



WIND TURBINES

Etsu drafts reveal secrets

A response to a heavily contested Freedom of Information request claims to reveal that the Government suppressed warnings that wind turbines designed to Etsu guidelines would cause noise nuisance.

Campaigners against the Den Brook wind farm in Devon used the Freedom of Information Act to extract unpublished draft copies of the 2006 Hayes McKenzie report. This report was commissioned by the DTi to investigate claims that wind farms produced low frequency noise (*Noise Bulletin Aug/Sep 2006 p1*). It claimed that there were few problems.

There was some disquiet about this report, further aggravated by a report from Salford University that claimed that wind farms produced insignificant noise. The Salford report prompted resignation of wind expert Dick Bowdler (*NB Aug/Sep 2007 p1*) and Freedom of Information requests to extract Salford's supporting evidence (*NB Feb/Mar 2009 p3*).

Now Freedom of Information requests have been used to reveal the early drafts of the Hayes McKenzie report into amplitude modulation (thumping). The requests were made in July 2007 and DECC,

which took over wind power from the DTi, initially refused to hand over information. In the event the Information Commissioner forced it to – albeit accompanied by just a handful of emails that claim to cover the entire period of Hayes McKenzie's contract.

The drafts claims to show that the consultant suggested lower noise limits than recommended by Etsu if noise disturbance was to be avoided. Etsu guidelines on wind turbine nuisance are under fire for being unsuitable (*NB December p3*) but so far the Government has refused to update them.

• More detail: see page four

COURTS

Wind farm consented: tough conditions

The hotly-fought Den Brook wind farm in Devon has been approved at planning appeal – albeit with many conditions.

Den Brook protester Mike Hulme has assumed a high profile in recent months fighting the plans for nine 120m tall turbines and has recently succeeded in a Freedom of Information request which undermines official Etsu guidance (see news, above).

But days after that success, he heard that Den Brook would be approved.

The inspector's report shows much legal argument and uncertainty on the issues of wind shear, amplitude modulation and the inadequacies of Etsu guidelines. Conditions – considerably more detailed than in previous inquiries – are intended to

compensate for that uncertainty. This is despite the inspector acknowledging that Etsu suggests that the need to regulate noise emissions from wind turbines is too complicated to be the subject of conditions.

The inspector noted: "Largely as a result of the complexities involved, the draft conditions are painstakingly elaborate, but in my view their acknowledged necessity by the developer does not inspire confidence.

Etsu is questioned in the judgement: "The parties are effectively in agreement that the utility of Etsu is questionable in some respects, and I have also been quite critical in a number of respects.

"I conclude that the possibility of a greater than expected impact from amplitude

modulation would be possible. In circumstances where the result of unforeseen consequences is sleep disturbance, I am in no doubt that, in the event of the appeal succeeding, a condition to regulate the phenomenon is both necessary and reasonable.

"The developer objects in principle to the inclusion of a condition designed to regulate amplitude modulation on the grounds that excessive amplitude modulation is rare; stable atmospheric conditions are rare at the appeal site; it is not recommended in Etsu; and there is insufficient knowledge to achieve the necessary balance between the preservation of amenity without causing profound damage to the

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Excess wind

This is a magazine about environmental noise, but news is random and sometimes one issue dominates – for this Jan/Feb edition it's wind and we've had to go to 14 pages, our biggest ever issue!

• Next issue early March.

Scots turbine noise

Scotland appears close to adopting similar noise restrictions on wind turbines and heat pumps as in England.

In a report just released, the Scottish Government outlines its thinking on permitted development rights for domestic wind turbines and air source heat pumps. Last month DCLG launched a consultation in England that promoted a 45dBA number which has inflamed campaigners (*Noise Bulletin December p1*).

In England early work on noise nuisance suggested level of 37dBA, arguments then centred on 40dBA as the level of protection, with experts warning that 40dBA would lead to problems, now 45dBA has been chosen. This is despite successful nuisance actions against installations at less than 45dBA.

Scotland is suggesting, for both domestic wind turbines and air source heat pumps, the criteria: "Noise at nearest neighbours' curtilage of less than 45dBA and less than 30dBA within any neighbours' room by Microgeneration Certification Scheme calculation method".

DCLG is consulting on the criteria: "The noise level must not exceed 45dB LA_{eq,5m} at 1m from the window of a habitable room in the façade of any neighbouring residential property (but ignoring the effect of that façade)."

• Permitted development rights: Domestic wind turbines and air source heat pumps can be viewed on www.scotland.gov.uk/resource/Doc/296738/0092262.pdf

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IN BRIEF

Motorsport meet

The Institute of Acoustics is holding a motorsport noise meeting at Silverstone on March 18th. It will explore the need to balance car enthusiasts' expectation of hearing vehicles roaring along the track with the needs of neighbouring residents.

● www.ioa.org.uk/events

Sentinel launch

Brüel and Kjær has released *Noise Sentinel*, an internet based subscription service for urban and industrial noise monitoring.

B&K says *Noise Sentinel* has applications in any industry that makes significant noise in the community and is required to report compliance with noise regulations, such as mines, ports, industrial premises, power stations, wind farms and large construction projects. "The service-based approach takes care of the complexities of maintaining a robust and defensible noise monitoring regime. *Noise Sentinel* does not impact on your resources and frees you to focus on your core business."

It continues: "Until now, the only practical approach to managing compliance with noise regulations has been for organisations to purchase noise measurement equipment, software and training and utilise existing resources to operate the equipment on an ongoing basis. This requires a degree of expertise not normally found within most organisations. With *Noise Sentinel*, Brüel and Kjær removes the problems and deliver tailored noise compliance reports."

Noise Sentinel is web based and shows the current real time noise situation, alerts the operator to any threshold exceedences and delivers regular noise compliance reports that are tailored to your legislative requirements. At any time, any particular noise situation can be investigated in detail through ad-hoc analysis.

● Doug Manvell, B&K, email: dmanvell@bksv.com

LICENSING

Live music – more complaints

Proposals to allow pubs and bars to put on live music without the need for a licence could lead to a massive increase in noise problems, council leaders have warned.

The Department of Culture Media and Sport (DCMS) has launched a consultation into plans to exempt small live music venues from the Licensing Act 2003 provisions. The proposals would scrap the licensing of live music performances for 100 people or fewer provided they were held inside.

The Local Government Association said: "The size of an audience is not a good way of judging the likely impact of an event. There could be considerable noise and disturbance from a heavy metal gig attended by only 20 people at a local pub, while an

audience of 250 listening to a jazz band in a remote village hall could create minimal difficulty.

"Common sense measures to allow venues to put on live music with a minimum of bureaucracy are already in place and make further amendments pointless. Resisting the badly thought out plans for new exemption rules are not about automatically saying 'no' to live music. Councils want to be able to say 'yes', confident that local people have been considered as part of the process."

The LGA group argues that further changes to the 2003 Licensing Act are unnecessary. Venues that want to have live music in the background rather than as a main attraction are able to make use of the 'incidental music' exemption. Councils are also making

businesses more aware of new rules which mean they can add live music to existing licences very simply. The 'minor variations' process allows bars and clubs to add entertainment to their licence by filling in an application form and putting a notice up outside for ten working days, which the licensing authority responds to within 15 days. The process makes it easy for venues to introduce live music but allows consideration of what impact there might be for people living nearby.

The LGA has polled council licensing officers and found nine out of ten think proposals to relax the rules for venues would lead to an increase in complaints about noise and nuisance. More than half said they expected the increase to be considerable.

PLANNING

Turbine noise not harmful

An expert panel review of wind turbine noise, brought together by the North American wind industry, has concluded that noise isn't a problem.

The Canadian and American Wind Energy Associations convened experts, including the UK's Geoff Leventhall, to carry out a literature search. They said: "There is no evidence that the sounds, nor the sub-audible vibrations, emitted by wind turbines have any direct adverse physiological effects on humans."

Key findings include:

- The sounds emitted by wind

turbines are not unique. There is no reason to believe, based on the levels and frequencies of the sounds, that they could plausibly have direct adverse physiological effects;

- If sound levels from wind turbines were harmful, it would be impossible to live in a city given the sound levels normally present in urban environments;
- Sub-audible, low frequency sound and infrasound from wind turbines do not present a risk to human health;
- Some people may be annoyed at the presence of sound from wind turbines. Annoyance is not

a pathological entity.

The report continued: "For more than thirty years, people have been living near more than 50,000 wind turbines operating in Europe and the more than 30,000 in North America. The vast majority of people have had a positive experience living near wind turbines, with no ill effects."

