

# NOISE

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BULLETIN

## WIND TURBINES

# Consistency check for Etsu

The Government has commissioned wind power specialist consultancy Hayes McKenzie to look at turbine noise guidance.

Etsu has been heavily criticised of late for being unable to properly predict noise disturbance for modern large turbines. There have been calls for Etsu to be reviewed, instead Decc has asked Hayes McKenzie to look at whether Etsu is being used consistently.

Renewable energy minister Charles Hendry told Parliament: "There is no reason to believe that the protection from noise provided for by the Etsu guidance does not remain acceptable, and we have no plans to change this. However, I have commissioned an analysis of how noise impacts are considered in the determination of wind farm planning applications in England. The project will seek to establish

best practice in assessing and rating wind turbine noise by investigating previous decisions. Our aim is to ensure that Etsu is applied in a consistent and effective manner and that it is implemented in a way that provides the intended level of protection.

"Following a competitive tender process, we have awarded the work to Hayes McKenzie, who will begin in September and expect to complete the project around the end of the year." Details of the review first emerged in spring but the contracts were delayed by the change of Government (*Noise Bulletin June p1*).

The decision was criticised by Mary Stevens of Epuk: "There is a body of evidence and experts in agreement that the issue is not inconsistent application of the guidance, which is the scenario quoted by Government, but the blatant

fact that the guidance has been overtaken by the technology.

"Etsu is 13 years old, its original authors stated it should be reviewed within two years of publication to stay in line with current best technical knowledge. Turbines have tripled in height since then, and designs have moved on. Potential issues are not as simple as simple noise levels, but include acoustic effects which while not 'loud' can penetrate buildings and in some circumstances ruin lives.

"These are difficult to predict, but we should be using the best knowledge and experience available to do this, not revisiting a discredited methodology, and, if cases arise where intrusive impact prove unavoidable, get a compensatory mechanism in place to allow wind farm neighbours their right to quiet enjoyment of a home."

## WIND TURBINES

# Appeal fails but assessment criticised

A High Court appeal against six wind turbines in the Lake District has failed.

Six turbines were approved last year but objectors to the Armistead wind farm near Kendal mounted an appeal centred mostly on noise grounds. The appeal judgement is long and complicated, containing hugely detailed arguments on wind shear, background noise measurements, noise conditions and other assessment issues.

Among other things, for instance, objectors were keen to tighten up conditions which

forced the developer to measure any nuisance noise in particular ways to ensure that the impact was properly measured.

These arguments failed, however the inspector said: "It seems to me most unfortunate that after many years of wind farm developments there are no generic noise conditions, contained in national planning guidance, for local planning authorities and inspectors to impose. The result is that resources have to be spent by developers, local planning authorities and objectors in agreeing, or disputing, what the

noise conditions should contain; and, on appeal, inspectors have to devote time at the inquiry and afterwards in resolving the matter. And then there can be challenges to the conditions that are imposed, as has happened here. Unsurprisingly appeal decisions come up with different answers, as I was shown, and the scope that there is for inconsistency in this respect is obviously undesirable."

● Judgement *Barnes v Others* [2010] EWHC 1742 (Admin) can be viewed on [www.bailii.org](http://www.bailii.org)

## IN BRIEF

### Police use meters

Almost 100 vehicles have had their exhausts tested for excessive noise by Suffolk Police.

Following successful tests, officers from the Bury Roads Policing Unit now have three meters. The device is designed specifically to test the volume of exhausts, and records levels of ambient noise, idling noise and then revving to gain an average noise reading.

Police say: "Most modified vehicles tested using the new device have registered at over 100db. Since May, 96 vehicles have been stopped, with 68 drivers receiving fixed penalty notices for having an excessively loud exhaust."



They add: "During the trial we gave advice to drivers whose exhausts were too loud, but now we have moved on to enforcement. Over two thirds of those vehicles we tested had illegal exhausts and have had to pay a £30 fine as well as the cost of making the exhaust legal again. If the driver doesn't remove the modification, we can prosecute through the courts for failing to maintain the silencer.

"We receive regular complaints about noisy vehicles and perceived speeding which can often be down to the noise. Now loud exhausts are being dealt with."

## HIGHLIGHTS INSIDE...

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Odd wording for Etsu, HPA report and new Defra job. And why not use bungs for wind?

## Letter to the editor

Dear Sir

With reference to the "No-noise Lacors?" story in July's Noise Bulletin, the content is not inaccurate however it may benefit from clarification.

Local Government Regulation (LACORS as it was then) underwent a fundamental policy review last year, which looked at issues facing regulatory services over the next 12 months and six years and what role the organisation should play, essentially, to ensure that we remain fit for purpose and meet the needs of councils.

After this process, noise became a 'watching brief' as of this financial year – an area with potential to flare up due to local authority need or media interest that requires some work as a result. This was the case for several other policy areas and we also took on a couple of new ones such as streetscene.

We have to recognise, especially now, that we can't just keep doing more and more and there was a need for prioritisation.

We will still carry on working on noise issues when they are raised as particular problems or will have a significant impact on local government, for example we produced the document on off-road bikes because it had been raised with us by local authorities as an issue.

Cassie Harrison

Local Government Regulation

## UK Soundmap launch

The UK Soundmap has been launched promising to form a community-led soundscape of Britain.

The British Library-hosted site uses widely available mobile technology in a novel way to capture and aggregate research-quality audio samples which are displayed as clickable samples on a web map. <http://sounds.bl.uk/uksoundmap/map.aspx>.

## POLICY

# Action planning: more delays

Crucial guidance to support English noise action planning has been delayed.

English noise mapping and action planning has lagged behind the regions and been beset by delays. Action plans were finalised earlier this year (*Noise Bulletin April p8*) but local authorities were told guidance would be delivered in July to finally let them get started on action planning.

Defra has now admitted that this will be later this year. This

will make it very difficult for local authorities and other bodies to meet deadlines for proposing quiet areas and important areas due next spring.

Defra says: "An outline timetable was included in the action plans. This indicated that, in addition to liaison, Defra would be publishing, in July 2010, guidance about the noise action planning implementation process. As part of this work, it is planned to hold stakeholder events in the autumn, enabling

the next stage of implementation to be discussed with the relevant authorities and other stakeholders.

"Defra wishes to use these workshops to listen to the views of stakeholders so that the noise action planning implementation policy is as efficient and effective as possible.

Consequently, the noise action plan guidance will not now be published until after these stakeholder events have occurred."

## NGOs

# New bosses for Environmental Protection UK

James Grugeon has taken over from Philip Mulligan as Epuk's chief executive. Mulligan left last month (*Noise Bulletin June*

*page one*).

Grugeon most recently ran his own business centred on low carbon advice. Previously he has had over 16 years' experience as an MP's researcher, a government affairs and corporate and social responsibility post with a major bank, and advising ministers in three Government Departments (and similar bodies on fuel poverty and environment policy).

Epuk has also elected former MEP Dr. Caroline Jackson as its new president. Jackson chaired the European Parliament's environment, public health and consumer protection committee from 1999-2004 and was involved in many key European environmental debates.



Grugeon: new chief exec



Caroline Jackson becomes Epuk's new president

## GOVERNMENT

# Defra seeks noise staffer

Defra is advertising for a high level technical advisor for its noise team.

The job title 'head of noise and nuisance technical and evidence team' suggests that Defra is bringing technical advice in-house rather than solely relying on outside consultants for advice (Bureau Veritas). The salary range is £48k-£69k.

