



NUISANCE

Heat pump 'unneighbourly'

Permission to retain a heat pump has been turned down at appeal – just days before the Government relaxed planning rules on home generation.

Heat pumps – effectively air conditioning compressors – are used to scavenge ambient heat but can be noisy and are subject to planning laws to control noise nuisance. The government has now relaxed the need for planning permission for heat pumps and domestic wind turbines subject to disputed noise limits (see news below).

The planning appeal concerned an air source heat pump at a house in Dartmouth. Local council South Hams served notices following complaints of noise from neighbours 30m away.

Noise readings came in at a maximum of 52db LA_{eq} against a low background noise of 28db

LA_{eq}. Council officers recognised this was well below WHO guideline levels, and against BS4141 industrial noise guidelines, the noise rates as 'marginal significance' in daytime and 'likely to cause complaint' at night – a condition on daytime-only use could be appropriate.

But spectral (detailed frequency slice) analysis showed distinct tonal noise.

The appeal judgement says: "This revealed distinct and elevated low frequency noise levels in the 40Hz, 50Hz, 80Hz, 100Hz and 200Hz bands during the cooling phase. This tonal noise has been identified as "problematic", as it is difficult to block and attenuate, and has been described as "penetrative". The consultants conclude by stating that it is "a matter of great concern".

The inspector says: "I give considerable weight to the concerns of these neighbours, who live alongside this noise source throughout the year.

Their representations are neither frivolous nor vexatious and the "constant droning noise" that they describe appears to me to be attributable to the distinctive tonal component of the air source heat pump when in operation.

"Heat pumps can cut carbon footprints and increase the energy efficiency of dwellings. However, this does not overcome or outweigh the harm that I have identified. This unneighbourly development conflicts with the noise objectives of the Devon Structure Plan and permission should be withheld."

● Email us for a copy of the decision

PLANNING

45db chosen, 100s of complaints expected

A 45dBLA_{eq 5min} noise limit is proposed in relation to both domestic and non-domestic installations of wind turbines and air source heat pumps. Councils can expect to field hundreds of complaints, admits the government.

A DCLG consultation says (apart from 'B2' industrial premises) noise controls to avoid the need for planning permission will be as follows: "The noise level from the installation must not exceed 45dB LA_{eq 5min} at 1 metre from the window of a habitable room in the façade of any neighbouring residential

property (but ignoring the effect of that façade)."

The proposed noise limit is higher than that proposed during consultation in 2007 (37dB LA_{eq 5min}).

Subject to the outcomes of this latest consultation, once a noise level for wind turbines and air source heat pumps is prescribed, the Government will review the suitability of the noise level "as soon as reasonably practicable" after the legislation has been in force for two years to examine whether there is scope to reduce it. "For example, if the proposed 45dB LA_{eq 5min} limit

were to be accepted initially, a future noise limit could be 37dB LA_{eq 5min}.

To address the risk of cumulative noise impact, the Government proposes that, except for installations on Class B2 industrial premises, only the first installation of a wind turbine or air source heat pump within the curtilage of a building in residential use, or on any other building, would be permitted development. Further installations of either technology would require specific planning permission.

The consultation adds: "The

● continued page two

IN BRIEF

3rd runway ok: #1

The Committee on Climate Change believes a third runway at Heathrow, which will allow UK aviation to expand by 10%, is compatible with targets to reduce CO₂.

● *Meeting the UK aviation target – options for reducing emissions to 2050*
Committee on Climate Change www.theccc.org.uk/reports/aviation-report

3rd runway ok: #2

MPs have also failed to come out against a third runway at Heathrow. They don't back a second runway at Stansted – but do think expansion at Gatwick is justified.

MPs said: "The Government needs to revisit its procedures for assessing the impacts of aircraft noise, the compensation arrangements and the effective enforcement of noise regulations. The Government should also review the adequacy of research into the effects of aircraft noise, particularly on human health.

Stop Stansted Expansion strongly welcomes the Committee's conclusions that the Government needs to revisit procedures for assessing the impacts of aircraft noise, compensation arrangements and the effective enforcement of noise regulations.

"News that the Committee is calling for a review of the adequacy of research into the effects of aircraft noise, particularly on human health, and for measures to improve air quality around major airports to be brought forward are also to be applauded."

● House of Commons Transport Committee: *The future of aviation, First Report of Session 2009–10* can be viewed on www.publications.parliament.uk/pa/cm/cmtran.htm

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IN BRIEF

Noise action 2010

Noise Action Week 2010 will take place on 26th to 30th April.

International Noise Action Day is on the 28th April.

● website www.noiseactionweek.org.uk

Live music review

A proposed consultation on an entertainment licensing exemption for live music is expected to be published soon.

The consultation will seek views on a proposal to exempt live music performed before not more than 100 people from the Licensing Act.

The Government says: "One reason the Government are considering an exemption is that other legislation exists to tackle noise nuisance and anti-social behaviour. In addition, we propose to create a power to revoke exemptions if there are problems at specific premises."

exercise of permitted development rights will be subject to compliance with a maximum noise level. This will mean the owner of a property must ensure the limits are met both upon installation and thereafter through proper maintenance of the equipment.

"Local planning authorities have enforcement powers to ensure that installations comply with noise limits throughout their lifetime." It adds that statutory EPA nuisance protection will be unaffected by granting of permitted development rights.

Domestic wind turbines would be allowed to be mounted on detached houses subject to size rules if they were less than 5m from the boundary.

The cost benefit analysis for the proposals admits that there will be "costs to local authorities of increased noise complaints."

It explains: "Defra noise specialists' expect complaints when source noise exceeds background noise by 10db. Their work suggests that a 10dB difference between a

source noise of 45dB LA_{eq 5min} and background noise could occur in up to 97% of cases. Whether this in fact occurs will depend on a number of variables, such as the position on the turbine on the dwelling i.e. the front façade (noisier) of rear façade (quieter) and time of day.

"This work also suggests that a maximum noise level of 37dB could produce a similar situation in up to 82% of cases. It is estimated that, during the first year following the legislation coming into force, there could be between 240 and 650 extra complaints from both wind turbines and air source heat pumps equating to about one or two per authority, and a total cost of between £190,000 and £470,000."

Epuk says it is "astonished" at the decision to deregulate heat pumps and small wind turbines. The proposal shows a "blatantly cavalier attitude to the facts", it adds.

It disputes that "strong safeguards in relation to noise levels, size and location" are contained in new proposals to

give permitted development rights to small renewables. "The proposal to 'restrict' noise levels from turbines to 45dB, flies in the face of the advice of experienced specialist practitioners in environmental health and acoustics, and recent World Health Organisation Guidelines published on night time noise and health.

"With proper advice from specialist practitioners on siting and installation, small renewables can be effective. However, field trials of small wind turbines to date demonstrate that permitted development, as proposed, will make a negligible contribution to carbon reduction targets while having high potential to cause annoyance and disturbance that risk undermining the credibility of the technology."

