Vol 37 No 6 November/December 2012

# ACOUSTICS BULLETIN

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*plus…* **Why it is so important to save the Musical Acoustics Group**

House prices and aircraft noise

Planning and noise – implications of the Planning Policy Framework 2012

Institute of Acoustics

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Vol 37 No 6 November/December 2012


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**Front cover photograph:** The regulation of places of entertainment remains a significant and important function administered by local authorities.

The Institute of Acoustics is the UK's professional body for those working in acoustics, noise and vibration. It was formed in 1974 from the amalgamation of the Acoustics Group of the Institute of Physics and the British Acoustical Society. The Institute of Acoustics is a nominated body of the Engineering Council, offering registration at Chartered and Incorporated Engineer levels.

The Institute has over 3000 members working in a diverse range of research, educational, governmental and industrial organisations. This multidisciplinary culture provides a productive environment for cross-fertilisation of ideas and initiatives. The range of interests of members within the world of acoustics is equally wide, embracing such aspects as aerodynamics, architectural acoustics, building acoustics, electroacoustics, engineering dynamics, noise and vibration, hearing, speech, physical acoustics, underwater acoustics, together with a variety of environmental aspects. The Institute is a Registered Charity no. 267026.

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**14-16 November 2012**
Organised by the
Electro-acoustics Group
**Reproduced Sound 2012**
*Brighton*

**27 November 2012**
Organised by the
Measurement and
Instrumentation
and Young Members' Groups
**Basics of measurement – practical implementations**
*Watford*

**28 January 2013**
**HOSANNA (HOlistic and Sustainable Abatement of Noise by optimised combinations of Natural and Artificial means)**
*London*

**21 March 2013**
Organised by the
Measurement and
Instrumentation Committee
**Making smooth the rough – the latest in measuring human vibration**
*Buxton*

Please refer to
**www.ioa.org.uk**
for up-to-date information.

## Dear Members

As I write this letter summer has just ended, the university year is just beginning, and the weather has become cold and autumnal. This means of course that the "conference season'" is upon us. When you read this two of our annual conferences – the Autumn Conference and Reproduced Sound – will be imminent. I feel very proud to be a member of an Institute that is able to organise such a large number of interesting meetings and conferences every year – it is an indication of our pride in the fascinating subject of acoustics, and a tribute to our members and to our office staff. If you hear a paper which particularly impresses you at a conference don't forget to note it on your feedback form so that it can appear in the Bulletin. And if you know of any other topics/authors that would provide interesting technical articles tell the editor or Publications Committee who are always on the lookout for good material.

You might see a familiar face if you attend a conference or visit the IOA office this autumn. Roy Bratby, our former Chief Executive, has very kindly agreed to act as part time Chief Executive following Kevin's resignation this summer. Council are now in the process of appointing a new Chief Executive to take the Institute forward, and there will hopefully be some good news to report in my next letter.

You may remember that in my last letter I anticipated some reports in the media of noise issues at the Olympics and Paralympics. The only mentions I heard were references to the "wall of noise", which was reputed to encourage the athletes. I had my own experience of this "wall" and found it unbearable. It was many years since I last attended a large sporting event and I was appalled at the noise. When did it become a feature of such events to have music played so loudly that it hurts the ears and drowns out all other sound? Maybe some members could enlighten me as to why excessive noise is deemed to be a necessary feature of sporting events. My worst experience was at a Paralympic sitting volleyball match at the ExCel Centre. The music was so loud that it was impossible to hear anything else and the commentator was screaming to be heard above the noise (unsuccessfully in my case). I was in a group of friends and family whose ages ranged from 17 to mid-60s and we all felt the same. The noise hurt our ears and actually made me feel quite ill. My daughter measured the noise on her iPhone (my colleague Stephen Dance has shown that iPhone measurements are fairly accurate for steady broadband noise) and it fluctuated around 92 dBA. There must also have been a very high level of low frequency noise. In the break between games two of us complained to one of the "Games Makers". I was very impressed by how our complaint was taken seriously. We were referred to one of the organisers who then asked if we would like to make an official, written, complaint to one of the venue staff, which we did. Amazingly, when we returned for the second match the noise level was about 10 dBA lower, and remained so throughout the game. It was so much more pleasant and I was extremely impressed by the way in which our complaint was handled and the fact that it was taken seriously and acted upon immediately. The only downside was that Team GB were playing in the second half and they lost. I hope I was not responsible... ◘

Bridget

Bridget Shield, President

# The long-awaited replacement of BB93

*Report by Andrew Parkin*

Starting in late 2008, many people have given up a lot of their time and resources with the noble aim of revising and refreshing BB93. Since its release in 2003 and adoption as a means of compliance with Part E4 of Building Regulations, BB93 has had a positive impact on the way we have designed schools, giving a sensible and practical framework for school buildings. Although only applicable to infant, primary and secondary education, BB93 has been adopted by many Further and Higher education providers also, in addition to forming the basis of BREEAM credits.

However, the way schools are designed now is not the same as in the early 2000s. The strain started to show during BSF when it was found that BB93 could not give adequate tools to design open plan teaching (remember *transformational learning*, anyone?). Recently during the second Academies Framework, where many schools have been refurbished, further problems occurred as the scope of BB93 does not adequately cater for refurbishment and change of use.

In essence, there was nothing really wrong with BB93 – it just became outdated. After many frustrating false starts and draft revisions, the Department for Education has now published "Acoustic performance standards for the Priority Schools Building Programme". This document is freely available on the DfE website and forms the acoustic section of the Output Specification, replacing the performance criteria of BB93 for the purposes of this building programme. Although published by EFA, this document is authored by IOA and Association of Noise Consultants members.

In order to be formally adopted as a means of compliance with Part E4, the document will need to go through a statutory three-month consultation period. This period is likely to start in late 2012.

The basic framework of the new document is not significantly different to BB93. However, content has been updated and revised as considered necessary by the contributors, based on experience of using BB93. Key features include:

- Clear scope of where, when and how the document applies
- Specific criteria for refurbishments
- Limits on the extent of Alternative Performance Standards, whereby they can be no more extensive than conditions for refurbishments
- Comprehensive description of what constitutes Special Educational Needs
- Minor revisions to target indoor ambient noise levels, sound insulation (airborne and impact) and reverberation times
- More extensive lists of area use types
- Deemed to satisfy ventilation types based on external noise levels, all based on achieving target values for concentration of CO2 in teaching areas
- Replacement of $D_{nT(Tmf,max)}$,w with $D_{nT,w}$ (where $T_0$ = 0.5 seconds)
- Composite $R_w$ value option for elements dividing teaching areas and corridors
- Replacement of $L'_{nT(Tmf,max),w}$ with $L'_{nT,w}$ (where $T_0$ = 0.5 seconds)
- Wider frequency range than standard $T_{mf}$ for SEN
- Relaxation of $T_{mf}$ in sports halls from 1.5 to 2.0 seconds, together with comprehensive guidance for compliance
- Extended criteria for open plan, together with comprehensive guidance for compliance
- Strong recommendations for pre completion testing, using the ANC Good Practice Guide for Testing as a reference.

This published document only gives performance criteria, with minimal explanation of how to meet the performance targets and no worked examples. DfE was keen for this element of the guidance to be written by Industry and therefore proposals are for a working party to be formed jointly by the IOA and ANC to make this happen. The ambitious plans are for this second document to be ready for publication in early 2013 that will then be of use to designers of the second wave of PSBP schools.

The IOA Building Acoustics Group conference on 6 November will contain a session on the published document, reflecting on whether it has given acousticians the extent of changes we have been asking for. The ANC conference on the following day will then have a session on practical aspects of the document, the proposals for Section 2 and a panel discussion.

***Andrew Parkin** is a member of the IOA Building Acoustics Group and Chair of the Association of Noise Consultants' Schools Committee. Andrew can be contacted on a.parkin@cundall.com*

Classroom acoustics standards are under the microscope

# Keith wins top US award for pioneering landmine detection research

## Sound-based method has 98% success rate in army trials

IOA Education Manager Keith Attenborough has won a prestigious award for his pioneering research into the way the ground is excited by sound, which has subsequently been used to develop a way of detecting buried landmines remotely.

Keith, a Research Professor of Acoustics at the Open University, was presented with a silver medal in noise from the Acoustical Society of America (ASA) in Kansas City, USA in October.

Among the first scientists to look at the physics of the interaction of airborne sound with the ground, he has been working on the concepts behind the acoustic landmine detection method for more than 20 years.

He said he hoped that the sound detection techniques would be used in the future to locate buried landmines and eventually help to save lives. "This new technique detects the unusual seismic activity induced by airborne sound directly above a buried landmine, using either a geophone – which is used by geophysicists to measure ground layering with a seismic refraction test – or with a laser beam device."

Colleagues from the University of Mississippi in the USA tested the laser beam method in certain "blind" trial areas provided by the US Army and found that the sound detection method located 98% of buried mines, while a team using current detection methods, which involve ground penetrating radar, detected only 67%.

His research on sound-to-ground coupling in Mississippi was supported financially by the US Army Corps of Engineers and his more recent work on buried landmine detection was supported in the UK by the Defence Science and Technology Laboratory.

The medal also recognises his work on outdoor sound propagation, which, apart from a textbook published by Taylor and Francis in 2007, has recently resulted in a three-year, £860,000 project, funded by the EPSRC, determining the agricultural ground structure using a loudspeaker and laser beam system to find out how easy it is to grow plants in different soils. Manchester University and Rothamsted Research, Harpenden, are also engaged on the project, which could benefit soil scientists, farmers and the agricultural community.

Keith is also involved in a £3.2 million three-year European Community-funded project, HOSANNA, researching ways of altering the ground instead of building barriers between and beside road carriageways which are cheaper, lower, more environmentally friendly and more functional than existing high barriers.

He added: "Over the years I have explored the technical areas that are important to the design of noise control materials and improving outdoor noise prediction, including fibrous and granular acoustic materials, the properties of porous grounds, the interaction of sound between air and ground surfaces, the propagation of sound in the atmosphere, and the effectiveness of noise barriers."

IOA Education Manager Keith Attenborough

# Search begins for a new Institute Chief Executive

The Institute of Acoustics is searching for a new Chief Executive after bidding farewell to Kevin Macan-Lind who stepped down in September.

Until his successor takes up the appointment, former Chief Executive Roy Bratby will serve in the role in a part-time capacity.

Bridget Shield, IOA President, said: "We are very grateful to Roy for agreeing to come back on a part-time basis. Council would like to thank Kevin for his six-and-a-half years' work with the Institute and to wish him well for the future."

Kevin said he felt the time had come to pursue other interests. "I will miss my colleagues at head office and the many members whom I have met at conferences and the myriad of committee meetings.

"The current team in St Albans is the best yet and I leave the IOA in safe hands.

"I am sorry if I didn't have a chance to say goodbye to everyone before I left, but if anyone wants to get in touch my email address is **kevin@bowiewonderworld.com**"

Kevin Macan-Lind

# IOA wind turbine noise consultation London workshop

*Report by Richard Perkins*

Forty delegates gathered in September at London South Bank University for a conference and workshop to discuss the Institute's consultation document on *A good practice guide to the application of ETSU-R-97 for wind turbine noise assessment.*

Richard Perkins, of Parsons Brinckerhoff and chairman of the Institute's noise working group, chaired the event and gave the first paper on the background to the consultation process.

He explained that the consultation document was fairly lengthy, but that this was done on purpose to aid understanding of the various issues, and to ensure informed responses could be made on those issues. The final good practice guide would be much more succinct.

He then went on to explain the process to be undertaken following the end of the consultation. Once the consultation responses have been analysed, the working group will then consider any new or outstanding issues brought up by respondents, and set about drafting the final guide for publication in the first half of 2013.

He acknowledged that more work was already being undertaken by equipment manufacturers to answer the issue of wind shield suitability for wind farm noise assessments, but that the group could not provide definitive guidance on the issue of amplitude modulation in the absence of the RUK reports which are still awaited.

The next paper was on background measurements, by Bob Davis of RD Associates. Despite a sporting injury, Bob managed the journey into London to explain to delegates the process of acquiring the noise, wind and rain data, the pitfalls and the factors to take into account. He noted that the working group had suggested what could be considered a "robust" dataset, and invited feedback on whether the right balance had been struck.

Malcolm Hayes, from the Hayes McKenzie Partnership, then gave a paper entitled *Data Analysis and Wind Shear*. Explaining why wind shear is an important part of a wind turbine noise assessment, Malcolm showed a number of graphs to illustrate how wind shear can impact on an assessment, and how it can be factored into an assessment. He then went on to explain how to analyse the data collected, how to identify and remove anomalous data and to present a robust relationship on which ETSU-R-97 noise limits can be derived.

The next paper was presented by Matthew Cand, of Hoare Lea Acoustics, on the topic of wind turbine noise prediction. Not covered in ETSU-R-97, Matthew discussed the method the working group believes provides the most repeatable and reliable propagation results for wind turbines, and the various parameters that should be applied to ensure atmospheric effects are not overstated, and the research undertaken on which these recommendations are based.

The final paper was presented by Richard Perkins on the subject of cumulative impacts on behalf of Chris Jordan, an environmental health officer on the working group. Richard described Chris's experiences of assessing more than 100 wind farm noise reports, and provided examples of bad practice which included a photo dubbed "Where's Wally?" as the equipment was located in a hedge. The talk led up to an illustration of the type of cumulative impact issues that are becoming more common place now that the "infill" sites are being targeted by developers close to existing sites as a precursor to the workshop session.

The delegates were then separated into three workshop groups to consider the issues of data collection, propagation and cumulative assessments. Following a number of interesting debates, a representative of each group reported back to the assembled group at the end of the conference with the points discussed. More on this feedback and other consultation responses will follow in a later article.

The IOA Noise Working Group would like to thank all the delegates who attended for an interesting and useful debate of some of the issues in the consultation.

Consultation update: At the time of writing, 50 full responses to the consultation have been received from a variety of respondents, from consultants, developers, local and central Government departments and other interested parties. The working group is looking forward to considering these in due course, and would like to thank everyone who has responded for their hard work.

# Sixty-two more applications for IOA membership approved by Council

Sixty-two applications for Institute membership were approved by the Council in September following recommendations by the Membership Committee.

Of the total, 25 were upgrades, the remainder were for new or re-instated membership. Two applications were for sponsorship membership.

## Member

Alonso Martinez I
Arbabi R
Bayles D
Bhalla P
Biggs C J
Boyle M
Cockcroft S G
Coles D G H
Davis G
Dentoni R
Fan A C H
Fenton R
Gillan S
Hale D J
Hiernaux A M
Howard C
Jedzura P S
Johnson N
Kennedy R P
Lakhiani S
Lane M J
Longdon C D
Lucas T J
McBride N
McDevitt I R
McNulty R
Robinson M K
Shiers N J
Singh M
Van Der Harten A W J

## Associate Member

Abraham D
Bligh J W
Booth R P
Dobinson N A
Goodfellow M P
Heath M D
Hoyle P
Katiyar N
Mills J O
Nurse J M
Piper B J
Priestley C A
Robinson M C
Russell-Smith B J
Taylor P
Valmorin E
Waters G L
Wickens G J
Williams P T
Wiltshire M
Yates D J C
Zeman J

## Affiliate

Thomas C R

## Technician

Beckingham W O
Mart J
Nazarko C
Poths THP
Spencer S
Underhill M A

## Student

Jackson M

## Sponsor

Farrat Isolevel Ltd
Pulsar Instruments PLC

# Responding to the END by demonstrating the benefits of grinding on the GB rail network

## Midlands Branch meeting

*Report by Kevin Howell*

In August the Midlands Branch returned to the Arup Campus in Solihull, where Oliver Bewes of Arup described a project commissioned in January 2012 by Network Rail (NR) who wished to assess the benefits resulting from the marked increase in rail grinding activities that they had initiated in 2004. The study used methods developed by AEA Technology Rail for Defra in 2004, and was supported by Rick Jones.

Olly began with an overview of railway noise, and showed that rolling noise is the predominant source on the GB network. Rolling noise is generated by wheel/rail roughness; the vertical profile of the wheel/ rail running surfaces. The AEA report had proposed Acoustic Track Quality (ATQ) as a measure of the condition of rails. ATQ was defined as the difference between the pass-by noise level of a single vehicle measured at 25m and the noise level that would be predicted using Calculation of Railway Noise (CRN). ATQ for the GB network was estimated indirectly by noise measurement using microphones mounted on the underside of a BR mk3 passenger coach on the East Coast mainline and measuring the transfer function between the under-carriage microphone and noise level at the wayside at 25m. The average ATQ was found to be +4dB, i.e. noise levels for smooth wheeled rolling stock operating on the network were, on average, 4dB higher than would be calculated by CRN. This value was subsequently used as a global track quality parameter in the first round of END noise mapping.

In 2004 NR implemented a new grinding strategy to reduce rolling contact fatigue. Additional grinding machines were introduced and now work on a cyclic basis across the network. Since 2009 sections of mainline have typically been ground every one to two years on straight sections and six months on curves. This represents a step increase in the amount of maintenance grinding and some benefit in terms of reduced noise levels was expected.

To assess this, NR re-commissioned a microphone system mounted under a Mk3 coach on their new measurement train. This now covers the majority of the network every 13 weeks and mainlines every two to three weeks. Once again the transfer function between coach-mounted and wayside noise levels has been derived, and the average ATQ calculated. The results show the average 2012 value to be -4dB, potentially a dramatic reduction of 8dB in rolling noise levels since 2004.

This result seemed too good to be true, although it is supported by direct railhead roughness measurements which showed reduced levels of roughness. Further verification is required before this figure can be assumed typical of the whole network, and further direct roughness measurements are being considered. However, the 2012 results strongly suggest that NR's change in grinding strategy since 2004 has significantly reduced wayside noise levels and that the ATQ value of +4dB is no longer valid. NR has recommended that for the second round of END mapping, currently in progress, an ATQ of 0dB should be incorporated.

Many thanks go to Olly for his excellent presentation and once again to Arup for providing the venue.

# The National Planning Policy Framework

## What happens to noise policy-decision-making in a vacuum?

*Report by Andy McKenzie and Graham Parry*

The Institute of Acoustics has now run two one-day meetings on the National Planning Policy Framework NPPF which has effectively brought together and replaced a number of planning policy documents including PPG24, Planning and Noise. The conferences were held at London South Bank University in June and in Birmingham in October. Because of the lack of definitive quantitative guidance on assessment for either noise sensitive or noise producing development, the meeting asked 'What happens to noise policy decision-making in a vacuum?'. The title had been chosen by the joint chairmen Andy McKenzie of Hayes McKenzie Partnership and Graham Parry of ACCON-UK to address the need for a uniform approach to planning and noise which many feel has been left without firm direction since the revocation of PPG 24 'Planning & Noise'. The London meeting sold out rapidly so was followed up by the second meeting in Birmingham to give more delegates the opportunity to share their views.

The overall feeling from the speakers was that, although there was almost certainly a technical guidance vacuum, the NPPF was there to provide a policy framework as a backdrop to whatever technical guidance was felt to be necessary and that, because it existed only as a framework, the technical guidance could be continually updated as new information becomes available.

The opening presentation by Stephen Turner of Defra covered the noise policies in the NPPF and the link with the explanatory note to the Noise Policy Statement for England (NPSE). He began by canvassing the delegates as to whether they felt that there was a policy vacuum and remarked that he hoped to demonstrate that the policy landscape was not as bare as some might otherwise think. He first explained that Nationally Significant Infrastructure Projects (NSIPs) have their own rules and fall to be determined as set out in the Planning Act. The NSIPs are supported by national policy statements which included those for energy, ports and waste water etc with other documents currently being developed. These documents all include specific references to noise, although even he recognised that the references to noise were far from exhaustive. Stephen referred to the European Noise Directive (END), as it wasn't mentioned in the NPPF, and said that the END is a subset of overall policy. He highlighted the four bullet points in NPPF paragraph 123 but was careful to mention that this wasn't the whole picture and that the document should be taken as a whole with particular reference to sustainability. He also reiterated that the NPSE is the government's policy on noise and that it is reflected in the NPPF with five principles of sustainable development referred to in both the NPPF and the NPSE, thus providing a firm link between the two. He then introduced the three effect level terms in NPSE; no observed effect level (NOEL), lowest observed adverse effect level (LOAEL) and significant observed adverse effect level (SOAEL) and the fact that it is not possible to have a single objective noise-based measure for any of them that is applicable to all noise sources in all situations. In particular, further research is required to increase P10

P9 understanding of what may constitute a significant adverse impact for given situations. There is a 12-month transition period during which decision-makers may continue to give full weight to earlier policies and local plans should not be considered as out of date simply because they were adopted prior to the framework. Stephen provided a little more information at the Birmingham conference as to why mineral extraction noise was included in the Technical Guidance for the NPPF, possibly as a result of questions put to him at the first conference, and commented that he understood that as MPS2 was relatively recent and minerals companies needed certainty in going forward it had seemed appropriate to include that within the technical guidance. The framework should, however, now be taken into account in preparing plans and due weight should be given to relevant policies in existing plans according to their degree of consistency with the framework. He highlighted the fact that, for many situations, PPG24 didn't give detailed information. Stephen did show how the old Noise Exposure Categories in PPG 24 and those which at one time were being developed for PPS24, might be linked to NOEL, LOAEL and SOAEL. For some in the audience, and certainly the chairmen of the conference, this could possibly be taken as a clear steer as to how they might develop technical guidance within local authorities. Stephen concluded by saying: "There is no policy vacuum, we now have a clear definition of the desired noise management outcomes, that flexibility of approach now exists which will take account of context for which a large amount of supporting information exists".

Greg Harris of Arup Acoustics then presented a paper, originally prepared by his colleague Richard Greer, looking at the NPPF in relation to transport and noted that, although the word "noise" is only used 11 times in the 30,000 words in the NPPF framework, this doesn't mean it is not integral to its "golden thread"' of sustainability. Greg yet again stood in for Richard Greer who was unavailable and did so admirably. His view was that the framework is very clear about the outcomes, and so perhaps there isn't a vacuum. He noted that although the NPPF is light on detail in terms of specific references to noise, it does refer to the NPSE, which gives much more direction in terms of what is trying to be achieved. The result may well be more sustainable development than under PPG24 and that "we are moving away from a more formulaic assessment approach". Greg highlighted the balance to be made between noise and other sustainable issues and this was a recurring theme in his presentation.