The job advertisement states: "Managing a new team of three scientists, you'll set their direction and priorities, in the context of Defra's wider

strategy, targets and priorities. Value for money will be a key criteria in delivering your responsibilities and you will need to identify and maximise synergies with other evidence activities, within and external to Defra. You'll need to develop strong working relationships with key stakeholders and use your leadership and influencing skills to secure beneficial outcomes for the programme, for Defra and Government as a whole."

● [www.ioa.org.uk/uploads/vacancy-](http://www.ioa.org.uk/uploads/vacancy-)

## IN BRIEF

### CIEH gets Kidney

David Kidney, former MP and climate change minister, has been appointed head of policy at the Chartered Institute of Environmental Health (CIEH) following his departure from Parliament in the May general election.

### IoA stats

An Institute of Acoustics survey of its members suggests 1800 work in industry, commerce and consultancies, 400 work in the academic sector and 450 work in the public sector.

More than half of its 3000 members are part of the IOA's environmental noise group.

● [www.ioa.org.uk](http://www.ioa.org.uk)

## NOISE AND HEALTH

# No change for final report

The expert report on environmental noise on health has been released in final form.

*Environmental Noise and Health in the UK*, was published in draft from last July (*Noise Bulletin July 2009 p2*). The final report appears to have seen few – if any – changes since draft form.

The draft report disappointed many through its lack of policy conclusions, and the time taken to conclude. It was set up in 2004 with the intention of producing a report within a year.

It had a number of conclusions, including the comment: “Attitudes to environmental noise in the UK are changing suggesting that people are increasingly dissatisfied with their noise environment, notwithstanding the fact that over recent years some of the important indicators actually show a reduction in sound levels and in the number of people exposed to high levels of environmental noise. In the UK, about 30% of the population express dissatisfaction with their noise environment.”

“Environmental noise is a problem in the UK today and many people are concerned about its possible effects on health. In terms of well-being

we have little doubt that a significant number of people are adversely affected by exposure to environmental noise. If it is accepted that health should be defined in such a way as to include well-being then these people can be said to suffer damage to their health as a result of exposure to environmental noise. There is increasing evidence that environmental noise, from both aircraft and road traffic, is associated with raised blood pressure and with a small increase in the risk of coronary heart disease. Evidence that environmental noise damages mental health is, on the other hand, inconclusive.”

The final report has been released alongside responses to the draft. Kensington & Chelsea council comments: “The conclusions of the report are disappointing in only recommending that further research is undertaken, without postulating any initiatives on reducing ambient noise based on the research to date. We think on the question of mental health it is particularly weak. Living in a noisy environment does affect quality of life and well-being which in turn can lead to depressive illness. The report does not sufficiently explore mental illness; for

instance it is possible even if not yet not proven that noise can bring on schizophrenia, or bipolar disorder. We would have thought some attempt to address the likely mental health effects, such as depression, would have been attempted. Elsewhere the effects of noise on hypertension appear to be accepted, why is this not clearly stated and why is the mitigation argument not even mentioned?”

Consultant Ian Gardner comments: “The report completely fails to cover noise from one of the newest and most damaging sources, windfarms, and completely misses the opportunity to comment on the adequacy or otherwise of the ETSU 97 noise assessment methodology which is both out of date and inappropriate given the ISO noise standards for all other noise nuisance.”

Epuk was critical of the draft report and is disappointed that many of its comments have not been included in the final report – for instance reference to the publication of the WHO Night Noise Guidelines for Europe and the Noise Policy Statement England which were released since the initial draft.

● The report *Environmental Noise and Health in the UK* is on [www.hpa.org.uk/noise](http://www.hpa.org.uk/noise)

## COURTS

## Human rights breached by noise problem

The European Court of Human Rights has ruled that an applicant (called Oluic) had her human rights breached by failure to tackle repeated noise.

Oluic owned part of a house in Rijeka in Croatia where she was disturbed by noise from the next door bar.

Repeated complaints were ignored as the case rose up through the national courts and Oluic then brought an action before the European Court of Human Rights on the basis that the state had failed to protect

her from the excessive noise from the bar.

Scottish UK Noise Association spokesman Frank McManus commented “Oluic follows previous decisions such as Hatton and Gomez where the European Court of Human Rights held that noise pollution which impacts on the enjoyment of one’s home is capable of flouting Article 8.

“Oluic also emphasises the point that in determining whether Article 8 has been flouted, not only is one entitled to take into account the relevant

domestic law of the country where the complainant lives, one is also entitled to take into account WHO environmental noise standards and also any acceptable noise levels which other European countries have set. Furthermore, Oluic also establishes the principle that one is not required to bring civil proceedings against the author of a noise nuisance before enlisting the aid of the European Court of Human Rights.”

● <http://cmiskp.echr.coe.int/tkp197/search.asp?skin=hudoc-en>

## IN BRIEF

## TENS vulnerable

Temporary Event Notices (TENS) could be changed in a bid to avoid “relentless form filling, high costs and red tape for organising summer street parties and fetes”.

Communities Secretary Eric Pickles said: “Extortionate, inconsistent costs and paperwork for road closures, risk assessments, and temporary event notices are barriers to community events.” He has announced a review of their application.

Meanwhile Responsibility for the Licensing Act 2003, except in relation to regulated entertainment, will transfer from the Secretary of State for Culture, Olympics, Media and Sport to the Home Secretary.

## WHO burden talks

The World Health Organisation is holding a meeting on the burden of disease from environmental noise in Bonn on 14-15 October 2010

The meeting aims to estimate the burden of disease from environmental noise, focusing on the burden of cardiovascular disorders and sleep disturbance in as many European countries as possible.

● [www.euro.who.int](http://www.euro.who.int)

## Westlakes down

Consultant Westlakes Scientific Consulting has gone into administration.

Westlakes provides environmental consulting services including noise and air and employs 65 staff across two sites in Cumbria – it was part of the University of Central Lancashire.

Administration is blamed on the decrease in funding available to support new research contracts and a significant pension scheme deficit. Pricewaterhouse Coopers said it is looking for firms keen to buy all or part of Westlakes’ business.

**IN BRIEF**

**Train idling cut**

Noisy train idling will be reduced as a result of East Midlands Trains introducing an energy saving mode on its Meridian trains.

Software will mean that if a train stands in a station for more than seven minutes most of the engines will shut down, resulting in reduced noise and emissions. Trains can wait up to an hour at stations such as Nottingham and St Pancras before setting off.

**Noise and air linked**

The Lisbon Internoise conference has included papers on possible linkages and confounding of noise and air quality impacts in urban areas.

The recent conference compared levels of noise and pollution levels. An analysis of decibel levels in Basel and Geneva was compared to annual mean modelled and measured NO<sub>2</sub> – there were found to be large differences.

In another study from Sweden noise levels were compared to NO<sub>x</sub> and PM<sub>10</sub>. No confounding or interacting effects were found.

See also our report p5.  
 ● *Correlation between traffic-generated noise and air pollution in two mid-size European cities: Trinalational Traffic, Air, Bruit et Santé project and Ennah WP4 – Moderating effects by air pollution on noise induced cardiovascular disease* were presented at Internoise [www.spacustica.pt/internoise2010/](http://www.spacustica.pt/internoise2010/)

**Gatwick green plan**

The former BAA Gatwick Airport has launched its first sustainability plan as an independent airport.

The plans – called *A decade for change* – set out the airport's environmental targets with key goals including reducing operational noise and improving air quality through the use of new technology and systems.

● [www.gatwickairport.com](http://www.gatwickairport.com)

**POLICY**

**White Paper excludes noise**

The Government has launched 'informal' discussions to shape a White Paper on the environment due in Spring 2011. It doesn't mention noise.