● *Wind turbine sound and health effects: An expert panel review* can be viewed on the association websites www.awea.org/newsroom/releases/AWEA_CanWEA_SoundWhitePaper_12-11-09.pdf

MOTORSPORTS

Noise from off-road motorbike events

Lacors is seeking feedback on motorbike event noise nuisance.

It has received a report of an increase in the number of organised off-road motorbike events and an associated rise in noise complaints. It explains: "Planning legislation permits landowners to use their land for such purposes up to 14 times a year and we understand that

proving a statutory nuisance can be problematic, particularly when the event only occurs two or three times per year.

"We would appreciate feedback from officers on:

- Whether their authority has been a rise in the number of these events?;
- If yes, has there been an increase in complaints?;

- What approaches have been taken to address this problem?;
- Is there any action the authority wishes to take, but cannot at present?;
- What changes would be required to make this possible?

● Any comments please email cassandra.harrison@lacors.gov.uk

IN BRIEF

WIND ENERGY

IPC starts to list applications

Details of applications for major projects are beginning to appear on the Infrastructure Planning Commission's website.

The IPC is taking over handling of planning permission for major projects as enabled by the Planning Act. This aimed to streamline procedures to allow fast tracking of important projects, but has been criticised for diluting local objections and removing nuisance safeguards (*Noise Bulletin December 2008 p5*).

Supporters of the changes say that bringing together major projects under one roof, and requiring developers to report on environmental impacts at the application stage will make the

planning process more transparent.

The list of new IPC projects seeking approval includes wind farms, incinerators and roads.

Sir Michael Pitt, IPC chair said: "The IPC's programme of projects is continuing to grow. I would urge the public to keep track of the projects being proposed for their areas."

He continued: "The new process for deciding nationally significant infrastructure projects provides three stages at which the public can have their say, including the Government's policy consultations, the promoter's consultation, and to the IPC by written representation and at its open

floor hearings."

Promoters must carry out extensive consultation with local communities prior to submitting their applications to the IPC. For many of the proposals included in the IPC's programme of projects, the promoter's consultation processes are already well underway.

People also have the opportunity to have their views heard through written representations and at open floor hearings chaired by IPC Commissioners.

● Infrastructure Planning Commission website <http://infrastructure.independent.gov.uk>

MONITORING

Online monitoring scheme on offer

Online noise monitoring is now possible as Brüel & Kjær has developed a high-speed, web-browser functionality for its family of hand-held analysers.

This allows operators remote control access to the instrument – or instruments – from a mobile phone, PDA, iPhone or internet PC.

It enables the user to monitor prevailing noise levels in real-time, manage the measurement setup and retrieve measurement data, thereby keeping the operator in touch with their measurements at all times. Because the remote-connection functionality is hosted in the instrument, the user does not need any special software installed on their PC or phone. Any web browser can access the remote instrument without any complex setup.

Brüel & Kjær's meters are simply required to be active on a wireless or WLAN connection or available on the internet via a 3G, GPRS, EDGE or GPRS router connection.

Applications can include:

- Concert organisers can have shared public access to the live display of the analyser for much quicker response when monitoring noise levels at music and sports venues;
- Automotive engineers carrying out roadside noise assessment no longer need to actually be next to the road when monitoring and managing measurements;
- Acousticians measuring building facade can control their meter remotely from inside the building whilst the sound level meter is outside;
- Construction teams can

utilise a number of instruments positioned around the perimeter of a building or demolition site for multi-point monitoring.

The 2250 or 2270 can also be configured to automatically send a text or e-mail status message when pre-defined conditions or events occur.

- www.bksv.co.uk

Free calibration!

Campbell Associates is offering to "calibrate your calibrator" free of charge when it is sent in with a sound level meter for calibration.

The offer is valid for equipment sent in before the end of February 2010 with promotion code CAL-C2.

- More details www.campbell-associates.co.uk

NUISANCE

Wind turbine separation distances discussed

A House of Commons library report has analysed the issue of wind farm noise and separation distances.

It explains: "People are often concerned that wind farms might be too close to houses.

There are no statutory limits in the UK."

It notes that in England separations distances of 350m are recommended, while greater distances are encouraged in Scotland and Wales. Scotland

suggests 2km separation, largely because of the visual effect, and Wales 500m.

● *Wind farms – Distance from housing* www.parliament.uk/commons/lib/research/briefings/snc-05221.pdf

Barking fine

A Rochdale man has been fined £450 after ignoring warnings to keep the noise down in his house.

Neighbours had complained about a barking dog day and night whilst chained up in the yard. He was given many warnings and finally an abatement notice which was then breached.

Meanwhile Rochdale council has also seized a woman's stereo and speakers following persistent complaints of noise nuisance. It will cost her £400 to get it back.

Royal Napier win

Edinburgh Napier University has been awarded the Queens Anniversary prize for its research on noise insulation.

The research led to the establishment of the Robust Details scheme aimed at improving the sound insulation performance of new homes.

Napier's research highlighted methods of dealing with sound transmission problems between buildings and ultimately allowed the development of a registration scheme and sound insulation 'pattern book' that developers could use to meet the standards set out in building regulations.

The scheme is now run by Robust Details Limited (RDL), it means builders registering their homes with RDL are not subject to on-site pre-completion sound testing.

RDL says: "The RDL scheme clearly shows how an efficient and effective industry scheme can be developed, removing the need for Government to impose prescriptive regulation. Ultimately, its success has been demonstrated by a huge drop in customer complaints about noise in new homes. Noise complaints in new homes, which had risen by 140% between 2001 and 2004, are now at their lowest level in eight years.

FOLLOWING ON FROM OUR PAGE ONE LEAD

Etsu undermined by disclosure (from p1)

Devon resident Mike Hulme has been actively campaigning against the Den Hulme wind farm but last month was told that the wind farm would go ahead (*see news, page 1*).

At the heart of his argument – and many others across the UK – is that Etsu guidelines on wind farm noise annoyance are outdated. Etsu guidelines were released in 1997 with the recommendation that they be updated within two years, the failure to update them forced an ad hoc working group to produce a non-official update last year (*Noise Bulletin January 2009 p4*). Despite this unofficial update, Government still says that Etsu guidelines are robust (*NB October 2009 p3*).

Etsu allows a higher noise output at night and protesters say that at night, atmospheric conditions can lead to wind shear where calm conditions on the ground are matched by higher winds at height. This means that there may be no masking noise from wind at lower levels, but the turbines are turning because of higher speed winds further up.

Modern turbines are much taller than envisaged by Etsu and can set up amplitude modulation – beating – which causes annoyance at night.

Etsu’s robustness in this light is being heavily contested at planning inquiries with experts arguing the point. The likes of Mike Stigwood argue that Etsu underestimates noise disturbance, while consultant Hayes McKenzie – author of the 2006 report – is usually retained by wind farm developers to argue that Etsu remains appropriate.

It is therefore highly significant to the

Etsu argument if Hayes McKenzie did indeed suggest to Government in 2006 that lower noise limits would be needed to avoid nuisance. As a reminder of what the published report said, see box, below.

Emails written by Malcolm Hayes of Hayes McKenzie reveal that he believed that wind farms meeting Etsu guidelines at night (ie 43dBA LA90) would not breach low frequency noise guidelines but would make the noise audible within a dwelling: “If modulation is associated with the noise, then a lower level might be appropriate. If inaudibility is desired then a still lower level may be required.”

The FoI requests allows us to compare drafts – with editing comments in red (reproduced right & below) and final comments. It is noticeable how the draft comment “However, the presence of aerodynamic modulation which is greater than that originally foreseen by the authors of Etsu, particularly during the night hours, can result in internal wind farm noise levels which are audible and which may provoke an adverse reaction from a listener.” becomes “The common cause of complaint was not associated with low frequency noise, but the occasional audible modulation of aerodynamic noise especially at night.”

The recommendation that consideration be given to a revision of the night-time absolute noise criterion proposed within Etsu is lost altogether in the final draft.

Mike Hulme elaborated: “The drafts reveal that the final published report silently removed earlier recommendations

...and turbine noise within the bedroom which is of more concern to that occupant. A difficulty in returning to sleep will result in tiredness the next day and all the associated descriptions of ill health which might be associated with a lack of sleep – this sentence is dangerous and could be read that windfarms cause ill-health which is not the intention. We need the report to stick to the facts that LFN is below the guidelines but that once woken by a car there may be problems getting back to sleep for those with sensitive hearing as a result of the windfarm – something like that. [Personal Details/Name of official removed under Reg 12(3) of the EIRs] When the wind is blowing from another direction than the

that the night time wind turbine noise limit should be reduced from 43dB to 38dB (by way of a 5dB penalty), and, in the event that the turbine noise has a discernible beating character, the limit should be further reduced to 33dB.