● *Permitted development rights for small scale renewable and low carbon energy technologies, and electric vehicle charging infrastructure*
www.communities.gov.uk/documents/planningandbuilding/pdf/microgenelectriccars.pdf

LETTERS TO THE EDITOR: WHO NIGHT NOISE GUIDELINES (NB November p1)

Dear Sir

Your article suggests WHO has tightened its previous internal bedroom guideline level at night of 30dBA L_{eq, t} by 5 dBA, presumably to 25 dBA L_{night}, inside, due to a partially open window giving 15 dBA reduction on the actual WHO NNG of an L_{night, outside} of 40 dBA. This would seem logical; but unfortunately is not what the WHO office for Europe has actually done.

As the L_{night} is a year value, the insulation value is also to be expressed as such. This means that if the insulation value is 30dB with windows closed and 15dB with windows open, the resulting value is 18dB if the window is open 50% of the time. If these windows are closed only 10% of the time, the result is little more than 15dB.

The issue is complicated by the fact that closing behaviour is, to a certain extent, dependent on noise level. When results about effects are expressed with indoor (that is, inside bedrooms) exposure levels, they need to be converted to L_{night} in accordance with the European Noise Directive definition.

The most important assumption is the correction for inside levels to outside levels. An average level difference of 21dB has been chosen, as this takes into account that even in well-insulated houses windows may be open a large part of the year.

The setting of a guideline external noise level of L_{night, outside} of 40 dBA based on an assumed default building envelope sound insulation of 21dB, suggest the WHO desire an internal bedroom target of 19dBA L_{eq, t}, i.e. 11 dBA lower than it previously recommended.

Some may question the validity of the concept of a long term

annual average sound insulation value based on the proportion of time windows are opened or closed.

Dani Fiumicelli
Aecom

Dear Sir,

You suggest that the new WHO night noise guidelines represent an approximate 5 dBA tightening on previous recommendations. My personal view is that this is not the case.

The 1999 WHO Guidelines give a night-time guideline value for dwellings as 45 dB LA_{eq 8hrs} outside the dwelling. This is the noise level at the outside facade and is usually taken as assuming a facade correction of + 3dB. When cited as a noise limit it would normally apply to conditions favourable for sound propagation from the noise source to the receiver.

The definition of L_{night} is the year round average of the L_{eq} level at the facade, but not including the reflection from the facade. The difference between the L_{night} and the typical "downwind" noise level would be expected to be of the order of 2 dB, but possibly more, at distances where meteorological conditions have a significant effect on sound propagation (i.e. not for a house immediately alongside a road).

Thus in many cases, the new WHO NNG is not significantly tighter than the previous WHO guidance. It would only be for those situations where there was no night to night variation in noise level that there is a degree of "tightening" of the noise limit, but then this would only be of the order of 2 dB.

Bernard Postlethwaite

IN BRIEF

WIND ENERGY

Hunt pushed on Etsu

Epuk is not accepting a refusal from Government to consider revising Etsu. Decc minister Lord Hunt last month told Epuk it would not change Etsu which is criticised for failing to properly reflect annoyance from wind turbines (*Noise Bulletin October p3*).

Epuk now says it feels "compelled" to revisit the issue as Hunt "failed properly to answer points we raised".

Epuk does not agree that the 'best information currently available' is being used now, in assessing potential noise impacts. "ETSU-R-97 is now more than 13 years old and was drafted in the light of 'best available guidance at the time' and in itself anticipated that it would need to be revised within two years.

"Etsu has now been 'adapted' in an ad hoc way by practicing acousticians to enable its continued use. We believe this alone demonstrates that in its original form it is no longer fit

for purpose and requires revision. Use of this in practice, diverging as it does from the original guidance accepted by government, could potentially lead to further confusion and delay, particularly in any planning inquiries.

"A further effort is needed to bring the science to a more settled position, to the best of our current ability, and subject

to review as further knowledge is developed, would enable the potential impacts of wind turbines to be more properly and effectively considered."

● As *Noise Bulletin* went to press, the inspector at the Den Brook wind farm planning inquiry is due to deliver a view on new turbines. Arguments at the inquiry centre on Etsu guidance.

Lawyers raise microwind planning fears

A planning lawyer has warned that removing the need to get planning permission for wind turbines could lead to problems down the line.

David Kerfoot of law firm Eversheds says: "The proposals would seek to give permitted development rights for wind turbines in the same way telecommunications operators have rights to erect telecommunications masts.

"As the planning system relating to telecommunications apparatus has faced legal challenges over the years, it is likely that any new regime relating to permitted rights for small wind turbines could also be subject to some legal challenges from local pressure groups who will still contend that the noise and amenity impacts of such proposals are unacceptable. We will have to wait and see how 'challenge proof' the new proposals will be.

WIND ENERGY

Wind shear alternative to Etsu method

Energy consultancy TNEI Services has devised its own method of tackling wind turbine noise.

It says its method copes well with wind shear, the phenomena where wind speeds are greater at height than on the ground. The Government's preferred method for assessing wind turbine noise (Etsu) has been criticised for underestimating

wind shear effects (*Noise Bulletin November p2* and see above).

The method is founded on bespoke software designed in-house by TNEI's noise experts in conjunction with colleagues in the Wind Resource Assessment team.

The firm says: "TNEI's wind shear model incorporates recent industry guidance and adds

significant value by using detailed site-specific large wind mast data, already used to predict annual energy production for wind farm financing. The influence of topographic, diurnal and seasonal effects on wind shear are also fully considered.

● www.tnei.co.uk/pages/posts/new-wind-shear-assessment-model29.php.

NUISANCE

Complaints fall in Northern Ireland

A new report has revealed that noise complaints in Northern Ireland have fallen by 5% over the past year.

According to the report, 11,099 complaints were made to district councils in the 2008/2009 year, which represents a 5% decrease on the previous year's figures, which may be weather related. However, this is still a 35.4%

increase on the number of noise related complaints received since 2003/2004. 82% of complaints concerned domestic noise.

More than half of the complaints were received by Belfast City Council. When the figures were adjusted to take account of varying population densities across the 26 council areas, Coleraine, Down,

Ballymoney and Strabane were found to have some of the highest numbers of complaints per 1000 of the population. The lowest levels of complaints were in Castlereagh, Magherafelt, Fermanagh and Limavady.

● *Noise: Complaint Statistics for Northern Ireland 2008/09* can be viewed on www.doeni.gov.uk

Etsu e-petition

An petition has been set up on the Number 10 Downing Street website calling for changes to Etsu wind turbine guidance.

The e-petition, currently with 621 supporters, says: "ETSU-R-97 is woefully out of date for measuring noise generated by current wind turbines & not fit for purpose and any wind turbine development planned or proposed using ETSU-R-97 should be cancelled immediately."

● <http://petitions.number10.gov.uk/ETSU-R97Failings/>

Where's the review?

Epuk has written to Europe seeking progress on the review of the noise directive.

Epuk says: "We are concerned that the deadline of 18th of July 2009 for reporting on the implementation of Directive 2002/49/EC and for making, if appropriate, proposals for its amendment to the European Parliament and Council, as referred to in Article 11, is well past and there has been no news of this report."

Epuk adds that it was accepted that the first round of noise mapping and action planning required by Directive 2002/49/EC was only the first step in this process, and as such experience gained as work progresses should be employed to review the Directive from time to time, for it to be developed to become more effective. The Directive recognises this in Article 11 'Review and reporting'.