It says: "The Natural Environment White Paper will be Defra's first environmental White Paper in 20 years. We want everyone to contribute their views on the natural environment – whether they're concerned at the plight of the songbirds in their garden, the quality of air in their town, flooding problems worsened by people paving over their gardens or the fate of our wider countryside.

"The economy and the natural environment have historically been pitted against each other rather than being mutually interdependent. Reducing the deficit and ensuring the economic recovery are the government's top priorities but greater knowledge of the value provided by natural systems and the high costs associated with their degradation means that the economy and the environment cannot be separated."

It does not mention quiet areas, currently being worked up as part of Environmental Noise Directive plans, but adds: "More people socialise in public space with trees and grass, resulting in residents knowing more of their neighbours. Green spaces are associated with better health regardless of socio-economic status, for every 10% increase in local green space there can be a measurable reduction in health complaints within the community. Increasing access to the natural environment can provide both mental and physical health benefits."

● *An invitation to shape the nature of England* can be viewed on [www.defra.gov.uk/environment/natural](http://www.defra.gov.uk/environment/natural)

**Editor's comment:** *The omission of any mention of noise or tranquillity from this thinkpiece suggests this is yet another apparently rushed Coalition announcement (announce first – think later).*

*There is a worrying pattern of policy changes being made seemingly on the spur of the*

*moment and without a great deal of thought going into them, even down to a carelessly repeated sentence in the air quality section of the document (with a document just 24 pages long, this is sloppy).*

*Did noise get left out by accident – or has it deliberately been excluded? Certainly there is plenty of emphasis on pleasing environments – the birds and the bees get numerous mentions – but someone might have noted that noise usually plays a key part in these, or at least made reference to quiet areas.*

*Usually policy development on the scale of a White Paper charts a well trodden course – flagging up of a need for change (for instance through a manifesto – then a Green Paper to discuss the plans – followed by a White Paper which sets out policy in some detail.*

*The informal discussion paper all seems rather lightweight and a means by which to bide time while draconian cuts inevitably hit progress on the environment.*

**CREDIT CRUNCH**

**HPA and RCEP go in latest cuts**

More quangos have been cut by the incoming government.

The Health Protection Agency, the Royal Commission on Environmental Pollution and the Sustainable Development Commission are among those facing the axe. This is on top of a number of cuts and revamps already announced and further cuts of 40% due in the October spending round.

The £250m a year Health Protection Agency oversees noise policy research albeit at arms length – HPA's Bob



**Two more bodies being cut**



**The Royal Commission on Environmental Pollution**

Maynard chaired the noise and health working group thinktank which has just released its final report (see news, page 2).

The HPA will now be abolished: "We propose to support the cross-government public health strategy through the creation of a new Public Health Service directly accountable to the Secretary of State, to integrate and streamline existing health improvement and protection bodies and functions, with an increased emphasis on research, analysis and evaluation. Our programme for public health will be set out later this year.

The CIEH says: "Environmental health practitioners with local HPA units to protect public health. The important challenge now for the

Government is to ensure that the new Public Health Service improves on what has been achieved rather than simply making savings."

Also going is the Royal Commission on Environmental Pollution which produced reports over the years covering topics such as the urban environment, biomass and environmental planning. Noise has been on the shortlist (*Noise Bulletin June p2*). Meanwhile Defra is withdrawing funding from the Sustainable Development Commission.

Eruk has criticised the decisions "which seem at odds with the Coalition's claim to be the 'Greenest Government ever'. Without them the Government will increasingly be influenced by partisan advice from vested interests, which will hardly aid the development of effective environmental policy".

# Internoise: 845 papers!

There were over 800 papers at the massive Internoise conference held in Lisbon. Lisa Russell and Lis Stedman pick over the best bits



**B**eing able to put a price on how noise affects people is seen as a key step in costing the benefits of policies to tackle it.

As reported last month, the UK may be moving closer towards including an evaluation of noise-prompted deaths as input into planning decisions (*Noise Bulletin, July p1*) and other countries too are seeking to put robust values on the health, sleep disturbance and nuisance effects of noise. The recent Internoise conference in Lisbon included presentations looking at latest developments in dose-response relationships and ways of quantifying the emerging knowledge in monetary terms.

A demonstration of the growing importance of the health implications of traffic noise came in a paper from TNO's Erik Salomons, Dick van den Hout, Sabine Janssen and Ulrike Kugler together with Stuttgart University's Ulrike Kugler and Vojtech Maca of the Charles University Environment Center. Disability-adjusted life years, or DALYs, a measure of the overall disease burden taking account of the effects of ill-health, disability or early death. For 2006, the researchers found a noise-related health loss of 1.6 million DALYs, with a monetary value of €14 billion. Applying predictions for 2030, they found that values would become 15% higher.

Their paper covered a method for predicting future traffic noise in urban areas in Europe. Costs were assigned to impacts such as annoyance, sleep disturbance, DALYs and health impact costs. Results were presented for a baseline of 2006 together with 2020 and 2030.

The methodology for calculating health effects of environmental noise consists of three calculation steps, covering the EU-wide exposure distribution, the prevalence of the health impact and its monetary value.

The valuation covers all components that may represent a change in welfare arising from noise. This includes medical expenses associated with treatment, lost wages, spending on preventative measures, aspects such as lost opportunities for leisure activities and changes in life expectancy or risk of premature death. Some factors can be expressed directly in monetary terms; others could make use of a revealed preference approach or a stated preference

approach to obtain values.

The project used monetary values derived from an earlier research project. Annoyance due to road traffic noise was costed at €85 per year per annoyed or highly annoyed person. Heavy sleep disturbance is assumed to be comparable to the effect of insomnia in terms of productivity loss and a value of 2% of GDP per employee is used. Heart attack valuation comprises both morbidity and mortality costs.

The researchers generated traffic data for the years 2006, 2020, and 2030, and obtained exposure distribution information for 2020 and 2030 by scaling Environmental Noise Directive data from 2006. The results showed that the percentages exposed to levels higher than 55/65/75dB were 55%/13%/0.5% in 2006 and would be 65%/20%/1.9% in 2030.

About 57% of people in the EU live in cities or agglomerations of over 50,000 inhabitants. The researchers find that 26 million were "highly annoyed" in 2006, and would rise to 29 million and then 30 million for 2020 and 2030. The numbers correspond to a contribution of 520,000, 580,000 then 600,000 DALYs to the total burden of disease. Applying monetary valuations to this gave results of €5.2 billion, €5.7 billion and €5.9 billion per year.

For sleep disturbance, the researchers found 18 million people would be highly sleep deprived in 2030 in urban EU, equating to a productivity loss of €9 billion (€8 billion in 2006).

Using a background rate of 2,000 myocardial infarction (MI – heart attack) cases per million led the researchers to establish that noise-related cases would be 7,200 in 2006, 10,000 in 2020 and 11,600 in 2030, equating to 27,000 DALY in 2030 and an annual cost of €1 billion.

"In general, the health impact parameters that we found are high because of the large number of people exposed to urban traffic noise," said the researchers. "Our results indicate that noise-related sleep disturbance has a higher health impact than annoyance and MI have," they said.

A paper by a team from the Université Paris Est's Centre Scientifique et Technique du Bâtiment (CSTB) presented a methodology for defining an indicator of the health risk induced by noise in urban areas.

The study shows the feasibility of aggregating different kinds of data in order to obtain a health impact of noise at a local scale, said the researchers. The results could be used for public policies and as a diagnostic tool to evaluate the impact of solutions or compare scenarios.

Two different approaches were used. Both took account of annoyance and sleep for both roads and railways, with the second adding criteria for cardiovascular diseases, sensitive buildings and green areas within the designated area.