Hulme added: “It is difficult to avoid the conclusion that the official was avoiding the commonsense interpretation of the Hayes McKenzie recommendation, namely that there was sufficient ground for a blanket recommendation to prevent any future wind turbines from causing noise disturbance, and seeking specious reasons for removing this measure.”

Hulme’s other observations are:

- Reference to WHO Guidelines and reducing Etsu limit removed;
- All suggestions present in the drafts that the existing Etsu limits should be revised were removed from the final report;
- Health comments removed.

Hulme added: “The recommendation that the indicative Government wind farm night time noise limits should be reduced substantially was made to the DTI in 2006. It is striking, and reprehensible, that this recommendation has only come to light more than three years later, and after a contested FoI request. In this time, further consents for wind farms have been granted, with the night time noise limits set at levels which Government’s own appointed acoustic experts had clearly stated would

To reduce the potential for such situations with future wind turbines, it is recommended that consideration be given to a revision of the night-time absolute noise criterion proposed within ETSU-R-97 and the development of an assessment methodology to take account of periods when high levels of aerodynamic modulation are found at a neighbouring receptor location. What will the impact of this be? [Personal Details/Name of official removed under Reg 12(3) of the EIRs]

Are we saying that this is the situation for all windfarms, just these a % only for people with sensitive hearing, a problem with older turbines – I think we need a sense of the scale of this and the impact. [Personal Details/Name of official removed under Reg 12(3) of the EIRs]

Backtrack: the 2006 Hayes McKenzie report on low frequency noise

In 2005 the DTI commissioned the Hayes McKenzie Partnership to investigate claims in the press that infrasound or low frequency noise from wind farms were causing health effects.

Its report was published in 2006 and concluded that there was no evidence of health effects arising from infrasound or low frequency noise generated by wind turbines (*Noise Bulletin Aug/Sep 2006 p1*).

The report went on to note that the cause of complaints was not low frequency noise or infrasound, but audible modulation of aerodynamic noise, i.e. aerodynamic noise which displays a greater degree of fluctuation than usual.

This aerodynamic/amplitude modulation was, in some isolated circumstances, “occurring in ways not anticipated by the government guidance document on noise from wind farms

known as ETSU-R-97”. The Government therefore took the view that more work was required to determine whether or not aerodynamic modulation is an issue which may require attention in the context of the rating advice given in the ETSU guide.

Within the conclusions of the Hayes McKenzie report, the following were identified:

- Infrasound associated with modern wind turbines is not a source which will result in noise levels which may injurious to the health of a wind farm neighbour;
- Low frequency noise was measurable on a few occasions, but below the existing permitted night time noise criterion;
- That the common cause of complaint was not associated with low frequency noise, but the occasional audible modulation of aerodynamic noise, especially at night.

not protect the sleep amenity of nearby neighbours.

“Furthermore, much time at public inquiries has been devoted to debating noise conditions to prevent nuisance from amplitude modulation. Had the information removed from the draft reports submitted to the DTI in 2006 been available to these inquiries different outcomes would have resulted, and public amenity been more adequately protected.”

Hulme points out that the Public Inquiry into the proposed wind farm at Den Brook closed on 26th October 2009, just one day before being notified this information was to be released to him. “This extended delay prevented me from using the information at the inquiry into the wind farm, noise from which is expected to erode the existing tranquillity of my property.”

What does the Government say about this? A Parliamentary question was tabled asking: “On what advice the maximum permitted night-time noise from onshore wind turbines was set at 43dB; when this limit was last reviewed; and why the recommendation in the 2006 draft report by Hayes McKenzie Partnership of a reduction in the sound level was rejected?”

The Government replied: “The 43dB night-time limit in the Etsu guidance is derived from the 35dBA sleep disturbance criteria referred to in PPG24. An addition of 10dBA was made to allow for attenuation through an open window, and 2dB subtracted to account for the use of LA₉₀ rather than LA_{eq}.”

“In relation to the Hayes McKenzie research, the reference to the decibel levels was not included in the final report because the consultants decided that referring to a specific level (as in the first draft of the report) did not reflect the terms of reference of the study.”

Noise Bulletin believes the terms of reference of the study were to:

- Assess the levels of noise within the complainants dwelling house;
- Determine these levels in comparison to existing guidance concerning low frequency noise emissions;

- Assess possible causes of low frequency audibility within the dwellings;
- Provide guidance to future wind farm developers to minimise the risk of future developments causing the alleged low frequency noise problems.

And Hayes McKenzie? What are they saying? Well they wouldn’t answer our questions. We made do with a response put into another ongoing wind inquiry in which the firm said: “On the basis of the analysis and the circumstances which were experienced at each of the three wind farms at which these measurements were performed, a discussion was undertaken within the draft reports as to the potential measures which might be considered to minimise or eliminate complaints due to amplitude modulation.

“During the final drafting process, we undertook a review of our draft recommendations with respect to whether the measurements demonstrated that the guidance noise limits contained within Etsu for night-time operation, when background noise levels are low, were the cause of these complaints or whether this was an issue connected with the character of the wind farm noise.

“The purpose of the low frequency noise study was not to consider whether the night-time noise limits were appropriate. If so then the study should have been carried out in a completely different way, including measurements at sites where no complaints had occurred and sites with low levels of amplitude modulation. The three specific sites were targeted precisely because it was alleged that low frequency noise was a problem. No such additional measurements were ever undertaken of wind farms from which no complaints had been received.

“Therefore, it was considered that the discussion of the night-time noise limit was inappropriate for these reasons:

- The final report issued by ourselves took account of the evidence which was available, i.e. this was a study into alleged low frequency noise and not whether the night-time noise limits were appropriate. If such a study were to be undertaken, then

control groups would be required which did not form part of the study undertaken for our low frequency noise investigations;

- In the absence of any evidence, as described above, we considered that any such recommendation to reduce the night-time noise criteria was scientifically invalid. What was found, i.e. amplitude modulation, was recommended for further investigation which resulted in the forming of a working group which commissioned further work from the University of Salford.

Already protesters are using the information revealed in the FOI request to challenge wind farm decisions. Mid Devon and North Devon councils, for instance, have asked that the planning inspector considers the latest evidence for current Devon wind farm appeals.

The Rural Exmoor Alliance (TREA) has also written to the inquiry inspector saying that Hayes McKenzie (which acted for the developer of the wind farms) “failed to disclose its considered view that the Etsu absolute night time limits are too high by some 5dB LA₉₀” and “agreed noise conditions on the basis of ETSU limits which they considered too high”.

Developer Airtricity angrily intervened after proceedings closed: “The TREA submission is considered to be insulting to a professional consultancy and its principals, with an established reputation in the field of noise impact assessment. Airtricity deprecates the deliberate attempt by TREA to undermine the good standing and reputation of the Hayes McKenzie Partnership (HMP) in the knowledge that closing submissions to the inquiry have already been delivered. It will be recalled by the inspector that counsel for Airtricity observed that either or both Mike Stigwood or TREA appeared to be pursuing a vendetta against HMP, and this most recent action appears to support that submission.”

Elsewhere protesters against turbines at Glyndebourne say: “Had this information not been suppressed by a government department it is extremely unlikely that approval would have been granted for the Glyndebourne turbines.”

Den Brook agreed with conditions (from p1)

UK wind industry.

“In my opinion these misgivings are either overstated or misleading. I do not see that the rarity of the circumstance constitutes a valid reason to object to such a condition. If it is unlikely, then it is equally unlikely that it would be necessary to enforce the condition.

“On the basis of the evidence I have heard I am satisfied that the phenomenon is not fully taken into account in Etsu and the condition proposed is of a precautionary nature. I would have more sympathy with the developer’s view had the purpose of Etsu been merely the preservation of amenity, but it is not. From the viewpoint of

wind farm neighbours the most important purpose of Etsu would be more accurately described as the preservation of sleep. Taking account of this and the uncertainties to which I have already referred, it is for these reasons that in my opinion the imposition of conditions is both necessary and reasonable.”

The condition on amplitude modulation reads: “At the request of the local planning authority following the receipt of a complaint the wind farm operator shall, at its expense, employ a consultant approved by the local authority, to assess whether noise at a dwelling is characterised by greater than expected amplitude

modulation. This will be deemed greater than expected if the following characteristics apply:

- A change in the measured LA_{eq 125} milliseconds, turbine noise level of more than 3dB (represented as a rise and fall in sound energy levels each of more than 3dB) occurring within a two second period;
- The change identified above shall not occur less than five times in any one minute period provided the LA_{eq 1min} turbine sound energy level for that minute is not below 28 dB;
- The changes identified above shall not occur for fewer than 6 minutes in any hour.
- Email NB for a copy of the decision.