Assembly on H'row 3

The London Assembly is holding an inquiry investigating whether "environmental conditions on possible expansion at Heathrow airport, which could lead to an extra 220,000 flights each year, are sufficient to deal with concerns about noise, air quality and climate change". It will make an assessment of the proposed conditions.

● webcast online at: www.london.gov.uk/assembly/webcasts.jsp

Edinburgh's enormous Euronoise

Lis Stedman and Lisa Russell attended the huge Euronoise conference. Here's part one of their report – the remainder next issue

Scotland's capital, Edinburgh, was an appropriate choice of venue for Euronoise in the 250th anniversary year of the birth of Robert Burns, the nation's favourite poet. The event started in fine style with a piper in full regalia introducing IoA president John Hinton and Scotland's environment minister Roseanna Cunningham.

Hinton opened the event with a few statistics – the first Euronoise in 1992 had 200 delegates, he noted, whereas the latest boasted 673, from all corners of the globe (except

Antarctica) as well as 116 exhibitor delegates, gathered in the ultramodern surroundings of the International Conference Centre.

The event had so many streams, with each speaker strictly kept to a 20-minute slot (with a couple of minutes for delegates to scurry across the venue's capacious three floors to their next chosen presentation) that it simply isn't possible to detail everything that took place. However, an overview of the event's key presentations is possible.

Euronoise's noise policy and regulation stream was a popular one and the large auditorium filled to hear the first presentation of the day, Colin Nugent of the EEA (previously with Northern Ireland) presenting on the EEA's launch of the most comprehensive map of noise exposure to date, which reveals the extent to which European citizens are exposed to excessive noise pollution.

The NOISE (Noise Observation and Information Service for Europe) database enables website visitors to click on a location and pull up the numbers exposed to air, rail, and road traffic across Europe and in 102 large agglomerations.

The task of checking the quality of the data (presented as Excel spreadsheets or Shape files) is ongoing, and has fallen to the University of Barcelona. They have a "lot to check", Nugent noted: "What does an empty cell mean?"

The mapping has been hampered somewhat by countries' slowness to respond – just nine met the 2007 deadline, Nugent said, and one has not yet reported. Only four countries' data is considered to be complete. The outstanding data will be included as soon as it has been quality checked.

Some countries (France and Germany, for instance) have reported their data in a spatial format so their major roads can be viewed on the EEA map. Data for only 102 agglomerations have been reported in total, which Nugent called "a disappointing return" as in 2005 it was suggested that the figure would be over 160. "Perhaps this underestimates the true exposure," he added.

The map gives a breakdown of those exposed to noise from agglomerations, major roads, major railways and major airports, at various levels of L_{den} and L_{night} (in 10dB bands from >55dB to >75dB) and the demo suggests it will be a valuable tool in future. The map can be accessed at <http://noise.eionet.europa.eu>.

Analysis of the maps

Martin Van den Berg of the Dutch government looked at the data and comments submitted for the EU noise maps, which shed significant light on the considerable differences between countries' data.

There were some strange problems, he noted, such as some member states consistently multiplying their data by 100 because they had misinterpreted a rule that

stipulated data had to be reported in hundreds. The quality-checked results certainly suggest the UK is a noisy place to live with one of the highest levels exposed to noise above 55dB L_{den} . Southern and eastern Europe generally have high levels of exposure, and only Germany and Estonia have less than 25% of their populations exposed to this level of noise.

At over 65dB L_{den} the picture changes considerably, van den Berg noted, with the UK relatively less exposed and Spain and France showing very high levels of exposure. However as always the devil is in the detail, or how it is reported – for instance, Germany only included its major road network so the population exposed could be underestimated.

The noise exposure distribution pattern by noise class shows the UK and Ireland with a "very striking" difference in pattern to the rest of northern Europe. "In Eastern Europe you can encounter almost anything," he added. "There is a very wide range with a distribution from very high to very low. You can question the correctness of that – the results depend on the modelling methods and the exposure estimation methods."

The UK's apparently sky-high exposure levels and other exceptions "are most likely caused by modelling assumptions for residential roads rather than calculation problems," he noted. Recommendations for future rounds of reporting include enforcement of the use of an electronic data format with online control of input, strong guidance on the format, and a common method.

Local action

After van den Berg, Henk Wolfert, from the Rotterdam area environmental protection agency and the Eurocities project, looked at European noise policies' relationship to local actions.

Provisional data from a noise questionnaire sent out in 2008 by the Eurocities Working Group Noise (WGN) has given an insight into the noise situation in European agglomerations, he explained,



Nearly 700 attended the Euronoise conference

while cautioning that “it is hard to compare noise maps as Europe has used so many different software calculation programs and input”.

The questionnaire, he noted, showed 55% of cities were exposed to noise levels above 55dB L_{den} , and 15% to levels above 65dB L_{den} . Looking at the local level, he observed: “Most cities are aware of their noise problems, but when you ask why they didn’t apply measures they say they didn’t have the money. It’s an easy answer. I think they didn’t give noise the right priority,” he said, adding that “if no better measures are taken, these percentages will increase dramatically.”

“There has been poor progress on noise reduction at source,” he added. “The END is helpful to show the extent of the noise burden in the EU, but we have a long way to go to get a complete view. The END is not effective enough – when you want to reduce noise it is missing some things.”

The problems look likely to continue – Wolfert noted, apropos quiet areas, that “cities say where are they – we don’t have any.” He adds: “There are not many quiet areas designated and we ask, where are they – there are many. They can be quite small or quite large, like a city park.”

He also said the 55dB action threshold is too high, that it should be “40 or 35dB”. The questionnaire has led Working Group Noise (WGN) to make a number of recommendations, including better exchange of information on measures that could be taken to reduce noise in urban situations, and that WGN should promote

the designation and preservation of quiet areas in European cities.

WGN has also issued a position paper on the END that notes that despite the availability of noise maps, “there is little evidence that any significant progress has been made in avoiding, preventing and reducing noise all over Europe”. The timetable for delivering noise maps and action plans has been too tight for many member states, he added. The working group wants the definition of quiet areas tightened up, possibly through criteria published in a guidance document.

He also pointed out that a compulsory date for the completion of measures mentioned in action plans would be useful, noting that “the END only forces member states to make some efforts on noise, but not to reduce the noise!” He added: “There were no deadlines, no measures – only intentions.” He also warned that countries would not find the second round so easy, noting: “Gathering data for the first round was seen as a one-night stand. Countries will face some difficulties in the second round.”

Noise action plans in England

Bureau Veritas’ Stephen Turner took a look at the development of noise action plans in England, looking in particular at the policy for identifying what it terms important areas.

In terms of principles for noise action planning, he stressed the many years for which noise has been managed in England. Because of this, he noted, “one of the first

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

Part two of our own news report on Euronoise will appear in our January edition.

principles was to ensure that noise action plans as far as possible reflect existing legislation and guidance”. England’s centralised approach “has come in for some criticism”, he added, but claimed it was vindicated “insofar as the mapping was completed and reported to the EC and EEA on time”.