The objective is to define an indicator that represents the health impact of noise at a French local scale, IRIS, which represents about 2,000 people. The first step was merge noise exposure and health data for the buildings in the area using existing acoustic data for  $L_{den}$ ,  $L_{night}$  and  $L_{day}$ . The second step brought in the IRIS scale and the aggregation of the building data with more town planning information.

The number of inhabitants in each occupied building is estimated using national data. Exposure-response relationships are applied to each building to obtain a percentage of people likely to be annoyed and likely to be disturbed in their sleep. Combining the information gives the number of individuals likely to be concerned and this can be added up to a total for the IRIS area and converted to a percentage which is then expressed as a value from 0 to 10.

The first intermediate indicator I1 takes into account four factors: annoyance and sleep disturbance for both road and railway noise separately.

The second indicator adds in other factors. Noise exposure to levels higher than 60dBA represent a risk to develop heart attacks and so a complementary indicator was developed based on the percentage exposed to day time levels higher than this. A further complementary contribution is added if schools and hospitals are present. Nearby green areas result in a deduction from the indicator. Taken together, the factors produce the indicator I4.

The initial results have demonstrated the approach's feasibility, though the researcher admitted that there are some limitations and uncertainties in the technique. The long-

● continued overleaf

## ● Internoise: from page 5

# Health costings (from p5)

term aim is to consider entire exposure during a 24 hour period, including sources other than transport and industry.

The UK government's Interdepartmental Group on Costs & Benefits Noise Subject Group (IGCB(N)) was established to develop a scientific and pragmatic approach to quantifying and valuing impacts of environmental noise. A paper by the group's Roald Dickens and Sravya Rao discussed the economic appraisal of noise and the way of integrating dose-response relationships between noise exposure and health impacts in the UK.

IGCB(N) had commissioned a review by Bernard Berry and Ian Flindell to identify impacts where quantitative links were sufficiently proven for dose-response functions to be incorporated into evaluation methodology.

Berry and Flindell's work on estimating dose-response relationships between noise exposure and human health in the UK is intended to help in the provision of more robust costing of noise in Defra policy. They have outlined a possible methodology for economic valuation based on assumed cardiovascular effects (*Noise Bulletin, August/September 2009 p8*). "There is clearly scope for developing the method to include more formal procedures for estimating limitations and uncertainties associated with the generalised method and testing it out on a wide range of scenarios,"

said their Internoise paper.

The rapidly growing literature surrounding the adverse effects of excess environmental and transportation noise highlights a wide range of detrimental effects including reported annoyance, adverse health outcomes, delayed language and reading skills in children, general irritation and effects on local ecology, they summed up. "However, not all of the available research is equally conclusive and there is no established methodology for ensuring that cost-benefit analyses of alternative noise management action plans take the anticipated monetary costs of these effects into account," they said.

Their work shows how dose-response effects for cardiovascular effects derived by Wolfgang Babisch could be used in the valuation of alternative noise management strategies. The paper presented an example used from the report exploring the numbers of people potentially affected by cardiovascular disease arising from exposure to road traffic noise across the whole of the Greater London Authority area.

The review recommended that noise impacts on the risk of acute myocardial infarction (AMI – heart attacks) be immediately incorporated into government decision-making as monetary marginal costs per decibel per household, pointed out the paper (*Noise Bulletin, July p1*). Given



the absence of robust evidence, monetary valuation of impacts other than AMI and amenity is not recommended. The Berry and Flindell review did identify notable links for hypertension and sleep disturbance and these should be prioritised for future research so that they can be given monetary values.

Among the key research priorities are identifying the health outcomes of hypertension, reviewing the approaches to value them in monetary terms and consideration of the impacts of sleep disturbance on next-day productivity and amenity. This would enable a monetary value to be placed on sleep impacts.

New evidence was identified surrounding annoyance impacts but was not robust enough to warrant change in the way this impact was evaluated. "However, it appears that amenity costs may potentially be very large, justifying future research should the evidence arise," the Dickens and Rao paper added.

Other current actions should include continuing to use amenity impacts in policy appraisal of noise, adopting values from the Department for Transport's WebTAG guidance.

The Department for Transport adopted willingness-to-pay based values for noise in

## Drawing together health research from around the world

**P**rojects are underway that have been making strides in drawing together existing knowledge and research. But some considerable gaps in understanding remain and these are advocated as future research priorities.

An international project is seeking to help resolve the areas of uncertainty in assessing health impacts. The two year European Network for Noise & Health (ENNAH) project launched in September 2009, with the aims of establishing a network of experts on noise and health in Europe and informing future research directions and policy needs (*Noise Bulletin, August/September 2009, p8*).

A key component of the project is a literature review to consolidate existing knowledge on noise exposure and non-auditory health effects, to identify gaps in the evidence and to suggest the future research needs and hypotheses to be tested.

A paper by four ENNAH members from Imperial College was presented at Internoise. The scale of the issue is apparent – the paper estimates that roughly 20% of the EU's population, or close to 80 million people, suffer from noise levels that scientists and health experts consider unacceptable.

There is increasing evidence that environmental noise exposure has a range of impacts on health and well-being, points out the ENNAH team.

The World Health Organisation (WHO) has also been reviewing the available evidence. The outcomes of WHO meetings are now nearing finalisation in the form of a document. It will provide initial guidance on risk assessment of environmental noise. WHO has developed and used

quantitative risk assessments based on the environmental burden of disease methodology and the disability-adjusted life-year measure. The work has demonstrated that environmental noise causes significant health effects, with loss of disability-adjusted life years.

The document reviews health effects of environmental noise in terms of cardiovascular disease, cognitive impairment, sleep disturbance, annoyance, hearing impairment and tinnitus. Estimates are provided, where possible, of the burden of the health outcomes of environmental noise.

An Internoise paper by a team from five institutions based in Australia and Europe, including WHO's Rokho Kim, pointed out that the process of risk assessment of environmental noise requires knowledge of the health effects, the exposure levels at which they start to occur, how the extent of the effect changes with increasing noise levels and how many people are exposed to the hazardous levels of noise.

Each author of the WHO guidance has also examined uncertainties, limitations and challenges in terms of risk assessment for each health outcome. For example, some noise exposures may be worse for some subgroups than others.

The guidance brings together available literature and data, providing transparent justifications where estimates have to be made. High quality information is available for some aspects including cardiovascular disease and established exposure-response relationships exist for annoyance, sleep disturbance, cognitive impairment in children and cardiovascular disease.



2006 as part of the WebTAG transport analysis guidance. John Nellthorp of the Institute for Transport Studies at Leeds University presented a paper reviewing their implementation and identifying lessons learned together with future research needs.

The noise values have so far been applied to trunk road projects, local transport major schemes, new rail lines and transport policy analysis. For major projects, noise valuation is now an integral part of the appraisal process, he said. The only projects for which no noise valuation takes place are projects where there are no measurable changes in residential noise exposure.

He gave some examples of the PVB – the present value of benefits – for a range of schemes. Two features stand out. Firstly, the majority have a positive noise PVB and therefore a noise reduction impact overall, measured in terms of willingness to pay. Secondly, the noise PVB is fairly small compared with the cost of the project. He pointed out that this is because the main purposes of the projects are not to reduce noise. In broad terms, the positive noise PVB is due to the improved noise mitigation measures in modern trunk road design compared with older roads and to the fact that some major projects are bypasses, which tend to route traffic away from more densely populated areas.

There are challenges and limitations, such as the detailed estimates required for noise exposure at residential properties. The omission of non-residential noise also remains a key limitation of the method. Noise changes at workplaces, schools and colleges, high streets or recreational areas are not picked up and valued, he said. This may change with the implementation of the Environmental Noise Directive. For example, designated urban quiet areas will typically include parks and green spaces, with implications for transport planning and the potential for valuation, he said.

