

COVER STORY:

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How the Environment Agency audits noise impact assessments **Page 14**

The best possible start to a career: The first acoustics technician apprenticeships **Page 24**

Instrumentation Corner: Health and whole life cost benefits of highways noise barriers **Page 36**

ACOUSTICS BULLETIN



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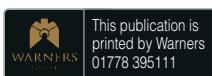
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ACOUSTICS BULLETIN

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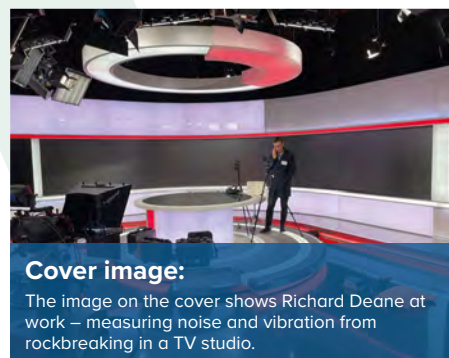
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Technical articles review procedure

All technical contributions are reviewed by an expert identified by publications committee. This review picks up key points that may need clarifying before publication, and is not an in-depth peer review.



Cover image:

The image on the cover shows Richard Deane at work – measuring noise and vibration from rockbreaking in a TV studio.

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, electroacoustic, 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

 Institute of
Acoustics



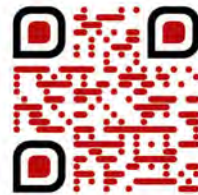
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Dear Member

The gradual easing of the COVID restrictions has enabled spectators to attend sporting events once more. Most notable were the crowds who attended the football at the Euros but, of particular interest to me, was the ability to attend professional cricket matches once more.

Sound or noise?

One of the features of these events, identified by the commentators, was the welcome return of crowd noise. And that brought to mind the challenge we have in the profession about the use of the words 'sound' and 'noise'.

I suspect that most of you who have written noise impact assessment reports have started them with a sentence along the lines of: *'Noise is regarded as unwanted sound'*.

At the start of my career, 'noise' was the word always used. We undertook background **noise** measurements and did **noise** assessments, although it was always made clear that sound levels meters measured **sound**.

But with the increased interest in concepts such as soundscape and the management of the sound environment, we have to be more careful over the use of language. What we hear is **sound**. It only becomes **noise** when it has an adverse effect on us (either cognitively or not).

The use of the word 'sound' in the title of the 2014 version of BS4142 – **Methods for rating and assessing industrial and commercial sound** properly identified this distinction – the sound is rated and assessed to determine if it is **noise** causing an adverse impact.

Thus, when commentators talk about "the fantastic noise from the crowd" – isn't that tautological?

It is hard, though, to maintain the correct language. We make background **sound** measurements to assist with a **noise** impact assessment. But for predictions – is it correct to call the methodology Calculation of Road Traffic **Noise**? Should it not be '**sound**' that might be noise? Or is **sound** from road traffic always **noise**?

The Oxford English Dictionary gives as one of its definitions of 'noise': *In a neutral sense, 'a sound of any kind (defined by the context)'* sourced as late Middle English. Maybe the words **noise** and **sound** are interchangeable after all.

National Model Design Code (NMDC)

The NMDC for England was published in July 2021. It sets out *'design considerations which local planning authorities will be expected to take into account when developing local design codes and guides and when determining planning applications.'*

The code itself comes in two parts – Part 1 'The Coding Process' and Part 2 'The Guidance Notes for Design Codes'.

The word 'noise' appears once in Part 1: *'All new streets should include street trees to improve streets' popularity and walkability, reduce air pollution and mitigate **noise**.'* (Page 31).

'Noise' appears four times in the guidance notes and the word 'noises' appears once, on page 4, where it states: *'Character includes all of the elements that go to make a place, how it looks and feels, its geography and landscape, its **noises** and smells, activity, people and businesses.'*

Surely 'soundscape' would have been a better word in this context?

The word 'sound' does not appear in either document. Neither does the word 'acoustic'.

So, all our efforts to encourage the use of Good Acoustic Design in new homes, through, for example, the ProPG document (which has been mentioned in Government planning guidance since 2019) and the AVO guide, have not found the necessary traction in Government Design Guidance.

Ironically, under the health and wellbeing section of the guidance notes, there are five bullet points on good design for lighting. And yet none on Good Acoustic Design.

Unfortunately, the Institute missed the consultation on the NMDC when it came out in January 2021. (We were busy at that time responding to the consultation on the Building Regulations). That meant we did miss our opportunity to influence to content of the NMDC.

As was mentioned at the AGM, Mary Stevens has joined the team at IOA HQ, part time, with the role of helping us spot when such consultations come out and also assisting us with the responses. Hopefully we will not miss anything important in the future.

Acoustics 2021

Acoustics 2021 is being held on 11 and 12 October. As you should know this is going to be a hybrid event at several locations across the country. Delegates will be able to attend online from their home or office, but also, and, we hope preferably, be able to attend in person and at either a speaking hub or listening hub.

I recently had the pleasure of going to our Milton Keynes office for the first time in nearly 18 months to join Chris Barlow, Robin Woodward, Alistair Somerville, Linda Canty and Alex Shaida in testing the technology we plan to use. Martin Lester was our notional remote delegate joining us from Northern Ireland. It worked very well.

If you haven't already done so, please keep the 11 and 12 October clear for the conference and also watch out for opportunities to help with the running of the event.

In the meantime, stay safe

Stephen Turner

IOA AWARDS entry deadline

The IOA annually honours people whose contributions to acoustics or to the Institute have been particularly noteworthy.

The medals and awards programme is wide-ranging in its acknowledgment of academic achievement, practical engineering applications and innovations, student achievement, contributions to the Institute and to the world of science and technology.

The 2022 IOA awards comprise:

Nomination forms are at
<https://www.ioa.org.uk/about-us/awards>
and if you are entering the 2022 IOA awards,
all submissions must be in by
1 October 2021 at the latest.

Decisions will be made by Christmas and the winners
will be announced early 2022.

- **The Rayleigh Medal** This is the IOA's premier award, given to persons of undoubted renown for outstanding contributions to acoustics without regard to age.
- **The Tyndall Medal** is awarded biannually to a UK acoustician, preferably under the age of 40, for achievement and services in the field of acoustics.
- **The AB Wood Medal** (UK/Europe acoustician in 2022) is aimed at researchers aged under 40, whose work is associated with the sea.
- **The Institute of Acoustics Engineering Medal** is awarded in even-numbered years to registered engineers at Chartered, Incorporated or Engineering Technician grade in recognition of their outstanding contribution in the field of acoustical engineering.

- **The Peter Lord Award** is given annually for a building, project or product that showcases outstanding and innovative acoustic design.
- **The Peter Barnett Memorial Award** recognises advancements and technical excellence in the fields of electroacoustics, speech intelligibility, and education in acoustics and electroacoustics.
- **The Award for Promoting Acoustics to the Public** has been created to encourage activity that generates greater awareness of the importance of acoustics to people without acoustical expertise.
- **The Dr Bob Peters Education Award** is a new award. It is to celebrate the memory of the late Dr Bob Peters and to recognise excellence in the design, plan, delivery, management of acoustics education, or other significant contributions to education in acoustics. The award may be for a single outstanding or significant contribution to acoustics education and training or a sustained long-term activity in this respect.
- **The Sustainability Award** is open to individuals, or teams, who are able to demonstrate and provide evidence of one or more of the following:
 - * An exemplar contribution towards the delivery of sustainability;
 - * Demonstration of value in all three key areas (societal, economic and environmental)
 - * Demonstration of a significant contribution – through education, design, construction practices or guidance – that promotes the implementation of sustainability through acoustics

This award is given on a rolling basis to those who reach the bar.
- **The RWB Stephens Medal (2023)** was named after Dr Ray Stephens, the first President of the IOA. It is awarded in odd-numbered years for outstanding contributions to acoustics research or education.
- **The IOA Young Persons Award for Innovation in Acoustical Engineering** (sponsored by Cirrus) is awarded every two years and recognises excellence and achievement in acoustical engineering among those who are aged under 35, or early on in their careers in industry. (The next time the Young Persons Award for Innovation in Acoustical Engineering will be awarded is 2024). ☺

More information and nomination forms are at <https://www.ioa.org.uk/about-us/awards>
 Nominations should be submitted by 1 October 2021 to ioa@ioa.org.uk



The deadline for nominations for 2022 awards and medals is 1 October 2021, and it's coming up fast.

IOA AWARDS

Don't miss out, to nominate go to www.ioa.org.uk/about-us/awards



Engineering Division



The IOA Engineering Division will support you through the process to help you become one of almost 225,000 registrants that hold international professional recognition.

By Blane Judd BEng FCGI CEng FIET FCIBSE, Engineering Manager

Lockdown rules are slowly lifting, but at present we are still working from home.

The interviews we held in June went very well and you can read about Adam Hill, one of the successful candidates, on page 10. Candidates are provided with guidance material when they first apply, and we are always ready to comment on the content of their professional review report prior to them submitting the final draft.

We continue to draw up the documentation to comply with the new UK-SPEC version four and we are starting implementation very soon. If you want to learn more about the new version, you can find out more detail on the Engineering Council website at <https://bit.ly/3cEALQu>. Those already working on their submission will be able to use UK-SPEC version three up to the end of the year. We will be encouraging candidates from now onwards to work to version four. The Engineering Council are expecting us to have made the transition by December 2021.

Interviews

We are working hard to keep response times down to a minimum while working remotely, and Emma is doing a great job helping with this. Neil Ferguson continues to help us with academic equivalence support for those candidates who do not have exemplifying qualifications. You can check for yourself if your qualifications meet the required specification by visiting www.engc.org.uk. But please don't panic if your specific qualification is not listed, as we can still help you through the process on the

individual route. Each institute has an Engineering Council liaison officer who comes from another Institute as a volunteer to help and support colleagues. Malcom Carr-West from the Institute of Agricultural Engineers has been attending meetings of the Engineering Committee as our new officer and he has asked to sit in on the next round of interviews, so some of you may get the chance to meet him in October.

We have already filled the places for the October interviews so the next set will be in February 2022. We hold a number of interview events through the year, depending on the number of candidates we have coming forward for registration. If you are interested in taking the next step to becoming a professionally registered engineer, contact us on acousticsengineering@ioa.org.uk sending a copy of your CV and copies of certificates and transcripts of your qualifications. It is important that we have all of your further and higher education certificates, not just your highest attainment.

Academic qualifications

The requirements for academic qualifications for CEng and IEng changed in 1999. Pre-1999 an honours degree at 2:2 or above was required for CEng or a higher diploma/certificate for IEng. Post-1999 this changed and for CEng a master's degree was required or an ordinary degree for IEng.

There are two routes:

1. **standard route** if you have the appropriate EC-accredited qualification (also referred to as an exemplifying qualification) in acoustics; and the


2. **individual route**, which requires further preparatory work from you before submitting evidence of your competence.

Remember that we are here to help you get through the process and advice and support is offered to every candidate personally.

For the individual route, the Institute accepts a number of courses in relevant subjects such as audio technology from certain academic centres, as being equivalent to accredited courses for the purposes of EC registration, without the need for further assessment.

The Institute recognises the IOA Diploma course and the several masters courses linked to it as providing evidence if you are looking to gain CEng registration. You could also offer a PhD qualification, depending upon the content of the associated taught element. We can also offer support for registration via a 'technical report' route, if you do not have the relevant qualifications to help you demonstrate you are working as a professional engineer in acoustics.