Interesting comments included the observation that “it was recognised that were the END dealt with in isolation, inappropriate noise actions might be promulgated that did not take account of the value to society of the source creating the noise. For example, the noise from one of England’s main motorways, the M25, could be minimised by simply closing the motorway.” This, he claimed, “would have many consequences people would find undesirable”.

The omission of industrial noise occurred, he explained, because “the management of industrial noise through the development control process and the relevant legislation related to the Pollution Permitting and Control and Environmental Permitting as well as the statutory nuisance regime already provide sufficient control mechanisms”.

Turner gave an interesting account of the controversial way in which important areas were determined, starting with the $LA_{10\ 18hr}$ indicator which he said was adopted because it was the one used in the mapping methodology and is the basis for the criteria used to determine compensation under the Noise Insulation Regulations.

However, using this criterion to identify important areas for road and rail would have put over 4.2 million people into this category, which he said “would not be practical” to address over the five-year END cycle, so this figure was chopped down to the top 1% of those in each agglomeration and, separately, affected by road and rail traffic.

Even though this reduced the figure to around 370,000 it was felt this was still not enough, so “further prioritisation” was undertaken by identifying sub-categories – for road, those areas where the $LA_{10\ 18hr}$ is at least 76dB and for rail, where this figure is at least 73dB. Amazingly, this still leaves around 124,000 people affected. Turner said without irony that “in terms of quantity, this approach will still be a challenge.”

Quiet area protection in England

Colin Grimwood of Bureau Veritas told the Euronoise conference that “local authorities when proposing quiet areas to the secretary of state not only have to produce and justify acoustically that they are quiet, but also that they have significant and important benefits and are already special.”

He pointed out that the END states that first round NAPs “shall aim to protect quiet areas against an increase in noise.” This, he suggested, “may mean this is an aspirational goal rather than a mandatory requirement”. Also, the END statement that plans should include actions and measures to be taken, including any measures to preserve quiet areas, could imply, he claimed, “that it may be acceptable in some agglomerations for no specific measures to be identified”.

Admittedly, as Grimwood says, the task of identifying and agreeing quiet areas is challenging – the UK’s biggest agglomeration, London, has 39 local authorities that could potentially be involved in the process. It is well known, of course, that England’s suggested criteria for a quiet area were that it be greater than 9ha and with more than 50% of the area at less than 55dB L_{day} . The process is hedged around with so many qualifications that one wonders if England could announce any quiet areas, in contrast to the many already agreed in Scotland and Wales.

Against robust questioning, Grimwood noted that “the Directive says to protect special quiet places, not just places that are rather nice”. Quiet areas, he suggested, might not just be parks, but could be paved, publicly-accessible open areas or “green walks”, or partially enclosed market spaces. Having quiet as a primary purpose is the challenge, he added. “How many places in a city exist to be quiet? This is why we must take a multidisciplinary approach.”

IN BRIEF

Scotland sorts maps

Noise action planning has been developed in a fluid and complex manner, with ongoing feedback being essential in identifying candidate noise management areas (NMAs) and quiet areas (QAs), Glasgow City Council's Nigel Kerr and Edinburgh City Council's Steve Williamson have found.

They told delegates about the successful collaborative approach that has been adopted. Using working groups meant that every stakeholder had the opportunity to have their say – the collaboration raised many issues that wouldn't otherwise have come up.

"Most importantly, because we are using the same process for both cities the output is the same," said Williamson. "There is a great rivalry between the two cities, but the team is able to assure the public that both are being dealt with in exactly the same way."

Hamilton McGregor (now Aecom) worked with the councils in devising ways of making the maps easy to use and understand. It is not enough to use the maps only on the desktop, said Williamson – reality checks are needed.

Candidate noise management areas and quiet areas are now in place and technical guidance has been developed, which will assist in confirming their status. The technical guidance gives direction in ensuring that data recording is consistent, said Kerr, given the number of councils and people involved.

It includes a range of tools such as checklists, site survey pro-formas and an interactive pdf layered map to allow stakeholders to cross reference the modelled parameters with "real world" situations.

HEALTH EFFECTS

Noise and death costed

Mortality statistics no longer tell the whole story," the Euronoise conference was told.

"We don't die much anymore – most of us will live way past 70 years, but the trade-off is that we get chronic diseases for a long period," said Guus de Hollander of the Netherlands Environmental Assessment Agency."

Disability-adjusted life years (DALYs) are an attempt to address this by taking account of the periods when a person lives with ill-health, including a weighting for the severity of the illness.

"Calculating a DALY simply means you take the years of life lost and you add the years spent with a disability, which is normalised by a severity weighting," he said. The measure also takes into account the number of incidents in a year, and average duration.

He showed a sample chart of a hypothetical person's life and progressive ill-health, "provocatively" including some shading to indicate a small effect from annoyance.

DALYs can serve as a sort of "public health currency" says the paper, enabling comparative assessment of the significance of disease, risk factors such as obesity or aspects such as the

environment and poverty. They can play a role in establishing the "best deal" in terms of how limited resources should be spent.

There remain many reservations and assumptions have to be made to fill gaps. "These assumptions can be very political," he added. There are also difficulties in weighing up choices. He highlights some of the dilemmas. People tend to be inclined to start first with saving lives, before setting out to improve the quality of life of many – even if the latter would yield much more DALYs.

"If you suppose that all DALYs are equal then you get into the situation where you exchange one attributable death for 10,000 annoyed for instance." Similarly, comparisons may be made between helping a "greybeard" or children; a parent or a hedonistic city dweller.

The DALYs may be equal but there are a lot of differences in the context, he said. "So let's use DALYs only for very specific questions – a crude estimate of priorities of significance for health. Don't give politicians and policy makers the opportunity to hide behind our DALY calculations because they are afraid to make

their own decisions."

A Dutch noise-related disease burden study looked at annoyance, sleep disturbance, risk for cardiovascular disease and problems arising from higher blood pressure. Estimates for noise-attributable cardiovascular disease are of the order of 200-600 DALYs/year/million – somewhere between 0.1% and 0.2% of total disease burden and almost 2% of total coronary heart disease burden.

"With noise, there is good data but disputed health effects, whereas for coronary heart diseases there is undisputed health significance of the cardiovascular end-points but poor epidemiology," he says. There are also many questions about causality.

A recent evaluation was carried out of new policies for noise abatement along state highways.

De Hollander added: "We calculated that to avoid one severely annoyed person in Holland you would need €30,000." This could equate to between €400,000 and more than €3 million per DALY – whereas normal medical assessment conventions are to spend €20,000 to prevent one DALY.

Auralisation related to noise mapping

Decibels, exposure levels and statistical indicators can confuse rather than inform the general public when trying to present noise data gathered under the European Noise Directive, believe researchers from Trinity College Dublin.

The technical nature of the information being gathered in the noise mapping process makes it largely inaccessible to the public, according to the paper presented to the conference by Paul McDonald.

To be properly informed, the public must be able to

comprehend all the data being presented. Decibels can be difficult for people to grasp; concepts such as L_{den} and the way that the maps display predictions about a single source make comprehension even harder. "Most of the people who can deal with it are here this week," he said.

With this in mind, the university has been developing a 3D virtual urban environment in which sound samples are coupled with noise level data from the strategic noise maps. The result is a fully-interactive

virtual soundscape – a first-person walk-through, which people can navigate while getting an idea of the changing sounds.