Temple Technical Director Dani Fiumicelli said:"We are no longer looking at noise within the context of simply the physical values, we are looking to balance it against other guidelines and criteria. The NPSE aim of, where possible, contributing to the improvement of health and quality of life could be used to counter or minimise 'creeping' background and ambient noise levels'". Dani suggested that: "Where it is justified within government policy on sustainable development, local authorities can use this to seek a fairly stringent standard of noise control". He wondered whether technical advice was needed and concluded that it was. PPG24 was a hybrid of policy and technical advice and, as it was difficult to change policy, some of its advice had become obsolete. Rather than incorporate specific technical advice, PPG24 pointed people to other guidance which still applies today including BS5228, BS8233:1999, ETSU-R- 97, BS4142:1997, WHO guidelines etc. The lack of fixed values for SOAEL provides flexibility to permit local consideration of specific issues. Dani concluded that we are not short of national policy – what we are short of is officially sanctioned national technical guidance. He commented that most LAs have technical guidance but it is very variable. Noise has to be assessed and judged in each case in the context of wider sustainability objectives and the effects of specific sources and any technical advice will also need to be flexible enough to accommodate this broader approach.

Colin Cobbing* of ARM Acoustics discussed noise and development control and the opportunities provided by the NPPF. Colin's enthusiasm as to how the NPPF could be utilised to bring about exemplary acoustic design knew no bounds and he warmed to his theme even more than he had at the first conference. PPG24 was all about guiding development without placing unreasonable restrictions on, or adding unduly to costs and administrative burdens of, business. It dealt with both new noise-generating and noise-sensitive developments, and sought to separate the two. "In essence, PPG24 was a zoning instrument," he said. "Did PPG24 help to deliver healthy places to live and work?" he wondered. Its thrust was the prevention of negative situations, he felt. It did not have a strong thread about promoting good practice, unlike the NPPF which deals specifically with areas such as achieving sustainable development, requiring good design, promoting healthy communities and in conserving and enhancing both the natural and historic environments. He pulled out phrases such as "...well- designed buildings and places can improve the lives of people and communities". "If that's not related to noise, then I don't know what is," he said."If you put noise within the wider context, you can see that it is potentially very strong within the overarching framework," he said. But there are issues, such as how "significance" should be assessed in regard to SOAELs, and the NPPF's use of the phrase "should aim to" he said. "Just how much we should try to avoid and minimise is a key question." There are real opportunities to do better, by following the NPPF and working with determination. "The burden clearly falls on local authorities to act with that degree of determination," he said. He would also like to see the development of technical guidance. Exemplary projects and improvements to the evidence-base around good acoustic design are also needed. He sees the IOA as potentially being an important player in helping local authorities to develop their technical guidance. "Each of us has a role to play in terms of ensuring the promotion of good acoustic design as an integral part of the development and design process," he said. "We should be banging on the architect's door." Acousticians need to be brought in right at the beginning, so that the issues are addressed early on rather than "using acoustic design as a sticking plaster". He welcomed the Ministerial Foreword to the NPPF which said "Our standards of design can be so much higher.....Planning must be a creative exercise in finding ways to enhance and improve places in which we live our lives". This was the clarion call which Colin challenged us all to rise to with the possibility that the IOA could play an important role in this process.

Mike Rickaby of the London Borough of Hillingdon provided a local authority officer perspective on planning and noise. Mike said that his authority would continue using its Supplementary Planning Document (SPD) on noise for guidance in relation to planning and noise, even though it is based on PPG24. "There is no technical appendix to the NPSE and so local authorities have the flexibility to develop local noise policies and standards," he said. Hillingdon's SPD on noise was adopted in 2006 and takes account of local circumstances, including the presence of Heathrow. In particular, Hillingdon's SPD had been through a lengthy consultation process with many local stakeholders including BAA. The SPD uses the noise exposure categories (NECs) of PPG 24 but with some refinements. Mike went on to examine case studies of noise within his authority and explained how he needed to deal with different development rights for microgeneration equipment, citing a case study involving an air source heat pump (ASHP).

In a departure from many IOA conferences, the greater part of the afternoon sessions was devoted to workshop sessions which invited the attendees to consider what place certain aspects of existing noise guidance might have in future Technical Guidance. The subjects covered included:

- The use of BS8233 in determining the acceptability of new residential and other developments
- What role does BS4142 now have?
- WHO Guidelines – can they continue to inform new development decision making?
- What parts of PPG24 should be saved?
- How do we define 'areas of tranquility' and what do we do about them?
- The END is not referred to in the NPPF or the NPSE – Does it form no part of current UK noise policy?
- Is noise a pollutant? (London meeting only)
- Is the Scottish Technical Guidance useful for England (London meeting only)

## BS 8233 discussion

The role of BS 8233 in planning was still considered appropriate in terms of design recommendations for new buildings affected by existing noise sources and could possibly be used as a replacement for the criteria in PPG24. Extending its scope to include advice on P12

P10 acceptable levels of noise from new noise sources affecting existing buildings was explored, but met with no enthusiasm. The new government policy encourages the use of good acoustic design, but it was noted that this did not explicitly refer to the levels listed as "good" in Table 5 of the standard. Views were divided on the function of the good and reasonable levels in this table. The good standards were considered to be aspirational in planning terms. Concern was expressed that a 10 dB range in the internal daytime levels for dwellings was too large and that a BS4142 approach may be better for day-time assessment purposes. It was also noted that the recommendations are restricted to anonymous noise sources and it would be helpful to include guidance on dealing with other characteristics of noise, e.g. tonal or intermittent noise. The 5 dB correction given in BS 4142 could be adopted or the range of adjustments given in ISO 1996-1 would provide a more flexible approach. Finally, concern was raised about the advice on individual noise events in bedrooms and advice on the number of events an hour or night would be helpful – the use of $L_{A1}$ rather than $L_{Amax}$ was considered to be a better way to limit this type of noise. Some of BS8233 was considered to be out of date, particularly in respect of design for office space.

## BS 4142 discussion

The key points that came out of the discussion were that BS 4142 will still be helpful and in line with good basic principles. A suggestion was made in relation to adopting BS 4142 into supplementary planning documentation for individual authorities as some people had already erroneously expressed the view that the publication of the NPPF had killed off the use of BS4142. There was discussion around a draft standard, BS 9142, which used a matrix approach to determine which, out of a suite of methods of assessment, would be useful and appropriate although ultimately that draft standard had not been published. The workshop noted that BS4142 is being reviewed and the question was asked what should be in the review. The ANC Workshop on 19 October should go some way towards addressing this. It was noted specifically that; the definition of background noise in BS4142 is fairly poor and needs updating; more examples are required; a sliding scale is needed for character correction; the 30 dB (background) and 35 dB (source noise) limitations need further clarification; the -10, +5 and + 10 benchmarks should be removed and consideration should be given to dealing with low frequency noise. Also, should BS4142 include assessment of SOAEL etc, should it include a sustainability weighting and could/should cost aspects be considered i.e. what is the value of the project and what is the cost of the mitigation? Finally, using BS 4142 to assess the effect of bringing people to noise is a very different proposition compared with its designated "proper" use. Some felt that this was wholly inappropriate, whereas others thought that in the absence of anything else it was a useful method of assessment. Better guidance is needed on the character correction and it would be helpful if guidance could be sought on what is "significant".

## WHO discussion

The key points which were aired in this discussion related to the way in which the guideline levels provided in the WHO could potentially be used for the SOAEL, LOAEL and NOEL and the extent to which the WHO guidance could be applied to the UK as it had been effectively over-ruled in some planning cases. Additionally, people tended to concentrate only on the noise levels within the table in the document as opposed to the wider issues of noise which it sought to address. The Birmingham meeting felt that it was not a planning or assessment instrument and that it was misused in this respect; its key role was to provide aspirational values with relevance to "health" considerations only.

## PPG24

It was noted that PPG24 is mostly concerned with noise sensitive development and the guidance on the development of the PPG24 NEC categories is mostly still available, so it could form the basis for future assessments in any case. It was hoped that a "set of numbers" might emerge in due course including recommendations as to limiting values of LAmax or similar as this was previously missing in the now revoked standard. Noise from new developments also referred to existing information and standards which could continue to be used.

## The END

It was noted that this mostly focused on noise mapping and that, although detailed mapping could be useful for developers and regulators, strategic maps were less useful although they were useful for looking at the economic costs of road traffic noise. They should be extended down to 40 dB at night although it was recognised that there were significant technical challenges in carrying out that exercise with any reasonable level of accuracy. It was noted that noise maps don't present the whole picture and that sleep disturbance may be affected by other factors (including LAmax!). The use of noise action plans was discussed together with the possible use of similar EEC limits to those for air quality although it was noted that this kind of approach seemed to invite developers or others to work "up to the limits" (the public and other professionals like limits). The overall feeling was that most people had not had much exposure to the directive.

## Tranquility

The NPPF specifically refers to identification and protection of areas of tranquility. The view was that this was quite different between urban and rural areas and that tranquil was not necessarily the same as quiet. It was felt that some kind of "designation" may be required for clarification purposes (i.e. the intent is not clear) but that such areas could be identified in local plans or similar. The reference to tranquility in NPPF paragraph 123 should not necessarily be co-joined with the reference to Local Green Spaces in paragraphs 76 and 77 however as the intent of this appears to be different. Various existing initiatives were discussed including CityHush which had used Bristol as a pilot study to determine the noise and cost benefits of establishing Quiet Zones, and other similar schemes together with various definitions of tranquility which had been proposed. It was observed that the impression of tranquility could be given by increases in noise rather than decreases providing such noise was natural rather than of human origin.

## Scottish Technical Guidance

The Planning Advice Note (PAN) 1/2011 provides advice on the role of the planning system in helping to prevent and limit the adverse effects of noise. It superseded Circular 10/1999 Planning and Noise and PAN 56 Planning and Noise. Information and advice on noise impact assessment (NIA) methods was provided in an associated Technical Advice Note with the inclusion of spreadsheets to assist in the assessment process. PAN 1/2011 includes details of the legislation, technical standards and codes of practice for specific noise issues and promotes the principles of good acoustic design and a sensitive approach and consideration of the location of new development. It seeks to promote the appropriate location of new potentially noisy development, and takes a pragmatic approach to the location of new development within the vicinity of existing noise generating uses. The idea is to ensure that quality of life is not unreasonably affected and that new development continues to support sustainable economic growth. It suggests that environmental health officers and/or professional acousticians should be involved at an early stage in development proposals which are likely to have significant adverse noise impacts or be affected by existing noisy developments. Interestingly, it had been reported by some local authorities that it had not been specifically utilised to inform their decision making although that stance might well be challenged in the future. The group agreed that whilst they did not have the advantage of having reviewed the Scottish Technical Guidance in detail, as they were mostly England centric, it was important to have some technical guidance in order to ensure a relatively uniform approach which could be justified through the planning process.

## Is noise a pollutant?

The view was – yes it is!

Summing up on both afternoons, Graham Parry thanked the speakers, the session facilitators and the rapporteurs for their contributions to what had been thought provoking conferences. It was accepted that there was a clear and relatively urgent need for technical guidance and the main question was whether that guidance should come from a professional body such as the IOA or from Government. **See page 34 for a detailed report from Colin Cobbing based on his paper.*

# Stephen Turner awarded Honorary Fellowship of the IOA

Stephen Turner has been awarded an Honorary Fellowship of the Institute of Acoustics "in recognition of the respect he has earned from peers and colleagues, in recognition of his continuing contribution to acoustics, and in recognition of his significant contribution to the IOA over many years".

He was officially presented with the award by IOA President Bridget Shield at the Institute's National Planning Policy Framework conference in Birmingham in October. Below is the citation for his award, which was read to the meeting by his former colleague Colin Grimwood.

Stephen graduated in engineering from King's College Cambridge in 1975 and obtained an MSc in Applied Acoustics from Chelsea College in 1980 under Geoff Leventhall.

He joined the Greater London Council (GLC) in the late 1970s to work alongside some of the early pioneers in the field of noise and vibration control such as George Vulkan. It was at the GLC, and with his involvement in the control of the development of Heathrow Airport and Battersea Heliport, that the seeds were sown for Stephen's career long interest in aviation noise.

After the demise of the GLC, Stephen and the team were taken on by the London Residuary Body, until a permanent home was found in private consultancy at the Civil Engineers Rendel Palmer and Tritton. Over the following years his employer passed through a series of name changes including London Scientific Services (LSS), TBV Science, Stanger Science & Environment, Casella and then finally Bureau Veritas (BV). While at BV, Stephen, together with his colleague Colin Grimwood, was an architect of the Noise Policy Statement for England – an important document that should shape the future of noise management policy for many years to come. Relatively recently Stephen took an opportunity to move back to the public sector and to his present position of Head of the Technical and Evidence Team - Noise and Nuisance at Defra, the government department with overall responsibility for environmental, neighbour and neighbourhood noise matters in England.

Stephen first became a member of the IOA in 1980 and was elected a Fellow in 1994. He represented the Institute on the Noise Council for about 10 years and chaired the working party that produced the Code of Practice on Environmental Noise Control at Concerts. He was a founding committee member of the Institute's London Branch and the founding chair of the Institute's Environmental Noise Group. Stephen served on the Council as an ordinary member in the 1990s. He was appointed chairman of the IOA Meetings Committee in the late 1990s and was Vice President (Groups & Branches) from 2005 - 2011. In recent years he has chaired the joint IOA/IEMA working party that has been seeking to develop and agree guidelines for environmental noise assessment.

Stephen Turner receives his award from Bridget Shield

# Why you should keep your Continuing Professional Development up to date

*By the IOA CPD Action Team*

The IOA is taking a fresh look at Continuing Professional Development (CPD). This article provides key points that you need to know about the IOA scheme.

## What is it?

Professional development is the systematic maintenance, improvement and broadening of knowledge and skills and the development of personal qualities throughout your working life.

## Should I do it?

Under the IOA Code and Rules of Conduct (rule A1.1) it is a requirement that members at all grades shall undertake professional development. This includes you!

Becoming a member of the Institute implies a willingness to practise professional development. IOA members who have Engineering Council registration or who are members of certain other professional bodies are also obliged to do so in order to maintain their status.

If you think that you don't need to do professional development, ask yourself if you really know everything there is to know about the particular field of acoustics in which you work. Are you up to date with current standards, regulations, advances in acoustic technology, theory or instrumentation? The IOA conferences and regional branch meetings are a helpful way to keep up to date and maintain your professional development.

## What is the IOA CPD scheme and what do I need to record?

The IOA CPD scheme is not about collecting "hours" or "points" but is based on achieving goals. The scheme encourages members to consider their career and personal development. Members should formulate a personal action plan with aims and objectives.

Your personal action plan will be individual and may include both technical and non-technical aspects. There may be non-acoustic aspects of your work and development in these areas should also be counted as part of your CPD, while including an appropriate amount of acoustics.

Your CPD records should include your personal CPD scheme.

Members are encouraged to work with their employers in planning their professional development.

## Do I need to submit my CPD records?

At present, only members who are seeking upgrade or reinstatement to corporate membership (MIOA or FIOA) are required to provide evidence of their professional development and submit their records to the Institute.

However, it is an aspiration of the Institute that a proportion of other members of the IOA will be required to submit their CPD records on an annual basis for review. Members will be updated regarding these requirements.

## I already do another CPD scheme – do I need to keep separate records for the IOA?

You may already be recording your professional development as part of the requirements of membership for another institute or for a company scheme. The IOA does not expect you to maintain two sets of records; any professional development scheme could be appropriate provided that the records can easily be understood by a third party.

The IOA will continue to issue attendance certificates for those members who may wish to use them for other organisations that still operate a CPD scheme based on attendance at courses and meetings.

## What information is on the IOA website?

The professional development section of the IOA website includes information about the scheme with tips on how to get started, a simplified set of blank forms for your own use and an example of a completed form.

The IOA CPD scheme has been updated into a three sheet system. The previous separate sheets for short and long term goals have been merged.

IOA Sheet 1 (Profile of Competence and Needs) is intended to be the baseline reference list for your development goals, based on the new skills you believe you will need in the future.

IOA Sheet 2 (Professional Development Plan) may be used to set down your plan once you have identified your goals, priorities and timescales.

IOA Sheet 3 (Professional Development Record) can be used to keep a record of activities which have contributed to your professional development.

With all the information available on the IOA website, there's no excuse not to get started.

## How do I start?

The suggested professional development process is set out below.

1. Review current situation – before goals can be set, your current situation should be examined considering qualifications, experience, technical skills, current and future requirements of your job and career.
2. Identify and prioritise some goals, along with a time scale. Consider what skills and competencies you need to fulfil your goals.
3. Planning to achieve – after identifying and prioritising specific goals and the skills needed, a plan should be drawn up to help achieve them. Think about how to record your learning and who can help you. Discuss your plans where possible with your employer.
4. Record your learning using a system that works for you. The IOA can provide you with CPD forms but any appropriate system is satisfactory provided it can be understood by a third party.
5. Review your plan regularly (at least once a year), evaluate what you have learned and make changes where necessary.

Why not ask your manager or a senior colleague to discuss and oversee your plan? Managers: why not act as a mentor and encourage your staff to complete a plan along the IOA guidelines?

## I don't have the time…

If you think that you haven't got the time to do professional development presumably you've put a reasonable amount of time into getting to the career stage you're at; don't you think it's worth maintaining that level of expertise?

You are probably already doing CPD in one form or another but just haven't realised it. Get into the practice of keeping records of your objectives and achievements.

CPD shouldn't be viewed as an onerous task but instead as a means to regulate and control your career progression in a structured manner. As with most things, you may find it easier if you incorporate professional development into a regular routine, or include timetables or deadlines in your personal action plan to achieve certain goals – whichever method suits you.

# Why it is so important to save the Musical Acoustics Group

*By Mike Wright, Acting Chairman of the Musical Acoustics Group*

Following the Institute's membership survey earlier this year, 1,077 members responded out of a total membership of some 3,000. Of these, 45 members indicated that they belonged to the Musical Acoustics Group (MAG). One of the questions asked: would you be willing to be a member of any of the following IOA specialist group committees? Forty-eight members responded they would be interested in being a member of the MAG. I have already sent an e-mail to these people, but there could well be many other members who did not respond but are nevertheless interested in the group. The survey also revealed that members were interested in the following outline topics related to music and acoustics to be featured at conferences and/or regional branch meetings:

- Concert noise
- Contemporary music (the exciting acoustic design/thinking of young composers)
- Music studio acoustics and design
- Music technology
- Music therapy
- Opera house acoustic design
- Singing voice
- Studio acoustics.

You may be aware that there have been recent concerns over the future of the group and the fact that I am making efforts to revive interest.

I consider that this group has a very important part to play in the understanding of acoustics and keeping up with the latest research. It is worth the effort to ensure its future and I am very keen to get ideas up for future conferences and meetings. I am aware that many MAG members are researchers in universities. However, more than half of the respondents to the survey were consultants and it would seem that some members in this sector would also like to take an interest if they had time. Like me, many acousticians have strong musical interests.

I have recently become a "semi-retired freelance consultant" after more than 40 years in the industry. While employed, environmental and transportation noise and vibration became my mainstay. However, with an interest in music, I have always been keen to further explore musical acoustics. The long-hours demands of the consultancy sector tend to limit time for actively taking a personal interest in musical acoustics. Taking time out to attend meetings and conferences on musical acoustics can be difficult for members who earn their living from other aspects of acoustics. Now I have the time to work and build this group.

Some of you may be aware of the attempt to hold a one-day musical acoustics meeting in Cardiff last May. Despite widespread publicity to members and others in allied professional bodies such as architects and music institutions, the meeting had to be cancelled due to lack of support. Geographical factors were part of the reason, along with the fact that some members with an interest in musical acoustics were drawn to Acoustics 2012 which took place a few weeks earlier.

In an attempt to reform a committee for the group, I programmed an AGM in June to follow the IOA AGM at London South Bank University. While I had some apologies for absence, nobody actually turned up. After discussions with our newly elected President, Bridget Shield, and Geoff Kerry, Vice-President, Groups and Branches, it was agreed that further efforts should be made to "spark new life" into the group.

Getting a quorum together to hold a meeting in a given venue appears to be the main problem. While it was suggested that a meeting could be held at the IOA HQ, travelling distances may still discourage attendance. The possibility of holding a meeting by teleconferencing is also being considered. While this method may be possible for ordinary committee meetings, at present the IOA terms of reference for specialist groups would prevent holding an AGM in this way until details of how such a method encompassing the committee election process can be worked out. Since this would involve considering the requirements of other groups, it may be some time before it is sorted out. In the meantime and following Peter Dobbins' decision to stand down, the Council has appointed me as acting MAG chairman, with David Sharp continuing as group secretary.

I am very keen to get things moving and would be grateful if you could respond by indicating the following:

**a)** Are you still interested in being a member of the group?
**b)** Would you be interested in being a member of the committee for this group?
**c)** What is your geographic location?
**d)** Do you have any ideas for conferences and one-day meetings including costs?

Please reply to me by e-mail **mike@isaamnet.org** or by mail to the Institute of Acoustics by 30 November. I will reply to all members who express an interest, initially by e-mail or post. If you wish me to call you, please advise me of your telephone number and the best time to call.

Following this, an informal meeting of the group will be held at the IOA HQ with teleconferencing facilities arranged to enable all interested members to participate. I am optimistic that the group will then be able to move forward and I look forward to hearing from you.

Many IOA members are interested in concert hall acoustics

Ferenc Szelepcsenyi / Shutterstock.com

# Acoustic Challenges in Green Buildings 2012

*Report by James Healey*

With the continued focus on ensuring high sustainability in the built environment, every aspect of design and construction has been placed in the spotlight. In particular, the provision of high quality acoustic conditions in conjunction with ever increasing sustainable design goals necessitates the use of new technologies and design methods.

To explore the role played by sustainability in acoustic design, the Building Acoustics Group held, for the second year running, a one-day conference titled Acoustic Challenges in Green Buildings at BRE, Watford in September.

The meeting was well attended, with representatives from acoustic consultancies, university departments, environmental health departments and materials manufacturers. The day was split into four morning sessions, one afternoon session, followed by a tour around BRE's Innovation Park and acoustic laboratories.