The election process is overseen by the Institute's Engineering Division Committee, which is made up of volunteers from the membership, to whom we are extremely grateful. They represent the 300 or so members holding EC registration. They provide the essential peer review process that affirms that you are at the appropriate level for recognition as an Engineering Council Registered Professional Engineer.

The opportunity is there, and we are ready to support you through it, so that you can become one of almost 225,000 registrants that hold International professional recognition. 

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Engineering Council successful candidate

The Engineering Council is the UK regulatory body for the engineering profession. It holds the national registers of Engineering Technicians (EngTech), Incorporated Engineers (IEng), Chartered Engineers (CEng) and Information and Communications Technology Technicians (ICTTech).



It also sets and maintains the internationally recognised standards of professional competence and ethics that govern the award and retention of these titles. This ensures that employers, government and wider society can have confidence in the knowledge, experience and commitment of professionally registered engineers and technicians.

The IOA is pleased to announce that Adam Hill has attained the standard required for admission to the national register at Chartered Engineer level.



Adam Hill

Adam Hill CEng

Adam is Associate Professor of Electroacoustics at the University of Derby where he runs the MSc Audio Engineering programme. He received a PhD from the University of Essex (2012), an MSc in Acoustics and Music Technology from the University of Edinburgh (2008) and a BSE in Electrical Engineering from Miami University (2007). Since 2003, he has worked seasonally as a live sound engineer for Gand Concert Sound (Chicago, USA) where he has designed and operated sound systems for over 1,000 artists. In 2019, Adam was presented with the IOA Young Persons' Award for Innovation in Acoustical Engineering.

Adam said: "Coming into the CEng process without accredited

degrees, I foresaw quite a complicated set of tasks ahead of me. The documentation and guidance Blane provided, however, clearly set out what was required, including exemplars for each core document. This allowed me to focus my efforts and draft all the necessary documents in a relatively short time.

"The interview felt like an informal chat amongst colleagues interested in my recent projects. Having done the appropriate preparations under Blane's guidance, the interview couldn't have gone better. Overall, the CEng process provided me with a chance to critically evaluate my current professional standing and revise my CPD plans to address areas for improvement." ©

Diversity, inclusion and equality update

By Angela Lamacraft, Diversity, Inclusion and Equality Working Group Chair

In the July/August 2021 issue of Acoustics Bulletin (page 28) I provided a summary of some of the diversity issues facing the Institute of Acoustics. We have now set up a Working Group to progress diversity, inclusion and equality within the Institute and would love to hear from anyone who is interested in joining.

We are particularly hoping to hear from people who don't typically get involved with Institute activities and we're happy to discuss anything

that may have prevented you from participating previously to see how we can accommodate you.

We are also hoping to improve the racial diversity of the Working Group so that we can better understand potential issues facing people of colour within the Institute and the acoustics industry more broadly.

If you would like to join the Working Group or discuss the opportunity further, please email us at: diversity@ioa.org.uk ©

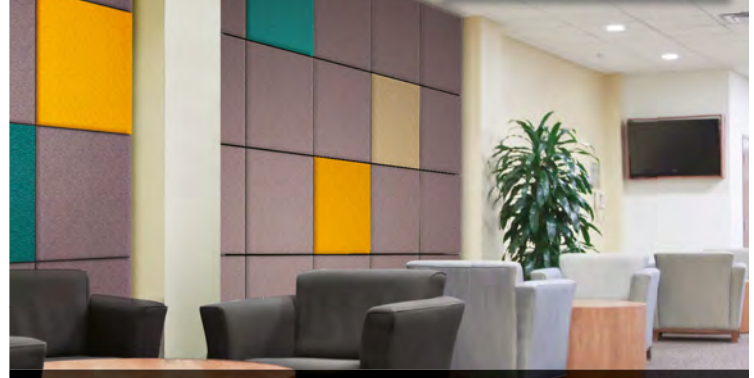
In the next issue of the Acoustics Bulletin, we will provide profiles of the members of the Working Group so that you know who is on the team.

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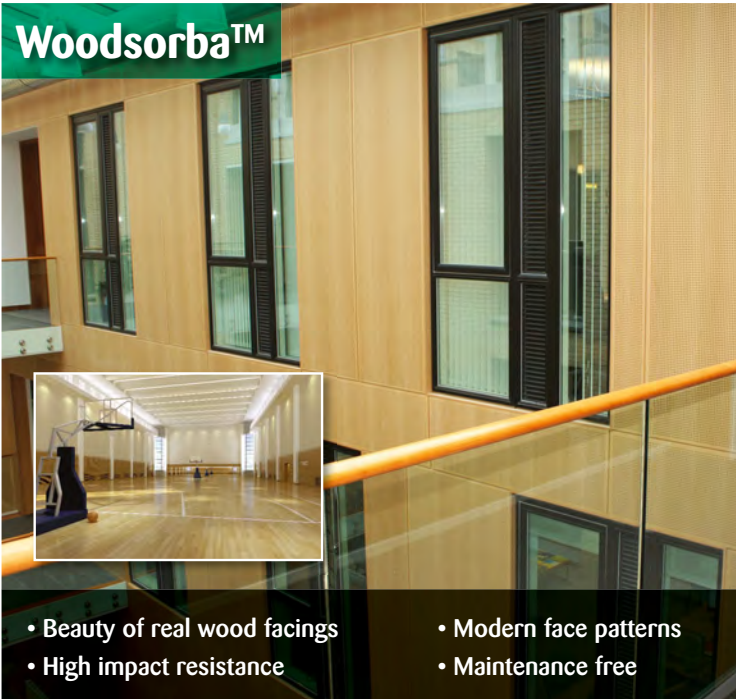
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Approved membership applications

The Membership Committee reviewed 68 application forms on 22 April by the online system, 29 corporate applications have recently been approved by the Council following the recommendations of the Membership Committee. The committee saw 18 new candidates joining the IOA and 24 members upgraded their membership.

FIOA

Gillian Clarke
 Colin Cobbing
 Richard Craster
 Hilary Notley

MIOA

Joseph Allen
 Thomas Brooks
 Luke Brough
 James Cousins
 William Fairman
 Calum Ferreira
 Boniface Hima
 Heather Isherwood
 Simon Jefferson
 Stephen Magee
 Antonio Martinez
 Samuel Monk
 Samuel Oates
 Joe Oxenham
 Christopher Richardson
 Ilona Rudnicka
 Harry Russell-Lees
 Alejandro Santana Roque
 James Shaw
 Shaun Sloan
 Jeeva Srilal
 James Stead
 Gareth Thompson

Scott Tunnah

William Twigg
 Jacob Tyler

AMIOA

Jo Criddle
 Daniel Elvidge
 Sarah Green
 Uchita Jhaveri
 George Karpouzas
 Conor McLean
 Dominic Young

TechIOA

Kieran Abadle
 Sarah Barnes
 Kalumin De Silva
 Ben MacIsaac
 Thomas Price
 Sean Rocks
 Adam Shaw

Affiliate

Matt Hayes



2021/22 Conference programme

Understandably, the 2021/22 conference programme is likely to be affected by the COVID-19 virus.

2021

ACOUSTICS 2021
11-12 October 2021
Regional Hubs

REPRODUCED SOUND 2021

16-18 November 2021
The Bristol Hotel, Bristol
 Organised by the IOA Electroacoustics Group

2022

HEAR FOR TOMORROW
30 March 2022
Royal Academy of Music, London
 Organised by the IOA Musical Acoustics Group and
 Hearing Conservation Association

ICUA 2022

20-24 June 2022
Grand Harbour Hotel, Southampton
 Organised by the IOA Underwater Acoustics Group

INTER-NOISE 2022

20-24 August 2022
SECC, Glasgow

Total cloud based monitoring solutions

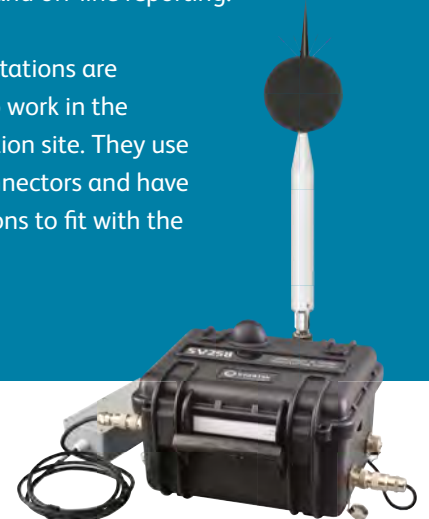


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How the Environment Agency audits noise impact assessments

Paul Doyle, Technical Advisor and Noise Lead at the Environment Agency's Air Quality Modelling & Assessment Unit (AQMAU), explains what happens to noise impact assessments when they are submitted to the Environment Agency.

As a Regulator, the Environment Agency (EA) audits noise impact assessments (NIAs), which are submitted in support of environmental permit applications for sites in England. Audits are undertaken by the Air Quality Modelling and Assessment Unit (AQMAU), a specialist team which analyses acoustic and air quality assessments.

AQMAU prepared this article to provide a 'behind the scenes' look at their approach to auditing an NIA, and to give some insight into how their audit conclusions facilitate the permitting process.

This article is one of several initiatives currently being worked on by AQMAU, with the aim of improving communications between the EA and acoustic consultants. As part of changes to the EA pre-application process, AQMAU will be publishing guidance later in 2021, which sets out report formats for NIAs and noise management plans (NMPs). AQMAU is also planning a presentation in early 2022, with the Association of Noise Consultants (ANC).

What is the AQMAU?

The AQMAU team is part of the National Permitting Service (NPS) in the EA, which is responsible for determining permit applications.

Additional noise specialists are based in the National Services Environment and Business (E&B) team which provides strategic guidance in relation to policy and operational compliance.

AQMAU offers technical advice on acoustic and air quality issues in relation to applications for environmental permits, as part of the pre-application process. AQMAU helps to ensure that acoustic and air quality modelling and assessments for permit applications, compliance, enforcement and incident investigations are consistent, of a high standard and based on sound science. AQMAU comprises a diverse technical team of 13 people with varied backgrounds, such as engineers and ex-consultants. Staff either have master's degrees in acoustics or IOA Diplomas. Historically, AQMAU was more focused on air quality, but in recent years, acoustics has become an equal consideration.

Permitting v planning

There are key differences between requirements for **permitting** and **planning**. Environmental **permitting** determines whether an operation can be managed such that pollution is prevented or minimised, while **planning** determines whether the proposed operation is a suitable land use.

The EA often receives NIAs, which have been prepared for planning applications and often refer to noise limits or guidance from British Standards such as BS8233: 2014¹, BS5228-1: 2009+A1:2014² or guidance from the World Health Organization^{3,4}. When determining an environmental permit application, the EA does not set limits, and requires the impact of external sound emissions to be assessed at the nearest noise sensitive receptors (NSRs), in accordance with BS4142: 2014 + A1: 2019⁵ only. Our standard permit condition requires that the operator must "prevent or where that is not practicable, to minimise, the noise and vibration". This ensures that our regulation process is consistent with the aims of the Noise Policy Statement for England (NPSE)⁶.