For instance, the level of detail changes as someone approaches a noise source, with the recorded footsteps or conversations heard more clearly. A particular L_{den} value can be rendered as either an L_{day} , $L_{evening}$ or L_{night} auralisation to provide an accurate representation of the long-term average noise level at varying places and times.

METRICS

Soundscapes revealed

“Rumours of the demise of the A-weighted decibel may be greatly exaggerated, but it is showing its age,” said Dani Fiumicelli of Aecom, who presented a paper co-authored with fellow Aecom director Dr Bernadette McKell.

“The A-weighted decibel has been around a long while which is a good thing in many respects but we should still question its use,” he said. It might not be the best thing in certain circumstances. “But there is a huge body of evidence and research that justifies its use and shows it works reasonably well.

And given the massive variability you have in human response, are we likely to get anything substantially better?” Until a substantive body of evidence exists to justify any change to any particular alternatives, its use will continue unabated.

Consideration of its suitability arose through work in environmental impact assessments for airport, wind farm and road schemes, he said. “The near ubiquitous use of the A-weighted decibel has been challenged on the basis that there could or should be something better.”

“Why measure noise?” sounds like a very simple question, he said. Primarily it is to establish an objective estimate of a subjective loudness in order to assess potential impacts. This involves a conflict, he said – an objective estimate of subjective loudness.

The perception of loudness is influenced by various factors, some of which are acoustic, but many of which are non-acoustic. The latter include attitudes towards the noise maker, the perceived utility of the noise-making activity and the receiver’s noise sensitivity and even personality.

The hearing system does not perceive sounds of different frequency but the same intensity as being equally loud, he pointed out. To complicate it

further, the rate of change in perceived loudness is not uniform with increasing or decreasing intensity.

But there have been rapid advances in the ability to measure sound and understand its effects on humans. Modern computational methods allow the manipulation of huge amounts of data. “It should be fairly easy – in fact it is quite easy – to measure loudness directly with proprietary sound measuring equipment.”

Reasons for not doing so are largely historic. Today the vast majority of acoustical measurements still use weighting networks originally developed 70 years ago.

These methods came from the concept of equal loudness, used to control, if not eliminate, the influence of non-acoustic factors such as annoyance. It is important to note that equal loudness contours are the results of experiments, he said. “They themselves are fairly artificial.”

The complexities in measuring loudness meant a simpler “short-hand” method of measuring sound pressure level was required, applying a correction to approximately mimic the hearing system’s differential frequency responses.

“These weighting curves represent a series of corrections that can be applied to discrete frequency bands so that the total summed broadband noise level is weighted to reflect the non-linear frequency response of the human hearing system,” he said. The A, B and C weighting curves are intended to be used at different levels of intensity, but this seems to have been forgotten, he added.

One of the main advantages of A-weighted measurement is that it is simple and it is quick, he said. It also copes well with intrusion of extraneous low frequency noise from wind on the microphone, and long distance sources during environmental noise assessment. A long history of

use in studies and research has established a wide range of guidelines, limits and impact assessment advice for its use.

On the other hand, weightings based on equal-loudness methods do not account for all the other acoustic and non-acoustic factors that might affect the subjective response to the noise. And the A-weighting may not cope particularly well with low-frequency noise.

Listening experiments by ME Nilsson published in the *Journal of Sound & Vibration* in 2007 found Zwicker loudness to be superior to A-weighted measurements as an indicator of short-term loudness and annoyance for road-traffic sounds with wide variation in low-frequency content, he said.

“But do we really worry whether there is a better alternative if the improvement is going to be fairly marginal to moderate, when we consider how variable human response to noise is?” he said.

He concluded that A-weighting probably is not best for certain specific types of noise. But a substantial body of existing data and research shows that the A-weighted decibel is a useful measure with a reasonable to good correlation with subjective response to many noises in most circumstances.

The A-weighted decibel continues to be in near ubiquitous use for noise measurement. “But we shouldn’t necessarily let it lie,” he said.

It is prudent always to question its use to determine whether more accurate measurements would be possible with alternative measures. “Why not look to recording other parameters in tandem with A-weighted noise levels?”

This would allow development of a database for future evaluation of the benefits or disadvantages of moving away from the A-weighted decibel.

IN BRIEF

Future view

Peter Rogers of Cole Jarman took delegates on a “trip into the future”, 41 years ahead, with accompanying Tardis sound effects.

“It’s now 2050 and there are now nine billion people on this planet. There is change and this story is about how acousticians were able to help on that journey,” said future-Rogers.

Acousticians defined something called sustainable acoustics, he said.

Acoustics proved relevant in many areas of sustainability including saving energy through the use of noise barriers as solar panel banks, making natural ventilation strategies viable in noisy environments and promoting health and well-being by protecting living environments from noise pollution.

Rogers sought to stimulate debate in the paper *Sustainable acoustics: survive and revive*, co-authored with Richard Cowell of Arup: “We are in a world in trouble,” said Rogers. There are shortages in energy, food, water and raw materials – action needs to be taken. Perhaps the greatest danger to success is the risk that acousticians may underestimate the potential impact of acoustics on sustainability, he said.

“There are some specifics we can think about,” he said. Acousticians need to shout about how eight out of 10 ‘one planet living’ concepts are relevant to their work. For instance, it is important to reduce the materials used and specify those with eco credentials. Natural ventilation needs to be made viable in difficult soundscapes.

“Another aspect is using positive soundscaping to remove obstacles for things like wind turbines, he suggested.

“We need to be proactive and think creatively,” he said. “Sound might not at first appear to be something to save the world, but it certainly is something that can contribute significantly.”

IN BRIEF

Soundscapes plan

Visual representations of traffic noise information through mapping are only of value to the members of the public if they have a clear understanding of the real meaning of the noise levels and if they accurately represent the effect of road traffic, said a paper by Andrew Watson of Acoustic Consultancy Services.

Presenting traffic noise as an L_{den} 24-hour average is appropriate for the EU Environmental Noise directive, but the results are not intended to illustrate the potential annoyance for the receiver. Using shorter period LA_{eq} levels would provide the public with better information and a greater understanding of the noise effect on the local soundscape, he said.

Learning affected

Road traffic noise exceeding 60dBA LA_{eq} around schools might be significantly and positively associated with elevated blood pressure in school children aged 7-11, Katarina Paunovic of Belgrade's School of Medicine told the conference.

A sample group of 856 children was divided into four groups depending on whether their home, school or both were quiet or noisy. Systolic pressure was significantly higher among children from noisy schools and quiet residences – by 2 mmHg on average – compared with those where both environments were quiet. Analysis also took into account other factors including eating habits, physical activity and time spent watching TV or at the computer.

The finding showed a significant positive correlation between noise exposure at school and both systolic pressure and diastolic pressure. No statistically-significant correlation was found with night-time noise around children's residences. Air quality could be playing a part, she acknowledged, though some of transport, such as trams and trolleys, is quiet.

NOISE MODELLING

Modelling aircraft noise

Decisions that are based on predictions can only be as good as the accuracy of the underlying modelling. Two papers in the aircraft noise session explored this area.