Peter Rogers of Cole Jarman opened the day with a case study into the design of the new World Wildlife Fund headquarters in London. He began by posing the question of what really is a "sustainable building", suggesting a cave, with fresh running water and good thermal mass could be the pinnacle of sustainable living, but, of course, without the obvious comforts of the modern built environment. Several acoustic challenges were apparent, including the difficulty of recreating a harmonious natural environment within an urban surrounding and trying to ensure reasonable working conditions prevail within a very large open plan space. In approaching the design in a sustainable future proofing way, the potential internal environment if passing cars incorporated quieter electric motors was also considered – with masking by natural sounds factored into the design.

Second up were Barry Jobling (acoustics) and Louise Wille (sustainability) of Hoare Lea presenting the careful balance between a sustainable building design and ensuring suitable acoustic conditions. Louise explained the important factors involved in current and future sustainable design, including an insight into what would typically be required to achieve current and future Building Regulations, noting that to achieve zero carbon design, it will almost certainly be necessary to incorporate CHP plant or renewable power technology. Barry reminded us all that we have to remember there is a balance to be had between acoustics and other internal environment quality criteria and that it is critical to involve acousticians and sustainability consultants at an early stage in order to ensure this is achieved.

Andrew Mitchell from the University of Exeter presented results of a study into the thermal performance of classrooms with and without exposed thermal mass. Monitoring of $CO_2$ concentration and indoor ambient temperature within BB93 compliant classrooms with a natural open-window ventilation/cooling strategy was undertaken for six months. The results showed no significant overheating issues in any of the classrooms and excessive levels of $CO_2$ concentration for the majority of the time – the likely result of not needing to open the windows for cooling purposes. Reverberation within the exposed open soffit classrooms was achieved by means of hanging raft panel absorbers, with confirmation that a general design rule of 65% raft coverage did not significantly affect the thermal performance desired from an exposed soffit.

Hong-Seok Yang presented the results of a collaborative study between the University of Sheffield and the University of Seoul into the efficacy of noise reduction techniques within a courtyard using natural elements. The study examined a courtyard within a complex of buildings at the University of Seoul where noise from congregating groups of people was affecting the working / studying conditions of occupants within rooms overlooking the courtyard. The team investigated the benefits of installing natural materials, such as soil and vegetation and grass on the ground and ivy and vegetation planted on a vertical wall. The results of reverberation time measurements were used to inform an Odeon room acoustic model of the space, with reasonable correlation shown at mid and high frequencies. Treatment was investigated, including laboratory measurements taken of absorption and diffusion coefficients for the various natural elements, with a design eventually recommended. Measurements following the treatment showed a decrease in reverberation time at 500Hz of 1.5 seconds (47%), sound propagation over horizontal distance decreasing by 3.1dB in un-weighted overall level. It was also reported that façade + ground treatment was found to be as effective as just façade treatment (likely due to the change in acoustic absorption and diffusion of opposing reflecting surfaces).

Delegates tour the BRE Innovation Park

Alastair Keyte of 3DReid Architects presented the afternoon session providing an in-depth analysis into the approach taken by an architect into the outline masterplanning and design and construction of sustainable development. The presentation focused on the processes taken when designing the new Co-operative Group head office in Manchester, which is on target to become the largest UK BREEAM outstanding building. The presentation highlighted the need for all design disciplines to input into a project early on. It also reminded us that an energy efficient building design is achievable with the right innovative and adaptive thinking.

The afternoon finished with a tour of the BRE Innovation Park, examining the conceptual designed sustainable houses, learning facility and outdoor spaces. A group was also shown BRE's acoustic laboratories, including a tour of the anechoic chamber, the horizontal and vertical transmission suites and – for those willing – a look into the cavity above the anechoic chamber, providing a rare insight into the behind-the-scenes construction of the facility.

Positive feedback from all attendees was given and all signs indicated that another event next year would be welcome.

# Upper limit of measurement microphones

*By Ian Campbell HonFIOA, Technical Director Campbell Associates*

Nearly all the measurement microphones used in sound level meters use the principle of a capacitance formed by a fixed back plate and a parallel thin diaphragm that is free to move in response to the incident sound wave. The air between them forms the dielectric and the basic equation is:

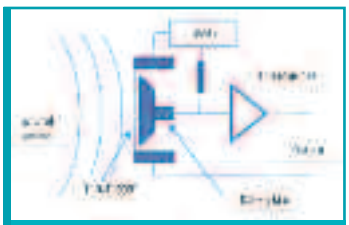
$$c \quad k.\frac{A}{d}$$

Where C is the capacitance, k is the dielectric constant, A is the overlap area of the parallel plates and d is the distance between them. So it can be seen that the capacitance is inversely proportional to the distance between the plates. If this capacitor is charged via a fixed resistor the relationship between the capacitance, charge and voltage will follow the basic equation of:

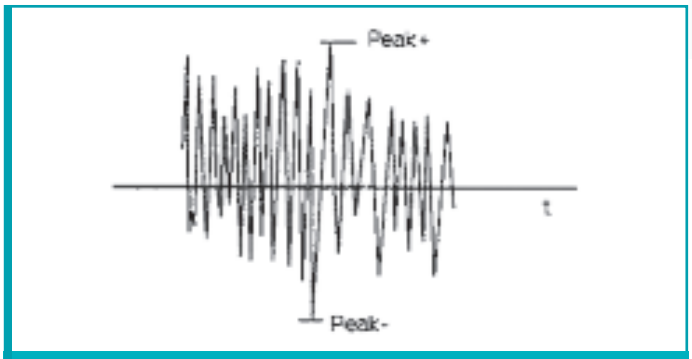
$$c \quad \frac{Q}{V}$$

Where C is the capacitance in Farads, Q is the charge in coulombs and V is the voltage. For measurement microphones this polarising voltage was almost universally set at +200v and if follows that for a 20pF microphone capsule the charge held in the microphone will be 4 nano Coulombs. As the diaphragm is depressed by a positive sound wave it will move closer to the fixed back plate and result in an increase in the capacitance and a fall in the voltage across it; similarly a negative sound wave will result in a reduction in the capacitance and an increase in the voltage. It follows therefore that with an externally polarised microphone there is a phase reversal with a negative peak voltage produced by a positive peak sound level. When pre-polarised (electret) measurement microphones were introduced the choice of a positive polarising voltage proved unfortunate as it was much easier to produce a negatively charged electret so we then get the opposite response of a positive going voltage for a positive sound wave and vice versa. As most sound level meter manufacturers only display the root-squared signal the sign of the peak is lost and so this is just an academic point for those making detailed investigation of peak signals.

These equations hold true for parallel plate capacitors but in a practical microphone the outer edge of the diaphragm is supported and cannot move and hence with increasing sound pressures the configuration will move away from the ideal parallel motion of the diaphragm and back plate. The relationship between sound pressure and the change in capacitance still holds true for low sound pressures but as the level increases so the change in capacitance will become non-linear and result in distortion of the signal. Most microphones have their upper limit specified as the point where this non-linear distortion reaches 3% and typical microphones then have a distortion level around 10% for sounds that are 6dB higher. If sound levels increase beyond the quoted upper limit the distortion will continue to increase until the diaphragm eventually hits the back plate and there it will stop and the microphone will be effectively short circuited. Although not to be recommended, there is a fair chance that the microphone will recover but there is a risk of damage caused by the shorting of the polarisation voltage or excessive negative displacement of the diaphragm.



Condenser microphone




Peak +ve and –ve

Basic physics limits the dynamic range of measurement microphones to around 125 dB; i.e. thermal noise to the distortion limit. The designer therefore has a choice of optimising them for measurement at low sound levels with a range of 15 to 140 dB or tip things in favour of high levels by shifting the range up to say 35 to 160 dB. The upper limit of a microphone is to a large extent directly linked to its sensitivity which is chiefly determined by its size and the tension on its diaphragm. Most sound level meters have half inch microphones with a sensitivity of around 50mV/Pa; to achieve this a thin diaphragm material is used that cannot take very high tension and as a result they are good at measuring low sound levels but have a 3% distortion limit at around 145dB peak. There are also significant numbers of half inch microphones having thicker high tension diaphragms that are not so good at low sound levels but are happy up to 160 dB. To go above these levels it is necessary use quarter inch microphones with examples measuring up to 194 dB. Beyond these levels the sound wave itself becomes non-linear and we move out of conventional acoustics.

The microphones themselves are quite good at dealing with high sound levels but they have to live close coupled to their preamplifier and consideration of this element of the measurement chain is for another day.

***Ian Campbell** is a member of the IOA Measurement and Instrumentation Committee.*

# New Minister for noise issues

Lord de Mauley is the new Government minister in charge of noise issues. As Parliamentary Under-Secretary for Resource Management, the Local Environment and Environmental Science, he has taken over the role from Lord Taylor of Holbeach who has moved to the Home Office.

Lord de Mauley, aged 55, had been a Government Whip in the Lords since 2010, as well as being Government spokesman on environment, food and rural affairs issues.

In Opposition he held a number of briefs, including serving as Shadow Minister for Business, Innovation and Skills.

He joined the Territorial Army in 1976, rising to the rank of Lieutenant-Colonel in 2003. He retired from the TA in 2005. He is married to Lucinda, and lives in West Oxfordshire.

# London taxi turns street noise into music

A London taxi which turns street noise into real time music has been roaming the capital's streets.The Sound Taxi has been modified with specially fitted speakers and micro-phones to pick up and record the London buzz as part of a project called Make the City Sound Better.

It feeds cockney chatter or noise from loud Londoners into a software programme which turns it into live music played through the cab's collection of 67 loud external speakers as it drives through the streets of the capital.

The musical black cab is the brainchild of sound artist and designer Yuri Suzuki who collaborated with headphone designer AIAIAI for the project.

AIAIAI spokesmanTobias Holz said: “What's interesting is the reactions are different depending on what area you're driving in.

“We had the most engaging reactions in the Hackney area, with bus drivers stopping, opening their windows and shouting ‘does it play reggae?’”

He added: “Round Mayfair you get a lot of puzzled looks and also a lot of smiles, but it's not as enthusiastic. It's a bit more reserved.”

The recorded tunes will eventually be uploaded onto Suzuki's official website, while the designer also plans to use the Sound Taxi as part of a live performance.

For more details go to **www.makethecitysoundbetter.com**

Fare enough: the Sound Taxi

# English state schools ‘fail to send girls to study physics’

Nearly half of all state schools in England do not send any girls on to study A-level physics, research by the Institute of Physics (IOP) has found.

The IOP study indicates that the situation is likely to be similar in schools across the UK.

The research also shows that girls are much more likely to study A-level physics if they are in a girls' school.

An analysis of data from the national pupil database showed that 49% of state co-educational schools in England did not send any girls to study physics at A-level in 2011.

Girls were two-and-a-half times more likely to go on to study A-level physics if they came from a girls' school. The same is not true of other science subjects, suggesting that physics is uniquely stereotyped in many mixed schools as a boys' subject.

The study was of English schools because comparable data is not available from schools in Scotland, Wales and Northern Ireland. But the disparity and problems were likely to be largely similar, the IOP said.

It said that schools should be set targets by the government to increase the proportion of girls studying physics from the current national average of just one in five.

# School forced to remove ‘too noisy’ wind turbine

A school has been forced to remove its controversial wind turbine after receiving a noise abatement notice. Blue Coat Primary School's 15-metre turbine was taken down after standing unused for a number of months.

Robert Weaver, environmental health officer at Stroud District Council, said: "As soon as it was operational, it was giving out unacceptable levels of noise at quite a lot of dwellings nearby, as well as some quite far away."

The school had been warned when it was granted planning permission in 2009 that if noise were to become an issue the turbine may have to be decommissioned.

Engineers had worked with the school over a period of about eight months to try to reduce noise, but modifying the blade tips and even shortening the blades themselves had little effect.

Simon Weston, chairman of governors at Blue Coat School, said the school had taken a reluctant but pragmatic decision that they had reached the end of the road after the physical adaptations to the turbine provided no improvement to the noise.

Wotton resident Michael Toft, who lives 100 metres from the school, said he was relieved that the threat of permanent noise intrusion in his house and garden had been removed.

He said: "The turbine wasn't just noisy in high winds. It had a whole repertoire of sound effects, ranging from an inexorable swishing in light winds, through to chuffing like a never-arriving steam train in moderate winds, with the piece de resistance being a full-blown impression of a helicopter hovering over the field outside our garden when the wind was strong."

It has also asked head teachers to challenge the misconception among teaching staff that physics is not for girls.

Meanwhile, girls in Scotland are to be urged to work in acoustics and other sciences, thanks to a new £250,000 fund to encourage them to widen their career options.

The funding will go towards Careerwise Scotland, a new initiative which will step up action to encourage more girls to consider careers in science and engineering, an issue highlighted previously by the Science and Engineering Education Advisory Group.

The initiative was announced by Scotland's First Minister, Alex Salmond, at the country's first Women's Employment Summit, co-organised by the STUC and attended by Deputy First Minister Nicola Sturgeon and Minister for Youth Employment Angela Constance.

Mr Salmond said: "It is vitally important that, from an early age, girls make the right subject choices at school to allow them to progress through education and training toward the widest range of job opportunities possible."

Scots girls are to be encouraged to work in science

# Wind energy: towards noiseless turbines?

How close are we to moving towards noiseless wind turbines? The October issue of *Science for Environmental Policy*, a newsletter published by the European Commission, poses this question when highlighting a new study into cutting noise levels.

Entitled *Noise Pollution Prevention in Wind Turbines: Status and Recent Advances*, the study was written by Ofelia Jianu, Marc A. Rosen and Greg Naterer, of the Faculty of Engineering and Applied Science, University of Ontario Institute of Technology, Oshawa, Canada.

One European study analysed by the research, SIlent ROtors by aCoustiC Optimisation (SIROCCO), focused specifically on modifying blades to reduce noise. It found that the sound produced by blades could be reduced by 1-1.5 dB(A) for a 58-metre rotor blade and by 2-3 dB(A) for a 94-metre rotor blade by changing the shape of the blades. However, in the case of the 94-metre blade, it was estimated that power production over a year would fall by 2.8%.

In further experiments, the same researchers added serrations, "teeth"-like shapes, to the 94-metre blades using epoxy resin and fine brushes made from polypropylene fibres to the trailing edge. Both strategies reduced noise by few decibels and up to 10 dB in the case of the brushes. However, at higher frequencies, noise produced by brushes and serrations may actually be greater than that produced by the blades themselves. The researchers therefore suggest retracting them at the frequencies at which they increase noise levels.

*Science for Environmental Policy* comments: "The findings of the study may help guide the design of low-noise wind turbines that will have a lower impact on local communities and wildlife. However, other types of disturbance, such as birds colliding with turbines and visual impact, as well as environmental benefits, including reduced fossil fuel use, also need to be considered in the planning of wind energy development and establishment of wind farms."

The study can be downloaded at **www.mdpi.com/2071-1050/4/6/1104**

# Want to shut someone up? Then turn to SpeechJammer

Ever tired of someone droning on and on? Well help may be at hand – thanks to SpeechJammer, a Japanese device which disrupts a person's speech by repeating his or her own voice a few hundred milliseconds later.

Working on the principle of Delayed Auditory Feedback (DAF), so disconcerting is its speech disturbance effect that a speaker will immediately splutter to a halt in mid-sentence.

The device was the winner of the acoustics section in this year's Ig Nobel prizes, an award sponsored by the *Annals of Improbable Research*, a magazine for weird and humorous scientific discoveries.

SpeechJammer is the invention of Kazutaka Kurihara, a research scientist at the National Institute of Advanced Industrial Science and Technology, and Koji Tsukada, a researcher at Precursory Research for Embryonic Science and Technology (PRESTO) and the Japan Science and Technology Agency (JST)

Looking like a vehicle speed gun, it comprises a direction-sensitive microphone (Sony ECMCZ10) and a direction-sensitive loudspeaker (Tri-state Parametric Speaker Kit),a laser pointer, a distance meter, switches and a mother board fitted in an acrylic case.

"The effect can disturb people without any physical discomfort, and disappears immediately they stop speaking. Furthermore, this effect does not involve anyone but the speaker," they say.

But while it could be used to silence an unwanted monologue from the pub bore, the researchers see its possible benefits as stopping public speakers from talking too fast or from going on too long.

For more details go to **http://arxiv.org/vc/arxiv/papers/1202/1202.6106v1.pdf**

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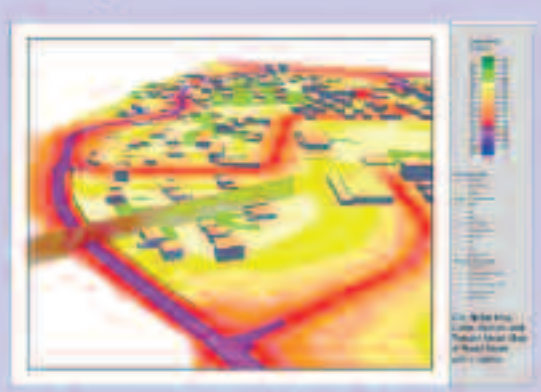

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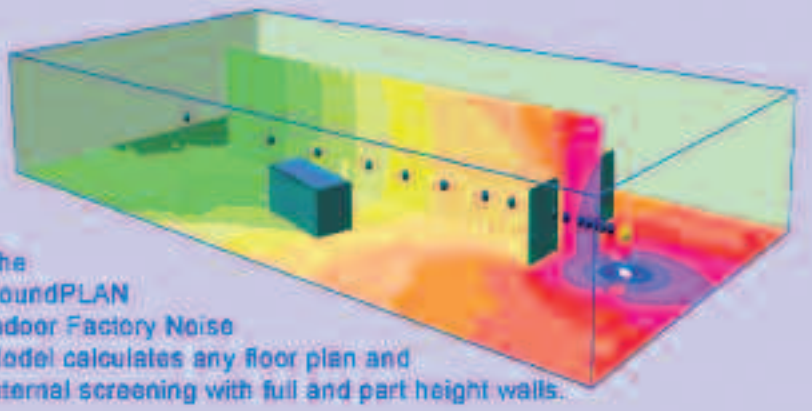

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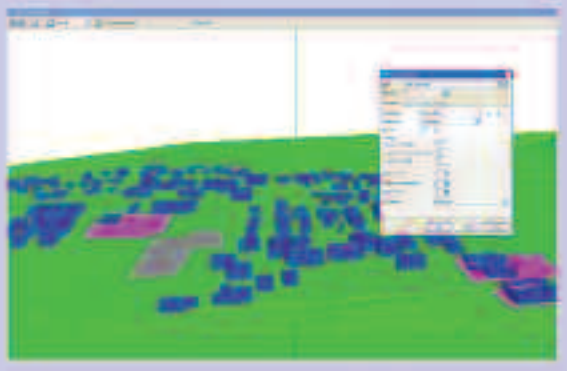

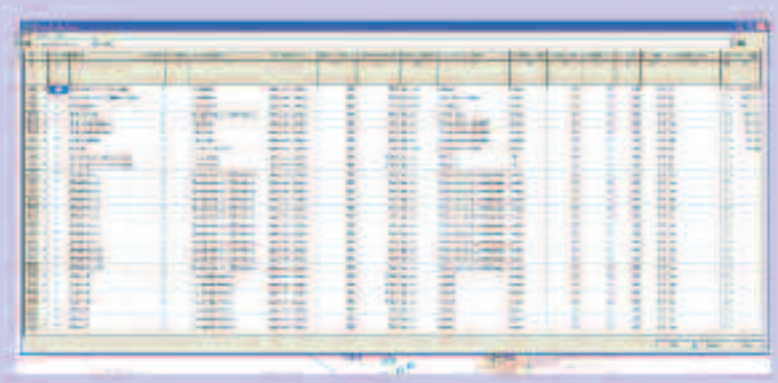

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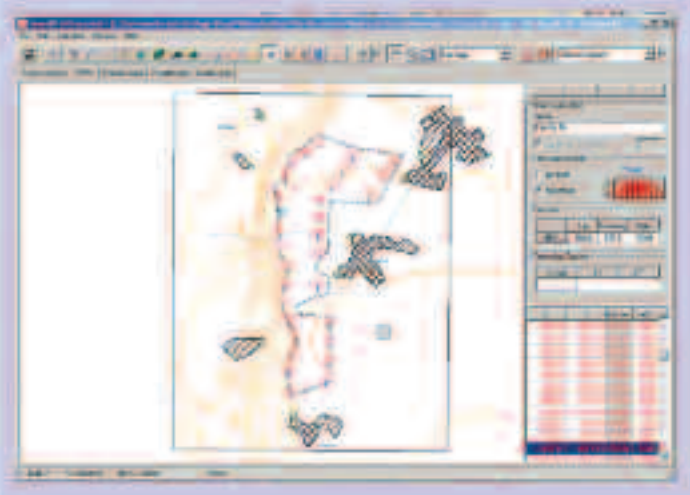

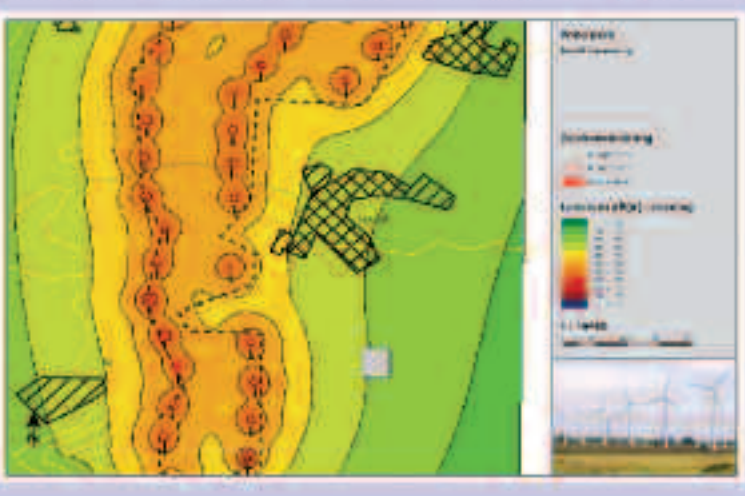

# The art of being a successful expert witness

*By Mervyn Rundle, of Solicitors Title, Exeter, an Affiliate member of the IOA*

Most acoustics professionals will be asked to give expert evidence in court at some time during their careers. The experience can be an exciting showcase of knowledge or it can be a daunting prospect, possibly involving several hours of cross-examination in a public court. Being a successful expert requires a high level of expertise in one's own field, but this is not the only quality required.

