and elsewhere, and we missed some of our regulars. But some good solid work and a useful discussion. I pressed for a session on large blades because there seems to be disagreement as to whether there are particular issues with large blades beyond simple size. In particular whether the thickness of the aerofoil and higher Reynolds number make changes to the turbulent flow that are significant. The discussion was not particularly conclusive in this respect but large blades certainly bring challenges.

Propagation

There is still some interesting work being carried out on propagation. Much of this is by consultants who perhaps have the opportunity when compliance testing. Most of the work shows that the modelling most of us are using seems to work well though there is still pressure from manufacturers and developers for more accuracy. There may be need for more work still on propagation across water, refinement of upwind propagation and more generally better prediction in meteorological conditions other than downwind.

In addition under this heading we had a presentation by Kristina Conrady about low level jets and wind maxima explaining how these metrological phenomena influence the propagation of turbine noise.

Regulations

It is interesting that regulations do not get much attention at most of these conferences. There were three papers this time. A lot of discussion around what level and what parameter to use to set limits but whether that will lead anywhere is difficult to see; politically any changes to national limits are too hot a topic.

There is a lot of work being carried out around reducing turbine noise at source and also on modelling propagation more accurately. None of this will help wind farm neighbours because noise levels at neighbouring properties will be determined by the local regulation. Quieter turbines just means more turbines. Modern turbine control systems mean that it is possible to control turbines in different wind conditions so that the noise level at any point is as close to the maximum permitted as possible.

Measurement and Assessment

A busy session this year. The presentations were very varied from the development of the new IEC TS 61400-11-2 to the attenuation of turbine noise through open windows. The discussion was equally varied, straying into suitable parameters for assessing wind turbine noise with particular emphasis on Lden. Lden, as used by WHO in the European Guidelines in 2018 is not much liked by consultants or perhaps by most people in the industry as a measure for turbine noise. I must say I sympathise.

Tonality

There was a larger than usual turn out of papers on tonality this time. These ranged from the psychoacoustics of tonality to the specification of standards to assess tonal noise. There were some interesting comparisons of methodology for assessing tonal noise. Although tonality in turbines seems to be much less common than it used to be it still comes up as a problem in some instances.

Amplitude Modulation

The issue of amplitude modulation varies from conference to conference. Sometimes it appears to be of particular importance and other times not so. Unlike tonality where well defined assessment techniques have been available for some time the assessment of AM is at an earlier stage. Nevertheless such techniques are moving on and we can see a pattern emerging in defining its severity. On the whole the issue does seem to be more widespread internationally. Whether this is because of the increasing size of turbines or not is a matter for debate.

Infrasound

The issue of infrasound does not seem to go away in spite of the fact there is clearly no evidence that it has any direct impact either on the health of people near wind farms or

on their perception of the noise. It is kept alive by a relatively small number of people in and outside the industry none of whom have recently attended our conferences.

Perception and Health

The formal session on perception and health had four papers covering a number of the issues involved. There was an excellent wide ranging discussion, some of which was centred round whether it was reasonable to have a criterion that was based on 10% of people being highly annoyed – or whether annoyance should be the measure anyway. How much noise should be considered on its own when it is known that other factors strongly play a part in annoyance. Should distance be used as a criterion? There was also significant discussion about sleep disturbance and further testing needs.

In addition we had other parts of the conference where the perception of wind farm noise was dealt with including a conversation between Frits van den Berg and two wind farm neighbours who explained their subjective perception of the noise. Frits also had a conversation on the day before with two members of RWE who explained how they were attempting to get wind farm neighbours involved at the planning stage of a wind farm. There were two examples of apps being used to try to monitor wind farm neighbours experiences in real time.

Opening and Closing

We had opening and closing sessions in which we had an informal chat – in the first to get people talking together and to meet old friends and new delegates. In the closing session we talked about how future conferences might be run.

On the second day the IEA Task 39 group also explained to us the progress they were making on Quiet Wind Turbine Technology.

Networking

Finally we experimented with networking hosted by www.wonder.me using a virtual meetings room where people could gather in groups. Many people seemed very pleased with the experience although only a small proportion of people seemed to use it.

WTN 2023 - Themes

My predictions of where we are heading or where we ought to be going to in terms of research and knowledge have rarely turned out to be correct in the past. Nevertheless that won't stop me trying.

Here are a few thoughts of what we need to address between now and 2023:

> Amplitude modulation seems still to be an issue and while Mike Lotinga's paper summarises what we know about the impact, perhaps we need other work to confirm his conclusions.
>
> Mainly, I would like to see more on regulations and compliance testing. It is proper regulations that will protect people while still allowing development. Compliance testing for wind farms has always been challenging but with

modern turbines having sophisticated control systems that challenge gets greater.

And, of course any other subjects that are useful to further the knowledge of Wind Turbine Noise.

Any feedback will be welcome – good or bad. Please contact me through the contact page at www.windturbinenoise.eu

Dick Bowdler