Pre-application considerations and EA guidance

It is important to note that an NIA is not always required, depending on the proposed use and the wider context of the surrounding area. Applicants for environmental permits should initially consult with the *Risk Assessments for your Environmental Permit* guidance⁷. For variations, if the changed element in the permit variation does not indicate a significant difference in impact compared to existing operations, a BS4142 assessment is generally **P16**

References

- 1 BS8233: 2014. Guidance on sound insulation and noise reduction for buildings. British Standards Institute.
- 2 BS5228-1: 2009 + A1: 2014. Code of practice for noise and vibration control on construction and open sites. Noise. British Standards Institute.
- 3 Environmental Noise Guidelines for the European Region (2018). World Health Organization.
- 4 Community Guidelines for Community Noise (1999). World Health Organization.
- 5 BS4142: 2014 + A1: 2019. Methods for rating and assessing industrial and commercial sound. British Standards Institute.
- 6 Noise Policy Statement for England (2010), DEFRA. <https://www.gov.uk/government/publications/noise-policy-statement-for-england>
- 7 <https://www.gov.uk/guidance/risk-assessments-for-your-environmental-permit#risks-from-your-site>

Sound Masking

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Open plan offices benefit from Sound Masking



Cellular offices achieve better speech privacy with Sound Masking

Sound Masking is a cost effective solution to the problem of improving speech privacy in today's modern office environment. Best installed during office fit out but often installed as retrofit, Sound Masking from AET has improved the office environment for many international companies throughout Europe over the last 20 years.

In today's office speech privacy becomes a key aim and open plan offices can suffer from two speech problems:

- Other people's conversations can be an irritating distraction
- Confidential conversations can be almost impossible to conduct

Similar problems also exist in cellular offices. Apart from noise breakthrough via partitions, flanking over, under and around them, other problem areas include light fixtures, air conditioning systems and services trunking. Sound masking compensates for these problems.

An investment in increasing privacy of speech is certainly cost effective, with Sound Masking one of the easiest ways of achieving this aim. Sound Masking systems along with acoustic panels and acoustic door seals are increasingly used to achieve the desired level of privacy by a number of our major clients including:

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- Barclays Bank
- Freshfields
- KPMG
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Sound Masking is also known as sound conditioning or white noise systems



Continued from p14

not required. For all sites which require an NIA, an NMP will also be required, with the NIA conclusions informing the content. Details of technical requirements for calculations and modelling submitted in support of NIA submissions are available at the *NIAs involving calculations or modelling* guidance⁸ page.

The EA currently offers an enhanced pre-application service, where advice can be requested for specific permit applications. As well as determining whether a NIA is required for a site, this can also include a desktop review of assessment proposals and/or meeting(s) between the EA, applicant and consultant. As part of future changes to the pre-application service, AQMAU will be publishing documents which provide simplified templates for NIAs and NMPs. These will be provided to applicants directly.

Additionally, the H3 guidance⁹ which acoustic consultants will be familiar with, was replaced in July 2021 by the *Noise and vibration management: environmental permits* guidance¹⁰, and provides further information on the content of NIAs and NMPs.

Pre-audit ‘completeness checks’

Not all NIAs submitted to the EA are audited by AQMAU. Audits are undertaken for relatively complex sites, or where site sound emissions are not considered be ‘low risk’. For sites which require an audit, initial ‘completeness checks’ are undertaken to determine whether the NIA has included the information required for a BS4142 assessment. In the last year, further information such as operational times, HGV routes, missing sound source and raw survey data was requested for 40% of submissions. 30% required a resubmission of the NIA, due to requests for additional baseline survey work, noise modelling or calculations, and the use of incorrect sound source data. Requests for further information are issued to the applicant in a Schedule 5 notice, and can also be issued during the auditing stage if additional discrepancies become evident.

AQMAU detailed audit – overview

Once a submission is considered to be sufficiently complete, the detailed AQMAU audit takes place. The EA deals with significant application volumes, so the audit is placed in a queue until AQMAU has capacity.

The audit comprises an interrogation of all aspects of the NIA submission, where AQMAU checks whether they agree with the consultant’s assumptions and conclusions for each element. Where there is a potential for variation to the consultant’s inputs, AQMAU tests sensitivity to the use of alternative data. This can mean testing sensitivity to the use of a lower background sound level at an NSR, higher sound power levels for sources, alternative receptor heights, modelling settings such as ground absorption, building absorption/reflection etc. The audit follows a risk-based approach, where the risk of each element is identified and used to determine an overall level of risk which sound emissions from the site present at NSRs. The following elements are analysed:

- L_{A90} data;
- source data;
- L_{Aeq} specific levels and modelling settings;
- acoustic feature corrections (AFCs);
- rating levels and determination of impact;
- context;
- uncertainties; and
- conclusions.

Below are some insights into how AQMAU analyses each element of the NIA during the audit.

LA90 background survey data

- is L_{A90} data representative of times/days when site will operate? Weekday data is often used for sites that will operate 24/7;
- data should be less than two years old. If older data is used, a good quantitative argument is required (e.g., traffic flow data, evidence for no change in major local sources);
- if the application is for a variation to an existing site, the LA90 should not include the operational site. If the site can’t be ‘switched off’, find other representative receptors and justify (BS4142 Section 8.1.2); and
- meteorological data is often not measured at the measurement microphone position, which invalidates the reliability of background sound data. Use of website data from nearby weather station will not be representative of localised conditions near the site and receptors. Justification should be provided where it has not been possible to measure meteorological data.
- AQMAU *risk-based consideration: Are meteorological conditions likely to affect how sound emissions are propagated from the site to NSRs? How would a different background sound level affect the NIA conclusions?*

Sound source data

- has the submission included manufacturer’s data for sources? Often this is not the case, but this data can be available;
- is source data in octave bands? A single value is often used, **P18**

References

- 8 <https://www.gov.uk/guidance/noise-impact-assessments-involving-calculations-or-modelling>
 9 <https://www.gov.uk/government/publications/environmental-permitting-h3-part-2-noise-assessment-and-control>. (Note this is now superseded)
 10 <https://www.gov.uk/government/publications/noise-and-vibration-management-environmental-permits>

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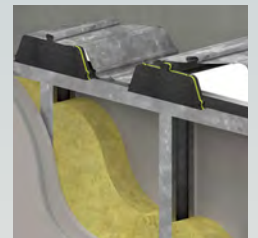
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Continued from p16

- which can result in inaccurate predictions, e.g., when sources emit more low frequency energy, have tonal characteristics and/or are located indoors;
- if data has been measured on site, has the consultant measured too close (1m) to a large source, which may propagate as an area source? Physical dimensions should be provided for all plant;
- if measurements have been made at a 'similar site', provide justification; and
- are on-time corrections realistic?
- **AQMAU risk-based considerations:** *Are the source levels realistic for the types of activity proposed? How do different source levels (single LW or octave band data) affect the NIA conclusions?*

L_{Aeq} specific levels and modelling settings

- AQMAU must be able to check submitted calculations/models, hence requirements for QSI data exchange file, and spreadsheets with all data necessary to replicate consultant calculations;
- input data used to create 3D computer model using high-resolution LIDAR data;
- sensitivity is tested to source parameters, screening assumptions;
- AQMAU standard modelling settings: order of reflection 3, building absorption coefficient 0.1, and receptor heights of 1.5m, 4m and above (where relevant); and
- consider that barrier attenuation calculations based on the methodology in BS5228-1 may **underestimate** the efficacy of mitigation measures.
- **AQMAU risk-based considerations:** *Can we replicate the specific sound levels presented in the NIA? With our sensitivity checks, are we predicting significantly different specific sound levels? If so, how will this affect the NIA conclusions?*

Acoustic Feature Corrections (AFCs)

- AFCs not always appropriately assigned, worst-case corrections often applied when feature may not be clearly audible at NSR(s);
- NIA should compare the specific (from site) and residual L_{Aeq} from other sources, to determine whether certain features may be audible at receptors; and
- EA expect +3 dB(A) 'other' correction to be applied for readily

distinguishable industrial noise, unless it can be demonstrated that this is not justified.

- **AQMAU risk-based considerations:** *Has the NIA compared the specific sound levels to the residual L_{Aeq} to determine audibility of features at NSRs? Do we agree with the AFCs? If not, what impact does this have on the NIA conclusions?*

Rating Sound Level

- L_{Aeq} specific level + AFCs at NSR.
- **AQMAU risk-based considerations:** *Do our rating levels and numerical impact differ from the NIA? How does this affect the level of risk the rating levels from the NIA present?*

Determining the impact

- below adverse (low)/adverse/ significant impact (depending on context); and
- low impact does not mean that there is no impact, applicant must still take all reasonable steps to minimise impact.
- **AQMAU risk-based considerations:** *Do we predict similar impact to NIA? Do site sound emissions present a lower or higher risk than the NIA states?*

Context

- discussion of context is often brief, but is one of the key elements of the assessment, requiring a robust discussion;
- context discussion should include comparison of site specific to residual L_{Aeq}, and judge how the proposed operations will fit into the existing sound climate; and
- for variations, has the site been operating without complaint for a period of time?
- **AQMAU risk-based considerations:** *Is context discussion robust? How will existing sound climate affect the impact from site emissions? Does the context make the site more or less of a risk than the NIA states?*

Uncertainty

- discussion of uncertainty is often not included, but is one of the key elements; and
- NIA should include a robust discussion of the uncertainty of

each assessment element, e.g., variables with background survey, source data, calculations/modelling methodology. E.g., if background sound levels have not been determined robustly, AQMAU could take a conservative view of the potential impact on rating sound levels, and overall impact.

- **AQMAU risk-based considerations:** *Has uncertainty been discussed robustly? Could uncertainty be lower or higher than what is stated in the NIA? Does the uncertainty make the site more or less of a risk than the NIA states?*

Audit conclusions

- does AQMAU agree with the NIA conclusions?
- can AQMAU advise the permitting officer that the NIA conclusions can be used to inform the permitting decision?
 - o yes – permit can be issued on basis of NIA/ NMP;
 - o no – permit cannot be issued on basis of NIA/NMP.
- Recommendations
 - o common: Noise Management Plan to target dominant plant;
 - o worst-case: applicant to revise NIA (further survey work, calculations/ modelling mitigation).

Conclusion

AQMAU hopes that this article will go some way to help acoustic consultants to understand EA requirements for noise impact assessments which are submitted in support of environmental permit applications. By creating an awareness of the work AQMAU undertakes in the EA and providing a 'behind the scenes' look into the auditing process, this will help acoustic consultants to understand why certain information is required. By being transparent with the guidance, requirements and auditing process, AQMAU wishes to ensure a more efficient permitting process that will assist submissions in terms of successful consultations and help operators in getting permits approved. ☺

About the authors:

Paul is Noise Lead of the AQMAU team at the Environment Agency, auditing noise impact assessments and providing technical advice in relation to noise issues. He has a BSc in Music Systems Engineering from the University of the West of England and an MSc in Sound and Vibration Studies from the University of Southampton. Prior to joining the EA, Paul worked for independent and multi-disciplinary acoustic consultancies for nine years, gaining hands-on experience in environmental and architectural acoustics.

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IOA Early Careers Group

Sun or rain, lockdown or not, Early Careers Group (ECG) members, as always, have been busy!

By Tom Galikowski, Group Chair



Nikhil Mistry represented the IOA at Inter-Institutional Career Path Virtual Event organised by the IOA ECG, Institution of Structural Engineers, Institution of Chemical Engineers, Institution of Civil Engineers, Institution of Mechanical Engineers and the Institution of Engineering and Technology.

The event showcased the disciplines and career pathways available within the engineering industry. Alec Korchev was the ECG coordinator and is currently working on the IOA involvement in CHAIN, an inter-institutional event organised by the Institution of Mechanical Engineers.