Apart from the kudos, the real privilege of being accorded expert status is that the court will allow and rely on an expert's opinion. Non-expert witnesses, by contrast, must confine their evidence to the facts alone. Courts are not experts in acoustics and there are very few judges, if any, who would claim any detailed understanding of the subject. Accordingly, the court will look for guidance in these areas and it will rely on the opinions of a person who has recognised expertise. An expert witness, therefore, has considerable influence with the court. However, the power which comes with such influence needs to be used sparingly and the temptation to be a "case winner" or a "mercenary witness" (which can be very lucrative) must be resisted.

In order to balance the privileges, an expert witness is fixed with a legal duty (which the non-expert witness does not have) to assist the court. This duty overrides any obligations to the instructing party (and who may be paying the fee). Balancing this duty with the pressure to present the instructing client side of the argument can be a very thin tightrope to walk. The overriding maxim is probably that any evidence or opinion offered to the court should be the same irrespective of which side instructs. Experts who stick rigidly to this principle don't go far wrong.

There are a number of legal forums where expert evidence may be required. This could be in the planning process, statutory nuisance or private nuisance or even in a prosecution concerning health and safety matters. This article is too short to discuss the detailed differences between each process, but, as an expert, it is vital to be familiar with the detailed legal requirements for the particular forum as there are differences between them. A criminal prosecution requires proof beyond reasonable doubt, whereas a civil action will apply the balance of probabilities standard. If in doubt, consult the Criminal Justice Act, Civil Evidence Act and the Civil Procedure Rules.

Not all cases start at the court door. At the outset it might just be a short assessment/report for a client in support of a planning application. Some months, or even years, later the matter may go to planning appeal. Even later there might be an action for private nuisance or a noise abatement notice appeal. This is worth bearing in mind since comments made some time previously for another purpose may be raised in court years later. It is important from the outset to bear in mind that any reports or opinions which you offer should always take into account that the matter may end up in court. Your strengths will be thoroughly exploited and your weaknesses well examined.

Usually prior to appearing in court an expert will be called on to provide a written report on the case together with his or her "expert" opinion. This report should be well researched and founded. It should be well reasoned so that the conclusions follow logically from the facts and evidence. Avoiding any suggestion of bias is vital and is it not a good idea to discuss the law or to offer the court legal advice. In fact, confining one's report to an acoustic assessment coupled with a discussion of the relevant guidance is probably a good starting point. It is not usually advantageous to try to blind the court with science or to drill down into technical detail. The judiciary may not be acoustic experts but they can spot an expert blinding them with science. Remember also that some points are best left for discussion in the court room when clearer explanations can be given and questions answered in front of the court. Finally, do not put in anything which you cannot justify.

Following submission of a report it is possible that an expert may be asked to rebut the other side's testimony. This can be useful but can also provoke a trial on the papers. It may be better, therefore, not to provide a long comprehensive rebuttal but wait until trial time to deal with the issues.

Prior to court it is possible that there will be an experts' meeting. Courts like these where there is more than one expert involved. Two experts battling acoustic technicalities confuse, if not bore, a court and judges always want to hone the points in issue to the bare minimum needed for trial. Having said that, sometimes experts' meetings can be very beneficial (I was involved in a case where the five experts all agreed that the case should be settled and tried to make recommendations for settlement). On the other hand, some experts' meetings do little more than agree that a meeting has taken place!

Finally, there will be the trial. Giving evidence in court is a highly skilled matter. The first step is to establish credibility. This will be a combination of qualification, experience and reputation. Appearance and demeanour are also important. The successful expert will be thoroughly conversant with his or her subject and with the arguments that both sides are likely to deploy. Being highly articulate both on paper and orally are also prerequisites. Most successful experts tend to be good listeners who think carefully about each question and then give a measured response. Evidence should always be directed to the court (i.e. the judge or judicial panel) and not to the questioner or the wider court. Avoid the temptation to joust with the opposition barrister – it's fun, but unless you are very experienced in court you will lose. Barristers have many different techniques and are often actors in their spare time. Good ones have an "anesthetic knife" – you don't feel the blade until after the court sees the blood!

Being an expert can be highly rewarding and one of the most demanding illustrations of expertise. If you can withstand two or three hours of cross examination (and relish it) then the conclusion must be that you know your subject. You will undoubtedly enhance your career prospects. However, if acting as an expert isn't for you then it's best to leave well alone – it can be stressful and punishing if you get it wrong.

# Licensing and public nuisance

*By David Horrocks, Technical Partner, and John Pointing, Legal Partner, Statutory Nuisance Solutions*

## Introduction

The regulation of places of entertainment and the control of public nuisance – principally the control of noise – remains a significant and important function administered by local authorities. From time to time interesting cases make the news headlines, where noise features as the main problem – see Figure (1) below.

Regrettably, no data are collected by local authorities on complaints of noise nuisance arising from licensed premises and so it is difficult to gauge the seriousness of the current problem. In a 2006 survey conducted by MORI into local objections to live music, the survey found, not surprisingly, that 77% of all objections to live music licence applications came from local residents and that 68% of those objections related to concerns about noise.

The evidence presented by the Live Music Forum (LMF) to the Home Office, during the government's review of the Licensing Act 2003, suggests that the Act has had a broadly neutral effect on the provision of live music, that local authorities have generally adopted a sensible, pragmatic and even-handed approach, and further, the LMF believes that live music is not, as is often claimed, a widespread source of public nuisance. Some environmental health practitioners with experience in this field may beg to differ.

## Licensing Act 2003

The Act has established a single regime for licensing premises which are used for the sale or supply of alcohol, to provide regulated entertainment, or to provide late night P24


Figure 1. Examples of licensed events and premises making the news headlines

P23 refreshment. Parliament's intentions were to encourage a flourishing and varied licensed sector whilst providing safeguards to protect neighbourhoods from subsequent harm and disturbance. Under the Act, local councils, acting as the licensing authorities, must carry out their functions with a view to promoting four statutory licensing objectives:

- the prevention of crime and disorder
- the prevention of public nuisance
- the promotion of public safety
- the protection of children from harm.

Through due consideration of the above licensing objectives in reaching decisions, licensing authorities must take into account their Statement of Licensing Policy, government guidance issued under section 182 of the Act and relevant case law.

With regard to the prevention of public nuisance, the local authority's environmental health service plays a pivotal role acting in its capacity of "responsible authority." It can make representations on new applications on the grounds of noise and can object in principle, or it can ask for suitable conditions to be attached to any premises licence granted. The service can, additionally, ask for a review of any licence on the same grounds. The licensing authority, having due regard to any representations so made, may:

- grant the premises licence subject to conditions deemed necessary to promote the licensing objectives
- exclude any of the licensable activities from the scope of the premises licence
- refuse to specify a person as the premises supervisor; or
- reject the application in its totality.

## Public nuisance

The powers bestowed on local authorities to control public nuisances go back to the 1848 Public Health Act, where the concept of statutory nuisance was born and was based upon the codification of a series of common law nuisances. Astonishingly, some public nuisances such as being a "common scold" or a "common barrator" were still offences as late as 1967 before being abolished by the Criminal Law Act and, interestingly, it was not until the passing of Noise Abatement Act in 1960 that noise was classified for the first time as a statutory nuisance.

The question "what is a nuisance?" has for centuries been steeped in confusion and ambiguity. In the celebrated case of *Brand v Hammersmith and City Railway Company* (1867)QB 223, the plaintiffs sought compensation in private nuisance for the noise and vibrations caused by the running of trains near their property. The issue was over whether they had already received compensation for the harm under the statutory scheme provided by the Railway Clauses Consolidation Act 1845. The House of Lords eventually decided that there was a compensatory gap arising from the excessive level of vibrations caused by trains and granted them damages for loss of enjoyment to their property. Chief Justice Earle remarked, rather ominously, that "…the word nuisance introduces an equivocation which is fatal to any hope of a clear settlement…" and added the words that guaranteed him perpetual fame: "…this cause of action is immersed in undefined uncertainty…." However, it is this lack of precision and its flexibility that has given nuisance such utility and durability over the years. In the case of *Hunter v Canary Wharf* [1997]AC 655, the boundaries of private nuisance were firmly fixed to proprietorial rights as against a personal right of freedom from interference. The core part of the case was over whether interference in the reception of television signals caused by the construction of the Canary Wharf tower could amount to a nuisance. Lord Cooke [at 711] spoke of the principle of "give and take": "The principle may not always conduce to tidiness, but tidiness has not had a high priority in the history of the common law. What has made the law of nuisance a potent instrument of justice throughout the common law world has been largely its flexibility and versatility."

Although the common law recognises nuisances as being either private or public, in reality these should be seen as separate torts

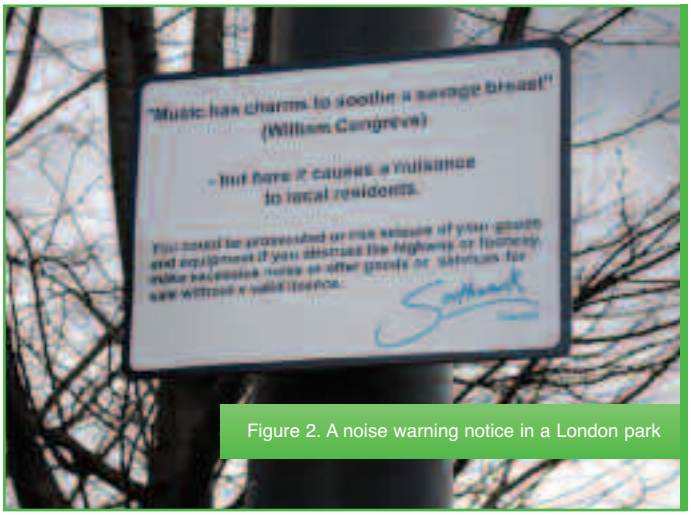

Figure 2. A noise warning notice in a London park

since they protect different categories of rights. A private nuisance involves the interference with someone's right to enjoy his/her own land – i.e. it is a proprietorial right, whereas public nuisance involves the endangering of health, comfort or of property, i.e. it amounts to a breach of rights on a much larger scale than is the case with private nuisance. The leading authority on public nuisance is recognised to be the case of *Attorney General v PYA Quarries Ltd* [1957] 2 QB 169. Here the damage to the locality resulting from explosions at the quarry to extract material was egregious; it amounted to a public nuisance, as distinct from a number of private nuisances suffered by the neighbours. Lord Justice Romer expressed the view [at 184] that: "…any nuisance is public which materially affects the reasonable comfort and convenience of a class of Her Majesty's subjects…It is not necessary to prove that every member of the class has been injuriously affected; it is sufficient to show that a representative cross-section of the class has been so affected...a public nuisance is proved by the cumulative effect which it is shown to have had on the people living within its sphere of influence". In the same case Lord Justice Denning [at 190-1] famously expressed the view that a public nuisance is a nuisance which is so: "...widespread in its range or so indiscriminate in its effect that it would not be reasonable to expect one person to take proceedings on his own responsibility to put a stop to it, but that it should be taken on the responsibility of the community at large".

The law on public nuisance has been further refined by a number of more recent cases. In the conjoint cases of *R v Rimmington and R v Goldstein* [2005] UKHL 63, the House of Lords gave detailed consideration to the common element requirement for a public nuisance. The facts in *Rimmington* were that the accused sent individual, racist hate letters to different individuals, all saying more or less the same thing. The issue of law was over whether these comprised a series of related though separate acts or whether there was a sufficient common nexus between them to amount to a public nuisance. If these were a series of separate acts, of course they could not amount to private nuisances because there would have been no breach of any proprietorial right. Baroness Hale expressed the view that: "It is not enough to point to a collection of private nuisances and to conclude that the point has been reached when they amount to a public nuisance. What is essential is to identify the breach of rights affecting the public at large – or at least a sufficient section of the public. It is the breach of those rights that constitutes the public nuisance."

In the case of *Corby Group Litigation v Corby BC* [2008] EWCA Civ 463, Lord Justice Dyson re-iterated the view that: "The essence of the right that is protected in the tort of private nuisance is the right to enjoy one's property….The essence of the right that is protected by the crime and tort of public nuisance is the right

not to be adversely affected by an unlawful act or omission whose effect is to endanger the life, safety, health etc of the public". This case involved a series of negligent acts and egregious failures by the local authority who were responsible for supervising the remediation of the disused Corby steel works. This was a class action pursued by the families of children born with severe birth defects that resulted from the manner in which the land had been remediated. The High Court found the local authority liable for breaches of statutory duty, negligence and public nuisance.

Finally, in the case of *Colour Quest Ltd and Others v Total Downstream UK plc and Others* [2009] EWHC 540, a public nuisance was found to have resulted from the explosion of the Buncefield oil storage terminal in Hertfordshire. An explosion – unlike the series of events in *Rimmington* – has the important element of contemporaneousness if a public nuisance is to be found. This case is also authority for the view that a particular set of circumstances can amount to both a private and a public nuisance. Mr Justice David Steele [at para 432] opined that: "A private owner's right to the enjoyment of his own land is not a right enjoyed by him in common with other members of the public, nonetheless any illegitimate interference, being the very same interference contemporaneously suffered by other members of the public, constitutes a common injury satisfying the public nature of a public nuisance".

In light of these recent judgements it would appear that a collection of private nuisances can only ever amount to a public nuisance where all of the following conditions are met:

- there is a serious breach of rights endangering the life, health, safety, comfort or property of the public
- a sufficient group or class of the public is sufficiently affected by the nuisance; and
- there is a sufficient common element to make the link between the individual private nuisances.

## Home Office Guidance issued under s182 of the Licensing Act 2003

If the law on public nuisance is so clear and well settled, why has the government continued to issue statutory guidance which is so clearly erroneous and misjudged? In section 2.34 of the revised Home Office Guidance, issued in April 2012 on the matter of public nuisance, the document suggests: "It is important to remember that *the prevention of public nuisance could therefore include low-level nuisance perhaps affecting a few people living locally*, as well as major disturbances affecting the whole community" (our emphasis). The courts have continued to emphasise the distinction between private and public nuisance, with the latter characterised as an egregious act resulting in serious breaches of public rights – there is nothing low-level about it! There is evidence that the guidance is beginning to lose its status and credibility with the courts in this regard, as exemplified by the recent appeal case heard in Birmingham Magistrates' Court before a district judge. Although the case of *Crosby Homes v Birmingham City Council* (unreported) is not binding authority, District Judge Zara in her judgement rejected the Home Office Guidance as "a fudge." On this issue the guidance is wrong in law and would seem to be the result of confusion in the minds of those responsible between a public nuisance and any nuisance that affects the public. P26

Music noise continues to be an issue for local authorities

P25 The question that needs to be answered is why did Parliament choose in the Licensing Act 2003 to set the threshold so high by establishing the prevention of public nuisance as one of the licensing objectives rather than the prevention of statutory nuisance, which would have accommodated most forms of noise nuisance emanating from licensed premises? We believe that the current position will almost inevitably invite a successful challenge some time in the future. We envisage circumstances, for example, where a pub with a large outdoor garden may result in localised nuisance to a single neighbouring occupant during long summer nights but which affects no one else. The steps required by the licensing authority to be taken by the business to resolve the problem on review of the licence – such as the introduction of a curfew on outdoor drinking - could conceivably be challenged on the grounds that no public nuisance has arisen, although it would of course be open to the local authority to instigate action under the Environmental Protection Act 1990 to require the abatement of any statutory nuisance should the circumstances warrant it.

## The control of noise through licence conditions

The test for the acceptability of licence conditions to control noise should, we believe, be analogous to the advice on the use of planning conditions espoused in *Circular 11/95 The Use of Conditions in Planning Permissions*, that is, that any condition must be:

- necessary
- relevant to the relevant licensing objective of the prevention of public nuisance
- relevant to the licensed premises
- enforceable
- precise
- reasonable in all respects.

Interestingly, recent case law suggests that licence conditions requiring entertainments noise to be "inaudible at the nearest noise-sensitive premises" may in future be considered to be *ultra vires*. In the case of *R v Developing Retail Ltd v East Hampshire Magistrates' Court* [2011] EWHC 618, the court ruled that such a condition was so vague as to be unenforceable.

If noise criteria and noise limits are to be included in licence conditions, these should be based upon criteria suggested in recognised published sources such as the *Code of Practice on Environmental Noise Control at Concerts*, published by the (now defunct) Noise Council in 1995 (currently being revised). Better still would be for licensing authorities to attach conditions drafted by the environmental health service, which incorporate noise criteria enshrined within the council's own published corporate policies. A good example of the latter is the *Technical Advice for Consultants on Sound Insulation and Noise Control Criteria for Entertainment Licensed Premises* published by Dover District Council. The Institute of Licensing is currently developing good practice guidance in relation to licence conditions and operating schedules which may or may not suggest appropriate noise criteria.

On a more general level, licence conditions need to be tailored to the size, style, characteristics and activities taking place at the premises/land requiring to be licensed and licensing authorities should remain circumspect in the use of standard conditions to control noise. Conditions should always be proportionate and due consideration should be given to the non-commercial nature of charity or community based events when drafting conditions.

## Recent changes to the Licensing Act 2003

Following a consultation process conducted by the Home Office, a number of significant changes have been made to the Licensing Act. The licensing authority itself, primary care trusts and local health boards are now included as "responsible authorities" and residents who wish to make representations on licence applications need no longer live in the vicinity of the premises seeking to be licensed. The evidential threshold has been lowered enabling licensing authorities to make decisions which are *appropriate* as opposed to being *necessary* for the promotion of the licensing objectives. Changes have been introduced to the Temporary Event Notice procedure, which allows the environmental health service to make objections based upon any of the four licensing objectives. In addition, licensing authorities will have the discretion to apply existing licensing conditions operating for premises which submit a Temporary Event Notice. Finally, possibly the most dramatic and significant change is that licensing conditions relating to music entertainment in small venues, defined as having a capacity of less than 200 persons, are suspended. It is believed that this will affect a large number of small pubs that currently have such conditions attached to their licences.

## Conclusion

The prevention of nuisance through the control of noise emanating from licensed premises will continue to be an important area of work for local authority environmental health services. With the suspension of licensing conditions relating to music entertainment in small venues and with the need for licensing authorities to be more focused in their considerations of the circumstances which may genuinely give rise to a public nuisance, we believe it is likely that a greater number of premises in the future will be the source of local noise nuisance complaints, despite their activities being legitimised by the local licensing authority. Surely this was never Parliament's intention in passing the Licensing Act 2003. We believe it is likely that a greater number of actions will be instigated *post factum* by councils to abate statutory nuisances in circumstances where nuisances ought to have been prevented through the licensing regime. Time will tell whether our predictions come to fruition.

Statutory Nuisance Solutions provides legal and technical support and specialist advice to businesses, local authorities, government departments, law firms, planning consultancies etc on all aspects of nuisance. For further information: **www.statutorynuisancesolutions.co.uk**

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## Abstract

This paper is based upon a presentation made by David Horrocks to the IOA conference Music to Your Ears – Outdoor Entertainment and Environmental Noise held in London in May 2012.

# House prices and aircraft noise

*Joan Carles Blanco Matos MIOA and Ian Flindell MIOA, Institute of Sound and Vibration Research, Southampton University*

## Introduction

In aircraft noise management, effective decision making requires accurate information about both the costs and benefits of alternative action plans and development proposals. The financial costs of physical measures such as new airport infrastructure, noise insulation schemes, changed operating procedures, or the replacement of older noisier aircraft types with newer and quieter aircraft types can usually be estimated sufficiently well to support effective decision making. Equivalent monetary values for the subjective benefits arising from these measures are much harder to quantify. Perceived or subjective monetary values associated with different amounts of noise can be obtained by using stated preference (SP) methods, but the results are hypothetical. In revealed preference or hedonic price (HP) studies, actual monetary values are revealed by comparing house prices in different residential areas across a range of aircraft noise sound levels at different distances from airport flight tracks. In this paper, we review the available evidence for the range of monetary values obtained from house price and aircraft noise studies and comment on the validity of those values.

In SP studies, respondents are invited to trade varying amounts of hypothetical money for varying amounts of hypothetical noise using questionnaire based techniques. In theory, SP methods can be used to directly monetise any hypothetical situation which might arise from proposed development or noise management policy. However, respondents do not actually experience any situations other than that pertaining where they actually live and no money actually changes hands. It is unknown to what extent respondents would actually respond in the same way in real situations as they do in the hypothetical situations tested (Mitchell and Carson, 1989).

HP noise studies assume that differences in relative desirability between houses in noisy areas and otherwise equivalent houses in quieter areas will be reflected in the price (Nelson, 2004). However, there are many other variables such as the size and condition of the house and the location relative to transport, jobs, and leisure facilities which can all affect supply and demand and may have to be taken into account to detect any additional or separate effect of noise.

## The Hedonic Price method in detail

Nelson (1980) defined the Noise Sensitivity Depreciation Index (NSDI) as the percentage price depreciation for each unit increase in noise exposure. A consensus view has developed over the past few years that, and all other things being equal, property prices are depreciated by around 0.5% per decibel increase in outdoor measured sound levels. In the general literature, not much attention seems to be paid to the baseline sound level above which these "increases" are assumed to take effect, possibly because the standard methods of statistical analysis used in HP studies do not require any assumptions to be made about baseline P28

P27 sound levels, but the results are difficult to interpret otherwise. Assuming a baseline sound level of 55 LAeq, in an area with a sound level of 65 LAeq, 0.5% per decibel is equivalent to £10,000 depreciation on a £200,000 house. For exactly the same house, if a much lower baseline of 45 LAeq is assumed then the depreciation would be £20,000, so it is clearly an important point.

Nelson reported a range of NSDI from 0.29% to 1.10% per decibel for studies carried out in 18 different cities (Nelson, 1980). Further studies since then have exposed an even wider range of apparent or observed NSDIs, which in some cases have even been negative (i.e. higher house prices in higher noise areas). The HP method assumes that the price paid for a house is based on the singular combination of its physical qualities, environment and locality. Properties with many positive qualities are assumed to be more desirable and thereby command higher prices in a free market than those with many negative qualities which can only be sold at correspondingly lower prices. The main statistical problem is that the overall price reflects a combination of positive and negative qualities which cannot be untangled except by assuming rational and consistent behaviour amongst buyers and sellers, but as anyone who has bought or sold a house will know perfectly well, few buyers and sellers are particularly rational or consistent.