Excellence awarded

People, firms and products were rewarded at last month's John Connell Awards administered by the Noise Abatement Society. Lis Stedman reports

This year's John Connell awards once again saw a wide range of initiatives take their turn in the spotlight alongside – as a Noise Abatement Society 50th anniversary special – an elite group of individuals whose outstanding contribution to the field of noise abatement was rightly honoured.

The Noise Abatement Society John Connell Local Authority Award was won by the **London Borough of Haringey**, whose enforcement response Team focussed on two particularly complex and sensitive but often connected issues: noisy residents living in temporary accommodation and noise caused by people suffering from mental health conditions, learning disabilities and severe social problems.

Haringey is a busy, diverse borough with around 200 languages spoken, and handles over 9000 noise complaints a year – the second highest number of any borough in the country. Team leader Derek Pearce says that the team is “very, very pleased to have won – it has raised the profile of the work we have done throughout Haringey. It first came about by team members talking to each other at team meetings, identifying the different cases involved.

“People in temporary accommodation, for instance, may not feel a responsibility to their neighbours or have a deep-rooted commitment to the area, so when there are problems they are more difficult to solve. Alongside this we realised that there was often a connection between noisemakers in temporary accommodation and mental health problems of one sort or another.”

Haringey realised that prosecution was not a solution and so adopted an innovative, highly-tailored approach that takes account of the individual circumstances of each case and engages the residents involved as much as possible when investigating noise nuisance complaints made against them.

Derek Pearce notes: “Playing music very

loudly, for instance, might mean someone's mental health had deteriorated and that their monthly or bimonthly meetings with their careworkers were not enough, they needed more help. We tried to build as many links as we could particularly with Social Services, and the NHS.”

The team liaised with a range of outreach services targeted at the varying needs of these vulnerable people including the outreach service team, which offers support to disadvantaged households; the Antenna Outreach Service, a mental health service targeted at 16-25 year olds; and the Association for Independent Living, a voluntary organisation that helps people with learning disabilities to access housing within the community.

“Historically they might have received a warning, an enforcement letter and prosecution,” Derek Pearce notes. “But this doesn't take into account their individual circumstances.”

In making the award the Noise Abatement Society said: “We applaud their truly outstanding holistic approach – to not only go beyond the symptoms and solve the root issues of noise nuisance in their community – but to prioritise the need for customised sustainable solutions to support the underlying needs of the vulnerable and marginalised.”

The three highly commended councils were **Kirklees Council** for its partnership solutions to noise problems, **Stockton-on-Tees BC** for its new out of hours noise service and **Westminster City Council** for its proactive noise team.

Kirklees environmental services team manager Wendy Blakeley explains that the department “recognised that several of the noise problems we deal with were being dealt with by a wide range of agencies. We recognised that if we worked with them we would come up with more efficient solutions.”

For instance, the department worked with the police to curb offroad motorcycle noise and noise from sound systems in cruising cars. It also created an “environmental crime toolkit” that set out the council's powers in relation to a wide range of issues so that its partners were aware of its remit, and included contact details to ensure the department could be

involved as needed.

It also takes part in Operation Focus, which aims to tackle antisocial behaviour in various localities. Blakeley explains that every month a different locality is chosen and all of the various agencies, such as the police, environmental services, environmental rangers, housing officers and the fire service, concentrate on the area for two days to raise awareness of what they can do and the issues. “We try to be more proactive,” she notes. “We have an environmental health officer who works part time for ourselves and part time for the antisocial behaviour unit, which helps us to work better to achieve solutions,” she adds.

The department also works with the council's licensing officers on noise issues relating to late-night opening of public houses, and speaks to owners to ensure they are aware of their own responsibilities under their licensing conditions. This inclusive approach entailed, in one instance, involving a brewery to try to resolve an intractable noise problem at a pub that eventually resulted in the closure of the premises.

The department has also worked to empower local residents by partnering with a local community mediation service – if both parties in a dispute are willing to go to mediation, the council will fund this process. “If a solution can be reached between residents we find it is quite effective.”

Stockton-on-Tees BC's award was also for developing a multi-agency partnership, this time to provide a proactive, innovative out-of-hours service. EHOs, security centre control officers and uniformed council enforcement officers are working in partnership to provide a 24/7 service to the area.

The service was on a “wish list” for several years, with funding finally agreed for the 2008/09 financial year and the challenging and complex setup was scheduled over a tight three-month timescale. Much research was required to identify potential needs (such as protective equipment) and staff requirements, and the chosen staff had to be trained – not least to work well together despite their very different ways of working. After resolving a myriad of challenges, of 33 local authorities that responded to a survey, it was found that just three provided a similar service, with Stockton providing more coverage per head than any of these.

EHO Stephanie Landles says: “We are really pleased with the award because it recognises all the hard work put in by the environmental health unit and our partners to deliver a quality service for our



Haringey's team won a John Connell award

residents. We are passionate about noise and our service and will seek to develop it further over the coming years.”

Sharps Redmore Partnership won the John Connell Innovation Award for the evolution and design of a noise management and control process to enable the Brit Oval cricket ground to host floodlit evening cricket matches during 2009, including the World Cup Twenty20 series.

The challenge involved resolving a key feature of these floodlit games: short bursts of music played at critical moments such as the fall of a wicket (“Another one bites the dust” being a favourite). Some residents nearby expressed serious concerns about noise disturbance, particularly those nearest the ground who were just 20m from the nearest speakers. The project manager, Sharps Redmore’s Clive Bentley, notes that “it was a very interesting project and we are very honoured and very pleased to be given the award”.

The difficult challenge given to Sharps Redmore was to enable the sound in the middle of the crowd to be at a suitably exciting level (around 80dB LA_{eq T}, where T is the period of the music) while simultaneously meeting a challenging London Borough of Lambeth target limit of 67dB at the nearest window. “We had to hit that 67dB level from any part of the event, with buildings 15m behind the stand. Physics-wise it seemed to be impossible.”

Ultimately, after considerable discussion and trial, a highly-directional line array speaker system from Denmark was chosen. The Oval’s speaker suppliers adjusted the output from these so that a relatively high level was achieved in the stand, with relatively little spillage offsite. As the directionality of these speakers reduces below 200Hz further adjustment was needed, so the outward-facing pitch-side speakers were used to provide a bass boost without the higher frequencies, while the inward-facing stand perimeter speakers were rolled off below 200Hz. Not only this, but Bentley notes that “the guy who does the announcements had such a dynamic range in his voice that we had to compress it”. This painstaking work enabled sound levels outside the ground to be reduced by 10dB, ensuring that the matchgoers were happy and the residents undisturbed.

Arriving at such a highly-tailored solution was inevitably challenging given the complexities of noise propagation in a vast three-dimensional stadium. Bentley notes: “A year ago we were out in the snow trying different speakers, with different frequency ranges for the different subsets.”

Cooperation included liaison and development with Arteis UK, the speaker suppliers and sound system operators K2B, and IoA training of an Oval worker to take noise measurements.

The Silent Approach award winner was the **Olympic Delivery Authority (ODA)**’s Code of Construction Practice, which was developed in conjunction with the Environment Agency, EHOs, British

Waterways and key government and local organisations.

The Code of Practice supported the ODA’s vision of delivering “an exemplary sustainable development and meet one of their six key sustainability objectives set out in their strategy: to ‘optimise positive and minimise adverse impacts on land, water, noise and air quality’.”

ODA environmental manager Richard Jackson says the ODA entered for the award “because we feel noise is a really important area for us in terms of environmental management”.

Highlights of the environmental controls include off-site construction of pre-fabricated materials; reducing the number of lorry movements to the site; a target of 50% of materials by weight to be transported to site by rail or water; noise screens around static plant; the use of hydraulic pile croppers instead of pneumatic breakers; extensive use of white sound broadband reversing alarms and use of auger piling or vibro-piling instead of traditional percussion piling.

Jackson explains that there are a number of sensitive receptors around the high-profile site, such as schools, which meant that a lot of importance has been placed on noise reduction. “That’s why we’re pleased we have won the award.” The ODA is trying to lead the way, he adds, setting an example for other projects.

A great deal of emphasis has also been placed on ensuring that the ever-changing and wide range of contractors on site reduce their noise levels too – the ODA Code of Practice (which was a requirement of planning permission) has been incorporated into the contractors’ contracts. “For instance, concrete slabs have been removed by diamond drilling to split them, which is quieter, rather than demolition, and we have required plant to use directional reversing alarms.”