As part of the Acoustics 2021 conference, the ECG and UKAN+ will host a session building on last year's theme of collaboration between industry and academia.

Above: Richard Deane at work – measuring noise and vibration from rockbreaking in a TV studio

Researchers, engineers and consultants will present their experiences of effective collaboration, followed by an informal panel discussion on the theme. We will talk also about areas of future research in acoustics. This event will be free to all.

Student representative

The ECG wants to include student members on the committee. Despite being the third largest group in the IOA (324 members), students are currently not formally represented on any committee and we feel there is much more that could be done in terms of engagement and involvement with the IOA and students earlier on in their careers.

Our vision is for the reps to act as a link between the IOA, UKAN+, other students and universities, help promote student membership and

events and watch over the interests of the student body.

As part of this drive, we will be welcoming representatives of UKAN+ and IOA Diploma courses at our ECG committee. We have also been collating views and feedback from various groups from the Institute as well as universities and IOA Diploma centres. We will provide an update on this work in due course.

ECG webinar: 'Upgrading your membership'

A webinar on 24 June 2021 was dedicated to upgrading IOA membership. The presentation was given by David Trew (BAP) who sits on the IOA Membership Committee and chairs Central Branch. The talk was framed around key questions of what, why, how, and when.

What? David outlined membership options and discussed key differences between them. Attention was drawn to the cost of AMIOA (associate) membership increasing to match the MIOA (member) grade fees after five years.

Why? Corporate membership of the IOA is widely recognised in the industry and can be used to demonstrate a suitable level of qualifications to satisfy some of the acoustic assessment methods (such as BREEAM). It is also commonly needed to comply with Local Authority requirements. For this reason, many employers require candidates to have (or be willing to apply for) IOA membership.

How? The IOA website offers detailed guidance about the application process. David stressed an importance of the term 'responsible work' in the context of applications for corporate

International Women in Engineering Day

Female acousticians from across the Association of Noise Consultants (ANC) network came together to mark International Women in Engineering Day (INWED).

Colleagues in the industry collaborated to celebrate the event, with activities including a social media 'take over' held over three days in the run-up to the day.

Sarah Barnes, assistant acoustic consultant at Adnitt Acoustics, Angela Lamacraft, principal acoustic consultant at ACCON UK and Vicky Stewart, associate acoustic consultant at Atkins, each hosted the ANC channels for a day.

As well as documenting their work in acoustics, they introduced content from fellow female ANC members, including Sue Bird MBE, Anne Budd, Helen Sheldon, Eleanor Girdziusz and Jo Miller.

The collaboration concluded with a presentation to members, which was held as part of the ANC's interim meeting, which took place on 23 June, the day of INWED.

STEM careers

Sarah Barnes, Vicky Stewart, Eleanor Girdziusz, Louise Beamish, Reena Mahtani and Anne Budd gave the presentation to members, showing prominent issues including the gender pay gap, and potential reasons why young women are not joining the industry and exploring STEM careers.

Vicky Stewart, who chairs the ANC's Future Acousticians committee, which is tasked with promoting equality, inclusion and diversity in the sector, said: "INWED is an important day for every woman working in STEM and the social media take over and the presentation to members gave us a great platform to talk about it to a wide audience.

"Through videos, case studies and slides on social media and our talk at the interim meeting we were able to show the huge impact women make in acoustics."



www.association-of-noise-consultants.co.uk

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- Environmental Noise (Non-Infrastructure)
- Innovation
- Vibration Prediction and Control

You can obtain an entry form **here**:

<https://theanc.co.uk/anc-awards/>

To find out more about joining ANC go to www.theanc.co.uk/membership



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grades. The applicant should be involved in the decision-making process related to acoustics or its applications such as education, research, development, design of surveys, experiments or procedures, writing of professional reports and preparation of briefs or evidence.

Use of standard procedures and undertaking routine acoustics measurements will not in itself be sufficient for corporate membership.

When? In some membership cases (e.g. MIOA and TechIOA), a minimum period of relevant experience is required following a period of formal education in acoustics.

The presentation was followed by Q&A. Particularly hotly debated were questions concerning meeting requirements of relevant experience in cases when the job requirements make it difficult or impossible, and finding suitable proposers when working alone or in a small team. In such cases, contacting the Membership Committee and IOA local branches is advisable.

A recording of the webinar and the presentation are available at: <https://tinyurl.com/2a57dfd8>

Early careers – acoustic consultancy in New Zealand

In this column, we highlight a wide range of skills, sectors and regions where early career professionals come from.

Below:
Richard Deane
of Marshall Day
Acoustics



In this issue, Richard Deane of Marshall Day Acoustics describes how his work in acoustics took him to all the way to New Zealand.

“I discovered acoustics by accident at an open day at Southampton University. I had just finished a tour of the mechanical engineering department when I spotted a sign advertising acoustical engineering. I had been briefly exposed to the convergence of maths and music at school through wave physics and a small maths project on harmonic series, but had never imagined there was enough content in this field to fill four years of study. I followed the sign, and am so grateful I did.

“My course at Southampton University showed me the depth and range of acoustics. Biomedical applications of acoustic signal processing, marine mammal calls and SONAR, and aerodynamic noise generated at a cyclist’s ear were just some of the topics covered. My thesis even had me roaming the forests of Hampshire at night to record owl calls (the identification of male Tawny Owls through analysis of specific vocalisation content for the purpose of population monitoring).

“In my final year, I took particular interest in architectural acoustics and how geometry and material selection could alter the aural experience of the users of a space. Finding work as a consultant allowed me to apply these concepts to the design of spaces new and old, commercial and public, intended for critical listening or for conversation amongst a lively atmosphere. This work also taught me how important communication is. When you are surrounded by acousticians, it is easy to believe acoustics is the most important element of any design. However, it can be a challenge convincing a client to spend

£X thousand on additional room treatment for a small change in an acoustic parameter which may be foreign to them. I am excited to see consultancies around the world employing new technology to auralise these acoustic environments and differences for clients. Being able to hear the difference you are paying for is a powerful tool for communication.

“Working in acoustics has also provided me with the opportunity to travel across the world. In 2019 I bought a one-way ticket to New Zealand and found work in Auckland. With the new territory came new challenges. Given the lack of earthquakes in the UK, I had never had to work with seismic engineers. Meeting impact insulation criteria while appeasing an engineer who wants everything rigidly fixed together can be difficult, especially when combined with a nationwide preference for lightweight floor slabs. Then there are the complications in mitigating construction noise when all earthworks have to contend with a land made of volcanoes, and controlling rain noise in a city where a week’s worth of rain falls in an hour. But with these new challenges come new perspectives. Now my time abroad is coming to an end, my biggest takeaway is to not assume old solutions fit new problems and to approach every problem from a fresh perspective.”

Join the ECG

The ECG is open to all members of the Institute (both corporate and non-corporate) who shall normally be under 35 years of age or within first five years of their career. The group is always keen to hear from members and non-members alike. To join the Early Careers Group, to find out more information or to voice your concerns, visit <https://www.ioa.org.uk/early-careers-group> ©

CPD

The ECG is always on the lookout for CPD ideas – please email us on earlycareers@ioa.org.uk if there is a technical, career or education-related topic you would like us to discuss.

ECG vacancies

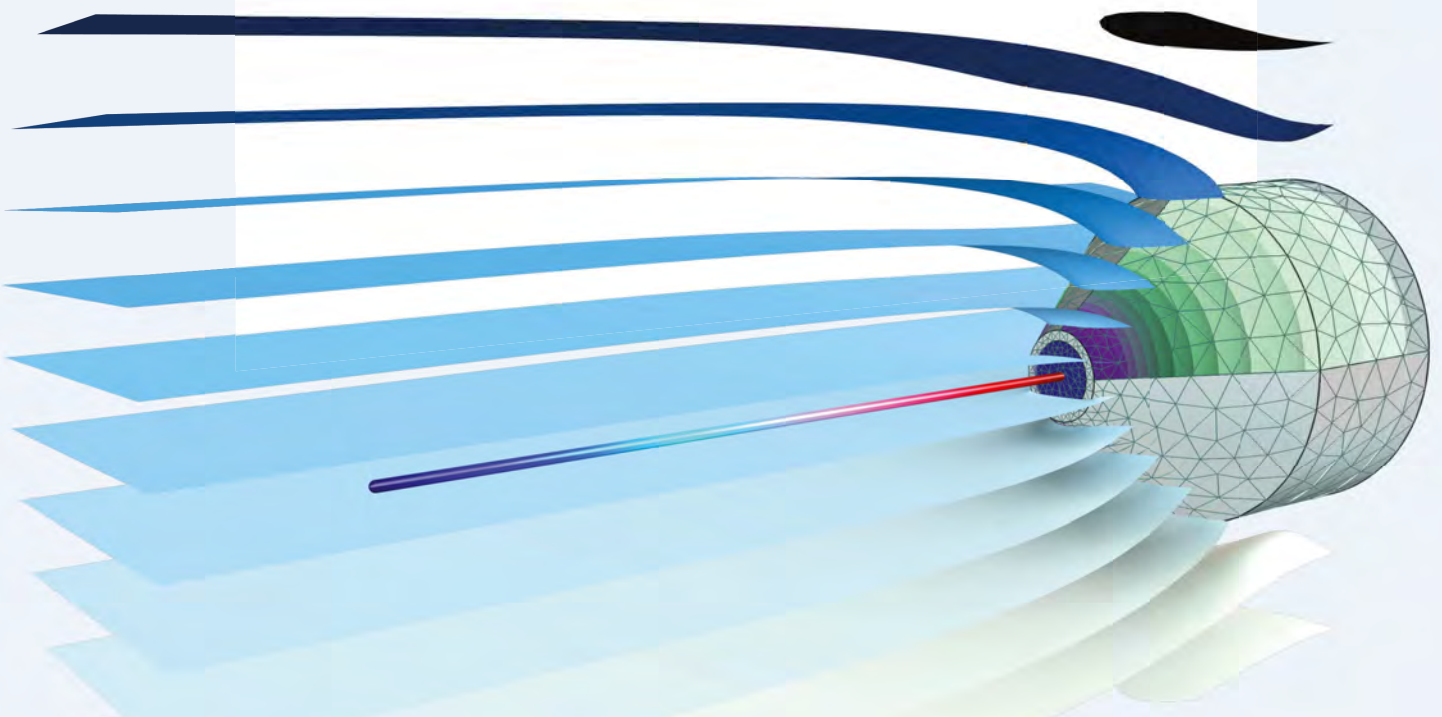
There are ECG vacancies at Central Branch, North West, Research Committee and Physical Acoustics Group – if you are interested, please get in touch with the ECG or the relevant groups directly.

SIMULATION CASE STUDY

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Acoustics technician apprenticeships

The first acoustics technician apprenticeships start this month and the first intake will qualify in two years' time with a level 4 qualification (equivalent to the first year of a degree) and successful apprentices will be able to hold the designation, TechIOA.

The scheme has been developed as an employer-led, industry initiative, with support from the IOA and the Association of Noise Consultants (ANC) and very appropriately, starts during the extended International Year of Sound.

The IOA has been confirmed by the Institute of Apprenticeships and Technical Education as an end point assessment organisation and successful apprentices will be eligible to register with the Engineering Council, at EngTech level. The end point assessment is a critical part of the apprenticeship; it assesses the knowledge, skills and behaviours that the apprentice has

learned throughout the programme and confirms that they are occupationally competent.