Statistical analysis requires a large amount of data on actual selling prices (or offer prices where selling prices are not available) and the corresponding physical attributes of each house offered or sold. Different houses are compared across a wide range of different geographical areas exposed to different amounts of noise and with non-correlated variation in other important variables, such as access to facilities or employment. The effects of correlated input variables cannot be statistically separated. This means, for example, that it may be impossible to separate out the effects of local air pollution from noise. The majority of studies reported in the literature deal only with physical variables, although it is also possible to include variables associated with different types of buyer in an optional second stage statistical analysis.

In the first stage analysis, the selling price of a house is regressed on its physical qualities, location and environmental variables, expressed according to the following function: $P = f(S1,S2,S3,\ldots Si; N1, N2, N3, \ldots Ni; Q1, Q2, Q3 \ldots Qi)$ where $P$ is the vector of housing prices, $S$ is a vector of physical qualities, N location characteristics and $Q$ environmental characteristics, where $Qi$ represents noise. $\partial P/\partial Q_i$ is the hedonic price for the noise variable, which Morrell et al., (2000) somewhat obscurely describe as the marginal implicit price of noise social costs.

In an optional second stage analysis, the marginal implicit prices estimated in the first stage analysis can then be regressed against income and similar socio-economic variables to estimate an individual buyer's willingness to pay for peace and quiet, taking into account their individual circumstances. Clearly, people with limited financial resources might not be able to afford to pay higher prices for quieter houses, no matter how desirable a quieter house might be for them personally. Lipscomb (2003) pointed out the risk of endogeneity with this approach, where physical variables used to estimate marginal implicit prices in the first stage analysis are then used as independent variables in the second stage analysis.

A comprehensive list of relevant papers is provided in the Appendix, starting with Gautrin (1975) who published an early paper on the relative price of houses near to Heathrow airport in 1975. Nelson (2008) reports an even earlier application of the HP method to aircraft noise by Emerson (1972) who investigated house prices in residential areas around Minneapolis St. Paul International Airport in 1967. A general overview of the literature suggests that the majority of authors agree that house prices around airports are adversely affected by aircraft noise to at least some extent, but there are considerable variations between different studies and many outstanding methodological concerns, some of which are set out below;

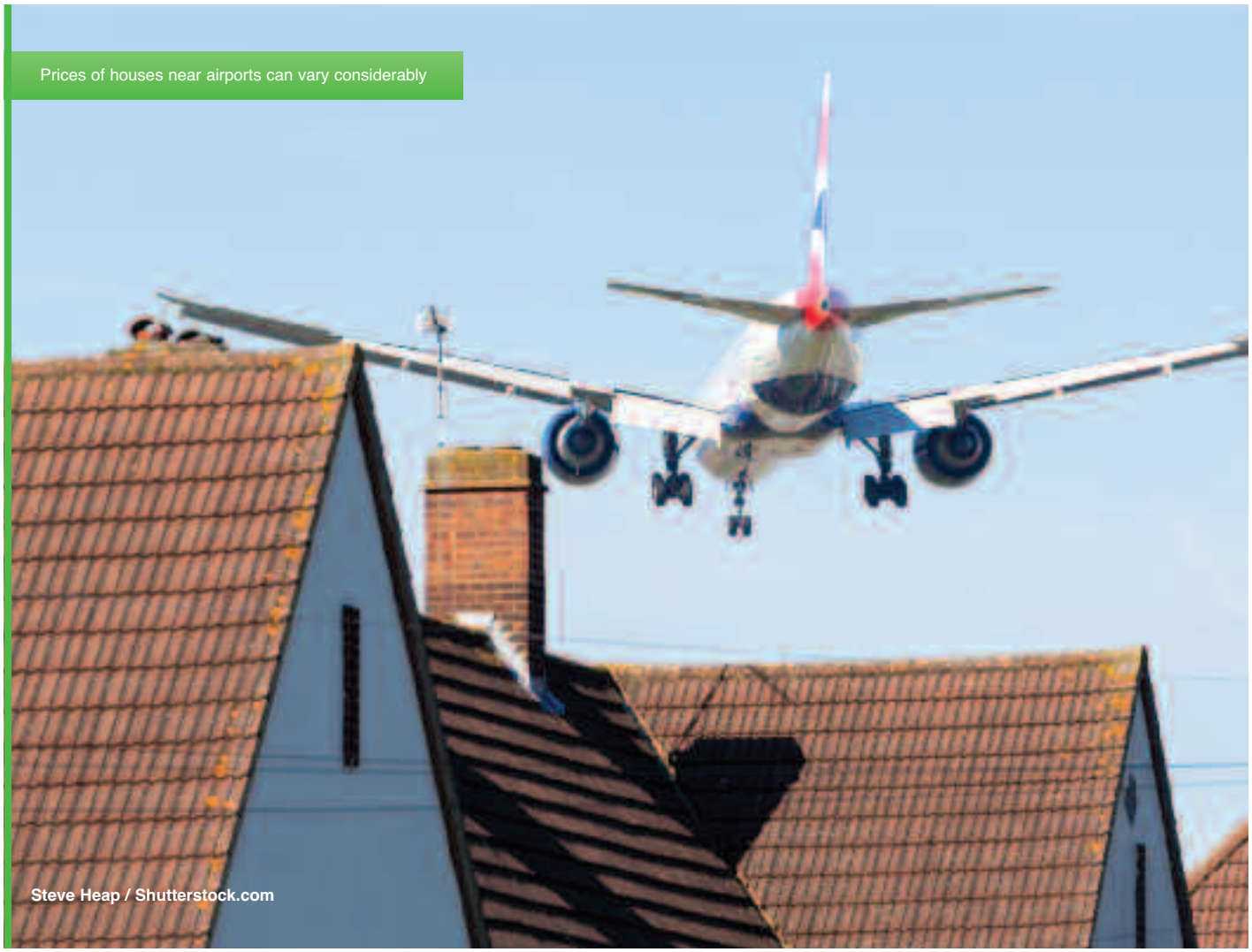
1. Not all buyers are equally informed about all relevant characteristics of the house they are considering buying. Anecdotal evidence suggests that many buyers either under-estimate or over-estimate the amount of aircraft noise present and the effect that it might have on them over the longer term (i.e. after they have moved in) when deciding to buy. Pope (2008) suggests that under-estimation of the amount of aircraft noise could bias estimates of NSDI downwards. On the other hand, many residents become accustomed or habituated to aircraft noise to at least some extent and this means that for these residents, estimates of NSDI could be biased upwards. No method has yet been devised that would be capable of testing these possible causes of over or under-estimation for the simple reason that buyers are by definition not aware of these possibilities.
2. Statistical analysis using alternative functional (mathematical) forms emphasises different ranges of the exposure variable when establishing dose-response relationships between noise and price, potentially leading to different values of NSDI which are nevertheless of equal validity for any given data set and depend only on the assumptions made during the analysis (Wadud, 2009). There is often no a-priori reason for choosing any particular functional form.
3. Spatial segmentation of the housing market into areas favouring different socio-economic groups was found by Bateman et al. (2004) to lead to significant differences in observed NSDI for road traffic noise in different parts of Birmingham. Any financial compensation scheme based on NSDI and intended to take this source of variation into account would also have to include the socio-economic status of the housing occupiers as a key determinant. This might not be politically acceptable.
4. The NSDI obtained in different studies is known to be sensitive to the choice of noise metric selected to represent the amount of aircraft noise present. Tomkins et al. (1998) compared NNI (the original aircraft noise metric used at Heathrow up until 1990) against LAeq, and found that noise had no significant effect on price when using NNI but that the effect of noise was significant when using LAeq. This suggests that for Tomkins et al. data, house prices were sensitive to particular aspects of aircraft noise which were represented by LAeq, but not by NNI. This is a statistical problem caused by an overlapping of the different features of aircraft noise exposure represented by different noise metrics but which cannot be resolved by the somewhat coarse nature of the data collected in typical HP studies. It may also be relevant to note that the relative importance of the different features of aircraft noise exposure represented by different noise metrics is not stable over longer time periods (ANASE, 2007).
5. The baseline sound level assumed in any analysis is an important variable, yet it is not often given the attention it deserves in the literature. As described above, an NSDI of x% per decibel is not interpretable unless it is quoted with respect to a baseline sound level above which prices are assumed to be depreciated. This issue probably arises because the standard hedonic equation used for HP analysis does not require a baseline level to derive a proportional relationship notwithstanding that the resulting proportionality cannot be interpreted without it. The standard method of statistical analysis used in most HP literature does not appear to distinguish between high baseline high NSDI outcomes and low baseline low P30

P28 NSDI outcomes both of which would often fit the same data equally well, and which further suggests the possibility of interactions between the range of sound levels actually tested in any study and the resulting NSDI values.

6. The relative desirability of different houses and their resulting prices is potentially affected by a very wide range of different variables and it is generally impossible to include all possible variables in any one study. For example, accessibility to the airport can be an important component of relative desirability, yet this varies not only according to the distance and the available infrastructure (roads and car parking, public transport etc.) which could be estimated by reference to a map and bus timetables etc. but also in accordance with individual propensity and preference for different modes of transport, which could only be measured (and then somewhat imperfectly) by means of questionnaires. House prices near to airport are likely to increase when airport employers are recruiting and may start to fall if the airport employers are cutting back. Even if all such variables could be included, they are not usually sufficiently orthogonal to permit statistical separation within any feasibly compact experimental design (sampling plan).
7. In general, for residential areas around airports, it is difficult or impossible to find residential areas which are sufficiently alike in all respects other than aircraft noise to justify like-for-like comparisons. Areas benefitting from close proximity to an airport in terms of access to employment, economic and social facilities are also likely to be affected by higher noise levels and will probably attract residents with different socio-economic and demographic characteristics from areas further away.
8. One of the most often quoted advantages of revealed preference methods, that they effectively ignore sentiment and simply observe actual behaviour, is, for the case of HP studies of aircraft noise, also one of the most important disadvantages. Because of the limited turnover of housing transactions within any meaningful or otherwise sensible research study period, only a very small percentage of the population actually contribute to the house price database. Prospective but noise sensitive buyers who have been put off by high aircraft noise sound levels exclude themselves from the overall analysis by not participating in the market in the higher noise areas. The effect of this would be to bias the resulting NSDIs downwards. People who do not sell their house during the study period are also excluded (Flindell and Le Masurier, 2009). For houses in high noise areas, it only requires two prospective buyers who are either insensitive to aircraft noise or are not fully aware of the amount of aircraft noise to establish price competition and insensitivity to (or lack of awareness of) aircraft noise are both sufficiently common characteristics to allow this to happen.

## The SP alternative

The three main problems with HP studies are that there are many other variables additional to noise which contribute



Prices of houses near airports can vary considerably

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| Author | Location | Noise metric | NSDI |
|---|---|---|---|
| Uyeno et al. 1993 | Vancouver International Airport (Canada) | NEF | - 0.65 (Detached) -0.90 (Condominium) |
| Lipscomb,2003 | Hartsfield Airport (USA) | DNL | Noise insignificant predictor |
| Pennington et al. 1990 | Manchester International Airport (UK) | NNI | Noise insignificant predictor |
| McMillen , 2004 | Chicago O'Hare Airport (USA) | Ldn | Properties affected by 65 Ldn 9% devaluation. Distance from O'Hare entrance properties decline by 2.5% |
| Tomkins at al. 1998 | Manchester International Airport (UK) | NNI and Leq | NNI: -0.28 Not significant. Leq: -0.78 Significant. |
| Ahlfeldt & Maenning, 2008 | Tempelhof and Tegel Airports (Germany) | LAeq | Tempelhof Airport: Between -5 and - 9%.<br>Tegel Airport: Premium between + 2% and + 3%. |
| Dekkers and Van Der Straaten, 2009 | Amsterdam Airport (Netherland) | Lden | Aircraft Noise: - 0.77, Railway Noise: - 0.67<br>Road Noise: - 0.16 |
| Kaufman and Espey, 1997 | Reno-Tahoe International Airport (USA) | Ldn | - 0.3 |
| Muldoon,2003 | Portland-Hillsboro Airport | DNL | Noise insignificant predictor |
| Bateman et al. 2004 | Birmingham | Leq | Aircraft Noise: Some submarkets show positive price<br>Railway Noise: - 0.6 to – 1.3 Road Noise: - 0.18 to -0.5 |
| Abelson, 1979 | Marrickville, and Rockdale Sydney (Australia) | NEF | Marrickville: -0.40. Rockdale: Noise insignificant predictor |
| Levesque, 1994 | Winnipeg International Airport, USA | EPNL | - 1.30 |
| McMillan et al. *1978 | Edmonton International Airport, Canada | NEF | -0.5 |
| Gautrin*,1975 | Heathrow, UK | NNI | House in Cranford either sold for the same price or for a premium of £50 per lot relative to Hayes-Harlington. |
| O'Byrne et al. 1985 | Atlanta Airport, USA | LDN | - 0.64 to -0.67 |

Table 1. Studies of the effect of aircraft noise on house prices have suggested a wide range of percentage devaluation per decibel. * from Nelson P. 1980

| Author | Location | Noise metric | NSDI |
|---|---|---|---|
| Blanco and Flindell, 2011 | Birmingham, Sutton Coldfield, London | LAeq | London: -0.45, Birmingham: +0.05. Sutton Coldfield: +0.58 |
| Kim et al. 2007 | Inner circular Highway, Seoul, Korea | LAeq | 1% increase in noise level 1.3% decrease in land price |
| Theebe, 2004 | Western part of the Netherlands | LAeq | Some samples noise insignificant predictor |
| Wilhelmsson, 2000 | Ängby, Stockholm | LAeq | 1% increase in noise levels reduction in price of 0.2% below 68 dBA and 0.3% above 68 dBA. |
| Rich and Nielsen, 2004 | Copenhagen | LAeq | Houses -0.54 and Apartment -0.47 |
| Carey, 2001 | Superstition Freeway (US60), Phoenix, USA | Distance to the Freeway | Detached single-family impacted by proximity to the freeway.<br>Multiple-unit residential Appeared to benefit from proximity to the freeway<br>Condominium Rise in property values when the property was located in the zone adjacent to the Superstition Freeway |

Table 2. Studies of the effect of road traffic noise on house prices have suggested a similarly wide range of percentage devaluation per decibel.

to prices, they are essentially cross-sectional, and that populations resident in different noise areas are unlikely to be homogeneous. SP methods such as Contingent Valuation and Contingent Choice are not subject to these same limitations, because there is no requirement for study participants to have actually bought and sold houses in noisy areas, and because they can be extended to any hypothetical situation which can reasonably be represented in the study. On the other hand, stated preferences are based on hypothetical sentiment which might not be transferable to real situations. For example, SP results implying any particular monetary value per dB do not necessarily mean that respondents would actually be prepared to pay those amounts in real-life. In low aircraft noise areas, with correspondingly low levels of aircraft noise disturbance and annoyance, a 10 dB reduction could be enough to completely eliminate residual aircraft noise intrusion and disturbance. In high aircraft noise areas with much higher levels of aircraft noise disturbance and annoyance, a 10 dB reduction might not be enough to have a very significant effect. In addition, not all residents are willing to report any monetary value at all, either because they do not feel confident to make any such assessment, or because they are suspicious of the uses to which the research might be put, or because, even though they consider the aircraft noise to be a nuisance, they do not agree that the community should be asked to pay anything towards its removal. It would seem that any technical approach which combined the best features of both the HP and SP methods while rejecting the worst features as far as possible would have the greatest chance of success overall.

## Summary

A sufficiently large number of Hedonic Price studies of the effect of aircraft noise on house prices has been carried out over the last 40 years to be able to demonstrate that, P32

P31 while aircraft noise is generally considered to have a negative effect on the relative desirability and subsequently, the price, of any house when put up for sale, the actual effect is subject to considerable variability. In some cases, and possibly due to the particular selection of variables and the ranges of those variables (from high to low values) included in particular studies, the observed Noise Sensitivity Depreciation Index (NSDI) has even turned out positive, suggesting an increase in monetary value in higher noise areas. This apparently positive NSDI could be a result of genuine preference for aircraft noise but it seems more likely to be a result of other positive variables such as accessibility to employment and other facilities outweighing any negative effects of noise. There is no questionnaire data available on the proportion of the population who take noise into account when negotiating to buy a house.

In other cases, the observed NSDI ranges from zero to 1% and higher per decibel. In many cases the assumed baseline value above which noise depreciation begins to take effect is not stated, possibly because the form of hedonic equation used for statistical analysis does not require this, and this means that the resulting NSDI is not interpretable in any practical sense. Because of the wide range of methodological uncertainties involved it is not clear that HP studies, considered independently of other data, can provide anything more than a general indication of the average effect of aircraft noise on house prices. On the other hand, other types of studies are often subject to similar uncertainties, and it may still be possible to reach a consensus view based on a general overview of the problem rather than by focussing on any single methodological approach.

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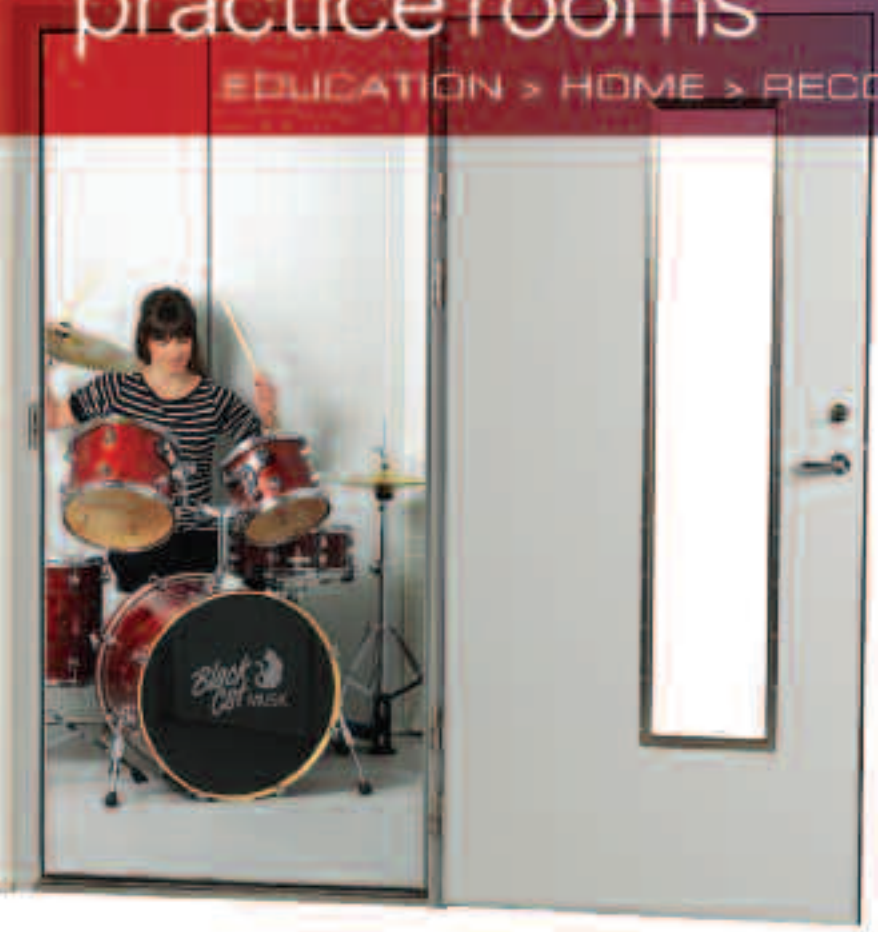

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# Planning and noise – implications of the Planning Policy Framework 2012

*Report by Colin Cobbing and Marcus Richardson of ARM Acoustics*

## Introduction

This article considers changes in planning policy and noise brought about by the introduction of the National Planning Policy Framework (NPPF)[1], which was introduced in March of this year by the Department for Communities and Local Government. We consider whether and to what extent the NPPF alters the context for development control in terms of noise and seek to highlight some of the challenges and opportunities that this may bring about for policy makers, local planning authorities, developers and acoustics practitioners.

The government's stated purpose in producing the NPPF was to simplify existing policy in order to provide a more succinct and easily understood framework for delivering sustainable development. The document provides a framework within which distinctive local and neighbourhood development plans can be produced, which will reflect the needs and priorities of local communities. Furthermore, there is a clear emphasis placed upon the need for engagement with people and communities throughout the planning process in line with the requirements of the Localism Act 2011.

Planning law requires that applications for planning permission must be determined in accordance with development plans. The new legislation requires that in producing such local and neighbourhood plans the NPPF must now be considered. In the short term local planning authorities may continue to give full weight to existing adopted planning policy, even if there is a limited degree of conflict with the requirements of the NPPF, however following a 12-month transitional period (ending March 2013) due weight needs to be given to the consistency of development plans with the NPPF.

The NPPF replaces previous Planning Policy Statements and Guidance including Planning Policy Guidance 24: Planning and noise (PPG24)[2], whilst the commitment to sustainable development indicated within the NPPF remains consistent with the more specific policy set out within the Noise Policy Statement for England, published by Defra in 2010. The NPPF does not, however, consider policies for nationally significant infrastructure projects, which are to be determined in accordance with the Planning Act 2008 and relevant national policy statements.

Throughout this article any emphasis given in bold text is ours unless otherwise stated.

## The legacy of PPG24

In order to consider the implications of PPG 24 being withdrawn, we need to understand what it actually achieved in practice.

PPG 24 outlined the main considerations to be taken into account by local planning authorities in drawing up development plan policies and determining planning applications for development which will either **generate noise** or be exposed to **existing noise sources**. The main thrust of PPG 24 was to provide advice on "how the planning system can be used to minimise the adverse impact of noise **without placing unreasonable restrictions on development or adding unduly to the costs and administrative burdens of business**". There was an element of imperative that noise generating development should not give rise to unacceptable levels of noise and that noise sensitive dwellings should not be exposed to unacceptable levels of noise.

It is worth noting that PPG 24 was old, dating from 1994, which represented quite a different era in planning policy terms e.g. when development would normally only be refused if, on balance, it gave rise to demonstrable harm. This perhaps explains why its focus was rather negative; the main rationale of the guidance being to prevent unacceptable levels of noise.

PPG 24 did a good job in so far as it was used to provide protection from unacceptable levels of noise. Unfortunately, however, it did not encourage good or exemplary design practices. For example, it was and still is common practice to engage acousticians late in the design process and for acoustic protection to be reduced to a consideration of façade treatment without proper consideration of other more effective means of mitigation. It is difficult to argue therefore that PPG 24 created a legacy of good acoustic design practice in the UK.