“The Department for Transport’s experience of applying noise values has been broadly positive, but we have also identified areas where further research would be useful,” he said. Annoyance-response relationships are key in the appraisal of noise impacts, however the relationships are based on data gathered in past decades. “As well as updating them, new research may be needed to assess the annoyance response to different sources of transport noise,” he added. This includes high speed rail, which produces a significantly different spectrum of noise versus conventional rail.

Assessing the noise implications of

multi-modal transport plans and strategies presents particular challenges. First, people exhibit different responses to noise and secondly, noise is a local impact that depends on the precise geometric relationship of source and receiver.

A number of other issues arise. Traffic noise is lower at night but people may be more sensitive then. However, noise during the night is not covered in the 18 hour measure used in the UK for assessing the annoyance impacts and monetary values of noise. The WebTAG guidance indicates that any significant changes in night-time noise should be reported using qualitative assessment.

Lastly, it is possible that annoyance is only part of the impact of transport related noise, he said. “Emerging evidence indicates that noise may also impact on health, productivity and the ecosystem.”

Health impacts arising from noise were also found in a study set up to determine the relationship between noise exposure, annoyance and certain chronic diseases in the adult population in Skopje, the capital of Macedonia.

The cross sectional study presented by Gordana Ristovska and Dragan Gjorgjev of Macedonia’s Institute of Public Health showed an association between noise exposure and annoyance; and an association between annoyance and certain chronic diseases such as hypertension, depression, migraine and arthrosis.

Chronic exposure to daily noise above 65dB(A) and night noise above 55dB(A) significantly increased the relative risk for annoyance by six times, with values for hypertension and migraine of 1.8 times and 1.4 times for chronic respiratory diseases.

These results showed that people who already suffer from these conditions are more vulnerable to noise exposure, said the researchers.

But this association between annoyance and morbidity may be interpreted as that people who are chronically exposed to noise and feel noise-induced annoyance have a bigger probability to develop diseases recognised as stress related. Chronic exposure to elevated noise level causes annoyance, and annoyance influences and increases the morbidity rate of hypertension, depression and migraine, said the paper.

The study’s risk for asthma and chronic respiratory diseases in subjects exposed to elevated noise level showed the potential synergistic influence of air and noise pollution.

Putting a value on the reducing noise nuisance is a difficult issue. Abigail Bristow from Loughborough University

focused on the recent application of stated preference techniques and the additional insights they can offer relative to the more traditional revealed preference approaches.

Values of noise nuisance are being applied in cost benefit analysis and in influencing policy, said Bristow, yet there are still many uncertainties relating to such values. Recent stated choice studies have seemed to work well where they have “embedded” questions about variations in noise amidst other quality of life factors such travel times, congestion, cleanliness and air quality.

The classic approach to valuing noise nuisance has been to relate it to a market within which noise is implicitly valued, notably housing. In the revealed preference approach, use is typically made of the housing market. The value of noise is normally expressed in the form of an index that indicates the percentage change in house prices resulting from a 1dB change in noise levels.

In contrast, stated preference approaches are essentially hypothetical questioning techniques. There are two main forms: the contingent valuation method and stated choice (SC). In contingent valuation the respondent is asked a direct question, such as “What increase in your monthly rent would you agree to pay in order to halve your housing noise level?” However, people find it difficult to provide a specific amount expressing a precise strength of preference, she said. Variants include giving respondents an amount and asking whether they would be prepared to pay it.

Stated choice experiments are similar to contingent valuation in that they offer hypothetical scenarios, but in this case the choice is between two or more situations. For instance, scenario A might leave aspects such as noise and journey times unchanged while B might bring about improvements but at the expense of higher council tax.

One of the difficulties is that noise cannot be sensibly presented to members of the public in the dBA units in which it is usually measured, she said. In addition, there is always a concern that hypothetical questioning techniques that they may be subject to various forms of bias, particularly in the case of aircraft noise (see our report, page 10).

## MORE INFO

Proceedings of Internoise are available from the organisers. see the Internoise website  
[www.spacustica.pt/internoise2010/](http://www.spacustica.pt/internoise2010/)



## INTERNOISE LISBON CONFERENCE (CONTINUED)

# What about using $G_{den}$ indicator?

Miriam Weber of DCMR (the Rijnmond area environmental protection agency) and Jan Jabben from RIVM (the Netherlands national institute for public health and the environment) looked at the use of the group noise level  $G_{den}$  as an indicator for area-specific noise impact.

The presentation's main argument focused at the municipal level, where spatial, economic, social and environmental factors are integrated into decision making, and proposed  $G_{den}$  as a potential instrument for area-based policy formulation and prioritising END noise action plan measures. RIVM and DCMR undertook a joint study to assess the use of  $G_{den}$  in a municipal setting (also looking at low frequency noise contributions in the area, which is discussed in the paper below).

$G_{den}$  is an indicator for average broadband noise levels and can be applied in developing area-based noise policy or prioritising policy measures, the authors explained. Essentially, if a 'group' is one dwelling then  $G_{den}$  is  $L_{den}$ , and if the group consists of more dwellings  $G_{den}$  increases. For instance, an area with a  $G_{den}$  of 100dB could be an area with a single dwelling that has a noise exposure of 100dB  $L_{den}$  or 10 dwellings each with a noise exposure of 90dB  $L_{den}$  and so on. One important feature of  $G_{den}$  is that it has a 'more or less' logarithmic relationship with the number of severely annoyed people in an area.

The presentation focused on two case

studies in the large economic and infrastructure hub city of Rotterdam and the smaller rural city of Lansingerland, both in the Rijnmond area.  $G_{den}$  and optimised END noise maps could aid prioritisation and cost-benefit analyses of the measures to be taken under Rotterdam's noise action plans, Weber suggested.

Lansingerland is formed from three small villages and attracts those who prefer high-quality landscapes and soundscapes, but it faces possible threats from nearby major sound sources – the high-speed train between Amsterdam and Brussels/Paris and Rotterdam airport. The municipality commissioned DCMR to identify various areas and the effect of noise sources on their acoustic climate. It was felt that  $G_{den}$  could be a useful instrument to identify these acoustic qualities and in monitoring trends within them as the use and therefore noise emissions from the train and airport increase.

Rotterdam is trying to decrease its noise-annoyed citizens (about 18% of the population) by 30% by 2025 and this year agreed an approach based on applying low-noise road surfaces (most people are annoyed by road noise), preventing noise annoyance in spatial (re)development projects, and addressing noise annoyance from various sources.

The number of residents affected by the proposed scenarios has been calculated per 5dB  $L_{den}$  group using the strategic noise

map. The choice of roads where low-noise surfaces will be used needed a more detailed analysis, and applying  $G_{den}$  for road traffic helped to pinpoint the living areas where many people are exposed to high road noise levels. The indicator identified areas where applying low-noise surfaces will probably be cost efficient and produce the best reductions in the number of annoyed people.

In quiet Lansingerland, the train and airport generate serious complaints about noise, and road traffic noise was also found to be high on closer examination of the figures. Despite this, most living areas have been characterised as "garden villages" with substantially lower cumulative noise levels. Applying  $G_{den}$  confirmed the conclusions.

The impacts of extending flights from the airport and the train line can be monitored at a general level and by source by applying  $G_{den}$  on an annual basis, the authors suggested. The research suggested two interesting uses for the indicator, to prioritise and apply cost-benefit analysis to noise reduction measures and, as in Lansingerland, for trend analysis and area-based noise policies where municipalities are facing major changes to their historic soundscapes.