The aircraft noise session opened with a report presented by Matthew Cand of Hoare Lea Acoustics discussing comparisons between actual values and ones modelled using the IMMI software, implementing the ECAC Doc 29 prediction model.

The company was commissioned to predict and assess the impact of flight patterns for a major proposed development in the Middle East. Testing carried out at an existing airport in the region allowed the team to compare the model with actual measurements taken in the hot,

humid climate over a six week period.

The predicted L_{den} noise levels were found generally to be marginally above the average measured noise levels, and correlated very well with the upper range of levels. The team concluded that the approach could be a useful reference in the subsequent study.

But predictions must be used in their proper context, stressed the paper. There are strengths in depicting longer-term relative trends, but short-term comparisons are highly prone to variations depending on the day or time of the measurement.

Using incorrect figures for factors such as aircraft fuel weight can lead to considerable errors in terms of modelled decibel predictions for aircraft,

found a Bureau Veritas study that was presented by Vincent Hii.

The “stage length” – the distance the aircraft will fly and hence a factor in its take-off fuel weight – emerged as an important parameter.

There was a mean difference of 13 dB between the lightest and heaviest values – incorrect assumptions could lead to a high error in noise modelling results.

As the stage length reduces, there is a significant reduction in noise level further out along each departure track.

However, the study found that in some areas, the lighter aircraft caused a 9dB increase compared with heavier ones, perhaps because the steeper climb directs engine noise towards the ground.

Annoyance scales compared

Caution needs to be exercised when comparing the results of different scales for judging annoyance. Research presented by Mark Brink of ETH Zürich showed that the two key methods for measuring annoyance may not produce congruent results.

The findings arose in surveys undertaken for a project to establish legal exposure limits for military shooting noise in Switzerland. Noise annoyance among 1,002 residents was

determined using the 5-point verbal and 11-point numerical scales recommended by the International Commission on Biological Effects of Noise (ICBEN).

The usual cut-off points of 60% and 72.7% for each scale were applied to determine “high annoyance” but the resulting curves didn't match and the predicted fractions of highly annoyed people differed, especially for higher exposure levels.

The researchers concluded that the two scales do not necessarily measure the same thing – for military shooting noise at least.

Knowledge about the issue is particularly important when it comes to pooling the results from different studies that used different scales, they suggest. In the shooting example, there was strong evidence that the 5-point scale better explains annoyance than the 11-point scale.

Highly annoyed found to be a good measure

Counting the number of highly annoyed people and the number of awakenings can give a more transparent description of the impact of airport developments than abstract figures such as decibels, found a study presented by Dirk Schreckenber of Zeus.

The work evaluated two new effect-based noise indices proposed for Frankfurt Airport as part of an “anti-noise pact” relating to construction of a

new runway.

The proposed primary index is the Frankfurt Aircraft Noise Index (FFI), which describes the number of people highly annoyed by aircraft noise in areas within the 55dB L_{den} contour.

The Frankfurt Night Index (FNI) assesses the traffic by counting the number of awakenings additionally induced by aircraft noise between 10pm and 6am.

The conclusion was that effect-based noise indices are, in principle, suitable for assessing the development of aircraft noise around the airport.

In particular, they felt the count of highly annoyed people and awakenings seems to give a more transparent description than figures such as abstract decibel levels, energy equivalent noise levels or weighted average sound pressure levels.

WIND TURBINES

Wind is much discussed

It was standing room only in the Euronoise wind turbine session, which brought together many papers including several that looked at annoyance.

People close to a proposed windfarm tend to be presented with noise predictions that are averages for a situation or a year, said Eja Pedersen of the University of Gothenburg and Halmstad University. In reality, all they really want to hear is what it will like to live near the turbine. The sound characteristics – the swishing and thumping – can be explained. “But people often ask how often will I hear it.” This was her starting point for the study.

“Twenty-four people agreed to keep diaries every day for three weeks, noting when they were at home and when they heard the turbines. Those who heard the noise at least once recorded it every other day on average and higher exposure levels equated to higher occurrences of hearing the noise. “It was more easily heard at wind speeds above 5 m/s than at lower wind speeds and the prospect of hearing the sound was closely related to the electrical power generation.

“Annual wind power distribution information is often available prior to building the wind farm and could form the basis of better descriptions of the noise to complement the standard immission levels presented today, she felt.

“Sabine Anne Janssen of TNO in Delft reported on work carried out by TNO and Sweden’s Halmstad University to explore exposure-response relationships for annoyance by wind turbine noise. Research has indicated that the expected annoyance for wind turbine noise is higher than the same level from other sources such as industry or transport. The study combined results from two Swedish surveys and one from the Netherlands – all with similar questionnaires – to achieve relationships between L_{den} and annoyance indoors and outdoors at the dwelling. Other

factors were also taken into account, such as noise sensitivity, whether people had an economic benefit from the wind farm, its visibility, the type of landscape and the degree of urbanisation.

She showed a graph comparing the percentages annoyed or highly annoyed by different sources. The graph climbs steeply for wind turbine annoyance beyond 40dB L_{den} , so that for instance at 45dB about 15% would be annoyed by wind turbine noise compared with about 8% for industrial. Once the level reaches 49db, the values would be about 26% and 12%.

Noise exposure isn’t the only influence on the degree of annoyance. People who have an economic benefit experience almost no annoyance, the analysis found. In contrast, there is increased annoyance among people who can see one or more of the turbines.

Frits van den Berg of Amsterdam’s public health service is well known for work in the field of wind turbines, though has recently moved on to work in the area of healthy living environments.

His paper focused on perceived loudness due to factors such as amplitude modulation, night-time exposure and non-acoustic factors. “A fair treatment of people when planning a wind farm could be important too,” he said. If people feel they have been listened to, they are more tolerant. “I think that involving residents in a fair process is probably the best start for a wind farm.”

There very different views about the noise from wind turbines, he pointed out, quoting BWEA comments about how quiet they are – like leaves in a gentle breeze – and a critic’s opinion of them as having a thumping, pulsing character. “I think they are both correct,” he said. “The explanation is in part because of differences between day and night-time.”

The beat, or amplitude

modulation, is the most disturbing aspect, he said – people are more annoyed when the sound is more strongly modulated. Amplitude modulation makes the sound more conspicuous.

Wind turbine sound does not abate at night as wind near the ground usually does, he said. The vertical wind gradient used in wind turbine noise assessments is valid for a ‘standard’ or neutral atmosphere but often is not a realistic description of the real atmosphere, especially between sunset and sunrise. In some countries, guidelines to assess wind turbine sound levels are now changing to reflect more realistic atmospheric conditions, he said.

In measuring amplitude modulation, he has found that the sound from a wind farm varied in level in the rhythm of the blade passing frequency where the variations varied up to 5-6 dB for a single, and up to 9 dB, for multiple turbines.

Swishing may be heard near a wind turbine or thumping at some distance away. The typical swishing is caused by the downward moving blades. This can be caused by the directivity of the blade as a sound source, with more sound radiated in the forward direction. It also comes from Doppler amplification – the blade tip moves at about Mach 0.2. This explanation also holds at increasing distances, but only to the side, according to van den Berg. A suggested cause for downwind listeners is diffraction, when the blade sound is partly blocked momentarily when the blade passes the mast.