It was only after PPG 24 was introduced that sustainable development came to the fore, starting with the introduction of This Common Inheritance in 1990. The 1990s heralded a change in emphasis and focus on improvement of the natural and built environment. Recently, the European Noise Directive[3] was introduced - the main objective being to reduce harmful levels of transportation noise.

## The new national planning policy on noise

So how does the new national planning policy differ? In order to understand the new NPPF in relation to noise we should resist any temptation to conclude that the four items identified within Section 123 (see box below) represent the sum of all the national planning policy on noise. To properly understand noise and the national planning policy framework we need to consider these points in the context of the whole document.

### Section 123

Planning policies and decisions should aim to:

- avoid noise from giving rise to significant adverse impacts[27] on health and quality of life as a result of new development;
- mitigate and reduce to a minimum other adverse impacts[27] on health and quality of life arising from noise from new development, including through the use of conditions;
- recognise that development will often create some noise and existing businesses wanting to develop in continuance of their business should not have unreasonable restrictions put on them because of changes in nearby land uses since they were established;[28] and
- identify and protect areas of tranquillity which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason.

27 See Explanatory Note to the Noise Policy Statement for England (Department for the Environment, Food and Rural Affairs).

28 Subject to the provisions of the Environmental Protection Act 1990 and other relevant law.

## Sustainable development

The NPPF states that the "purpose of the planning system is to contribute to the achievement of sustainable development". The UK Sustainable Development Strategy "*Securing the Future*" set out five guiding principles of sustainable development. These being:

"living within the planet's limits; ensuring a strong, healthy and just society; achieving a sustainable economy; promoting good governance; and using sound science responsibly."

The NPPF (Section 7 *et seq*) builds upon this to describe the fundamental purpose of the planning system to perform a number of roles, stating:

- "**an economic role** – contributing to building a strong, responsive and competitive economy, by ensuring that sufficient land of the right type is available in the right places and at the right time to support growth and innovation; and by identifying and coordinating development requirements, including the provision of infrastructure;
- **a social role** – supporting strong, vibrant and **healthy communities**, by providing the supply of housing required to meet the needs of present and future generations; and by creating a **high quality**

**built environment**, with accessible local services that reflect the community's needs and support its health, social and cultural well-being; and

- **an environmental role** – contributing to **protecting and enhancing our natural, built and historic environment**; and, as part of this, helping to improve biodiversity, use natural resources prudently, **minimise waste and pollution**, and mitigate and adapt to climate change including moving to a low carbon economy."

At the heart of sustainable development is the aim to improve people's quality of life. Consequently, improvement and enhancement is one of the key themes of the NPPF. As an example of this, Section 9 states:

"Pursuing sustainable development **involves seeking positive improvements in the quality of the built, natural and historic environment, as well as in people's quality of life, including (but not limited to):**

- making it easier for jobs to be created in cities, towns and villages;
- moving from a net loss of bio-diversity to achieving net gains for nature;
- **replacing poor design with better design**;
- **improving the conditions in which people live, work, travel and take leisure; and**
- **widening the choice of high quality homes**."

This is also reflected in several of the 12 core planning principles set out in the document, the most relevant of which are highlighted below.

- "**not simply be about scrutiny, but instead be a creative exercise in finding ways to enhance and improve the places in which people live their lives;**
- **always seek to secure high quality design and a good standard of amenity for all existing and future occupants of land and buildings;**
- **contribute to conserving and enhancing the natural environment and reducing pollution**. Allocations of land for development should prefer land of lesser environmental value, where consistent with other policies in this Framework;
- **take account of and support local strategies to improve health, social and cultural wellbeing for all**, and deliver sufficient community and cultural facilities and services to meet local needs."

It has long been recognised that noise is a material planning consideration, especially in those proposals which involve the generation of noise, and it is also a common ground for objection to development proposals. For many people noise represents the most immediate aspect of their living environment and can be a strong determinant in people's quality of life and social well-being. There is also increasing evidence that at high levels of exposure noise can also adversely affect physical health. In the context of the new planning policy, it is therefore evident that noise is an important, if not pivotal, aspect of sustainable development.

If any further convincing is necessary, it is worth referring to the Noise Policy Statement for England (NPSE)[3] which has this to say on the matter:

"1.1 The Government is committed to sustainable development and Defra plays an important role in this by working to secure a healthy environment in which we and future generations can prosper. One aspect of meeting these objectives is the need to manage noise for which Defra has the overall responsibility in England."

*And*

"1.6 This Noise Policy Statement for England (NPSE) sets out the long term vision of Government noise policy: **Noise Policy Vision - Promote good health and a good quality of life through the effective management of noise within the context of Government policy on sustainable development."**

Having established the clear connection and relevance of noise to sustainable development, it becomes obvious how noise is a thread that can be considered to run throughout the document and many of P36

P35 the specific policy elements.

Admittedly, noise is not explicitly mentioned in many of the parts of the NPPF, apart from the part on 'Conserving and enhancing the natural environment', but that does not matter. Remember, the purpose of the new NPPF is to simplify policy and to make it more accessible. Consequently, we would not expect the document to be so explicit or pedestrian in its description of the policies. It is a framework document, so applying the basic premise – that noise is a key component of sustainable development – it follows that noise is directly relevant and an intrinsic part of many of the policies set out in the document. Clearly, the extent to which it is relevant will depend upon the particular circumstances of the local area and individual development proposals.

It is not the intent of this article to provide a thorough analysis of all aspects of the NPPF which may be relevant to noise. However, the policies addressing good design deserve particular attention.

## Good design

A number of extracts on design are reproduced below:

"**56.** The Government attaches great importance to the design of the built environment. Good design is a key aspect of sustainable development, is indivisible from good planning, and should contribute positively to making places better for people.

**58.** Local and neighbourhood plans should develop robust and comprehensive policies that set out the quality of development that will be expected for the area.

**59.** Local planning authorities should consider using **design codes** where they could help deliver high quality outcomes. However, design policies should avoid unnecessary prescription or detail and should concentrate on guiding the overall scale, density, massing, height, landscape, layout, materials and access of new development in relation to neighbouring buildings and the local area more generally.

**62.** Local planning authorities should have local design review arrangements in place to provide assessment and support to ensure high standards of design."

It can be seen from these extracts that there is a strong emphasis on ensuring and promoting good design and, of course, this should clearly include good acoustic design of our built environment.

## NPPF noise policies

We now turn our attention to the specific noise policy set out in S123 (see Box 1).

At the risk of sounding repetitive, S123 should not be considered in isolation. Section 109 states that the planning system should contribute to and enhance the natural and local environment by, amongst other things:

"Preventing both new and existing development from contributing to or being put at unacceptable risk from, or being adversely affected by unacceptable levels of soil, air, water or **noise pollution** or land instability."

It can be seen that the same degree of imperative that was contained in PPG 24 – that is to prevent unacceptable noise impacts – is carried over into the NPPF. This is the backstop. Subsequently, S123 develops noise policy further by stating that we should aim to:

- avoid noise from giving rise to significant adverse impacts on health and quality of life as a result of new development;
- mitigate and reduce to a minimum other adverse impacts on health and quality of life arising from noise from new development, including through the use of conditions.

These expressions of policy go much further than the principles set out in PPG 24. To suggest that significant adverse impacts from noise should be avoided and that other noise impacts should be minimised, even when they are below a threshold which may be considered to be significant, is a strong expression of policy. However, the policy is caveated by the preceding words that "planning policies and decisions **should aim to**" avoid significant impacts and minimise non-significant impacts. Consequently, there is no imperative to avoid or minimise; instead we must *try* to avoid.

Just how much we should try to avoid and minimise is fundamental to making plans and decisions and yet no further guidance is given on this point. Could this be the vacuum that was referred to in the title of the one day IOA meetings – "What Happens to Noise Policy Decision Making in a Vacuum?"[4]. Of course, just how hard we aim to avoid and minimise noise impacts will have economic and social consequences. There is a concern that, in the absence of robust information on the costs, benefits and effectiveness of different intervention strategies, it will be difficult to establish an optimal balance between these competing considerations.

Further guidance on the interpretation of S123 can be obtained from NPSE, which states:

"Within the context of Government policy on sustainable development:

- avoid significant adverse impacts on health and quality of life;
- mitigate and minimise adverse impacts on health and quality of life; and
- where possible, contribute to the improvement of health and quality of life."

It can be seen that there are strong similarities between the two documents and that the NPPF uses many of the same terms as the NPSE. Consequently, we can look to this document to obtain a better understanding of what may be considered to be significant as well as a better understanding on the wider interpretation of S123.

It is clear from the words that a test of significance relates to the significance of the noise impact itself and does not depend upon other factors such as financial implications. On the question of significance, the NPSE states:

"It is not possible to have a single objective noise-based measure that defines SOAEL that is applicable to all sources of noise in all situations. Consequently, the SOAEL is likely to be different for different noise sources, for different receptors and at different times. It is acknowledged that further research is required to increase our understanding of what may constitute a significant adverse impact on health and quality of life from noise. However, not having specific SOAEL values in the NPSE provides the necessary policy flexibility until further evidence and suitable guidance is available."

It also explains that that noise policies and decisions must not be considered in isolation. The NPSE Explanatory Note states at 2.18

- "There is a need to integrate consideration of the economic and social benefit of the activity or policy under examination with proper consideration of the adverse environmental effects, including the impact of noise on health and quality of life. This should avoid noise being treated in isolation in any particular situation, i.e. not focussing solely on the noise impact without taking into account other related factors."

So, the NPSE seems to be suggesting a two part process, that is: a) determine whether it is significant or not and then b) consider other factors, such as cost. These, no doubt, are progressive goals but in the absence of further guidance on significant effects and how other factors are to be considered it will be a challenge to determine how these policies ought to be applied in practice. The local authorities, now charged with the responsibility of interpreting and implementing these policies as they apply to local circumstances and conditions, are not in an entirely envious position. We turn to this point later.

Before we go on to consider the challenges that local authorities now face, it may be worth some further consideration of the test of a significant noise impact.

NPSE refers to NOEL, LOAEL and SOAEL. We might consider them as a hierarchy, with SOAEL being somewhere above LOAEL, and NOEL below. These terms originate from toxicology and other related fields. Because of this, there may be a tendency to believe significance should be defined through consideration of dose or exposure response relationships and relevant guidance on the effects of noise on health, such as that published by the WHO[5]. However, we should remember that SOAEL is not just about health effects but is about quality of life as well as health effects. Consequently, amenity considerations may well come into play.

Where a development may affect existing receptors, which enjoy a pre-existing level of amenity, then the change in amenity that may be caused by a development proposal (positive or negative) should be assessed. This would suggest that methods of assessment, based upon relative changes in noise level, and consideration of the new or modified noise in the context of the prevailing noise environment, may be relevant. Where both health and quality of life considerations are relevant it is likely that a combination of assessment methods or

criteria might apply. It can be seen from this that the test of significance in planning policy is potentially complex. That said, such situations are not that different from those regularly tackled as part of the Environmental Impact Assessment process.

## Summary

To summarise, the NPPF provides real grounds for optimism. It sets out a policy framework that is progressive and forward thinking. However, local authorities face real challenges if they are to succeed in turning these policy aspirations into actual practice.

In his foreword to the NPPF, the Minister for Planning - Rt Hon Greg Clark MP - claims, amongst other things, that "Our standards of design can be so much higher..." and that "Planning must be a creative exercise in finding ways to enhance and improve the places in which we live our lives."

If we agree that the NPPF provides the means of finding ways to enhance and improve the natural and built environment, then we must also agree that it provides real opportunities to do better than we have in preventing and managing noise impacts.

## What next?

Local authorities are now required to revise and update their local plans, either through partial review or by preparing a new plan to make them NPPF compatible (see Section 211 et seq of the NPPF). As mentioned, local authorities are given some leeway (up to March 2013), but after that date the policies must be NPPF compliant.

The majority of local authorities already have policies in place - essentially flowing from PPG 24 - which aim to prevent unacceptable noise impacts. However, local authorities should be urged to build upon these policies to give expression to the more progressive aspects of the NPPF. Local authorities should consider the quality of the noise environment in different areas and develop policies for those areas where:

- the noise environment is of such quality that it should be preserved
- the area is already degraded in terms of noise impacts such that any further degradation should be prevented, and
- the areas are so far degraded that policies should help to reduce noise impacts or improve the quality of the noise environment.

With respect to design, local authorities should be urged to develop and adopt policies which encourage good, integrated acoustic design. But what do we mean by this? Does this mean that good acoustic standards are always achieved? The answer is plainly no. Good design must be responsive to the particular circumstances and conditions (opportunities as well as constraints) of each area/development site. Design must also be responsive to other factors affecting the quality of the places in which we live our lives e.g. privacy, lighting, amenity areas, mix of use and, of course, costs. Some of the competing requirements are not necessarily compatible with good acoustic design e.g. orientation of habitable rooms away from noise exposed facades may not be conducive to achieving good standards of privacy.

In this context, good *acoustic* design may be defined as that which achieves the best acoustic outcomes given the particular circumstances of the area/development site, and when balanced with the other design requirements. In many cases it may be entirely reasonable to achieve good acoustic standards, without exception. However, in high noise exposure areas there may need to be a balance and optimisation between achieving good or reasonable design standards and achieving other design and policy aims*.

To achieve good acoustic design a hierarchal or sequential approach should be encouraged starting early in the development process, with control at source being the most preferable form of mitigation and façade or off-site treatment representing methods of last resort.

Updating local plans may not be as onerous as some officers/practitioners may suspect. The task may be made easier if the policy and technical elements of the policies and implementation procedures were treated separately. Policy frameworks can be developed to allow flexibility so as to allow technical standards and requirements e.g. methods of noise assessment - to be adopted and continually updated without having to change the policy framework. In fact, technical standards and the evidence base are always evolving and so it makes sense to separate the local policy framework from the technical requirements.

Local authorities may find the task easier if they group themselves together and pool experience and resources. This may also help to foster consistency of approach, whilst also allowing flexibility to respond to local circumstances and priorities.

Professional bodies, such as the IOA, CIEH and the ANC, could also potentially play a valuable role in the preparation of best practice guidance on good acoustic design standards and practices.

If the potentially progressive aspects of the policy are to be fulfilled, it is worth considering the significant role that central government could play in assisting the process through such activities as:

- providing assistance to local authorities on planning and noise and development of noise policies and management strategies
- publishing the anticipated research on SOAEL and continuing to support on-going research in the field,
- supporting professional organisations in developing technical guidance that will assist local authorities and developers alike
- supporting research and maintaining a database of information on the costs and benefits of different acoustic design methods and intervention strategies
- supporting information exchange networks on best practice, and
- developing programmes to promote and encourage exemplary developments.

In the absence of guidance and good tools that will help local authorities to protect people from the adverse effects of noise without placing unreasonable burdens on development, there is a risk that they may take an overly cautious approach. This, in turn, could hinder the government's policies on sustainable development and economic growth.

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2. Planning Policy Guidance 24: Planning and noise (September 1994) Department for Communities and Local Government.
3. Environmental Noise Directive 2002/49/EC of the European Parliament and of the Council of 25th June 2002 relating to the assessment and management of environmental noise
4. Noise Policy Statement for England (March 2010) Department for Environment, Food and Rural Affairs. (http://www.defra.gov.uk/publications/files/pb13750-noise-policy.pdf)
5. The National Planning Policy Framework - What Happens to Noise Policy Decision Making in a Vacuum? (2012) Institute of Acoustics - One Day Conferences.
6. Guidelines for community noise (1999) World Health Organization (WHO).


* This supposes that the development proposal represents an appropriate use of the site.

# Sustainable building design – how do we address sustainability in the environment and what does this mean for acoustics?

*By Alastair Keyte of 3DReid Architects*

I'm an architect first and foremost so everything I write comes strictly from an architect's perspective. The architect's role has changed over the years as the industry has changed. I guess as a profession we let it happen. I sound as though I bemoan the days of the architect as being the lead designer of being in charge. However, ironically, the contractor's view of the architect has not changed; he still sees us as a prissy group of individuals more concerned about colours than practicality. Perhaps true! We, like most in the profession, have had to grasp new technologies and new ways of thinking, and sustainability is one of those. I think perhaps we all struggle with it, and perhaps none of us has grasped how big a deal it actually is.

Our aspirations for a building are what they always were: a building of its time and place. It used to be easier, but today's construction industry is a myriad of conflicting requirements, that we all have to negotiate through, sustainability being one of those. Full of conflict and competing voices.

I will cover a couple of headings in this article:

- Sustainability, what it is and what it means to different people, a few definitions and what it means to different parts of society and our industry.
- Masterplanning, because it is at the heart of every development, or should be.

## Sustainability

Sustainability means? I suspect if you asked your colleagues what sustainability is, you would receive a variety of answers.

Firstly, it is not a tick box. I suspect a few years ago, and perhaps it still is in some people's minds, sustainability was a tick box, a check list.

Sustainable development is generally what we, as an industry, deal with. I found this on the internet: "Sustainable development (SD) is a pattern of growth in which resource use aims to meet human needs while preserving the environment so that these needs can be met, not only in the present, but also for generations to come".

Another, also from the web, would be: "Development which meets the needs of the present without compromising the ability of future generations to meet their own needs".

However, in the wider sense, and also found on the internet: "Sustainability is the capacity to endure. For humans, sustainability is the long-term maintenance of responsibility, which has environmental, economic, and social dimensions, and encompasses the concept of stewardship, the responsible management of resource use".

I particularly liked the use of the word stewardship here. The concept of everything, our planet, held in trust sounds somewhat philanthropic, but strikes a chord in today's society. Much of the chatter of recent years has focused on energy, materials and the environment, but the wider social and economic aspects are becoming equally important. It mirrors some of the social and cultural changes that have taken place in society. The holistic view is becoming paramount and I believe that this wider view, of the holistic view, is the one that will be focused on in the next few years.

With regard to sustainability in the UK, since 1994, when the government produced its first strategy for sustainable development, there have been a few others, including the government's own promise, to put sustainable development at the heart of every departments work.

You may be familiar with the diagram in figure 1. It plots the overlap between economics, environment and social. Again stewardship appears and I think we will see more of that theme. Also there are business ethics, Fair Trade and workers' rights. Some may say that these are not sustainable issues, but in the holistic sense, they are very much part and parcel of Sustainability and that reflects the earlier changes I mentioned in society.

Figure 1. The Three Spheres of Sustainability

Given the title of this publication, it would be pertinent to discuss sustainability in terms of the role of acoustics and the acoustician in that process. At first glance that may seem difficult to assess, even prove. However, acoustics and sustainability are linked directly through the choice of, and specification of, materials, design and layouts of buildings and sites, the environment, air quality and health. All are part of the wider sustainable agenda.

## Masterplanning

Masterplanning generally, and sustainable masterplanning also, is appropriate at different levels, from the individual building and individual site to whole new city quarters. Much of it is common sense and is something that we all have been doing in our professional lives for years, but perhaps without thinking about it.

**Why is it so important?**

Here's one of those many facts that you'll wish you didn't know. In 1950, there were only 37 cities with populations greater than 1 million. By 2005, it was estimated at 414, and rising. By 2007, more than half the world's population lived in cities, and this figure continues to grow.

At its heart, masterplanning is a framework, trying to resolve and manage differing requirements, often complex, very often competing, but could be summed up as maximizing opportunity, whilst minimising risk.

To maximise its sustainable potential, you are required to prioritise issues, while acknowledging a site's or development's strengths and its weaknesses. This is to be achieved without undermining the sustainability of the overall project.

There are a myriad of different requirements seeking attention. The housing developer wishes to maximize his return, the shop owner is more concerned about prime retail frontage and his signage zone, while the commercial developer is about the net to gross ratio and clear spans.

Sustainabilty will certainly mean different things to them. And more importantly, they will prioritise different aspects. Sustainability is still seen as yet another competing interest, competing for time, resource and money.

Some of the areas that you would wish to examine would include:

- Land use and ecology through site selection, topography. Minimising ecological effects

- Mobility, transport networks, routes, frequency, parking. How you can influence a change of transport patterns, encourage walking, cycling and discourage car dependency
- Water. A major issue especially in different parts of the world. Flood risks, water usage, quality and management
- Energy and climate change. Energy use, efficiency of buildings, lighting. Optimising energy generation and supply
- Pollution. Noise, light, air. Controlling or minimising these encourages use of land and buildings without compromise
- Material, recycling and waste. Building/structures/materials re-use. Designing for adaptability and reuse. Embedded energy of products, favouring locally sourced using local labour. Storage of waste, and minimising waste
- Usability. Quality of streets, spaces, buildings. Universal accessibility
- Place making. Landscape, scale, historical contexts, active frontages. Improving connectivity
- Cultural. Encourages amenity, community and social inclusivity
- Costs and economics. Remembering that commercial viability may depend on any of the factors named above.

My apologies for the list, but I want to give a feel of the aspects of a site that you would consider before engaging in any masterplanning. It is very diverse, and some aspects such as cultural and social aspects are representative of the wider, holistic view of sustainability.

## Sustainable acoustics: its objectives and its sources

At its heart it's to control or regulate noise levels, either inside or outside buildings. In doing so, it is creating internal and external spaces that can be enjoyed without injury, or excessive exposure to noise.

Sources of noise pollution can vary from extraction of natural resources to construction and demolition. Transportation is probably one of the biggest issues, be it aircraft or motor vehicle noise. Other sources and industrial and production processes, building plant that service those industries or indeed any building. Very topical at the moment are wind turbines and the noise and perceived landscape pollution they bring.

And also there are people, from cheering crowds to late night revellers in the city centres.