When proposed new noise legislation finally arrives, which is predicted for 2013,  $G_{den}$  could be used as a reporting and communication tool, the research concluded.

## Harmonisation of action plans and noise reduction plans

The EU-funded HUSH (Harmonisation of Urban noise reduction Strategies for Homogenous action plans) project was introduced by Sergio Luzzi and Raffaella Bellomini of the Italian consultant Vie En.Ro.Se Ingegneria and Francesco Borchini of the University of Florence, two of the partners in its development – the others being national and regional environmental agencies and the Eurocities network.

Remarkably, previous EU projects – Harmonoise, Imagine, Silence et al did not consider the problems created by co-existing national legislation for noise mapping and noise action planning, which cannot simply be replaced by the END, the authors noted.

The HUSH project aims to provide a general methodology that can move towards harmonising these varied pieces of legislation, taking account of member states' experiences in action planning and general recommendations from EC working groups supporting the END.

The paper looked at the general setting and startup actions of the project, as well as its objectives, which include highlighting unresolved conflicts among current regional,

national and European standards, and defining common methods for designing strategic and specific solutions.

The Florence municipality began general data collection this March, alongside other data collection to analyse and compare available data platforms, and detection and classification of conflicts between national and regional legislation. A specific indicator will be defined to express the quantity of normative conflicts that will be used, with others, to monitor and evaluate the overall impact of HUSH.

The data will be analysed, compared with the state of the art, and solutions defined and tested, pilot cases chosen and areas where interventions will take place will be chosen. After this, an assessment of the data, looking at sensitive receivers and people's perception of disturbance, will be undertaken and experiments in strategic interventions will be planned and carried out.

The timetable shows that the proposed revision of Italian legislation and the END is due in June 2012, along with proposals to revise regional legislation. Dissemination and monitoring, and the final report, will take till the end of that year.

## INTERNOISE LISBON CONFERENCE (CONTINUED)

## Low frequency fuss?



Martin van den Berg gave a presentation to the Internoise audience that acknowledged low frequency noise is one of those issues that has “sometimes been blown up to mythical proportions” while objective studies at everyday levels are unable to substantiate the claims.

One peculiarity of low frequency noise is the claim that if just over the hearing threshold it can cause annoyance, unlike “normal” noise. He looked at a study and anecdotal evidence shedding light on this little-researched topic.

The descriptions of low frequency noise are so varied (ranging from “like air roaring up a chimney” to “like a compressor unloading”) that he suggests “a misclassification between psycho-acoustic categories and common understanding, but perhaps something more fundamental.”

The assumption is that because the level at which low frequency noise is annoying is low, it is something in the character of the noise that causes annoyance, but the descriptions suggest non-low frequency noise can also be annoying at low levels – one well-documented source being wind turbine noise. Newer studies tend to place thresholds for aircraft noise annoyance at 30 to 35  $L_{den}$ , and the current approach is to

assess the intrusive characteristics of a noise to rank it according to its “annoying potency”. But does this approach lead to the correct ranking, van den Berg asked.

Expert and public judgments on impulsive and fluctuating noise show fundamental disagreement, so unsurprisingly finding a physical description that fits the annoyance of a sound has proved difficult. When annoying noises have a number of characteristics of varying duration, it becomes impossible to decide which penalty should apply for which duration – van den Berg gave the simple example of a pub, where tonal noise from music, impulsive noise from bottles in crates and low frequency noise from ventilation could occur simultaneously or in succession.

Case studies looking at shunting yards suggest that it was not the impulsivity of the sound that annoyed people but the fact the operations took place at night, and that there was vibration. Similar problems occur when trying to assess low frequency noise, he noted.

Looking at studies into the factors contributing to annoyance, the complexity of the problem was clear – as with wind turbines, there are sometimes visual and

also long-term exposure effects. Revisiting the descriptions, van den Berg noted that the special characteristics of the signal appear to dominate, which could explain why a study by Andy Moorhouse of Salford University could only relate three of 11 field cases to a specific part of the low frequency spectrum.

Van den Berg’s conclusion was that although psycho-acoustical descriptions of a sound may help to explain why a noise is annoying at low levels, they can not be used as only measure to assess or predict annoyance levels from a particular example. Even exposing subjects in laboratory settings may not get the rights results if they had no previous experience with the source. He noted: “Low frequency, fluctuations, tonality, impulsivity and duration all contribute, but the human interaction determines what the final impact is.”

Van den Berg concluded: “The bottom line is that fixed penalties should be handled with care, especially in situations where the offending sound contains a number of these special qualities, with different duration. If in doubt, preference should be given to results of dose-effect relations from field studies.”

### LOW FREQUENCY NOISE

## Need for guidance on low frequency noise

Piet Sloven of DCMR looked at low frequency noise and the problem of Dutch town planners feeling forced to allow noise levels up to the maximum A-weighted limits at facades, which may mean that although noise reduction measures can reduce sound levels, indoors more low frequency noise is created.

Low frequency noise, he explained, became associated with infrasound, vibration, phantom noises and extremely sensitive people when A-weighting was widely accepted. Though it is now viewed as a normal part of the sound spectrum, it is a complicated field because high noise levels are needed to be able to hear the lowest frequencies, which seem to give some people either a headache or an urge to flee, while others have to strain to hear the same sound.

Research into low frequency noise was carried out in the Greater Rotterdam area in the 1990s until a lack of funding slowed down the work. Since then, research has led the Dutch Health Council to conclude that noise with low frequency components, tones, high rise times and events with high

peak levels could cause extra annoyance. Low frequency noise is seen as especially bothersome at night because other sounds that normally mask it are themselves reduced.

Sloven explained the acoustical and non-acoustical factors and characteristics contributing to disturbance, which range from irritation about the source to the noise having a beat or surge component. In The Netherlands, he said, for detailed assessment the use of curves is normal – these allow a noise to be examined in detail. There are a number of Dutch curves, which are selected depending on the characteristics of the noise and target groups (one is designed for the over-55s).

Sloven then looked at the possibility of new rules to assess low frequency noise and guide authorities dealing with the issue. He noted that changing laws immediately to end all low frequency noise problems would lead to “severe rules and a lot of resistance” and that in such cases the Dutch usually phase in legislation.

As an example, he cited the “hum of Nesseland” – complaints about this

mysterious noise have been received from dozens of families in the eastern part of Rotterdam since 2007. Much effort has been spent trying to find the source or sources of “Nessy” and new instruments and software are going to be applied in the next few months. Unusual techniques that could be used include adding markers to suspected noise sources, using a panel of people who can hear low frequency noise, and the use of microphone arrays or mini-barometers.

Low frequency noise will remain a lower priority than traffic and neighbour noise, Sloven acknowledged. However new rules will increase awareness and promote new investigation. He noted that low frequency noise “is a growing problem” and suggested an approach in which if it is decided that low frequency noise is playing a role in a case of annoyance an ndBA penalty should be attached, where the number ‘n’ will be “safe and may be rather high”. If the source – or complainant – did not agree with this penalty, they would have to undertake research themselves and argue for an adjustment.

## The quiet side concept

Swedish researchers presented a case study on the creation of less noise-exposed courtyards and sides in a 1950s residential area flanked by two busy roads.

The improvements were achieved through a programme of considerable rebuilding to create a continuous physical barrier made from the buildings themselves, constructing a new garage to fill a gap, putting a new asphalt layer on the main highway and erecting a noise barrier.

The case study, in the Partille municipality east of Gothenburg, was a sub-project of a research programme called "Soundscape support to health" which measured and characterised acoustic and perceived soundscapes and how these were linked to effects on health and wellbeing.