Grading is based upon two components:

1. Project and presentation; and
2. Presentation and questioning.

Assessments need to be completed within six months of the apprenticeship end date.

Richard Grove, Acoustics Director at BDP, is Chair of the working group which has developed the apprenticeship. He said: "The new apprenticeship will help deliver the acousticians of the future, which are needed across a range of industries to meet demand. It will also bring benefits to the higher education sector, by acting as a feeder for

degree courses, either under the apprenticeship route or as a sponsored degree by a company.

Apprentices will have a clear, defined career path and the programme will offer opportunities for diversity and inclusion within the acoustics industry."

Why hire an apprentice

There are some compelling and sound reasons why apprentices can make a strong addition to your company's recruitment policy and will also enable employers to be actively involved in the education and skills development of a diverse range of people.

1. Taking on an apprentice will enable you to grow your own talent, develop your company's skills base; and boost the skills of the workforce.
2. Apprenticeships offer a new path into acoustics: balancing the science (critical thinking and theory) and the art (practical experience and real-world application).
3. The figures add up: organisations with a payroll of more than £3m pay into the Government apprenticeship levy and can get an allowance of £11,000 per apprentice. Businesses that do not pay this levy receive up to 95% funded by the Government. [P26](#)

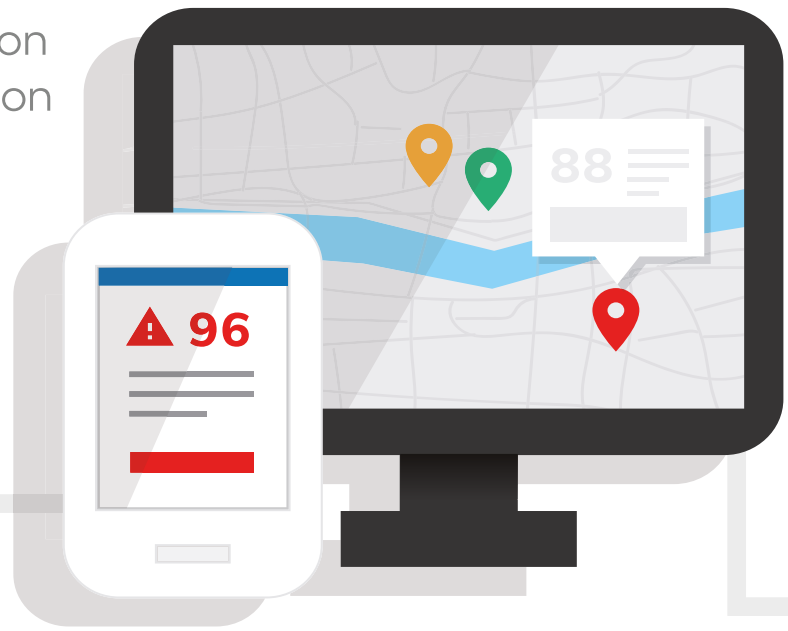


Left: Drone testing will be part of the acoustics technician apprenticeships at LSBU



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How to hire an apprentice

Your company hires an apprentice like any other employee, so advertise as you would for any other position within your company. You should draw up an apprenticeship agreement which sets out the skills, trade of occupation your apprentice is being trained for, the name of the apprenticeship, the start and end dates and the amount of training you will give them. Write a commitment statement, to be signed by the apprentice and the training provider, this will include the planned content and training schedule, what is expected and offered by the employer, the apprentice and the training provider, and a procedure for resolving complaints.

Help is available at every step, you can write your own agreement or download one from www.gov.uk/government/publications/apprenticeship-agreement-template The same applies to the commitment statement, write your own or download one from

www.gov.uk/government/publications/apprenticeships-off-the-job-training

There are plenty of helpful tips at www.gov.uk/employing-an-apprentice

Best possible start to a career

To ensure that apprentices get the best opportunities and experiences at the beginning of their career in acoustics, the apprenticeship scheme is delivered in partnership with London South Bank University (LSBU) and will be a mix of online lessons and attendance at labs.

For many years, the UK acoustic industry has consistently reported and continues to report the insufficient number of acoustic qualified candidates to fill the job vacancies available and LSBU has been running acoustics courses for more than 45 years now, and produces more qualified acousticians than any other institute in the country.

Professor Steve Dance of LSBU says that they are delighted to be the first to offer the new acoustics technician apprenticeship, starting

on 20 September 2021. The course is aimed at technician apprentice engineers who are looking to develop their skills and it will be the first ever occupational course in acoustics taught at level 4 in the UK. The course will feature a strong practical focus by having a substantial part of contact time dedicated to undertaking a wide variety of demonstrations, real-world applications, practical assignments and laboratory-based experiments. It will equip apprentices with the technical, professional, management and communication skills to be effective employees and members of the acoustic industry and/or its affiliated sectors.

Steve said: “This apprenticeship will increase the number of suitable trained acousticians and the programme includes many acoustic design tools and complements the IOA Diploma in Noise Control.

“If you are an employer in a field related to acoustics, we strongly recommend developing your employees through this carefully designed scheme.” ©

For more information see www.lsbu.ac.uk/study/course-finder/acoustics-technician-apprenticeship

MODAL

Structural analysis with HEAD acoustics – the new ArtemiS SUITE 12.5 software package makes modal and operational vibration analyses effortless, intuitive and efficient. Ingeniously simple.

Meet the IOA front line staff (part two)

There is an enthusiastic and loyal core of people and companies who support the IOA's business operation and the Institute's 3,000+ members. Here, you can find out a little more about them. We published part one of this series in the July/August 2021 issue.

Keith Attenborough,
IOA Education Manager

Keith has been the part-time IOA Education Manager since 2007, having previously been Chief Examiner for the Diploma. During the lockdown year, Keith was busy overseeing the blended learning version of the Diploma. With that and his 'Introduction to the Diploma' video on YouTube he feels that the Diploma candidates probably see too much of him. In his spare time Keith has published the second edition of his book 'Predicting Outdoor Sound' (Taylor and Francis 2021). Lockdown severely curtailed his amateur musical activities (three choirs and an orchestra) but some of his music making is on YouTube <https://youtu.be/ukWm8R3nFak>



John Pritchard,
Chair of IOA Education Committee

John has been a senior lecturer in Acoustics and Noise Control for 30 years at the University of Derby. He took over the chair of the Education Committee in 2020, and is currently overseeing new short course developments (including Report Writing) that will be of benefit to existing members. He is also actively involved with many other IOA committees and is one of the external examiners for the IOA diploma course. Apart from acoustics, John's academic interests also include environmental management and sustainable energy resources. He sits on various IOA committees including Environmental Noise Management, Workplace Noise Risk Assessment and Tutors and Examiners. If he gets any spare time, John enjoys walking, keeping fit, spending time with his family and eating chocolate!



Nicky Rogers,
Acoustics Bulletin editor

Nicky has been editing B2B magazines for Warners Group Publications for more than 20 years and Acoustics Bulletin since 2018. Still new(ish) to the field of acoustics, she has now firmly grasped the difference between noise and sound and is more than equipped to tackle Highways England over the wrong surfacing they used on the A1, which runs only a field away at the back of her house, thus, disturbing sleep. Previous careers include a hectic few years running her own hot air balloon rides business, (pilot's license now lapsed) and a stint as a sales rep for a dental company, in the days before female sales reps were a thing.



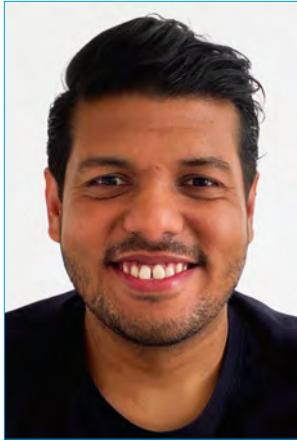
Mary Stevens,
IOA Policy Support

As Information Officer at the National Society for Clean Air, Mary heard a lot of noise complaints. Having lived next door to a squat that hosted all-night dub sessions, she was keen to take up the cause of noise sufferers. This soon led to coordinating national Noise Action Week and working with noise management professionals across the UK and EU on policy. In 2010 she received the IOA award for Promoting Acoustics to the Public. She now supports IOA in bringing acoustics to the attention of policy-makers. To escape noise, Mary enjoys walking and cycling on the South Downs, and is looking forward to the sound of music as live gigs return.



Pathum Don,
Customer Success
Manager at Veda
Consulting Company

Veda Consulting Company provides customer relationship management (CRM) solutions to the not-for-profit sector and works with clients all over the world. Veda designs and supports the complete IOA online presence, including the learning platform and the media library and they developed the updated look on the website.



Parvez Saleh,
Managing Director at Veda
Consulting Company

Parvez formed Veda Consulting Company in 2011 and he helps IOA to identify efficient operating models, taking their organisational goals into consideration.



Jared Carty,
Senior Network
Consultant at Cerulean
Solutions Limited

Jared leads the data centre/hosting team at Cerulean that manages and supports the IT setup at the IOA. With a focus on uptime and security, he and his team ensure that the IOA remains operational and secure. Apart from 18 years of IT support, Cerulean were instrumental in helping to integrate the CRM and ERP systems, streamlining the operations of the organisation. Jared's confidence and laughter always warms the back office team at the IOA.



Andrew Tomlinson,
Film maker

Since 2018, Andrew has been creating videos for the IOA and he also films the learning modules for the Diploma in Acoustics & Noise Control. He runs the video production agency, Seekalook Digital Video, where he focuses on helping businesses in the education, technology, manufacturing and construction sectors. He says that he "enjoys making videos on subjects that are difficult to explain" to make the topics accessible and more understandable. In his spare time, he enjoys gardening, travelling and football.



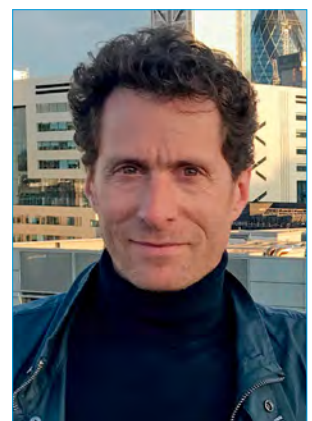
Paul Smith,
Creative Director at
marketing and brand
agency, Sun Street

Paul designed the updated look of the IOA website (including the new 'sound wave' element) to be more responsive by considering the messaging structure and tone, moving the focus away from the science and towards the human benefit of the science. Paul introduced a brighter, fresher colour palette together with a contemporary geometric font to unify all IOA communications platforms. A series of other small changes made a big overall difference, to show the IOA as an exciting organisation with a great sense of purpose and energy. Most recently, he designed the flyer and poster for the IOA's secondary schools competition. Paul is a highly experienced and award-winning designer and strategist and has worked across different markets and industry sectors worldwide.



Paul McKenzie,
Design Director at
Paul McKenzie Studio

One of Paul's first projects for the IOA several years ago was to re-design the Institute's Acoustics logo, which is still used on branded media. He helps with IOA conferences and advertising; for the conferences he designs and produces branded literature and other marketing communications for delegates, such as programmes and guides, while for marketing and advertising he works on the adverts that appear in trade publications and on social media. These are all directed towards building awareness of the IOA, helping to attract new members and promoting specific events, seminars and courses.



Selling STEM with Science Sizzles

IOA Acoustic STEM ambassadors continue to promote acoustics to schools through a variety of means. One of these is a collaboration with the Winchester Science Centre, which is focusing on acoustics this October.

By Richard Collman



Adventures in nature

The indoor/outdoor experimentation zone, Bio:Space, lets visitors have a go at challenges themed around the Science Centre's location in the South Downs National Park to find out more about the birds, bugs and plants of this ecologically important area.