AM is experienced at considerable distances from a wind turbine, particularly after sundown. This can be explained by changes in wind speed over the rotor area due to changes in the vertical wind profile (wind shear). A doubling or tripling of sound energy, due to two or three pulse trains arriving simultaneously, could add 3 or 5 dB respectively, according to his paper.

IN BRIEF

Survey selection

Survey samples need not involve huge numbers of people, if they are well chosen according to a study carried out in Spain.

The work by a team from the University of Valladolid in Spain is looking at how people perceive noise and its effects. The results have indicated that valid results will be obtained in follow-up work by working with representative smaller sample groups or individuals.

The survey was carried out in Málaga and involved 741 subjects, with considerable effort expended in ensuring that the sample was random and representative of the population. Issues such as annoyance, behaviour changes and sleeping effects were studied.

The findings were used to establish 10 clusters, each containing between 54 and 103 people. This will allow follow-ups where several randomly individuals are chosen within each group as representative archetypes.

The survey also compared the results for the full sample of 741 and a part sample of 392. Results were very similar for both, so the researchers concluded that sample size is not too relevant if all citizens have the same chance of being interviewed.

Aircraft health

Long-term aircraft noise exposure appears to lead to an increased risk of hypertension in men, but not in women, according to initial results from a study centred on Stockholm’s Arlanda airport.

The work by Sweden’s Karolinska Institute studied 4,721 subjects aged 35-56 years at baseline, who were followed for a period of 8-10 years.

For the overall population, there was no significant increased risk of hypertension for those experiencing 50 dBA L_{den} . But for non-smokers there was a significant increase in risk in men primarily among those annoyed by aircraft.

HEALTH EFFECTS

Where are we on health?

Issues related to noise and health played an important part in the Euronoise conference, with more than 40 papers and a plenary session devoted to the topic.

"Very often, noise research has been carried out in isolation and I don't think that is healthy for the research community," said Professor Stephen Stansfeld of Barts and The London School of Medicine and Dentistry in his plenary presentation on *New directions in noise and health research*. "I think both the general biomedical and sociological communities need to be more involved in noise and health research, and noise and health researchers need to look further afield."

He quoted Anne Vernez Moudon of the University of Washington, who said earlier this year: "Ambient noise now likely belongs to the list of environmental stressors affecting the population over the long term. The time has come for the health sector to acknowledge ambient noise as an eminent public health burden and to embrace its abatement as one of its responsibilities". "This is a call to arms," he said.

"I believe there is scope for considerable further research on noise and health," he said. "Noise-related policy needs more precise and reliable evidence in order to make decisions," he said.

Exposure-response relationships for aircraft noise and annoyance, sleep, reading impairment and hypertension are reasonably well established, he said. But although there are relationships for particular aspects, there are also many gaps – and a lot of unanswered questions. "For instance how do short-term exposures and short-term effects translate into long-term effects? And what is the real evidence on noise and respiratory health?"

There are also questions about reproductive outcomes, with some studies showing that noise is related to pre-term births and low birth rates. "But that stream of research has not really been followed up."

Such gaps in research were among the reasons behind setting up the European Network on Noise & Health (ENNAH). ENNAH is a network of European scientists working on noise and health research. "We anticipate that it can provide the background and focus for future research," he said.

An initial objective is to review existing literature on environmental noise exposure

and health, focussing on the consolidation of knowledge and the identification of gaps. It aims to improve the measurement of noise exposure in ways that will allow thorough testing for health effects.

"We also want to build more complex analytical models of noise and health effects that take into account possible mediating, moderating and confounding factors, particularly including the joint effects of air quality and noise."

There are a number of cross-cutting themes that will be explored in particular, including vulnerable groups, gender differences, the effects of social disadvantage and comparison of children and adults.

Noise exposure indicators will be looked at, particularly relating them to noise and health research. "Sometimes energy average measures are not necessarily the best indicators," said Stansfeld. The work will also touch on valuation of noise and health outcomes.

“ Sometimes energy average measures are not necessarily the best indicators ”

Among the topics will be recommendations for using noise mapping in health studies. He showed how Bristol's noise mapping has been used for annoyance, suggesting that a similar approach might be possible for linking health outcomes. "I know that there are a number of 'health warnings' about noise maps but I think that potentially, with development, one might be able to use them for health research."

Stansfeld highlighted his own personal list of opportunities for new research. These include new research designs; new ways of measuring noise; noise and immune function; neuroscience and noise; genetics and noise sensitivity; and investigating tranquillity.

Many existing community studies are cross-sectional. "But there are a lot of benefits in longitudinal studies, particularly in terms of looking at causation. They also allow you to look at a change in noise exposure and a change in health and such things as accumulation of noise exposure over time." One of his "dream studies" is to carry out a longitudinal study in mental

health.

It is also important to be alert to the possibility of natural experiments, where research showed that effects diminished in children living around Munich's old airport and developed in children living around the new one.

Stansfeld also highlighted new methods of measuring noise exposure such as work done by Dr Eiman Kanjo, which incorporated live noise measurement into a mobile phone that sent data to a central computer while cycling around Cambridge. "I thought this was a lovely example of how one could get minute-by-minute noise measurements according to where people were in the environment. It has always been a major problem in noise studies that we assume that people's noise exposure is fixed."

Questionnaires may not give a true estimate of their exposure at work, home and elsewhere.

Noise and immune function is a complex area warranting further research. Studies have suggested that a general suppression of immunity may arise through prolonged stress – noise may be important as a background stressor.

Looking at interaction is important in noise research, and a key interaction that keeps emerging in research is the issue of control over noise. "People's perceptions of whether noise is controllable can have a potent effect on health outcomes," he said.

An evolving field is auditory distraction, with work by psychologist Dylan Jones of Cardiff. Sounds are important to our survival, said Stansfeld. "The brain is hard-wired to focus on sound." He reported Jones' findings that disruption happens if someone is focussing on a task when the brain needs to keep track of changing sounds. "This I think has relevance to other areas of noise research."

There continue to be enormous advances in neuroscience, including in the role of the amygdala – a key brain structure in threat detection and vigilance. Work by Chris Plack at the University of Sheffield has brain scans during pleasant and unpleasant sounds interspersed with periods of silence. Different parts of the brain light up according to pleasant or unpleasant sounds, said Stansfeld.

"It opens up the possibility of getting some objective brain measurements for responses to sound, which I think is a very exciting prospect."

POLICY

END: unclear and missing

In policy and regulation talks, Brian McManus of Dublin City Council highlighted unclear and missing provisions of the END.

His presentation was based on a position paper from the members of a working group on assessment of exposure to noise (WG-AEN) who had produced the good practice guide to assist member states with strategic noise mapping and producing associated data which, he said, “came to the view that there were some elements of the END that were unclear”.

His presentation looked at the key (not all) unclear or missing provisions, the first observation being that as maps are required for L_{den} and L_{night} for roads, major roads, rail, major rail, airports, major airports, industries and a strategic map is required for all sources, there is a potential total count of 16 maps. “It’s a sure fire way of confusing people,” he warned.