Although the definition for a "quiet side" was not reached through the interventions, (defined as  $LA_{eq, 24hr < 45db}$  free field value), the noise levels were reduced by 5 to 10dB on the most traffic-exposed elevation and by 4 to 10dB in the courtyards (though noise levels at one building were unchanged).

Pre- and post-intervention questionnaires proved that general noise annoyance reduced substantially (for instance, the perception of the sound environment as relaxing rose from 32% to 82% and the number experiencing road traffic noise annoyance dropped from 84% to around 25% in the buildings where noise levels had dropped).

For three out of the five sites investigated, the perceived sound environment both indoors and outdoors was improved but unsurprisingly for those in the buildings most affected by the roads there was little change. However, a majority of the respondents still perceived the outdoor environment as dominated by road traffic sounds.

## INTERNOISE LISBON CONFERENCE (CONTINUED)

# Airport study captures annoyance

Sometimes the degree of annoyance goes beyond what would be expected, as is demonstrated by the situation near a Nato airport in the Netherlands.

Internoise delegates heard that annoyance caused by Geilenkirchen airbase is severe, despite the relatively low amount of movements – 2,800 a year – over Dutch properties.

The friction between theory and reality has led to political discussions on national and international level in an effort to find solutions, said Dik Welkers environment ministry.

The maximum noise levels are up to 110 dBA. A study found that more than 40,000 in the region on the Dutch side of the border are highly annoyed. "The reported annoyance was more than one could expect based on the normal dose-effect relations and the known contours," said Welkers. There are many suggestions about the reasons, including the difference between the usual noise levels in this region and those for the airport, the fact that it relates to activities of a relatively unknown entity and that residents feel fear.

The most expensive of the plans being considered is to extend the runway 900m eastwards. Another measure is to move the flight path from the south to the less densely populated north.

As a last resort, under Dutch law the Netherlands is allowed to close the borders for aircraft that causes problems on Dutch territory. "Of course, politicians know the impact of such an action, but after 30 years of discussion it seems to be the last possibility," said Welkers.

There remain many uncertainties in analysing the degree of annoyance from aircraft noise and thus determining reasonable levels.

A number of different dose-response functions for aircraft noise annoyance have been developed, said Truls Gjestland of Sintef. They are all based on actual social surveys, and they all claim to be "correct". However, the amount of people highly annoyed at a given exposure level may differ by ten

percentage points or more.

He pooled results from 25 different aircraft noise surveys and found considerable scatter, with none of the "official" dose-response curves seeming to fit particularly well. Numerous analyses have shown that the annoyance response is not controlled by acoustic factors alone, he said – it is a distinct possibility that other variables play a part.

The mean values of the aircraft noise survey responses show that there is a distinct change in the response functions around 55dBA. Below this level the percentage highly annoyed is well below 10%, and at about 55dBA the percentage jumps to around 25%, says Gjestland.

His research found that all "standardised" dose-response functions seem to underestimate the annoyance in the range 55dB to 65dB. "This is perhaps the most important exposure range as a large number of residences are normally located in this range," he pointed out.

The rise in low-cost flights has caused a surge in aircraft noise around some popular destinations, raising concerns about resulting health issues.

One such location is Ciampino (Rome). Evidence from the Hyena project associating aircraft noise exposure with blood pressure levels led to a study on behalf of the Lazio regional health service. The team of researchers found that the results confirmed the impact of aircraft noise exposure in raising blood pressure.

Data collected by interview included personal characteristics and the use of pharmaceuticals. Blood pressure was measured for each participant and three aircraft noise levels were defined using a noise model and linked to each participant's address using a GIS. A total of 597 subjects participated in the study and the effects of airport noise on blood pressure measurements were analysed through linear regression models taking account of several confounding factors.

The researchers found a statistically significant

association between aircraft noise levels and both systolic and diastolic blood pressure for subjects in the highest noise exposure category. The effects could contribute to the burden of cardiovascular disease and indicate the need for preventive measures, said the researchers.

A possible way of helping control airport noise would be the use of tradable noise permit schemes.

A paper by Astrid Gühneemann, Richard Connors and John Nellthorp of Leeds University Institute for Transport Studies presented a market model to analyse tradable noise permit schemes for airports.

The ongoing work is part of a European Commission co-funded project aimed at assessing the efficiency of market-based solutions to tackle noise problems at airports.

Trading schemes have existed for several decades in other sectors as a means of reducing environmental impact. They are a halfway house between approaches such as standards or quotas and fiscal instruments including taxes or subsidies. Designing a scheme involves many choices, such as whether it is mandatory or voluntary and whether the producer or consumer pays.

The MIME project is aimed at discovering whether, and how, such mechanisms can be used to improve environmental noise control in air transport, especially at airports that have limited capacity due to noise constraints.

The market model consists of three main parts: a demand model, an airline operation model and a permit trading model. The principle underlying the permit trading model is that at any given price, each airline can decide to buy or sell permits.

An airline whose current schedule requires more permits than it holds can abate noise by adjusting the schedule or by buying permits. An airline that can abate noise cheaply can choose to do so in order to sell permits onto the market. Market prices will emerge in response to supply and demand.

## INTERNOISE LISBON CONFERENCE (CONTINUED)

## Dublin bus gate cuts noise

Eioin King, Henry Rice and Paul McDonald of Trinity College Dublin's Department of Mechanical Engineering and Brian McManus of Dublin City Council Roads and Traffic department's traffic noise and air quality unit looked at a "bus gate" scheme introduced in the particularly sensitive College Green city centre area to prevent private vehicles from gaining access during peak traffic hours.

The hope was mainly to alleviate traffic congestion and shorten journey times on public transport, but also to reduce noise pollution. Noise levels were monitored before and after the scheme was introduced so that its impact on noise could be evaluated.

It was also felt that the "bus gate" could demonstrate the potential for traffic management schemes to form the basis for Noise Action Plans as required under the END. Quantifying the effect was undertaken using both experimental and predictive techniques.

Two monitoring locations

were chosen for the noise analysis, one at a busy interchange within the ban area and one along a street approaching the entrance to the "bus gate". A long term environmental noise monitor from Sonitus Systems was used to continuously log noise levels in  $LA_{eq}$  and  $LA_{10}$  in five-minute intervals. Measurements were taken at both locations for 14 days before the scheme was introduced and a further 28 days after.

Traffic counts were also undertaken at key junctions in the test area to assess the impact of the ban – one before and one after the ban was introduced. The most widespread method to predict road traffic noise in Ireland at present is the UK's CTRN, which was used to create strategic noise maps for all of Ireland's major roads.

The results show a significant drop in traffic levels – even buses, equating to a decrease of 2.7dB for each hour. Predictably, there was an increase in traffic at a location where people were trying to

avoid the "bus gate". At the location approaching the zone, the ban had almost no impact on traffic profiles.

The predictions were reasonably accurate for the other location – during the ban periods, there was around a 2dB reduction in noise levels. However, the overall weighted average 24-hour level showed no significant improvement.

The authors' observed that a complete ban on private cars did not automatically imply a significant reduction in noise levels – HGVs and buses are key contributors to the noise level on a street.

The conclusion was that the initiative did indeed reduce noise levels during the enforcement hours, and showed that a traffic management strategy such as this could be incorporated as a potential action plan for noise control. However, in the case of this study, and in its present form, if noise levels are considered over a full 24 hours,  $L_{den}$ , the associated impact on noise levels was found to be minimal.



### IN BRIEF

#### Quiet area metric discussed

Juan Battaner-Moro, Christopher Barlow and Paul Wright from Southampton Solent University proposed a new metric to characterise accessibility to "quiet areas" in urban agglomerations as defined by the END, using GIS software in conjunction with END noise mapping results.