UK's largest standalone planetarium

The 360° screen puts visitors right in the action as they 'fly' through the solar system and discover more about the stars, constellations and planets. There are shows created for younger audiences, families and those with sensory sensitivities.

Become an Acoustic Explorer

The new live science show, Acoustic Explorers is the final show in WSC's 2021 Year of Sound celebrations. On weekends and school [P32](#)

Winchester Science Centre (WSC) has developed a range of formats to present different types of STEM information, such as:

Immersive exhibits

- A new interactive sound, hearing and vibration experience encourages visitors to venture into a 10m long guitar, they can climb inside a giant ear and try their hand at British Sign Language.
- Explorer:Space allows an interactive mission through the solar system; exploring everything from robots and coding to black holes and human space flight.

Spectacular live science

The Science Centre's free live shows include exciting demonstrations, explosive 'wow' moments and audience participation.





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Continued from p30



holidays between Saturday 25 September and Sunday 21 November, visitors are invited to put their investigation skills to the test and become an acoustic explorer, find out what an acoustic engineer does, discover what reverberation is and how we can use it to control sound.

STEM resources

IOA STEM ambassadors had a brainstorming session recently to look at how best to use these different formats and what type of acoustic material is most suited to each. This will be useful not only for our work with WSC but also to improve the breadth and quality of STEM resources we can use in the future too.

- **Science Sizzles** – engaging, fun experiments that the pupils can do themselves at home, school or college.
- **WOW videos** – surprising, informative activity that the pupils cannot do themselves, as the activity may require specialist equipment. An example could be using an acoustic camera to show sound generation distribution visually for a complex source.
- **Curiosity challenges** – interesting experiments based on surprising facts. If not too passé, perhaps a tin can and string telephone may be appropriate, explaining how sound is transmitted along the string as vibration etc.
- **Let's try it video** – a step-by-step guide through a suitably straightforward experiment that

Above left:
Explorer:Space
©Harvey Mills

Above right:
Science Live at
Winchester Science
Centre ©Harvey
Mills

the pupils can do themselves with readily available materials. Perhaps making a basic musical instrument for example.

- **Stand up science** – active learning where the pupils are learning while doing something active. Perhaps, if there is access to a reasonably quiet, very large open space, they could investigate the speed of sound, or reflections and echoes, or the effect of acoustic barriers.
- **60 second scientist** – pupils make a spinner that lands on one of several subjects e.g. a regular hexagon gives six outcomes, each of which is a topic that the pupil should then try to talk or share

facts about for 60 seconds. It can be made easier by working in pairs, or harder by extending the time period.

- **Science Sparks** – with Snap, or related item cards.
- **Guides** – provide relevant and interesting information on specific topics, which can be referred to as appropriate, for example, explaining the Doppler effect using the frequency shift of the siren when an emergency services vehicle passes a listener.

These are only some ideas. Hopefully between several thousand acousticians we can come up with many more? We can all be unofficial STEM ambassadors! ©

The IOA STEM committee are working with Engineering UK, Bradford Science Festival (October 2021) and Winchester Science Centre (also October 2021). They are all looking for willing volunteers for in person and pre-recorded input to inspire young people into careers in acoustics. If you are up to the challenge please get in touch at STEM@ioa.org.uk

If you want to find out more about the STEM resources the IOA already has and is developing, or would like to become a STEM ambassador, promoting acoustics to the next generation, please email the STEM committee at STEM@ioa.org.uk

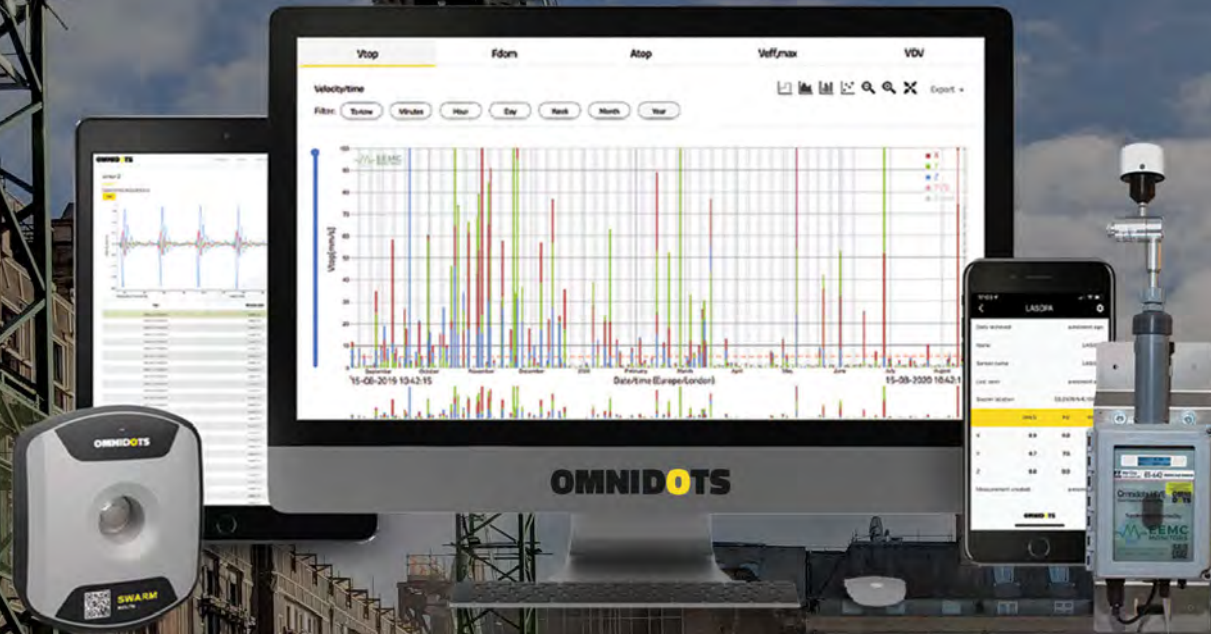
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ProPG and AVOG – response to article published in July/August 2021 Acoustics Bulletin

In the July/August issue of Acoustics Bulletin, we published an article written by three members of the working group responsible for the ProPG. Here, two of the major authors of the AVO Guide, Jack Harvie-Clark and Anthony Chilton, who is Chair of the AVO Committee, respond to that article. They write:

The article appears to present the AVO Guide and the ProPG as if they are competing guidance documents – which they are not. In our view, that article makes some inaccurate and misleading claims that appear to undermine the application of the AVO Guide. Some of these are discussed below, in pursuit of clarity and transparency for acoustics practitioners.

Position of AVO with respect to ProPG

The AVO is clear, from para. 1.19 quoted below, that it seeks to support the guidance in the ProPG:

1.19 The ProPG emphasises the importance and principles of good acoustic design; ...
1.20 In particular, the paragraphs 2.34 – 2.36 of the ProPG indicate that an integrated design approach must be taken to acoustic, ventilation and thermal comfort conditions:

- Paragraph 2.34: 'design the accommodation so that it provides good standards of acoustics, ventilation and thermal comfort'
- Paragraph 2.36: '[where a] scheme is reliant on open windows to mitigate overheating, it is also necessary to consider the potential noise impact during the overheating condition. In this case a more detailed assessment of the potential impact on occupants should be provided in the ADS'

FEATURE

ProPG and AVOG

The ProPG: Planning & Noise, May 2017 (ProPG) is jointly published guidance issued by the CIEH, IOA and the ANC. The Acoustics Ventilation and Overheating Residential Design Guide, Version 11, 2020 (AVOG) was published jointly by the ANC and the IOA.

Colin Cobbing, Dani Fiumicelli, Somayya Yaqub were members of the Working Group responsible for the production of the ProPG and are CIEH members, with a background in environmental health.

This article outlines common ground and differences between ProPG and AVOG. It identifies important areas of divergence between the guidance documents and aims to provide insights into how the two guidance documents can be used alongside each other to achieve consistent outcomes. The aim of this article is to provide guidance and advice on some of the issues identified: such as to disseminate and update the documents to the use of them together is more coherent than currently.

Key points

1. Both documents aim to achieve integrated design and good acoustic design and recognise that the overheating conditions must be controlled for.
2. The AVOG only applies to design control to be achieved with windows open through consideration of site layout and other design options that might control internal noise levels.
3. The noise standards are not directly comparable because the documents use different terminology. Neither is there

4. The AVOG levels are significantly greater than the levels recommended by the ProPG. A level of noise exposure that is 'increasingly divergent' from public health represents a level that is greater than SOAEL and is a situation that could be unacceptable, as defined by Planning Practice Guidance. According to the AVOG, the upper levels specified in Table 3.3 of the AVOG could give rise to unacceptable levels of noise if they occurred more than occasionally.
5. From a public health perspective, all possible adverse effects on sleep should be considered on the assessment of L_{Aeq} levels, which should be used with caution as significant adverse effects on health and quality of life can occur at levels lower than this threshold.
6. In noisy locations, before reverting to closed windows and other means of ventilation control of overheating, proPG solutions including non-airtight curtain tapes should be considered alternative to the approach of diverging from

7. It is appropriate, where possible, that noise should be assessed with windows open to avoid risk of overheating and the overheating design difficulty points on windows being open to control indoor temperatures. Overheating that should be considered. The occupants of dwellings and other buildings may choose to open windows for a variety of reasons as well as controlling thermal comfort. Residents in noisy locations will therefore be exposed to higher noise levels when windows are open. This is a choice that residents should be allowed to make. However, the potential impacts on health and quality of life need to be assessed for when deciding if housing in such circumstances is appropriate, and design and construction options to permit natural ventilation and control of overheating should be considered on an approach based on the information reported in the WHO Night Noise Guidelines or other generic occupancy data is used to consider the duration of windows open/ closed over 24

Aspect	ProPG	AVOG
Application	All residential development	Only parts of residential development that meet good acoustic conditions with ProPG
Situations	Internal and external noise	Internal only
Factors	All aspects of the built environment offering living conditions	Acoustics, ventilation and overheating
Subsidiarity objectives including climate change	Yes, indirectly	Yes, indirectly
Noise from mechanical systems	No	Yes

to assume closed windows when a mechanical ventilation system is used to provide background ventilation, in accordance with Part of the Building Regulations and without any clarification of overheating. Assuming windows closed may not be appropriate when integrating and good acoustic conditions with windows open. Both documents recognise that the overheating conditions must be accounted for.

People may open windows for a variety of reasons. Controlling thermal comfort only represents one of the reasons why occupants open. For example, connection with the outside, better air circulation and control over one's status and consideration of these factors is beyond the scope of the guidance.

ProPG addresses internal noise in the context of noise design aspects of the buildings and other sustainable design objectives. In other words, it is based on a holistic design approach. The design aspects referred to include

ventilation and overheating. The ProPG also addresses external noise amenity. By contrast, the AVOG deals with internal noise and overheating. Acoustics, ventilation and overheating are intended to supplement the ProPG.

Importantly, the AVOG only applies to situations where good acoustic design cannot be achieved with windows open through consideration of site layout and control design options that might control internal noise levels. The starting position for AVOG is to consider the impact of noise impact on new residential developments, especially, as detailed only considers design options that relate to the building envelope.

The AVOG aims to fill the gap left between other guidance in relation to overheating, climate resilient, sustainable dwellings, however, not least because the ProPG also considers sustainable design objectives as part of other relevant factors.

The above key findings summarises the key aspects of focus and application of the two documents.