The working group recommended amending Annex IV so that as a minimum only global assessments are required as a source of public information.

He also pointed out the problems with mapping low

flow roads in agglomerations. “Mapping low flow roads does lead to inaccuracies by potentially overestimating exposure and also due to the unsuitability of some models for lower flow situations. In reality you are damned if you do and damned if you don’t include low flow roads.”

For airport noise mapping, he suggested: “Do we just want ‘air noise’, as we have now, or ‘ground noise’ as well?” The Directive uses a multiplicity of terms such as “airport noise” “air traffic noise” and “aircraft noise” and the working group has suggested that this be clarified so that only air traffic noise is assessed in noise maps.

WG-AEN has suggested that Europe consider removing the requirement to noise map industrial sources (which has made mapping complicated because of the need to ascertain the power outputs of various bits of machinery).

This will undoubtedly gladden the UK, if this goes ahead, as McManus makes the identical point, that it could be argued that industrial noise is already being dealt with under IPPC licensing or equivalent

systems.

Even if a common harmonised method is developed for noise modelling, inconsistencies will arise because of the varying quality of input data, he noted.

The working group has therefore recommended that standards or guidelines need to be developed relating to input data quality. Other recommendations include creating a definition of a quiet area, and considering allowing states to produce maps in synchronisation with their own limit values (resulting in two different types of map).

The working group also suggests further research on whether L_{den} correlates well with annoyance, and whether there should be a noise weighting for individual types of noise because of their different impact on population exposure.

McManus highlighted a depressingly long list of vague terminology and inconsistencies, but stressed that the exercise was not a criticism but intended to “enhance an already far-reaching and important directive”.

HEALTH IMPACTS

Night noise effects on sleep

In the noise and sleep stream of Euronoise, Barbara Griefahn of Dortmund University looked at the effects of nocturnal transportation noise on heart rate, quantified in terms of “arousals” – an EEG assessment of cardiac or autonomic arousals and cortical (brain) arousals.

The study examined 12 females and 12 males between 19 and 28 years of age, who slept in a laboratory for three weeks, four nights a week. Of these nights, three were designated as noisy and one

quiet, in a random order, with the noisy nights representing traffic, rail and aircraft noise at 39, 44 or 50dBA, with an LA_{max} varying between 40 and 77dBA to reflect the characteristics of the type of noise.

The study found that in an autonomic cardiac arousal without awakening there was a distinct increase in heart rate at the beginning of the noise, with a subsequent dramatic decrease.

But if the subject wakened the decrease was much slower,

with a response still evident even after a minute.

With rail noise, a very steep response and decline were noted, whereas with aircraft a similar pattern emerged but with the maximum heart rate much lower.

“With awakening, there was no difference between the traffic modes. Griefahn quoted a paper that warned cardiac responses “are particularly dangerous as they do not habituate – they are pure reflexes, and purely pathogenic”.

IN BRIEF

Housing standards

Professor Sean Smith of Napier’s Building Performance Centre reviewing the development of Scotland’s new standards for sound insulation for housing and introduced Napier’s new “Hangar 17”.

This is a test facility that will undoubtedly be useful for checking new building products against the major changes to Scotland’s *Section 5: Noise of the Technical Handbooks*, which is being introduced in 2010.

The stringent performance levels apply to new, altered, extended or converted buildings and raise the sound insulation performance levels of the separating walls and floors between attached dwellings, introducing sound insulation testing and provisions for non-domestic buildings.

The presentation gave an overview of the research undertaken to establish the increase in sound insulation performance levels and the relevance of sound insulation testing.

Extended research gave new levels based on minimum (airborne) and maximum (impact, for floors) criteria rather than the ‘mean’ approach of the current performance levels, of 56dB $D_{nT,w}$ and 56dB L_{nT} , respectively, “a hard target”, Professor Smith said. “To achieve it consistently you need construction to hit at least 60dB.” There will be real changes in wall widths, cavity widths (from 50 to 75mm) and floor depths (up to 48% increase to at least 200mm slabs) The increase in wall width from 282mm to 366mm is something some developers have already adopted, he noted.

He also explained that “the days of only using floating screeds have gone – they will have to use bonded soft floor coverings”.

The ten test buildings in Hangar 17, all with different structures, are already being used by product manufacturers keen to test full systems and get a feel for how they will perform on site, he added.

Scotland's Euronoise proved quite remarkable. Many have commented how well it was organised, it needed to be with so many delegates and speakers, requiring split second timing so that one could dash from talk to talk.

Noise Bulletin's two reporters worked hard to attend as many talks as they could, and ended up with enough to fill two issues. Of course the whole point of international conferences is that we can learn from each others' successes and failures. Mind you, one country, which shall remain nameless, has repeatedly used arguments that Scotland's excellent noise action planning progress is only possible because Scotland is small.

Given most European countries are somewhat larger than Scotland, can we expect slow progress across Europe?

Duncan McNab from the Scottish government's air noise nuisance team told Euronoise about his country's recently-introduced statutory nuisance legislation which, he explained, came about because of a government commitment to give local authorities new enforcement powers.

This gave the authorities "flexible enabling" (and fully funded) antisocial

behaviour noise legislation, based on objective noise levels, with the discretion for each authority to choose the periods of the day and week to enforce it, depending on resources and needs. English councils take note: yep, they get funding and the necessary powers.

The day, evening and night levels were identified by Aecom's Bernadette McKell as 41dBA, 37dBA and 31dBA respectively. "We were looking for something immediate and quick, rather than say we will monitor a situation for a few months and then act," McNab noted.

The success, compared to the Noise Act in England and Wales, can be seen from the uptake – as of 2006, 25 of the 32 authorities had bid for funding. As a result, the number of noise complaints has quadrupled, suggesting a much-suppressed demand. A verbal warning often works, McNab said, as does the power to seize noise-making equipment and the fixed penalty notice system.

Interestingly, the act gives wide scope as to the definition of "noise making equipment" – "You can seize a granny, there's no limit," said McNab.

Government has rolled over to heavy lobbying from the micro generation lobby

on permitted development and while Defra and its advisors (Bureau Veritas) mounted an effective holding action against the 45dBA number, in the event they were trumped by business interests.

Local authorities (and of course neighbours) will foot the bill through increased nuisance and enforcement action. If we are being asked to trust the government on noise issues then think again. The jump from the initially-proposed 37dBA to 45dBA is massive. And the promise that the Government will review the suitability of the 45dBA noise level will cause many involved in Etsu big wind argument to choke. The government said it would review Etsu two years after release in 1997, eleven years later, that review has yet to happen despite fairly obvious evidence that Etsu has lost its credibility.

The argy bargy on Etsu is precisely what will happen with relaxed controls on microgeneration. The appeal case concerning nuisance noise from a heat pump in Dartmouth (see news, page one) is a timely warning about the consequences of getting it wrong.

And it will be local authority EHOs who will be in the front line and expected to pick up the pieces.

NOISE EVENTS 2010

27th January

WIND TURBINE NOISE

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

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

9th to 11th June

LOW FREQUENCY 2010

The 14th international conference on low frequency noise and vibration and its Control will be held in Aalborg, Denmark Email organizer@lowfrequency2010.org

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