He adds: “We are pushing the industry to reduce noise and to think about this before they start work.” To ensure the high aims translate into operational practice, a team of onsite experts review the contractors’ environmental management plans and check the site on a regular basis. “They ensure people are not just paying lip service to the code,” he notes. A series of noise-awareness communications have also been issued to contractors to ensure the issue remains at the top of their agenda.

The ODA also liaises closely with EHOs from the four local authorities whose remit its vast site lies within – Tower Hamlets, Waltham Forest, Hackney and Newham, having monthly meetings to run through the results from the noise monitors that are stationed all round the site.

In this category, the **London Borough of Islington**’s construction impact noise monitoring officer was highly commended.

The Noise Abatement Society also made a series of special 50th

anniversary awards to individuals – some extremely well-known names: **Max Dixon**, Bureau Veritas’ **Stephen Turner**, HACAN Clearskies’ **John Stewart**, SenterNovem’s **Robert Goevears**, and a surprise award to IoA president **John Hinton**.

Hinton, presenting these awards, said of Max Dixon: “In a career spanning 40 years, whether on the local or world-wide stage, wherever noise is being discussed this gentleman will be there offering sage advice, brokering solutions, offering a list of ideas which will make a palpable difference to noise mitigation be it from aircraft, neighbours, buildings or vehicles. He is a quiet force majeure.”

The multi-talented Dixon was responsible for preparing and implementing the first citywide noise strategy in the UK: he was in charge of developing and implementing the Mayor of London’s Ambient Noise Strategy ‘Sounder City’. “This was the first of its kind, marking a fresh start in UK noise policy,” Hinton noted.

Dixon, having taken early retirement, is planning to venture into independent consultancy. He calls the award “extremely gratifying”. On wider issues, he warns that in terms of the future “noise is at a crossroads. It has got huge potential with more momentum on the health side with night noise guidelines and soundscape research.” He notes that the latter “is not just about landscapes” but the whole future of acoustics and intelligent sound source recognition. “All of these things are becoming available but need more research effort.”

He warns of the “obvious threat to all noise professionals in the public sector of the contraction in public expenditure over the coming year. There will be huge pressure on people in these areas to make the case for the importance of noise services to ordinary people. Getting through this period is vital.”

Dixon also says that “professionals have got to make the wider link with climate change and have a more positive attitude to environmental policy in general. The link between the climate change debate and soundscapes is important – reconnecting people to the richness of the sound world and reconnecting with the natural environment, which we all need to do if we are going to make the adjustments to tackle climate change.”

● continued page eight



Sharps Redmore were recognised for the Oval

● from page seven

John Connell awards (continued from previous page)

He urges: “We need to make the case for noise resources not just in terms of individual purposes, which continue to be enormous, but the need for systems for people to tackle these problems and for links to wider environmental issues. We must make sure that noise resources survive the recession.”

Another recipient of the individual award was Stephen Turner, of whom Hinton said: “He has spent the last 30 years encouraging practitioners in the noise field to think about what they do and how they do it. His ethos has moved others away from the assumption that noise assessment is no more than a black box into which data is put, a button is pressed and analysis produced.”

Among Turner’s many posts and achievements, he is a vice-president and fellow of the IoA, and chairman of the joint Institute of Acoustics/ Institute of Environmental Management and Assessment working group on noise impact assessment. His extensive experience is focused around environmental noise in general and aviation noise in particular, reflected in his appointment by the DfT as a peer reviewer of the ANASE study. He was also an expert witness at the Heathrow T5 inquiry, and produced and steered the publication of the Code of Practice on Environmental Noise at Concerts.

Turner says modestly that he has “managed one or two things” in his career and that the award is a “great honour and privilege”.

HACAN’s John Stewart also won an anniversary award – he has been memorably described by *The Guardian* as “a one-man eco industry” and in his citation as “a great eco-warrior, he has spent the best part of his life campaigning to protect a quality of life that was being eroded swiftly by large and thoughtless development.

The citation added: “As Heathrow’s only full-time, and paid, watchdog, he is credited with assembling over 10 years of possibly

the most formidable coalition ever formed against any single building project in Britain.”

Stewart notes that “I don’t see myself as having that great a knowledge of noise, but perhaps [the award] was for the campaign. I was very pleased to get it”.

His focus now is on the next government (with the forthcoming election very much in mind), noting that the current government has been “very disappointing” on noise. “We are disappointed that Labour did very little on noise – it almost set the noise agenda back. They didn’t make it a priority, or a priority for local authorities. As a result noise problems have not been dealt with and people’s quality of life has suffered.” He hopes that a focus on noise issues will fit with the Conservatives’ “quality of life” agenda.

John Hinton himself was the surprise recipient of the last of the anniversary awards – described by Bob Russell as “an industry stalwart, having worked on environment noise management and control for nearly 35 years for Birmingham Council – just taking early retirement this summer”.

One of Hinton’s main achievements during his years at Birmingham was the production of the first ever comprehensive city-wide noise maps, which encouraged Europe to push forward with proposals to require all member states to produce noise maps and then action plans.

The citation said of Hinton: “Hardworking, resolute, visionary and committed, he has been the backbone of the noise industry for a generation. Engaging stakeholders on the widest possible platform and moving forward policy and the noise agenda from which the next generation will build, to him the industry owes a debt of gratitude.”

Hinton himself says that he retired when he did mainly “because it was a good time to go. The first round of noise mapping is more or less complete and the first round of action planning is also more or less complete.”

His other work chairing the EEA Expert Panel on noise finished at the end of the

year. “This has already contributed a lot to how the common calculation method for the next round of noise mapping can be developed.”

He notes that “We achieved something in the first round and moving on to the second round is a good place to stop, unless I wanted to go on for another five years.”

He notes that “some people think the action planning is not very ambitious, but when I was at Birmingham City Council, before we knew how the government was going to implement action planning and involve the councils, when we tried to turn our noise maps into action plans we came up with the same approach.”

Taking the top 1% is a “manageable amount”, he explains. The council found little scope to reduce speeds, and as most of the roads involved had fairly low speed limits anyway, low noise surfaces would not have been effective and barriers were often impossible to retrofit, so a decision was taken to create a fund to improve insulation in the worst affected dwellings, phased over a number of years. “There is a finite cap on the budget, and that is really what Defra has said though not in so many words.” It may be disappointing he notes, but from his own experience he sees it as a “stepping stone in the right direction”.

He is looking forward to the Common Calculation Method as he notes that the first round of mapping noise exposures “was not comparing like with like”. He adds: “We need transparent and accurate data, and hopefully we will have this in the second round.” With the next round requiring mapping for agglomerations down to 100,000 population he notes that it “wouldn’t surprise me if some member states say they will just map the whole country to the same standard, as it’s easier to do that than bit by bit”.

Hinton’s own future is still busy – he is president of the IoA till the next AGM in May and then has a year as immediate past president. “I like to think that as Gary Lineker said it is best to get out while you are at the top,” he jokes. Somehow it is hard to imagine him hanging up his boots just yet.



This year John Connell included awards for people: left to right Max Dixon, John Hinton, Stephen Turner and John Stewart

Euronoise overflows!

Lis Stedman and Lisa Russell conclude their coverage of the huge Euronoise conference. Last month we covered many topics discussed – here are short news reports from the rest of the conference

Smoking ban affects residents

Scott Lothian of Napier's Building Performance Centre focused on the smoking ban (introduced first in Scotland, in March 2006) and noise effects on residents.

The presentation looked at the results of an investigation into noise complaints from residents living near licensed premises during the second year of the smoking ban, across a sample of urban and rural areas of Scotland.

There were suggestions that there had been a significant increase in the number of noise complaints to local authorities following the introduction of the ban – there were reports that complaints in Edinburgh doubled, but no real investigation to verify this or analyse the complaints in any detail. In fact, the Napier research proved that the recorded number of complaints was significantly fewer than reported in the media.

The study also found that smokers congregating in groups

of six or more, often in "surges" during breaks in live televised sporting events, were most likely to trigger complaints, as was noise breakout from doors being opened, which was attributed to pub-goers going outside for a smoke, sometimes even leaving the doors ajar.

The most common noise source complained about was vocal – sudden, raised voices, including laughing, shouting and singing.

Most complaints were extremely local – from people within 20m of the noise source (70%) and most were from city-centre flats (though this is not surprising as flats comprise nearly 40% of the housing stock in Scotland). Pubs were the biggest culprits, with night clubs much lower down the list – possibly, Lothian speculated, because they tend to be further away from residential dwellings.

Complainants tended to describe a fairly quiet

background noise, against which the smokers' noise stood out. Where noise breakout from doors was the source of complaint, the vast majority of culprit premises only had a single door rather than a lobbied entrance. This suggests that creating a lobby could potentially reduce noise breakout, Lothian observed.