The process and metric methodology were explained, from the initial step of determining the  $L_{den}$  of Southampton's parks – some large parks mystifyingly have no END noise data and some were either overflow or close to road or rail noise sources, leaving only a couple as potential candidate Quiet Areas.

The authors concluded early in the presentation that accessibility to quiet spaces was an important factor in determining "disadvantage". Looking at socially-disadvantaged areas of Southampton, determining which suffered from "tranquillity deprivation" was calculated using a formula that included distance and the average of  $L_{den}$  and  $L_{accessibility\ level}$  for each area. Surprisingly there was a lack of correlation between social deprivation and tranquillity deprivation, possibly because the city has affluent suburbs near major roads such as the M3 and M27, and rather less affluent suburbs that happen to be closer to quiet parks.

Nevertheless, the results could potentially help urban planners to identify areas that need better provision of tranquil spaces and to enforce measures to protect existing quiet areas, the authors concluded.

## Dutch study quiet facade benefits

Yvonne de Kluizenaar, Erik Salomons, Saine Janssen, Henk Vos, Han Zhou, Henk Miedema and Johan Mackenbach of the TNO Department Environment and Health in Delft and Frank van Lenthe of the Department of Public Health at the Erasmus University medical centre in Rotterdam, looked at refining the normal approach to predicting annoyance by assuming that a quiet façade has benefits.

Questionnaire data from a large population-based cohort study in The Netherlands were linked to individual exposure assessment using detailed spatial data, GIS and state-of-the-art modelling techniques. The premise was that a quiet façade allows an "escape" from noise, and may therefore be expected to be less annoyed or sleep disturbed on average to those who do not have this benefit. However, few studies into the effects of road traffic

exposure on annoyance have taken exposure at different sides of the dwelling into account.

Knowledge of environmental noise transmission modelling and GIS technology was combined to give a spatially-refined exposure assessment for the participants in a large ongoing health study that encompassed Eindhoven, at that time the fifth-largest city in The Netherlands. The exposure data were combined with data from the study, taking potential "confounders" – confounding factors – into account.

Road traffic noise was calculated at the most and least exposed facade of all dwellings within the study area using two different noise models, the Dutch standard model for road traffic noise and a street canyon model recently developed by Salomons et al. The street canyon model was expected to give more realistic results at shielded areas in a city, for

example at quiet facades.

Annoyance was measured using a question from the study about whether people were disturbed by the presence of environmental noise in their dwelling or neighbourhood. Logistic regression was used to study the association between exposure at the most exposed façade in  $L_{den}$  and annoyance, while also taking into account the exposure at the least exposed façade.

Having a quiet façade was found to influence annoyance in addition to the noise level at the most exposed façade, which suggests that people may benefit from having this respite as the hypothesis suggested.

This means that future practical approaches to reducing the impact of traffic noise may be to create quiet facades and quiet areas as noise refuges, either from scratch in new construction or by modifying existing urban areas.

The final report of the Ad hoc expert group on noise and health has at last appeared over a year after it emerged in draft.

Maybe the HPA and the group itself realised that if they didn't get it out quick, their funding and sponsors would disappear leaving the report to sink without trace.

There is an odd feel to the report – not least in chairman Bob Maynard's introduction: "Drawing firm conclusions from evidence is never easy and members have been, in places, cautious about their interpretations." Very cryptic.

*Renewable Energy News* reports that the proposed Coalition Government's Localism Bill might include a buffer zone for windfarms.

Wow. This would scupper transparent attempts by civil servants to prop up wind power by defending the indefensible Etsu guidance with oddly-worded research contracts. A 2km zone would rule out pretty well everything.

Is Decc trying to screw up? Why let contracts that are so narrowly defined that they will solve nothing? Looking at the consistency of Etsu rather than Etsu

itself gets us nowhere. And then letting it to a firm so closely aligned with the industry that there is no hope that any conclusions will carry weight beyond wind interests in industry and Decc.

If the Government is looking for ways to save public money, it may do well to look at the Etsu debacle to prevent blinkered civil servants and overly-strong lobby groups defending guidelines that are the cause of delays and extra costs for everyone involved.

Part of the problem with onshore wind (or indeed most large infrastructure projects) in this country is the poor compensation mechanism for those affected.

In the UK, Nimbys thrive because the authorities seem to have this idea that householders would welcome developments on their doorstep for the common good and without compensation.

We hear of an interesting technique in the US – offer residents near proposed wind farms \$5000 dollars if they sign a no-complaint waiver.

In the absence of any signs that the Government is going to cave in on Etsu, maybe such crass bribery could be

considered better than nothing.

We are intrigued at the wording of Defra's advertisement for a noise technical head.

One of the requirements is to "Be able to work with policy officials across Government to formulate clear, cogent negotiating positions and to present these positions in the face of challenge".

This is a thinly veiled dig at the likes of Decc and DfT, we think. In plain English, it should say: "If the Government is unduly swayed by overly strong industry lobby groups and decides to make incongruous decisions like a third runway at Heathrow or blind support for wind turbines, you will be the one in the firing line facing intolerable pressure to roll over and keep your mouth shut."

Well whoever gets the job, we hope they tear up current wishy-washy noise policy so they can approach interdepartmental negotiations with some backbone

We will watch closely to see whether Defra's overarching noise policy drops the dreadful catchphrase "in the context of sustainable development" which ensures any interdepartmental battle is lost before it is begun.

## NOISE EVENTS 2010/11

### 9th September

#### WHERE NOW WITH WIND TURBINE IMPACT ASSESSMENT?

Epuk wind turbine conference to be held in Birmingham  
www.environmental-protection.org.uk

### 15th-18th September

#### DESIGNING SOUNDSCAPE FOR SUSTAINABLE URBAN DEVELOPMENT

A conference on soundscape and urban planning to be held in Stockholm. More details on www.soundscape-conference.eu

### 30th September-1st October

#### EAA EUROREGIO 2010

Congress to be held in Ljubljana, Slovenia. More details on <http://lab.fs.uni-lj.si/sda/euroregio>

### 13th October

#### EPUK NOISE UPDATE

Epuk noise update conference to be held in Aston, Birmingham  
www.environmental-protection.org.uk

### 18th-22nd October

#### 10TH INTERNATIONAL WORKSHOP ON RAILWAY NOISE

Workshop to be held in Nagahama, Japan [www.rtri.or.jp/IWRN10/](http://www.rtri.or.jp/IWRN10/)

### 29th October

#### TOWARDS A GREATER AWARENESS OF LOW-NOISE OUTDOOR MACHINERY

Conference organised by the EC to be held in Brussels  
website <http://ec.europa.eu/environment/noise/workshop.htm>

### 2nd – 3rd November

#### PRACTICAL ACOUSTICS IN AN EVER CHANGING WORLD

IoA autumn conference (in association with the ANC) to be held at Austin Court, Birmingham, contact Linda Canty, IoA 01727 848195

## 2011

### 23rd-27th May

#### NOISE ACTION WEEK

Co-ordinated by Environmental Protection UK  
www.noiseactionweek.org.uk

### 27th June – 1st July

#### FORUM ACUSTICUM 2011

to be held in Aalborg, Denmark. Website [www.fa2011.org](http://www.fa2011.org)

### 4th – 7th September

#### INTERNOISE 2011

to be held in Osaka, Japan. [www.internoise2011.com](http://www.internoise2011.com)

## INTERESTED IN CARBON?

By popular demand, we are trialling a supplement covering carbon and how to cut it. *Carbon Reduction Bulletin* is aimed at people who need to know how others are tackling carbon reduction.

You should have had issue four with this issue of noise. To ensure you get your own copy, tell us if you want it sent to you direct!



*Jack Pease*

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