Process

The ProPG advocates a systematic, proportionate, risk based, two-stage approach. Stage 1 is an initial noise risk assessment of the proposed development site; and Stage 2 sets out a systematic consideration of four key elements for higher noise exposure areas. Where Stage 2 is not sufficient it leads to recommendations for the decision maker. In simple terms the choice of recommendation is as follows: greater or present noise conditions, grant with conditions, 'lower' or 'prevent'.

In the case of environmental noise impacts, the AVOG also describes a two-level assessment procedure for the overheating condition. The first level is a site assessment of opening windows and the assumption that the resulting noise levels and the assumption that the resulting noise levels are the primary means of mitigating overheating. The second level assessment considers the ambient noise levels. The Level 2 assessment is recommended for 'high' risk sites. For 'low' and 'medium' risk sites, a Level 2 assessment can optionally be undertaken to give more confidence regarding the stability of internal noise levels. This may be particularly appropriate for sites in the Medium risk category.

The Level 2 assessment suggests that assessment of the adverse effect from noise exposures should include an estimate of how frequently and for what duration the overheating condition occurs. No guidance is provided however on what durations and levels of frequency will be considered to be appropriate.

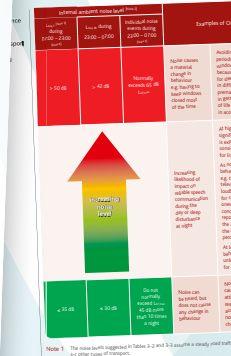
Rather, the Level 2 assessment provides qualitative guidance to apply a rating scale for acceptable levels of internal noise based upon the frequency and duration over which the overheating condition occurs (see figure 3.2 reproduced from AVOG). The practitioner that uses this information to inform an assessment of adverse effects on the way in which this information is used in the decision making and design process. In particular, the document provides guidance on how to assess the risks to health and quality of life of following the AVOG guidance.

Comparison of the noise standards

Both guidance documents use the internal noise standard defined from WHO Community Noise Guidelines 1999 and BS5223 as a starting point for assessing the internal noise standards.

The ProPG suggests that for a residential standard where it is not possible to meet target levels with windows open. It states: 'Where development is considered necessary or desirable, design standards may be relaxed by up to 5 dB and reasonable internal conditions still achieved. The three other internal L_{Aeq} levels start to exceed the internal L_{Aeq} target levels by more than 5 dB. The more that noise exposures are predicted, applicants should be required to show how the relevant number of noise affected has been kept to a minimum.'

It can be seen that it is a question of degree in terms of noise level, the extent of exceedance as a proportion of the development, and the frequency of occurrence. If the situation is to be considered unacceptable or not. The reference to frequency and duration can be used to link the noise assessment to the overheating assessment.



consistency between the documents on how the frequency and duration of internal noise levels should be considered. In other words, there is no alignment how frequency and duration of internal noise levels should be interpreted.

The ProPG suggests that internal L_{Aeq} greater than 40 dB during the day (living normal) and 35 dB at night should be avoided if the levels were expected to occur frequently. The use of the word 'avoid' is deliberate and links to the most objective set out in the ProPG and policy in the NPPF and the ProPG which references the ProPG. The AVOG suggests that the upper levels of noise could be greater than 50 dB during the day and 42 dB at night could be considered to represent SOAEL values, depending on the frequency and duration. In policy terms the NPPF recommends that SOAEL values should be avoided and are therefore compatible to the ProPG levels. Thus, it can be seen that the AVOG could potentially give rise to a significantly lower level of

1.21 In addition, paragraph 2.38 says: 'Where mechanical services are used as part of the ventilation or thermal comfort strategy for the scheme, the impact of noise generated by these systems on occupants should also be assessed'.

1.22 The AVO Guide provides a practical method to address these requirements.

There is no ambiguity or competition in the AVO Guide that it should be used in preference to the ProPG.

Lack of evidence

The article asserted many times that the AVO Guide has a lack of evidence to support the guidance it contains. The authors of the AVO Guide explicitly set out the basis for the guidance with clear references to existing research and guidance, including noting gaps in research that could inform future revisions. This is not the case in the ProPG, however, which puts forward 5 and 10 dB relaxations to the guideline levels with no supporting discussion, evidence or justification. The ProPG committee members have confirmed that these numbers are based on their expert opinion rather than any epidemiological evidence. We concur that expert opinion is necessary, following the precautionary principle where there is an absence of evidence, but this should be declared as such.

The AVO Guide also makes clear that there are areas that would benefit from further research study and hope that this study will be forthcoming.

Lack of information regarding duration

The article criticised the lack of quantitative information regarding duration in the AVO Guide. Quantitative guidance is not included because, whilst convinced that duration is an important factor, the authors concluded that there was insufficient robust evidence for quantitative values. Really, this criticism is just a statement that more research study is necessary in this area, as already clearly stated in the AVO Guide.

The ProPG includes qualitative statements relating to duration, that are included in the article e.g. 'the more often', 'more than occasionally' and 'likely to occur frequently'. The article put these forwards as evidence that the ProPG provides a link to the question of duration that the AVO Guide tackles. It seems that the AVO approach is supported by the ProPG and also that there is also agreement that quantitative guidance would be preferable, if there was a sufficiently strong evidential basis. The article suggested that the AVO Guide posits a linear relationship between acoustics and temperature. This is not the case and Figure 3-2 of the AVO Guide is deliberately shown without linear axes.

declared: ...the assessment of the relationship between different types of single-event noise indicators and long-term health outcomes at the population level remains tentative. The guidelines therefore make no recommendations for single-event noise indicators.


Design guidance

The AVO Guide offers criteria, which will always be open to criticism – too high, too low, impractical, insufficiently evidenced etc. Prior to the AVO Guide, the question of noise conditions for occupants when relying on opening windows for thermal comfort went unaddressed. Designers and regulators both need clear and unambiguous guidelines to support design and decision making.

Next steps

A joint working group is being formed now between the IOA, CIEH and ANC, in order to better integrate the ProPG and AVO Guide. The first step is intended to be a statement jointly issued by all three organisations. This will indicate that the AVO guidance shouldn't be the starting point in the design of mitigation of noise impact on new residential development. Instead, the AVO guidance should be used after reasonably practicable attempts to use Good Acoustic Design to achieve the internal target levels recommended by the ProPG have been exhausted.

There is a positive intent from members of both the ProPG committee and the AVO committee, representing the three organisations, to work together to consider further how to best integrate the advice within the two documents, and present it more clearly. It is disappointing that the authors of the recent article have implied that there is such a gulf between the two documents.

That article might be used by some who wish to avoid doing anything to address the problem, to the detriment of the future occupants. The authors of that article were consulted on the AVO Draft, but up to the time of writing have not responded. The AVO Committee remains open to communication and constructive feedback and will always enter into dialogue to improve the two documents. 

might also be intermittent and continuous, which means that the same health risk can result from getting the same number of events. The two types of sleep disturbance should both be considered in assessment and may have separate implications for guidance.

Disturbance of the sleep cycle that covers biological awakenings can be a significant adverse effect (as defined in the NPG Noise Exposure Categories when such awakenings cause sleep disturbance on a regular basis, as this leads to poor sleep quality due to fragmentation of the sleep cycle. Researchers Neil JW. Van Someren, 2015) note that although statistically more able than total sleep deprivation (SD), chronic sleep disruption by for example consequences arising from the effects on pain (and) and with recent insights the mechanisms involved in chronically disrupted sleep (noticed by people suffering from insomnia, one of the most common disorders. In some cases, sleep consequences result from fragmentation of the normal pattern into short sleep bouts (often) interrupting sleep stages, even if the total daily (or) sleep is not disrupted. Some researchers (e.g. C. F. The relevance of findings (epidemiological studies) is not fully understood, but it is the consequences of the recurring sleep disruption,

whether due to environmental and societal demands or pathological conditions such as sleep-disordered breathing or tinnitus. The resulting insights lay ground for a mechanistic understanding of the epidemiological finding that disrupted sleep contributes to the major health challenges facing our aging society, including type 2 diabetes, cardiovascular disease, neurodegeneration, and depression. Consequently, as well as assessing the "unacceptable" adverse effect of self-reported sleep disturbance, it is also important to consider impacts of noise on sleep or noise levels that reduce biological awakenings (i.e. objective sleep disturbance) but can have significant adverse effects in terms of sleep disturbance which in the long-term could cause fragmenting sleep due to interference with the sleep cycle on a regular basis.

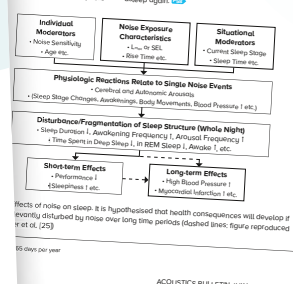
Based on a (DIN) standard for a health protection scheme for the Leipzig-Halle airport in Germany to manage the risk of sleep disturbances associated with aircraft noise, Borner et al. recommended that:

- on average there should be less than one additional self-awakening induced by aircraft per night, and
- awakenings recalled the following morning should be perceived as much as possible, and
- there should be no relevant impairment to the process of falling asleep again. 

Approach to L_{max}

The approach to assessment of noise from events, L_{max}, is described in the paper presented at the 2019 IOA Annual Conference, 'Assessing L_{max} for residential developments: the proposed AVO Guide approach'. (<https://tingurl.com/xpt8dhzv>)

This discusses the constraints of using the 'one additional awakening' method, as well as threshold value methods. There was consensus from the audience and acoustic practitioners more widely that quantitative guidance on assessing L_{max} was desirable. To develop evidence-based guidance for assessing L_{max} is a task that should not be underestimated; the WHO 2018 Environmental Noise Guidelines (<https://tingurl.com/yxvvt7hn>)



Effects of noise on sleep: it is hypothesised that health consequences will develop if it is even if it is not perceived as noise over long time periods (dashed line; figure reproduced from [25]).

55 dB(A) per year

Health and whole life cost benefits of highways noise barriers

As with any asset on the highways network, it is common sense to allow for realistic maintenance costs when choosing and procuring a noise barrier system. But a short-term approach of focusing on newly installed prices alone creates a false economy and potentially stores up financial hardship for the future.

By Giles Parker, Sound Barrier Solutions Ltd

The Design Manual for Roads and Bridges (DMRB) document CD 355 covers 'the application of whole-life cost for design and maintenance of highways structures'. Appendix B gives an example of a lifecycle appraisal for a highways structure stating that a 60-year period is normally required.

Maintenance free?

Few noise barrier systems currently installed on the UK network can be considered maintenance-free and are certainly not designed for a 60-year life. At the very least, any highways noise barrier designer/specifier should be providing a comparative cost appraisal for the lifecycle of the noise barrier that includes for the initial installed cost;

- PLUS
- the reinstatement cost;
- PLUS
- the clearance and removal cost of the existing degraded system;
- PLUS
- any traffic management cost associated with the replacement **each time the barrier needs replacing.**

This is apart from any localised repair work that might be required on an ad hoc basis, not to mention the impact on road traffic flows or journey time reliability each time a replacement is required.

Further guidance

DMRB document GD 304 *Designing health and safety into maintenance*

considers the safety benefits of choosing assets with a higher design life. As an example, it states in Table E/A.1 'choose barrier design life taking into account both working life costs and the safety issues associated with in service maintenance of the system.'