Noise tended to be clearly audible whether complainants had single or double glazing, suggesting that it was the sudden step change in noise that proved a trigger for complaints. People were most susceptible to noise problems when they were trying to get to sleep, he added.

Lothian suggested solutions including adding a lobby and removing outside seating to discourage groups of smokers from congregating, as well as limiting the number of people who can gather outside at any one time – though he added that the latter might be hard to enforce.

Sawn off night noise procedure for roads

Paul Bassett of Hepworth Acoustics presented a shortened measurement procedure for road traffic noise at night based on colleague Sue Bird's earlier work (hence the "revisited" in the title).

Land destined for development often requires an assessment of exposure to road traffic noise, he explained, but unless a site is secure 24-hour measurement is not possible. Attended monitoring is also labour intensive and costly, and potentially unsafe, hence the UK's shortened procedure for

calculating road traffic noise which requires measurements of traffic noise levels across any three consecutive hours between 10am and 5pm, which are converted to 16h L_{eq} by taking 2dB off.

There is no such procedure for evaluating night-time noise, however, so most consultants have developed their own. Hepworth examined two methods, and compared them to actual results. Hepworth's own method involved measuring the first or last three hours of the night-time period, which ad-

hoc comparisons with whole night data showed a reasonable amount of accuracy.

Sue Bird's method, based on examination of a great deal of data, concluded that measuring the first or last two hours and applying a correction factor gave a good representation of the eight-hour value. A major Highways Agency study with complete 24-hour measurements at around 90 locations proved the greater accuracy of this approach – method A tends to overpredict, Bassett noted.

IN BRIEF

Web surveys

Miguel Ausejo of Madrid Polytechnic University's Applied Acoustics Investigation and Instrumentation Group highlighted a Spanish pilot study whose relevance to the Environmental Noise Directive is that it says "action plans should be drawn up in consultation with the public," he pointed out.

"We are very focused on noise maps and sometimes forget what the public feels. The only way to know is by a survey – traditional paper or web-based."

There are a number of pros and cons to web-based surveys, not least that some age groups will be under-represented and others over-represented, he noted. But many internet surveys can be carried out over a very short period of time, and can be validated in real-time.

There were some interesting answers – people showed a significant preference for living in a cheaper, very quiet (40dB day and night) house than a more expensive, moderately noisy (60dB) one, for instance. It was also found that despite the inherent bias towards certain groups, the results from the internet and paper surveys correlated well.

The "willingness to pay" information also provided "very useful data to develop local action plans," Ausejo noted.

IN BRIEF

Train noise mapped

Over in railway noise SNCF's Arthur Pouzet demonstrated that it is possible for rail operators to take an interest in the noise their trains are making.

This painstaking project, which assessed over 70 commercial trains travelling at between 280kph and 325kph, produced train "noise maps" for various speeds that showed the major noise sources to be the pantographs, sidewalls, windshield wiper, equipment on the lowest parts of the coaches and the power bogies, with the focus changing as the train speed increased.

Sleep deprived?

Sabine Jenssen used a study of Eindhoven to look at the effects of long-term road traffic noise exposure.

The modern assessment of the study used very detailed noise exposure data and noise maps, and depending on the location and height of the dwelling, each was given a noise rating. Receptor points were based on the most exposed façade.

The Eindhoven study was a large, random project that questioned 18,000 people to determine socio-economic differences in health, with the baseline data collected in 1991. Noise levels at the houses in question showed a significant correlation with those who reported they were tired and not rested in the morning.

There was no significant relationship with other major life events, as might be expected, and Jenssen concluded that the research proved that night-time road traffic noise did have after-effects the following day, including the risk of getting up tired, though no apparent significant effect on the likelihood of taking sleeping tablets. "Noise plays a role among all the possible causes of sleep problems in the general population," she concluded.

Road noise

In the Road Traffic Noise stream, Acustica's Simon Shilton looked at the equivalence of road traffic noise assessments using various possible techniques including Harmonoise.

His basic message was that, given the huge numbers of people who live within the major EU cities for which noise maps and action plans have been drawn up, and DG Environment's review of the activities for the forthcoming second round of mapping, it is an appropriate time to assess the extent to which it is possible to undertake meaningful comparison of the exposure results from different agglomerations. He noted: "Comparability, equivalence and accuracy are not necessarily the same."

Shilton explained DG Environment had brought in the Joint Research Centre to investigate equivalence, and that member states had been asked to use its protocol and report the results, noting: "I have not seen any reports. There have only been seven responses discussing the issue – a lot of people are dodging it." No country did what JRC asked, he noted.

"None ran an equivalence protocol. They were asked and none wanted to know."

He highlighted the hazy definitions that bedevil the task of mapping – individual member states or local public bodies determine the definition of an agglomeration, and there are similarly conflicting ways to define major roads & railways.

Shilton concluded that "the JRC protocol suffers from imprecise description, there are aspects without guidance and uncertainty in application." The assessment of noise immission, undertaken by computer modelling, has also been subject to many factors influencing quality and giving uncertainty to the results. He noted: "The recent JRC report indicates that seven member states used only the interim methods, five used only national methods, and 15 used a mixture of interim and national methods depending on the area or source of assessment."

He added: "As to whether any of these methods are able to



demonstrate that they produce 'equivalent results' to the interim methods is presently unknown, although there is a question to be answered as to what the results from the interim methods actually are."

The recent JRC report on equivalence gave results for three software packages, running the same models, with the same interim methods, by the same user. Even so, analysis across the 1741 receptor locations showed an average 95% CI of 4.6dB, and a range of 95% CI of 0.2dB to 33.3dB.

"It's a big variation," he noted. His presentation underlined the many variations both within the modelling criteria and the software settings and usage that left the listener in no doubt that equivalence is a fair way off. He concluded ironically: "If you want to reduce noise – switch methods!"

Update on where we are with assessment

In the noise mapping stream, Stylianos Kephelopoulou and Marco Paviotti looked at the current state of play in developing the European common noise assessment methods.

DG Environment prepared a road map for the common assessment methods, Kephelopoulou explained. This identified and evaluated existing methods on the basis of a number of criteria such as the ability to consider differences in noise source amongst EU regions, features of which vary depending on local environmental factors including road and rail maintenance, specific regulations and noise reduction techniques.

Other criteria such as the ability to consider meteorological effects, ease of

implementation, availability free of intellectual property rights, integration of scientific evidence; the availability and quality of input data and the degree to which they fulfilled the requirements of the END were also used. Part of the assessment process was an extensive literature survey of existing source and propagation elements of methods from across Europe, the US and Japan.

The main candidate methods are Harmonoise/Imagine and Nord 2000 for road and rail noise, and ISO 9613 for industrial noise. For aircraft noise, AzB and ECAC-CEAC Document 29 Third Edition are being considered, and possibly the best of both may be integrated to ensure as many END requirements as possible

are met. An ad-hoc workshop will take place before the end of the year, Kephelopoulou said, to discuss this.

As four recently developed or updated methods – ASJ RTN 2008, NMPB 2008, RVS and Schall 03, fulfil most of the requirements, they will be considered as supplementing the process of developing the common assessment methods.

Between this November and April 2010 a draft of the common assessment methods for road, rail and industrial noise will be prepared, as will good practice guidelines for approaching and using the methods in relation to the target quality and input value requirements.

Reports will be available through the DG Environment website.

Mapping equivalence

Acustica's Simon Shilton asked some crucial questions on mapping equivalence: "What constitutes an equivalent result? The same number, or how it is generated?"

Comparable, equivalent and accurate are not the same thing."

Comparable results are needed, he stressed. "Can member states reliably say that it is noisier here than there?" he asked. "The answer is no."

At European Union level, he added, the results need to provide a basis for developing community measures to reduce noise emitted by major sources, and provide the evidence base for an overall health impact assessment of the worst-affected areas.

At a national or regional level there are various other policy aspects that may apply such as vehicle and tyre restrictions, traffic calming and national rail grinding strategies. At a local level, authorities or municipalities may have other requirements such as low emission zones, or road surface changes.

One key issue is that the

END left the definition of an agglomeration to individual member states, he noted. Some member states have long-standing and well-defined concepts of an agglomeration, whereas others only have a definition for EU strategic assessments.

Definitions include authority or municipality boundaries, urban areas, population density criteria and planning areas. This can lead to large differences in population density and distribution as well as variation in the inclusion of open spaces.

To illustrate the point he showed four options for defining the Belfast agglomeration, all of which would be valid within the END context, but which would lead to significant statistical bias in the exposure assessment.