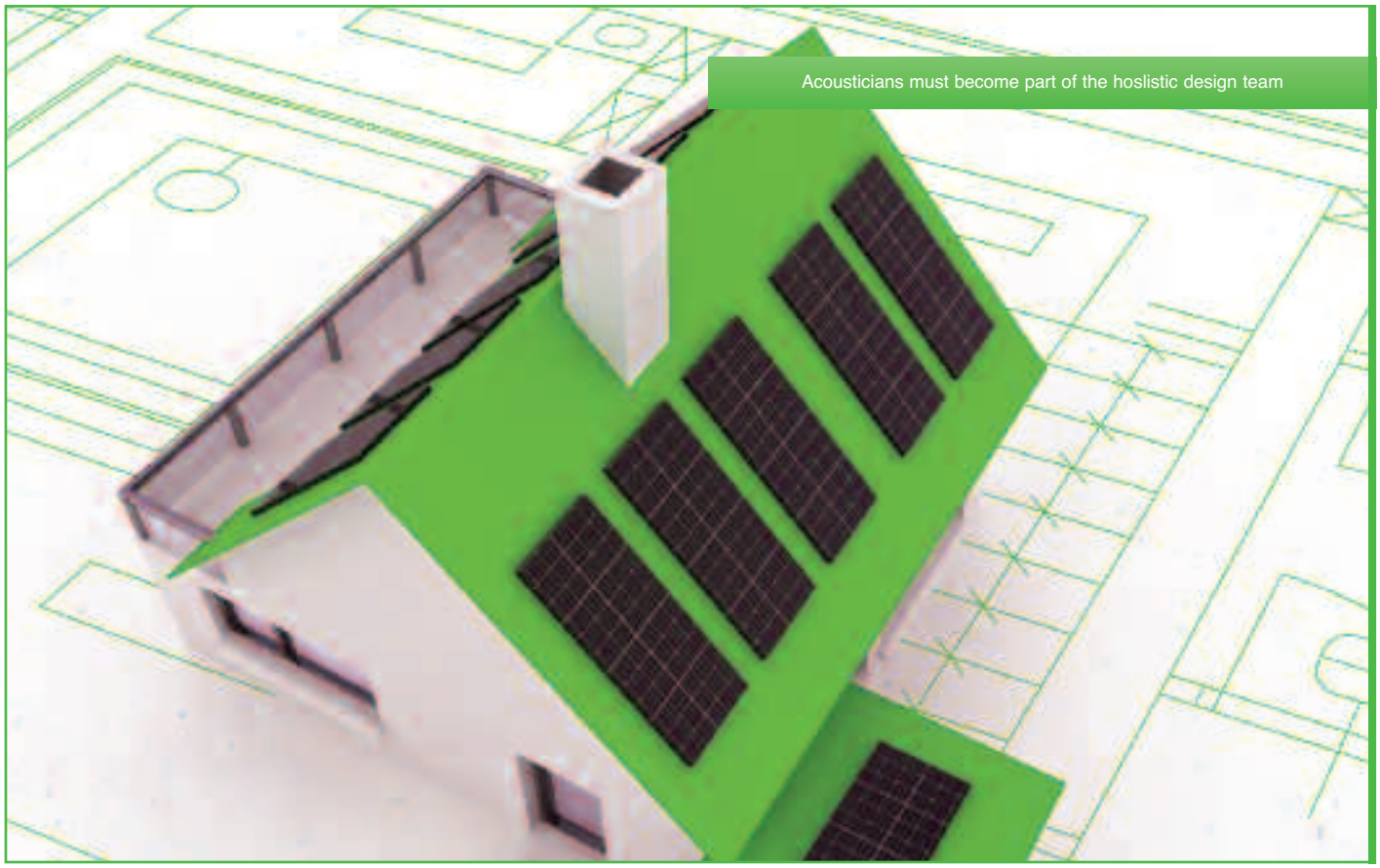
The implication for acoustics and acousticians are many:

- Separate noise sources from receivers. If you can't do that then you have to mitigate
- Minimise noise at source. It is not always in your scope
- Orientation of buildings. This is possible, this is dependent on some other aspects and may be difficult to control
- Natural screening with trees and bunds
- Non-sensitive buildings screening. Lay the site to locate another non-sensitive building in the line of sight
- Downwind. Again not always easy to achieve
- Maximise distance
- Land zoning. Planners through their local and regional planning policy dictate this, and there may be some opportunity perhaps within a large masterplanning exercise to zone different, conflicting uses within the site
- Natural noise masking such as water features and vegetation.

## Summary

In summary, I think it's the challenge for the acoustician to become a part of that holistic design team. There will always be pressures that might try to exclude them, especially from an early stage, and perhaps even then for a restricted scope, but it befalls to the rest of the design team to advocate for their inclusion, along with others, so that a holistic view can be taken as early as possible. By doing so, it would be hoped that many pitfalls of poor layout, poor design, uninformed decisions are avoided, to the benefit of the project and to the client.

*This article is based on a presentation given to the Institute of Acoustics conferences in Manchester in March 2012 and at the BRE, Watford in September 2012. Alastair Keyte is Associate Director of 3DReid, working primarily out of the Edinburgh office, but has worked in Manchester for more than two years on the Co-op Head Office project. He is currently "toing and froing" between Edinburgh and Glasgow.*



Acousticians must become part of the hoslistic design team

# IAC appoints Calum Forsyth as new CEO

IAC, the world's largest noise and acoustics control company, has appointed Calum Forsyth as Chief Executive Officer.

He joins from Wavin BV, a leading European supplier of plastic pipes and fittings to the construction industry, where he was Regional Managing Director of South West Europe. In this role, he was responsible for businesses in the UK, Ireland, Spain, France and Portugal, in addition to being in charge of the group's US licensees.

With a wealth of experience in growing businesses through organic growth and by acquisition, he says he is ready to lead IAC to further global expansion (see IAC boost North American presence page 42).

"I am really excited for this opportunity to strengthen IAC's position as a global leader in the noise control industry," he said.

"The future of IAC looks very strong having evolved over the last decade to a world-leading manufacturer and solution provider. My aim is to build upon current success and drive sustainable, profitable growth both in our current territories and in new untapped international markets."

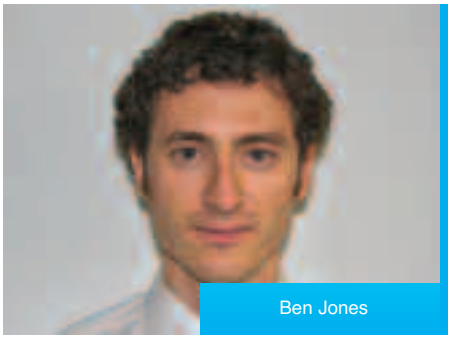
Calum Forsyth

# Ben Jones joins Engineering Council

Ben Jones has joined the Engineering Council in the newly created role of Professional Development Executive which results from the recent restructure of the organisation.

Previously Exams Co-ordinator at King's College School, he will be working closely with employers and professional engineering institutions to develop a shared understanding of the benefits of professional development throughout the career of engineers and technicians.

"From an early interest in education policy, I've tried to move my career in the direction of professional development, which is shaping up to be the hot topic of the UK's constantly shifting economy for the foreseeable future," he said. "I'm excited about becoming part of the Engineering Council team and helping to work with employers to drive professional development forward."



Ben Jones

# Xodus Group strengthens acoustics capability

Nathan Thomas has joined the acoustics team of Xodus Group as Lead Acoustic Consultant as the company continues its rapid worldwide growth in providing consultancy services to the oil and gas and low carbon industries.

Colleague Bernard Postlethwaite said: "We're delighted that Nathan has joined us; he strengthens our expertise in noise control diagnostics, marine impact assessment and acoustic design for oil and gas installations."

One of his first tasks was undertaking noise control diagnostics to provide bespoke solutions for an offshore installation. He said: "My time with Xodus has already provided projects with unique engineering challenges. The integrated approach is refreshing and creates a fun place to work."

Nathan Thomas

# Ramboll Acoustics team expands

Following a period of growth at Ramboll over the past three years, its acoustics team has recently expanded with the recruitment of Paul Driscoll and Fabrizio Filippi.

Fabrizio's appointment means that Ramboll now has an acoustics presence in London, while Paul will be serving the South Wales and Southwest region, based between the Bristol and Cardiff offices.

Ramboll's acoustics team now comprises 15 UK-based specialists working across offices in Cambridge, Birmingham, Cardiff, Bristol, Chester, Southampton and London. This is complemented by a further 40 consultants working in the consultancy's international offices.

Raf Orlowski, Director of Acoustics said: "We are delighted to have Paul and Fabrizio on board to strengthen our team."

Left to right: Paul Driscoll, Raf Orlowski and Fabrizio Filippi

# SATRA unveils new hearing protection test facility

SATRA has unveiled a new hemi-anechoic chamber at its Kettering headquarters, the result of a significant investment by the company to extend its hearing protection testing service.

The new chamber was designed and commissioned by IAC. Positioned within an existing building, with other kinds of research being carried out on a daily basis, the chamber needed to meet a demanding acoustic specification despite a high background noise level of around 70dB(A) within the host structure.

With this in mind, the new facility was configured as a room within a room and constructed using IAC's Moduline acoustic panel system. The inner chamber is structurally isolated from the outer skin using a series of anti-vibration mounts and an air gap between the two walls helps to further increase the acoustic performance.

The internal walls and ceiling of the chamber were covered with foam anechoic wedges of an appropriate size and length to achieve the 100Hz cut-off frequency target set by SATRA in the specification.

Access to the chamber is via a set of IAC Noise-Lock linked acoustic doors between the two skins and a wedge basket door at the room entrance to ensure maximum internal sound absorption.

Thanks to the hemi-anechoic chamber, SATRA is now able to test all types of ear-muffs, ear-plugs and safety helmet-mounted hearing protection to the BS EN 352 series of standards.

The new facility will help manufacturers place tested and certified hearing protection products on the market quickly. SATRA has also increased its team of acoustic specialists who can advise on all aspects of hearing protection testing including technical and legislative issues.

As well as acoustic testing, SATRA also tests products' physical properties, weight, construction, sizing, adjustability, cup rotation, headband force and flexing, cushion pressure etc.

Christine Powley-Williams, divisional manager, said: "SATRA already provides certification for hearing protection products and has more than 90 years' experience in product testing, so investing in this new facility seemed a natural progression.

"The acoustic assessment of hearing protectors is not widely available, yet demand from manufacturers is rising. Gone is the one-size-fits-all approach. Today employers want hearing protectors adapted for different purposes and to fit different individuals."

Inside the new hemi-anechoic chamber

The opening came as 3M signed up as the first customer for acoustic testing, with SATRA and 3M donating the £3,000 test fee to the charity Action on Hearing Loss.

For further information, ring **01536 410000**, email **earingprotection@satra.co.uk** or go to **www.satrappeguide.com**

# College goes Solo to solve ceiling problem

King George V College in Southport has installed an unusual configuration of Ecophon's Solo and Solo Freedom acoustics ceiling rafts as part of a major refurbishment of its learning resource centre.

Using the circular ceiling light in the middle of the room as a focal point, a circular-shaped Solo Freedom acoustics raft has been hung from the ceiling and downstands directly under it. Three lengths of Solo raft, measuring 19.5m, then run down the centre of the ceiling on either side with strip lighting in between.

Andrew Gibson, the lead designer on the project from AA Projects, said: "Due to the layout of the ceiling and the number of services, we weren't able to install a traditional suspended ceiling. Ecophon's rafts allowed us to be creative with the design while maintaining high acoustics standards."

The learning resource centre's new ceiling

# IAC boosts North American presence with acquisition of GT Exhaust

IAC, the world's largest noise and acoustic control company, has acquired US-based GT Exhaust (GT).

Based in Nebraska, GT is one of the leading providers of sound and emissions control solutions to the North American energy, power, and heavy transportation industries and will become a subsidiary of IAC.

IAC CEO Calum Forsyth said: "GT Exhaust adds a very strong business to IAC's portfolio and provides access to the North American energy and power market.

"While we have been serving our European customers in the energy and power sector very successfully mainly through our French subsidiary Boet Stopson, we did not have local capabilities in the United States and Canada.

"GT Exhaust is the ideal addition to IAC and helps us accelerate our international expansion. GT Exhaust also brings a whole new range of products for emissions control into the group, a market that is experiencing strong growth and where IAC has not been represented until now."

GT's product line which includes silencers, catalytic converters, diesel particulate filter (DPFs), emissions monitoring systems, and related accessories, is used in new installation and retrofit applications for large diesel and natural gas engines.

IAC said the acquisition was consistent with its strategy to expand in the North American markets and would give it a strong customer base consisting of some of the world's leading blue-chip companies.

For more information go to **www.industrialacoustics.com** or **www.gtexhaust.com** or contact David Ballan at **david.ballan@iac-acoustics.com**

# Castle extends its consultancy services

Castle Group has expanded the services offered through its consultancy business. They now include air sampling, light monitoring, indoor air quality, EMF detection and assessment, noise and vibration. It also carries out health surveillance for noise at work regulations, hand arm vibration and COSHH compliance.

Castle has also extended its outdoor services to include ecology surveys, soil analysis, water quality, environmental particulates, noise, vibration and traffic surveys.

Simon Bull, Managing Director, said, "These days more and more companies want a package of services to save them the management headache of employing multiple consultancy firms."

Noise monitoring is one of the services offered by Castle Group

For more information contact Dianne Hamblin at **Dianne@casltegroup.co.uk** or **01723 584250**.

# Brüel & Kjær acquires partner NoVoSim

Brüel & Kjær Sound & Vibration has acquired long-term partner, NoViSim, to consolidate its position in the development of NVH simulation products.

The move brings on board the NVH Simulator and SoNoScout products as well as the development team who produced them.

Mark Allman-Ward, of NoViSim, said: "Our long association with many automotive companies has allowed us to develop unique solutions to the difficult issues facing NVH engineers. Being part of Brüel & Kjær Sound & Vibration allows those tools to be used in a wider range of applications."

The acquisition is in line with Brüel & Kjær Sound & Vibration's strategic direction to strengthen its automotive product portfolio by providing an integrated NVH platform for vehicle development programs at OEMs and suppliers.

Lars Rønn, Brüel & Kjær Sound & Vibration CEO, said: "We believe that a tighter integration of the NoViSim products with our existing solutions' portfolio will lead to a more efficient environment for NVH development."

Since 2005, the NoViSim team has been continuously extending the application range of the NVH simulator portfolio in close cooperation with Brüel & Kjær Sound & Vibration. The NVH simulator has been adopted by a growing number of Automotive OEMs and Suppliers for improved NVH decision-making.

An NVH vehicle simulator

New enhancements and products are planned to further improve the application of this ground breaking technology for the benefit of Brüel & Kjær Sound & Vibration's customers.

For more information on NVH Simulator portfolio and SoNoScout go to: **http://www.bksv.com/NewsEvents/News/bruel-kjaer-acquires-novisim.aspx**

# SRS serves up 'recipe for success' at school dining hall

Noise levels at the dining hall at Collingwood School, Morpeth, have been drastically reduced, thanks to the installation of Sonato Vario panels by Sound Reduction Systems.

After calculating the extent of the reverberation problem, acoustician Toby Makin was able to suggest the appropriate amount and configuration of raft absorbers to achieve a worthwhile improvement. In this case he looked to at least halve the reverberation time, getting the dining hall much closer to the requirements of BB93.

For more details ring **01204 380 074** or e-mail **info@soundreduction.co.uk**

Part of new dining hall ceiling

# Infographic shows the importance of good classroom statistics

Ecophon Saint-Gobain has produced an "AcousticMatters" infographic to highlight the importance of good classroom acoustics.

"Research clearly shows that acoustics of a classroom can have a massive effect on learning rates, teacher-pupil relations and even the physical well-being of teachers, and yet this is a subject that receives a fraction of the attention that other, more visible, teaching obstacles receive," it says.

It has created the infographic in order "to cast some light on an issue that is hampering educational progress on a constant basis". The statistics include:

- 80% of teachers report vocal strain and other throat problems, compared with 5% in other professions
- A 10% increase in background noise on a regular basis causes a 7% drop in SATs scores at Key Stage 2
- At 24 feet from a teacher, pupils understand only 36% of what is said
- Only 21% of UK local authorities can confirm that schools in their area meet government acoustic guidelines.

The company says: "This is a very real problem that we wish to drive into broader conversation. You can join the discussion on Twitter using the hashtag **#AcousticMatters**."

The Ecophon infographic


# Cheers! Tiles solve sound absorption problem at drinks shop

Troldtekt ultrafine tiles have been installed in the ceiling of Hedonism Wines, a new drinks shop in Mayfair, to solve a sound absorption problem stemming from the use of wood floors and other hard surfaces.

The 2400 x 600mm tiles are made from 100% natural wood fibres mixed with cement. They are available in various sizes and in three grades from ultrafine to coarse. They can be left untreated or painted in virtually any RAL colour.

Hedonism Wines, which stocks around 1,000 different spirits and 3,500 wines, is the result of extensive refurbishment and the formation of one large unit from the separate supermarket and cafe which used to occupy the site.

For more information ring **0844 8114877** or visit **www@troldtekt.co.uk**

Hedonism: the new drinks shop in Mayfair

# Discord: The story of noise

## Mike Goldsmith

*Review by Ian Bennett*

I have to say at the outset that I enjoyed this book. *Discord: The story of noise* is a chronological account of what we now call acoustics, with something of a bias towards environmental and workplace noise. Mike Goldsmith starts with a very simple explanation for the layman of what noise is, and how it is transmitted, then starts in chapter 2 with the somewhat alarming news that the Big Bang was in fact silent. Well, it would have to be, when you think about it. His account of the next four billion years or so is necessarily compressed but culminates with some interesting thoughts on how and why the organs of hearing evolved in the higher animals. A theme starts in pre-history, which is the contrast between harmony and dissonance, but in terms of noise nuisance, the gods of ancient Mesopotamia (according to the Epic of Gilgamesh) were so disturbed by the noise from the world's first city at Uruk that they called forth a great deluge … which does have a ring of familiarity. I am rather afraid, however, that I cannot see this as a viable noise prevention measure for environmental health professionals in the post-Christian western world.

The uses of noise in ancient wars are also considered, and whilst there can be little doubt that the noises produced by a Bronze Age army were, to say the least, somewhat intimidating, Mike does pause to "knock on the head" the Battle of Jericho: the walls may indeed have come tumblin' down but it was nothing to do with the amount of sound power produced by the drums and trumpets.

Having dealt with natural noise-making phenomena, including the Hill of Sounding Sand in China, much loved by the Immediate Past President of the IOA, Mike goes next to the writings of the Ancient Greeks, especially Pythagoras (he of the theorem) who regarded sound in terms of dissonance and his search for simplicity in mathematical relationships. He seems to have been on the right track, but he extrapolated his ideas well beyond anything that was reasonable — at least we think he did, because dear old Pythag was obsessively secretive and never told anyone apart from his devotees, sworn to secrecy, what he was up to.

A familiar name to architectural acousticians then appears: Vitruvius. He may have been somewhat misled by earlier Greek writings, but there seems little doubt that this particular Roman knew what he was on about, and in the first century CE he correctly described how sound propagates through air.

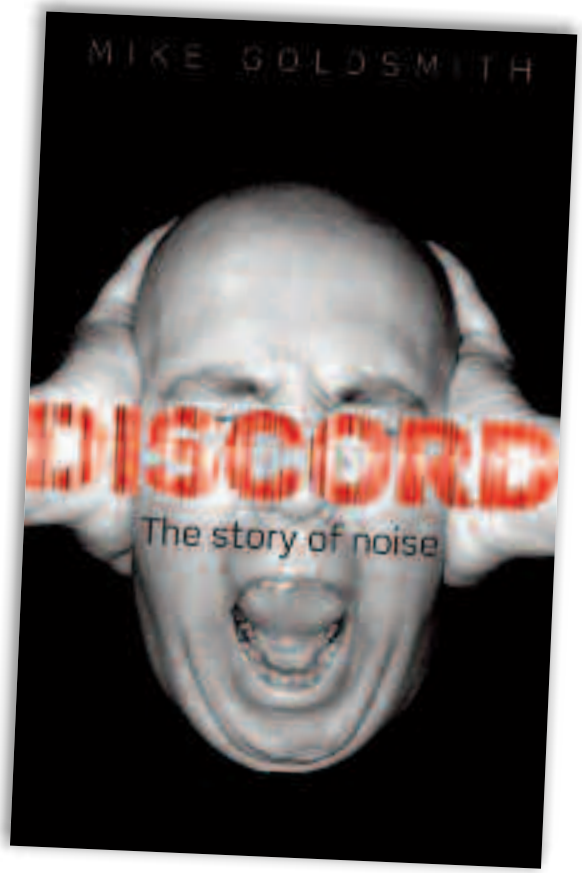
The account then skips through the Middle Ages, which saw some very early attempts to control noise in cities by means of zoning, and past Sir Isaac Newton, who got some of the principles of acoustics right but (typically) got his sums wrong. I must admit to wishing I had known when studying A-level physics that what we were calling a "variable constant" or fudge factor, Newton had introduced as "crassitude" in order to calculate the speed of sound. Robert Hooke demonstrated for the first time that frequency was related to pitch, and interestingly explored the idea that sound could be used to discover the internal motions and actions of bodies.

The coming of the industrial revolution meant for the first time that anthropogenic noise began to drown out natural sounds, although the sound of money being made did not seem to bother our Victorian forebears too much — not the ones who were making the money, anyway. Presumably the ones most exposed to the noise had little choice in the matter, but they did not have the time or the facility to write about it.

Acousticians and acoustical engineers work in an area where anecdotes concerning historical figures (or possibly apocryphal tales) are somewhat thin on the ground. I am grateful to Mike Goldsmith, therefore, for providing the tale of Thomas Carlyle, the 19th century Scottish essayist and historian, who was apparently so bothered by domestic noise that he commissioned an architect to build him a "soundproof" attic room. Not wanting to suffer the noise of its construction, he moved out, leaving his wife in charge of the project. When the room was complete, back he came, and he found — and wrote about — the tranquillity that was now his. Unfortunately, his domestic bliss was cut short a few months later when his wife ran off with the architect. There's a moral there somewhere.

The book prepares for its move into the twentieth century with the reasonably familiar account of William Sabine and the Fogg Lecture Hall. The logistics of moving vast quantities of absorptive seat cushions in and out of two halls did not deter him, although as a cynic might point out, he did have an army of impoverished research students to help him (nothing changes!). Perhaps he is most loved as the "father of acoustics" because he set a precedent for night-time working, a practice with which many consultants are all too familiar.

I will not spoil the twentieth and twenty-first century chapters for the reader, except to mention that underwater acoustics, environmental noise, industrial noise and music all receive due consideration. Mike has succeeded in producing a very readable book which is capable of raising a smile and telling readers things they did not know. I am less sure exactly where it fits, and whom its target audience may be, but anyone with a vaguely technical mind would be happy to receive it as a seasonal gift.