There are similar discussions over identifying major roads and railways, he explained. "Should major road identification be based purely on exceedence of a stated flow threshold, regardless of road category? For airfields, what is a 'military movement?'" He added: "Everyone can choose

what they want to choose – it makes it impossible."

Shilton observed: "The models are never going to be perfect, they will always be a facsimile for reality – they have just got to be fit for purpose."

In reporting results, he added, populations are skewed into different categories simply because of the input data. "The simpler the input data the more it gets noisier," he noted. As an example he showed results from one highly-industrialised member state "which appears to be about the quietest country in Europe," with another block of results appearing to be from the noisiest state.

"The country in the middle is not the noisiest and the country on the left is not the quietest," he said. "They just made different decisions when making their maps."

His recommendations included a common definition of agglomerations; a common approach to data shortages, including guidance; verification and testing of software tools; and clearer guidance on population exposure assessment.

IN BRIEF

Alpine bike noise

The health-annoyance stream kicked off with Peter Lercher of the Division of Social Medicine in Austria's Medical University, Innsbruck, looking at a case study in resolving the problem of exposure to motorbike noise in otherwise peaceful Alpine residential areas.

Bike riding over Alpine passes has become very popular over the past decade, Lercher explained. Austria has 155 such pass roads, which are typically approached through quiet rural areas, which means residents are highly annoyed although the responsible agencies hesitate to apply curfews to protect them from excessive bike noise exposure mainly because they lack health data to justify it.

Although noise surveys show people are more annoyed by bike noise than ordinary traffic, no-one has created exposure-response curves and only a few experiments have tried to evaluate the evidence from surveys by psycho-acoustic means.

The university undertook a noise exposure survey in one such residential area, taking traffic frequency data over a period of two months and actual noise measurements at four roadside locations, as well as noise propagation calculations for the entire residential area.

Perhaps unsurprisingly, bikers were found to comply less with speed regulation than car drivers, and third octave analyses showed strong low and high frequency noise components, compared to cars.

"A penalty of 5dB(A) for motorbikes seems appropriate in public health assessments," Lercher noted.

Mapping may take place using 'clouds'

Acustica's Simon Shilton highlighted the advantages of SaaS (Software as a Service) as an answer to the increasing burden of noise mapping.

He noted that estimates suggest strategic noise maps were drawn up in the first round for 160 major cities across Europe, and over 85,000km of major roads. In the second round of mapping, to be reported in 2012, there will be twice as many agglomerations and between four and seven times the length of major road and rail mapped, he said: "Round one is pretty much finished – most people got through it okay, but the sting is in the tail...it is a significant challenge. The second round extends the challenge to cities without knowledge, inclination or funding to do this work."

There is a complex mix of associated activities, ranging from data collection and noise calculation to results analysis,

public dissemination and noise action plans, Shilton noted. "The first round was handled with tenders for every agglomeration. It could be challenging for a consultant, even across Europe, to deal with so many tenders."

Scalability becomes a big issue, he added, with such a large project: "The traditional approach to a noise mapping project does not fit the requirements. We need a decision support process." He noted that there is "lots of data, in different places, muddled and messy forms – it doesn't support quality or integration".

Chris Hoar, from NGIS China, then expanded on the mapping work that has been undertaken in the region. The web-based system is based on client-server technology, and its purpose is to estimate the improvement in the calculated noise exposure of the population. The software is

clustered with a constructed 3D model server to present the existing noise exposure, determine noise impacts and deploy solutions such as noise barriers and quiet road surfaces by "point and click". He added: "I took the Lambeth noise data last night," showing a similarly impressive map built in an evening for London's Lambeth area. "It shows you how quickly you can build the detail." He added: "We thought it would be ideal for SaaS."

Software as a Service (SaaS), Shilton went on to explain, is a hosted web service that leverages HPC cluster and cloud computing technologies.

Add-on services such as data preparation and processing and quality assurance can be encompassed, and the software has flexibility and scalability beyond that of conventional solutions, while being accessible to multiple stakeholders.

IN BRIEF

Is simple better than accurate?

In the Soundscapes – urban stream, Dick Bowdler gave a lively presentation while wondering aloud whether he should be in the soundscapes stream. He made a convincing case for simplicity in day-to-day acoustic consultancy or, as he argued, consultants should use “the level of precision to fit the job”.

As an example he produced a noise assessment report written for a client in south east England who wanted to sell a parcel of land for housing – “In all, the report was 120 pages, with figures, all traffic flow data for 12 years, a list of references and a glossary,” he added. A delay in the planning application meant that two years later a further report was needed – this time, Bowdler said, a second consultancy produced a report that was just three sides of paper in length.

“The landowner wants to sell the land at the best price and needs an acoustic consultant to provide a clear description of what the builders need to do to insulate the houses against noise. They didn’t need flows.” All the builders need to know, he explained, was how much they would have to pay for sound insulation.

“Two reports – one precise and useless for what the client wanted, one approximate and exactly what they needed,” he concluded. Using a number of examples of situations where pragmatism would produce as useful a result as painstaking (and sometimes, to the layperson bewildering) accuracy, he concluded: “We have to consider what our own task is – to make things as simple as possible without compromising the aim. Above all, we must be flexible.”

Open windows and nuisance

In the Building services noise conference stream, Bernadette McKell and Jon Willmott of Aecom discussed a study that compared the noise-reducing merits of openable windows and other forms of ventilation.

The project also considered alternative ways of achieving natural ventilation in terms of their adequacy in providing ventilation and how well they mitigated road traffic noise. Willmott noted: “In some cases specifications for sound insulation may be appropriate, but only in exceptional circumstances should the sound level be achievable only with windows shut.”

Equations exist that can be used to calculate internal noise levels resulting from external noise sources and the effect of incorporating an element within the façade (such as an open window) that has zero sound reduction. Using these, level differences were calculated for various types of ventilation.

Three arrangements were assessed, Willmott explained – open windows, staggered dual glazing and trickle ventilation.

As might be expected, the open window was the worst at reducing noise (by just 15dB LA), particularly at mid to high frequencies. Secondary glazing with staggered openings was found to achieve somewhat better attenuation (26dB LA), more so if an absorptive reveal was used between the panes. The ventilation rate was similar to that of a partially-opened single glazed window. Willmott noted that the sound level was “slightly less than with an open window but still reasonably high”.

Trickle ventilators are available with varying acoustic performance, and where two trickle vents were used, a sound reduction of 31dB LA was achieved. However, this markedly better performance

could only be achieved with windows shut, and if windows were opened to provide the required purge ventilation, noise levels rise by around 15dB.

Willmott noted:

“Realistically, there are many city areas where you would have to exclude open windows if the required sound levels are to be achieved.”

He also presented a case study looking at a hotel in Leicester next to a busy dual carriageway where noise levels of up to 65dBA at night were experienced. The operators wanted to achieve 30dBA, preferably with open windows. Ultimately, this challenging target was met with trickle ventilators on the lower noise facades, a bathroom extractor fan and a ducted, attenuated system on the high noise side of the building.



Noise annoyance study characteristics

TNO’s Sabine Janssen who looked at the role of study characteristics in changes in aircraft noise annoyance, which is of obvious interest given the recent ANASE study – indeed the discussion was in the light of this and the HYENA (HYPertension and Exposure to Noise near Airports, Babisch et al) study.

Janssen highlighted a hypothesis that it may be the increased number of flights rather than the noise of individual planes (which has decreased) that is causing the increase in annoyance.

In addition, she pointed out, changes such as extra runways cause abrupt and permanent changes in noise situations that cannot be predicted by steady-state exposure-response relationships.

Another possible explanation for the apparent increase in annoyance could be changes in the design of more recent studies (a charge levelled at ANASE), actual changes in the population living near the airport, or even in the general population.

Since there is no similar increase for other sources of transportation noise, a factor specific to aircraft noise must be responsible, Janssen suggested. Her study aimed to thoroughly test whether there was a change in annoyance levels over time and the reasons why.

TNO has an archive of original datasets from surveys of residents’ reactions to transport noise. In total, the dataset chosen encompassed 34 airports over 22 surveys and an

overall sample size of over 48,300. As far as possible, a common set of variables was derived, which included annoyance measures, demographic and attitudinal variables as well as acoustical variables. A statistical model that TNO had developed was applied to study the association between L_{den} and self-reported annoyance.

The study found a significant increase at a given level of aircraft noise exposure – rather than a gradual increase, annoyance appeared to increase substantially from around 1996 onward. Oddly, “postal surveys showed higher annoyance than face-to-face,” Janssen noted.

Frustratingly, she concluded that the research “had not found a satisfactory explanation for the effect.”

More on Euronoise

Euronoise was organised by the Institute of Acoustics on behalf of the EAA.

● Papers, photographs etc can be purchased via www.euronoise2009.org.uk



‘UK tram’ approach

In the Railway Noise stream Acoustic consultant Rick Jones, formerly of DeltaRail, looked at the UK solution to the range of issues holding back the increasing adoption of tram, light rail and metro systems.

UK Tram is the industry body addressing issues such as noise and vibration. It commissioned DeltaRail to take the lead in a programme of activity focusing on the topic, and the result is a set of best practice guidelines to help the promoters, designers and operators of these systems to minimise noise impact.

The guidelines draw on current practice in the UK and good and bad experience internationally, he added. The guidance is now on the DfT website, and Jones went through the process followed in developing the guidance documents.

The study started by sending questionnaires to existing

operators (such as Blackpool, Manchester Metrolink, and Croydon) and the promoters of recently-proposed schemes (Edinburgh Tram and Merseytram). From this it was seen that UK schemes had generally taken similar approaches, with more recent schemes tending to use the accepted heavy rail criteria for noise as well as using the UK model for heavy rail noise.

The questionnaires showed there was a need to understand in more detail the extent to which the various criteria reflect the impact of trams and light rail and the effectiveness of available methods for controlling their impact.

The advice provided in phase two of the study included all of the factors that contributed to airborne and ground-borne noise as well as feelable vibration, and recommended specifications were developed. For airborne noise, the systems

have to be designed to ensure they never exceed 68dB between 6am and midnight and 63dB for the designated six night hours ($LA_{eq,1m}$ from any façade of a residential property) due to operations alone. The maximum free field LA_{eq} in the vicinity of properties is 55dB from 7am to 11pm and 45dB for the night-time period. The maximum desirable free field LA_{max} in the vicinity of properties is 82dB twice an hour.

In operation, vehicles must also not emit more noise when negotiating curves on the track than on the straight, and should not create any pure tone “squeal”.

Guidance on monitoring and PA system and door closure alarm noise advice is also provided, as well as associated noise such as track maintenance activity and depot maintenance activity, as well as substation and trackside cabinet noise.

IN BRIEF

Roof shape effects

Ghent University’s Dick Botteldooren gave an interesting talk on research that confirmed some very unconventional roof shapes as best for minimising noise in an adjacent street “canyon”.

Because more complex situations are heavy on computer time, the modelling considered two adjacent, idealised “city canyons” with canyons and buildings 10m wide (the buildings were also assigned a 10m height). The source (a vehicle modelled at various speeds) was positioned 6m from the left façade of the middle building, with all surfaces modelled as fully spectacularly reflecting and the roofs and street surfaces as perfectly reflecting (rigid). Receivers were located along the shielded façade.

The roof configurations considered included standard saddle-backed (pent) roofs with various slope angles; a roof with a single constant slope; a half-cylinder roof with a diameter equal to the building width; a quarter cylinder with a flat side either towards or away from the noise source; and a saw-tooth roof.

The results showed the saw-tooth design gave the best results, followed by the inclining single-slope roof and the half-cylinder rooftop. The quarter cylinder (with curved side towards the source) also did well. Worst was a traditional saddle-backed roof with a fairly shallow angle. A plain rectangle (flat roof) performed best at all vehicle speeds, and it was found that the higher the speed, the more important the roof shape.

Progress noted on Harmonoise & Imagine

Hans van Leeuwen of DGMR in the Netherlands looked at the status of Harmonoise/Imagine, noting “significant progress” on noise prediction methods and adding that in his opinion “it is an appropriate tool for a standard calculation method.

About 90% of the objectives are achieved but it needs to be finalised. A lot of information is not documented and a lot of things are unclear”.

It is clear, he explained, that a large number of successor projects use the Harmonoise/Imagine principles, but that “there is a need for more comprehensive description and for much shorter calculation time. A few weeks to calculate part of a highway is much too long for noise mapping.”

The first application is for producing noise maps, so this has priority, he noted. For this, he said that “it is essential to simplify the method as much as possible.

“We need to ‘undress’ the engineering method to a limited number of essential calculation elements which are essential to the calculations for noise maps.”

He noted the tension between accuracy and detail on one hand, and ease of use and simplicity on the other. The most accurate application is the use for detailed calculations, for which it is critical that the input data is as accurate as possible. Mapping individual objects needs less detail and mapping large areas need even more generalised data.

Using octave bands instead of third octave bands would make the calculations faster “for a small decrease in precision,” he suggested. The frequency range could be limited, for instance to between 63 and 4000Hz, with a maximum of one reflection in point to point combination, no directivity of the source and other simplifications such as reconsidering the corrections close to intersections and calculating only limited meteorological conditions.

In conclusion, he noted: “There is a need for a harmonised method, firstly as a screening method. Then if necessary for action it can be made more accurate. We can simplify some components to give a reasonable calculation time.”

SOUND BITES

This month, in our biggest ever 14-page issue, news is dominated by wind power. Well it makes a change from mapping, and for once it's a Defra-free issue!

The Freedom of Information requests and judgement on Den Brook make interesting reading. We think those involved in the defence of wind farms and Etsu are getting tainted.

Unquestioning support for a failing regime poses obvious dangers should that regime fall!

We finally catch up with Euronoise and the Noise Abatement Society's John Connell Awards.

The event was held towards the end of last year (NB November p6) and for the first time honoured key individuals in the profession – including John Hinton, Max Dixon, Stephen Turner and Hacan's John Stewart.

Baroness Jenny Tonge presented Stewart with his award. She has a sense of humour – she confessed to laying awake with her husband in the small hours of the night thinking of Stewart!

No, it's not what you think, she clarified: "Once the first jet goes over and I wake up, it's true, I think of Stewart and his efforts to sort out night flights."

Some readers have been pulling our leg by sending in pictures of *Noise Bulletin* being read in bizarre places. Can you beat this igloo location?



Animals worth more than soldiers?

Noise has been dragged into a unpleasant argument about payments to soldiers.

A Sky News Freedom of Information request to the Ministry of Defence has revealed payouts due to noise from low flying aircraft over the last few years (see below). The macabre point being made is that noise disturbance to animals is worth more than soldiers' compensation for battle injuries.

This prompted the MoD to comment: "Comparing payments made through the Armed Forces Compensation Scheme (AFCS) and civil litigation is misleading as it is not a like for like comparison. The amount awarded for civil compensation is decided by the courts, not the MoD. The AFCS is a no-fault scheme and the initial lump sum is only one part of the package of financial support."

Compensation payments noisy aircraft

Amount	Aircraft	Location	Nature of damage
£121,000	Various aircraft on exercise	Scotland	Ponies alarmed and injured, Fencing damaged. Personal injury to owner
£42,000	Red Arrows, Hercules, & Tomado	Staffs	Egg production affected at free range unit.
£40,000	Helicopter	N. Ireland	Two injured horses
£39,000	Helicopters	Scotland	Injured cattle, damaged crops and fences.
£117,000	2 x Fast jet	Yorkshire	Fatally injured race horse.
£52,000	Various	Devon	Psychological damage continuous overflights

NOISE EVENTS 2010

27th January

WIND TURBINE NOISE

Inaugural meeting of the Welsh Institute of Acoustics Branch, Linda Canty, IoA 01727 848195

2nd March

LOW NOISE AND VIBRATION EQUIPMENT FOR EUROPEAN MARKETS

Health and Safety Executive event to be held in Coventry Ricoh Arena www.hse.gov.uk/noise/eventarchive/equipment020310.htm

10-11th March

NOISE SPRING WORKSHOP

Two day/overnight spring workshop organised by Epuk to be held at Woodside, Kenilworth. Call for papers: mary.stevens@environmental-protection.org.uk

18th March

MOTOR SPORT NOISE

Institute of Acoustics meeting to be held at Silverstone, Linda Canty, IoA 01727 848195

26-30 April

NOISE ACTION WEEK 2010

Organised by Epuk www.noiseactionweek.org.uk

29-30 April

NOISE IN THE BUILT ENVIRONMENT

Joint meeting of the IoA and the Belgian Acoustics Association (ABAV) to be held in Belgium, contact Linda Canty, 01727 848195

6th May

CADNA BASIC TRAINING

Campbell Associates course to be held at Stansted e-mail joanne@campbell-associates.co.uk

18th May

CADNA USER GROUP TRAINING

Campbell Associates course to be held at London City University e-mail joanne@campbell-associates.co.uk

13th – 16th June

INTERNOISE 2010

to be held in Lisbon, Portugal website www.spacustica.pt/internoise2010/index.htm

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