*Discord: The story of noise* by Mike Goldsmith is published by Oxford University Press (ISBN 978-0-19-960068-7). Price £16.99

# Confusion over the law of nuisance

The law of nuisance is a tricky area to analyse and the case law has many strands to it that are difficult to reconcile and may be inconsistent. Mervyn Rundle, who contributed to the July/ August and September/October Bulletins, makes a bold and useful effort in part, but may have confused some of your readers on a number of important points. In the latter Bulletin, he states that the concept of statutory nuisance is "quite simple", but then misinterprets the local authority duty under section 79 Environmental Protection Act 1990. He states that the duty is to "monitor noise levels and to reduce excessive noise by serving an abatement notice". However, there is no continuing duty of a supervisory kind as his wording implies. The Act provides for a duty of the local authority to inspect its area from time to time to detect statutory nuisances and a separate duty to investigate complaints from residents. It must then serve a notice if satisfied that a statutory nuisance exists, or is likely to occur or recur – a process that is often far from simple, because the decision on nuisance requires a balancing exercise to be properly carried out which has to take into account all the relevant circumstances. Most crucially, the reasonability of the activity causing the noise, taking into account the effects of the noise upon victims, needs to be carefully weighed by the environmental health professional making the decision on behalf of the local authority.

In the later Bulletin, Mr Rundle states that noise levels must be "physically damaging" to be injurious to health as distinct from merely a nuisance in order to come within the scope of the statute. The triggering of the health limb for statutory noise nuisance has never been properly tested by the courts and even a long-term interference with sleep has not been judicially analysed under this limb. This is a very contentious area for practitioners, but to require physical damage – resulting, presumably, from damagingly high levels of noise or vibration – would be far too high a standard, for which there is no credible support from any source (with the possible exception of Mr Rundle).

Some errors are, perhaps, more excusable than others. In the July/ August Bulletin, to imply that the controversial decision of the Court of Appeal in *Coventry (t/a RDC Promotions) v Lawrence* [2012] EWCA Civ 26 is authority for the grant of planning permission providing a complete defence to a nuisance claim is not right. The "*Gillingham* exception" (after *Gillingham BC v Medway Dock Co Ltd* [1993] QB 343) is just that. It sets out the *limited* circumstances – changing the character of the neighbourhood for a large-scale scheme for which planning permission has been granted – when the grant of planning permission allows interference from nuisances. But there are limits. The nuisance must be a direct consequence of the grant of planning permission and should not be the result of negligence. But whether the motor-sport track in *Lawrence* should have come within the scope of the *Gillingham* exception is controversial and the Court of Appeal may have come to a wrong decision on the relevant facts. Time will tell and a future decision of the Supreme Court may well take a different approach.

But less excusable is Mr Rundle's equating of public nuisance with statutory nuisance. A statutory nuisance coming within the scope of section 79(1) Environmental Protection Act 1990 will be more often a type of private nuisance, even if several people are affected by it. A statutory nuisance may be prejudicial to health and sometimes it will not be either a private or a public nuisance. This is a complex area for practitioners. Generations of students have confused themselves over public nuisance, so Mr Rundle is in good company. Clarification can be found in the article by David Horrocks and myself on licensing and public nuisance that features in this Bulletin. Further assistance may be found in my book – Malcolm and Pointing, *Statutory Nuisance Law and Practice*, 2nd edition, 2011 (OUP: Oxford).

**John Pointing**, Barrister and Legal Partner, Statutory Nuisance Solutions

## Product News

# Launch of Noise Nuisance App

Three Spires Acoustics and Encentre have released the Noise Nuisance App on iTunes.

Chris Hurst, Director and Acoustic Consultant at Three Spires, said: "We think this is quite an innovation and will help both noise sufferers gather evidence and log incidents as well as assist local authorities who have resource limitations in making judgements on whether to proceed with further investigations.

"Most nuisance cases result from ongoing or intermittent noise disturbances so it is important that evidence is logged over time to demonstrate that a state of affairs exists. The Noise Nuisance App enables the sufferer to get a head start by logging the information needed to help progress the case.

"Using the app is easy; within seconds the sufferer is able to make an audio recording of the noise and enter detail about the nature of the disturbance. At any point the user can then email their diary and share the audio files directly with their local environmental health department. Alternatively the sufferer can use the evidence they have gathered by taking their own action or refer to social landlords who might have a responsibility to act to prevent nuisances.

"Successful cases often rely upon the quality of evidence provided and commitment from the complainants. Not everyone will have access to Smartphone technology but those who do can take advantage of the Noise Nuisance App."

The app is available at **http://itunes.apple.com/gb/app/noise-nuisance/id549277744?mt=8**

# Fourth generation of hardware for Brüel & Kjær sound level meters

Brüel & Kjær has launched a fourth generation of hardware for its sound level meters and hand-held analyzers –Types 2250 and 2270 G4.

This new hardware enables Types 2250 and 2270 users to run multiple, upgraded applications, such as frequency analysis, logging and signal recording. It also has a high-contrast colour screen, which makes performing outdoor measurements easier for environmental officers and consultants.

The Type 2270 G4 meter provides users with dual-channel capabilities, such as sound intensity for noise source location measurements in vehicles, sound power for testing consumer goods or machinery during development and building acoustics tools, which can be used for measuring sound insulation inside structures. The new hardware has boosted the meter's processing capabilities for faster calculations and increased battery life.

All Type 2250 and 2270 instruments running version 4 of the instrument software can interface directly with Vaisala ultrasonic weather stations, which allows seamless integration of noise and weather data within the sound level meter, so wind affected noise measurements are easily identified.

GPS devices (Global Positioning Satellite) can also automatically record the measurement location, making it simpler to link noise levels to particular areas during the post-processing stage.

Brüel & Kjær has also transformed its Sound Level Meter PC software BZ-5503, a post-processing PC software application for all Type 2250 and 2270 meters. BZ-5503 Measurement Partner Suite allows users to download, view, post-process and archive noise and weather data in one PC application.

The new Brüel & Kjær sound level meter

The most common post-processing tasks are available in a graphical environment, designed for noise level analysis. This eliminates the need for repetitive and time-consuming exportation of data to spreadsheets. Existing BZ 5503 users can download the new Measurement Partner Suite for free on Brüel & Kjær's website.

More information on Type 2250 & 2270 G4 is available at **http://www.bksv.com/doc/bp2025.pdf**

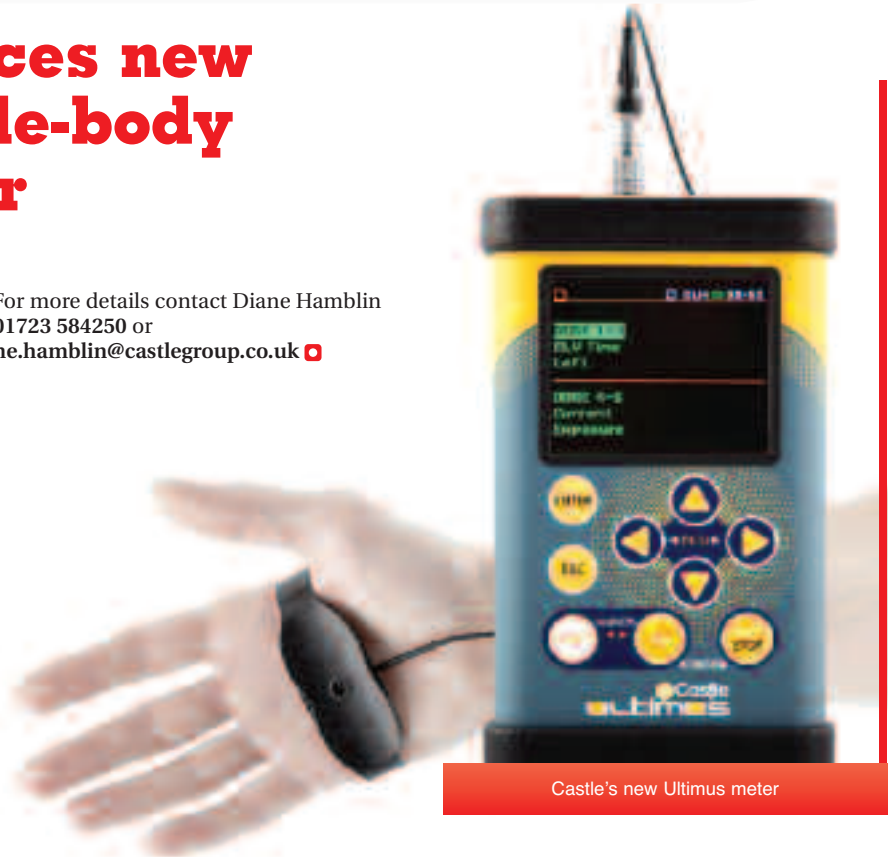
# Castle introduces new hand-arm whole-body vibration meter

Castle Group has launched a new hand-arm and whole-body vibration meter which it says can halve the time it takes to get the readings required for the Control of Vibration at Work Regulations 2005.

The Ultimus is capable of measuring six channels at once, so can either measure on two handles of a hand-held power tool or can measure whole-body vibration from a vehicle at the same time as measuring, for example, the hand-arm vibration from the steering wheel .

This feature is combined with large memory, colour display and MEMS (Micro Machined) sensor technology. The accelerometer system used on the Ultimus allows measurements to be taken in a new way, without the need to fix the sensor onto the tool.

For more details contact Diane Hamblin on **01723 584250** or **diane.hamblin@castlegroup.co.uk**



Castle's new Ultimus meter

# New wood range from Armstrong Ceilings

Armstrong Ceilings has added a range of wood tiles to its Atelier offering which comply with all fire requirements (Euroclass B-s2, d0) and do not compromise acoustic performance (sound absorption up to Class C) or environmental considerations (FSC-certified).

The range is available in tiles and planks, either in laminate or veneer. Both options are coated with a clear UV-enhanced and solvent-free lacquer to protect them from ageing and sunlight. Both the tiles and planks are compatible with Armstrong's grid system.

The matt finish veneers are available in five colours and the laminates in three. Edge details include the Vector option which produces a 6mm reveal that minimises the visible grid, creating a ceiling that appears even more monolithic than standard suspended ceilings.

For improved acoustic performance, several perforation options in circular or grooved holes, backed by an acoustic fleece, are available for the veneered range that achieves up to 0.65 αW. The complete range of veneers and laminates offers light reflectance values of up to 72%.

Following launch of the eco-friendly CoolZone system, Armstrong has introduced a RIBA-approved CPD on the use of the PCM (Phase Change Material) the concept is based on.

The CPD *"Using phase change materials in construction for a more sustainable built environment"* is designed to help architects, interior designers and clients better understand where and how PCMs can be used to create a more energy-efficient and comfortable environment and how they play a role in supporting high-performing sustainable properties.

Formulated specifically to meet the requirements of RIBA's core curriculum in terms of "Climate: sustainable architecture" and "Designing and building it: design, construction, technology and engineering", the CPD advises on the how, what, where and when of PCMs in new-build and refurbishment projects in the office, education, healthcare, commercial and retail sectors particularly.

For more details go to **http://www.armstrong.co.uk/commclgeu/eu1/uk/gb/wood.html** or email **as-info-uk@armstrong.com**

An example of the new wood range

# New water-based acoustic barrier aims to make plenty of waves

The world's first water-based viscoelastic acoustic noise barrier production line has been opened by Acoustica in St Mary's, New South Wales, Australia.

The QuietWave noise barrier heralds a shift away from petrochemical based barriers and, in particular, what until now has been the industry standard, loaded vinyl barriers which include harmful plasticisers.

QuietWave is the culmination of the adoption by Acoustica of the principles of green chemistry and seven years of research and development.

Green chemistry, also called sustainable chemistry, is a philosophy of chemical research and engineering that encourages the design of products and processes that minimise the use and generation of hazardous substances. Green chemistry seeks to reduce and prevent pollution at its source. It aims to avoid problems before they happen.

The QuietWave biodegradable noise barrier which isolates noise and dampens sound vibration to increase sound transmission loss is now incorporated into Acoustica's range of architectural acoustic products replacing the previous mass loaded PVC barriers in their wall, partition, floor, ceiling and pipe lagging products.

Philippe Doneux, Acoustica's founding director, is confident that their change away from petrochemicals including harmful plasticisers to a natural organic barrier is the beginning of a move away from mass loaded PVC and thermoplastic barriers towards environmentally acceptable alternatives such as QuietWave

He added that the company was now well placed to benefit from this change and was already in licensing and joint venture discussions with international companies.

For more details go to **http://www.acoustica.com.au/pdf/Natural-alternative.pdf**

New South Wales Minister for Primary Industries and Small Business Katrina Hodgkinson inspects the new facility with Philippe Doneux, Acoustica's founding director

# 'Unique' new absorption product from Flex Acoustics

AqFlex is a new on/off broadband absorption product from Flex Acoustics, Denmark.

Company spokesman Niels W Adelman-Larsen said: "AqFlex is an inexpensive way to achieve enough absorption variability when installed in the ceiling to make it possible, for example, to present both symphonic music and rock concerts in the same venue with ideal acoustics.

"To attain reverberation times in between the extremes, any number of absorbers can be activated. The product is meant to be installed permanently in music schools, performing arts centres for on/off use or, since it is extremely thin and light, it could be installed temporarily in any hall."

He added: "This is the only variable absorption product in the world to include what are scientifically proven to be the most important frequencies to alter the reverberation time at: the 63 and 125 Hz octave bands."

For more details contact Niels W Adelman-Larsen at **nwl@flexac.com**

# Svantek unveils new miniature sound level meter

Svantek UK has launched a new lightweight sound level meter and analyser. The SVAN 971 offers advanced features such as a new user interface, which aims to make the configuration of measurements "effortlessly easy," a dosimeter function and a vast time/history logging capability.

The Type 1 meter, which conforms to IEC 61672-1 standard, is designed for use by acoustics consultancies and technical engineers dealing with general noise issues.

The SVAN 971 provides broadband results with all required weighting filters, as well as 1/1 octave & 1/3 octave analysis. It has a high-contrast colour OLED-type display and can be successfully operated in a wide range of temperatures and environments.

For more information contact Paul Ruben at Svantek UK Ltd. Mobile: **+44 (0)7815 087915**, email: **paulrubens@svantek.co.uk**, or visit **www.svantek.co.uk**


The SVAN 971

# Coco fibre fence aims to provide noise protection

Kokowall is a fencing system which aims to provide a natural looking screen that can be overgrown with plants and also act as an effective noise barrier.

It consists of galvanized steel U-channels filled with a double row of coco fibre wrapped plastic poles. A noise insulating plate is locked between the two rows of plastic poles. Two coco fibre taped steel poles reinforce the coco fibre wrapped plastic poles.

The barrier has a noise insulation value of (Rw) 30dB and a sound absorption level of DLα= 7dB (a) or even as high as DLα= 11dB (a).

For more details ring **01895 835544** or email **sales@tendercare.co.uk**

The Kokowall fencing system

# Uvex launches new hearing protectors

Uvex has launched two new hearing protectors – the xact-fit and the hi-com .

The xact-fit's ergonomically designed stems and oval foam pods mimic the shape and contours of the ear canal.

The company says it is "ideal for noise environments below 100 decibels or for people exposed to intermittent noise or moving in and out of noisy areas".

The hi-com's oval shape, moulded from soft PU foam, is also designed to fit into the ear canal.

Uvex says its design not only reduces background noise but helps retain excellent speech recognition through the increased surface contact between the plug and the ear canal. It also "significantly reduces the annoying and distracting" inner sounds that other earplugs reflect back to the ear-drum.

Nigel Day, Product Manager of uvex UK, said: "These two products set new benchmarks for hearing protection, providing wearers with products that are easy to fit and comfortable to wear."

For more information go to **www.uvex-safety.com** or ring services team on **+44 (0)1252 731200**

The new xact-fit protectors

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# Committee meetings 2012/13

| DAY | DATE | TIME | MEETING |
|---|---|---|---|
| Tuesday | 6 November | 10.30 | ASBA Examiners |
| Tuesday | 6 November | 1.30 | ASBA Committee |
| Thursday | 8 November | 11.30 | Meetings |
| Thursday | 15 November | 11.00 | Executive |
| Wednesday | 21 November | 10.30 | CCENM Examiners |
| Wednesday | 21 November | 1.30 | CCENM Committee |
| Tuesday | 4 December | 10.30 | CCWPNRA Examiners |
| Tuesday | 4 December | 1.30 | CCWPNRA Committee |
| Thursday | 6 December | 11.00 | Council |
| Thursday | 10 January | 11.30 | Meetings |
| Tuesday | 22 January | 10.30 | Diploma Tutors and Examiners |
| Tuesday | 22 January | 1.30 | Education |
| Thursday | 24 January | 10.30 | Membership |
| Thursday | 7 February | 11.00 | Publications |
| Thursday | 14 February | 11.00 | Medals & Awards |
| Thursday | 14 February | 1.30 | Executive |
| Thursday | 28 February | 10.30 | Engineering Division |
| Tuesday | 5 March | 10.30 | Diploma Examiners |
| Thursday | 7 March | 11.00 | Council |
| Monday | 8 April | 11.00 | Research Co-ordination |
| Tuesday | 9 April | 10.30 | CCWPNA Examiners |
| Tuesday | 9 April | 1.30 | CCWPNA Committee |
| Thursday | 18 April | 11.30 | Meetings |
| Thursday | 2 May | 10.30 | Membership |
| Thursday | 16 May | 11.00 | Publications |
| Wednesday | 22 May | 10.30 | CMOHAV Examiners |
| Wednesday | 22 May | 1.30 | CMOHAV Committee |
| Thursday | 23 May | 11.00 | Executive |
| Tuesday | 28 May | 10.30 | ASBA Examiners |
| Tuesday | 28 May | 1.30 | ASBA Committee |
| Thursday | 30 May | 10.30 | Engineering Division |
| Thursday | 13 June | 11.00 | Council |
| Wednesday | 19 June | 10.30 | CCENM Examiners |
| Wednesday | 19 June | 1.30 | CCENM Committee |
| Thursday | 20 June | 10.30 | Distance Learning Tutors WG |
| Thursday | 20 June | 1.30 | Education |

Refreshments will be served after or before all meetings. In order to facilitate the catering arrangements it would be appreciated if those members unable to attend meetings would send apologies at least 24 hours before the meeting.

# Institute Council

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NEW CadnaR

## Calculation and assessment of interior noise

We are pleased to announce the release of the fantastic new software from Datakustik to enable you to model internal noise.

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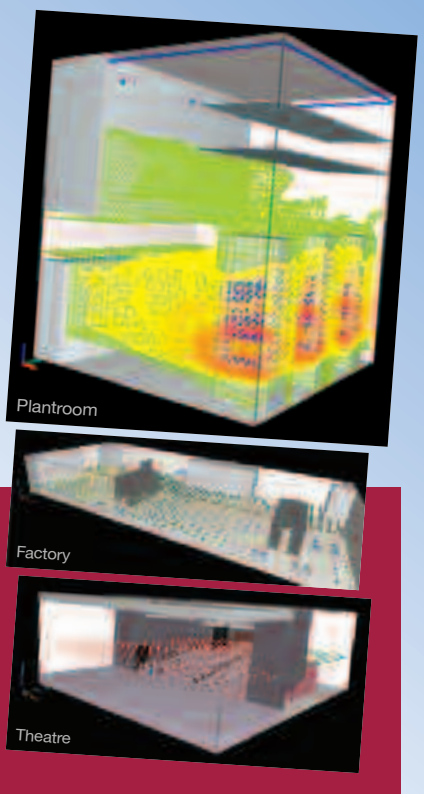


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- Classsrooms
- Plant rooms

ANV MEASUREMENT SYSTEMS

The UK Distributor of RION

sales - hire - calibration

# Long-Term Monitors

Reliable - Site Proven - Quick & Easy To Use - Realistically Priced

## RION Outdoor Protection with Two Layer Outdoor Windshields

- Site proven – years of continuous use at some sites
- Practical simple and effective
- No complicated additional calibration procedures
- Widely deployed on windfarm and construction projects
- Class 1 (WS-15) / Type 1 (WS-03) frequency response with appropriate Rion meters

## Remote Control and Download Software (RCDS)

- Downloads & controls noise monitors using the GSM network
- Cost effective and reliable
- User configurable alarm levels
- SMS text alarms to multiple numbers
- Downloaded data in csv format easily imports into online systems
- Software displays live data remotely
- Hundreds of systems already supplied & principally deployed on construction sites
- Automatically downloads up to 30 monitors with auto scheduler (ARDS)

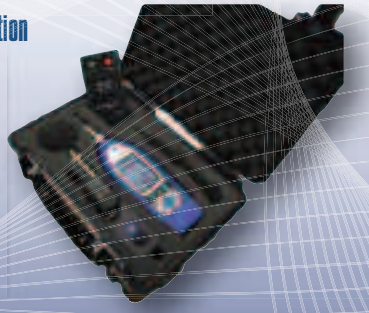
## profound Vibra + Designed for Demolition and Construction Monitoring

- Logs PPV and dominant frequency (essential for BS 7385: 2 evaluation)
- Extended frequency range down to 1 Hz
- Measures peak displacement (essential for evaluation of low frequency vibration)
- Accuracy complies with DIN 45669 Class 1
- Integral GPRS modem sends out daily data & alarm e-mails
- User friendly software displays data and exports to csv file
- Real time clock and dominant frequency given for each measurement
- Very easy and intuitive to use

## RION NL-52 A Complete Solution for Environmental Noise Measurement

- $L_{Aeq}$, $L_{Amax}$, $L_{Amin}$, SEL & 5 Statistical Indices
- 100 msec data logged simultaneously with processed values
- Uncompressed audio recording NX-42WR (option)
  - Continuous
  - Manual start /stop
  - Triggered by up to 4 user selected levels (different triggers for different times)
  - Periodic samples (including 2 minutes – perfect for windfarm compliance)
- Real time octaves/third octaves NX-42RT (option)
  - Full logging functionality maintained but in octaves or third octaves
- Narrow band FFT analysis NX-42FT (option)
  - 8000 line FFT up to 20 kHz (2.5 Hz resolution)

## NNR-03 Noise Nuisance Recorder Quicker, Better and Easier – A More Professional Solution



- Uncompressed WAV files - superb audio quality
- Up to 1 minute pre-trigger
- Simply drag and drop data into the new and intuitive Rion AS-60 software
- Extremely easy to use
- Outer pilot case for discrete deployment
- Handset with illuminated buttons clearly shows when audio is recording
- Wireless remote (up to 50 metres) included as standard

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