DMRB document LD 119, *Roadside environmental mitigation and enhancement*, chapter 5: Noise Barrier Design – para 5.9 requires that noise barriers 'have a non-acoustic durability of at least 20 years'. By the 60th year of its lifecycle, such a noise barrier could be being installed for the fourth time; having required full replacement three times already! Will the specifier take into account the whole life costs associated with all these anticipated replacements?

Following rigorous testing of installed barrier systems, the Transport Research Laboratory published a project report – PPR 490 on the *Acoustic durability of timber noise barriers on England's strategic road network*. The test results suggest that the acoustic performance of timber absorptive barriers degrade in acoustic performance by approximately 7 dB after only five years. Over the same timeframe, single-skin timber reflective barriers to degrade by the order of 4-7 dB but starting from a much lower initial sound insulation level.

When barriers degrade so quickly it becomes essential to financially quantify the effects of durability when choosing between noise barrier systems based on their

whole life cost benefits and long-term acoustic performance.

Transport Analysis Guidance (TAG) workbook

The adverse impact of road traffic noise on public health is long appreciated. Being able to quantify in financial terms not only the perceived annoyance but also the long-term damage to health due to traffic noise helps to justify why one particular noise barrier design will benefit the community more than another over its lifecycle.

DEFRA has produced guidance on assessing the impacts of transport-related noise using an 'impact pathway' approach and covering a range of impacts on: *annoyance, sleep disturbance, and health impacts, including heart disease (acute myocardial infarction, or AMI) stress and dementia*. The TAG noise workbook in the WebTAG appraisal analysis provides a way of determining the impact of highway noise on these health aspects and compares the overall (holistic) cost benefit over a 60-year lifecycle of different mitigation measures; such as alternative noise barrier designs.

Noise modelling

To help illustrate how the health and whole-life cost benefits of noise barriers might be compared, a hypothetical road traffic noise model was produced using CadnaA to predict how noise propagates from a dual carriageway towards a nominal 300-house residential scheme. **P38**



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OSCAR
acoustics

Continued from p36

The houses were spread over a 600m length adjacent to one carriageway, each house with a receiver on its most exposed first floor façade. To be generic, the model was assumed flat.

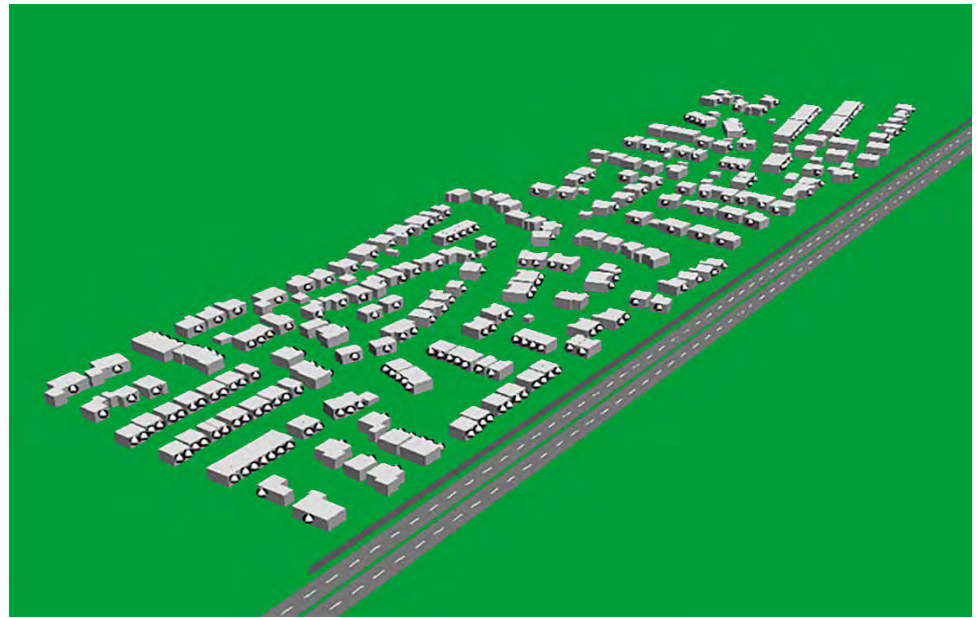
Using Calculation of Road Traffic Noise (CRTN), different barrier design scenarios and types were compared to determine the average noise reductions due to barriers ranging from 600-1000m long and from 2-6m in height. The exercise was then repeated assuming 300 houses on either side of the carriageway for parallel noise barriers of the same dimensions.

Based on the health aspects listed above, the TAG noise workbook in the WebTAG analysis can determine the financial health benefit of these noise reductions for different barrier heights, lengths and configurations. This financial health benefit is referred to as the net present value (NPV). If TAG assumes that these noise reductions are *maintained* over a 60-year lifecycle, then this *maintenance* will obviously require some barrier types to be replaced a lot more frequently than others.

By selecting different barrier types and material, a detailed cost comparison could then be made, knowing the typical installed costs of each barrier type, the expected number of replacements over a 60-year cycle to maintain performance, the cost of full reinstatement, the clearance and removal cost of the existing degraded system and any traffic management cost associated with the replacement. In so doing, one can obtain a more realistic 60-year whole life cost comparison for different barrier scheme options.

The TAG noise workbook then generates a benefit to cost ratio by dividing the net present value by the whole life cost to determine which option offers the best long-term value to the country both acoustically and in health terms.

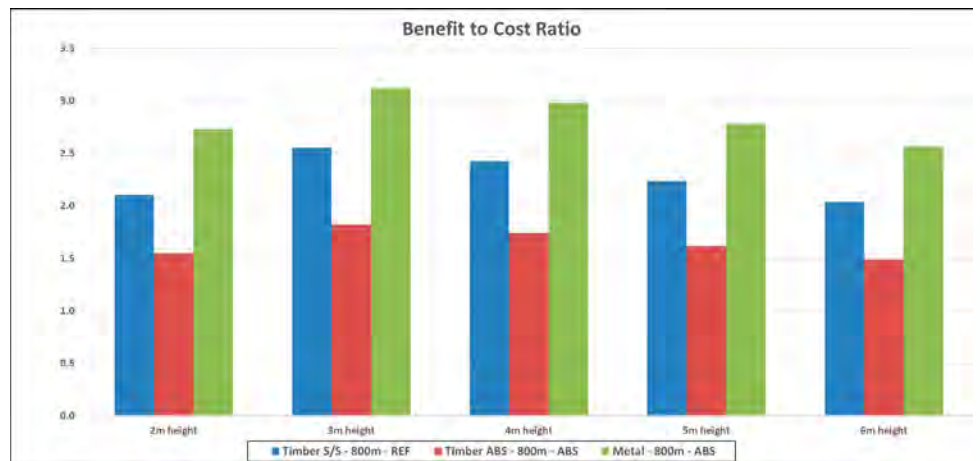
$$\frac{\text{Net present value (financial health benefit) over a 60-year lifecycle}}{\text{Barrier cost over a 60-year lifecycle}} = \text{benefit to cost ratio}$$



Single barrier comparisons

As an example, using the modelled performance of 800m long single barriers, a whole-life cost comparison was made for a typical single-skinned timber reflective design and a timber absorptive design, which tend to represent lower durability products and a physically and acoustically more durable system such as a metal absorptive barrier design.

CRTN is a blunt instrument and assumes that all the barriers give the same level of attenuation when new, however, when one takes into account the different maintenance expectations for each barrier type and includes for the overall cost of replacements over a 60-year lifecycle to maintain that performance, the benefit to cost ratios may differ enormously.



For every barrier height from 2-6m a more durable system such as metal absorptive would normally be expected to give the greatest benefit to cost ratio. For the 3m high barrier design it could be almost double that of the same timber absorptive over 60 years.

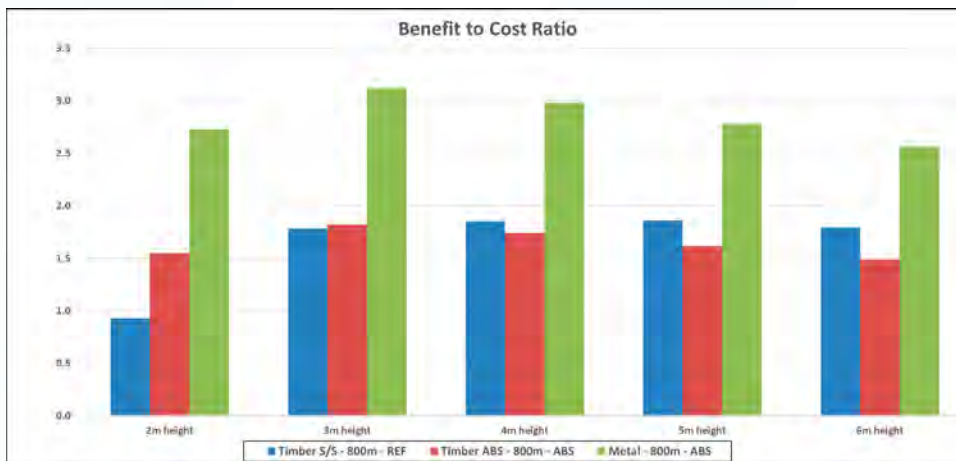
It is also worth noticing that, because of its superior durability, a 6m high metal absorptive system would not only provide twice the acoustic noise reduction of the timber options and protect 60% more properties, it would do so while still maintaining a considerably greater benefit to cost ratio over a 60 year lifecycle than a 3m high timber absorptive system.

Below:
Properties benefitting are those where the façade noise level reduced by 3dB or more

Single Barrier	3x800m	3x800m	3x800m	6x800m
Whole life	Timber S/S	Timber	Metal	Metal
Performance Factor	REF	ABS	ABS	ABS
Average Reduction (dB)	2.6	2.6	2.6	5.3
Properties benefitting	174	174	174	277
Benefit to Cost Ratio	2.6	1.8	3.1	2.6

Parallel barrier comparisons

The comparison difference is even more stark for the 800m long parallel barrier scenarios. Here, metal absorptive barrier designs maintain a high benefit to cost ratio from heights of 2-6m whereas less durable timber options, though typically cheaper when first installed, demonstrate in the long run that they represent lower value for money to the country in terms of public health and the acoustic environment.



Again, building a taller, durable barrier system is shown to give a much greater noise attenuation for far more people and a greater overall sustained health benefit than low-cost systems that may be more prone to rapid deterioration.

Parallel Barriers	3x800m	3x800m	3x800m	6x800m
Whole life	Timber S/S	Timber	Metal	Metal
Performance Factor	REF	ABS	ABS	ABS
Average Reduction (dB)	1.5	2.6	2.6	5.3
Properties benefitting	228	343	343	554
Benefit to Cost Ratio	1.8	1.8	3.1	2.6

Things to consider

Scenarios differ and road-to-residential schemes are not normally as uniform as this, however, the principles remain true. There will be different barrier material types that are more durable than others, timber-concrete-based absorptive barriers have been shown to be among the most durable systems both acoustically and structurally.

Realistic assumptions have been made regarding the lifecycle of different barrier types and the costs associated with each complete replacement. So, whether you agree or disagree with some of the values in these comparisons, when you specify, ask yourself:

- How are you determining the whole life cost of a highways noise barrier?
- How are your factoring in for the

durability of road traffic noise barriers when you specify them?

- Do you allow for realistic rates for maintenance, replacement, removal and traffic management?
- Rail barriers will require a similar approach – what would be the cost of access each time a barrier needs removing and replacing and are those being considered when pricing for a long-term barrier scheme? 🕒

IOA secondary school competition for the International Year of Sound

2020 should have been the International Year of Sound (IYS). As the pandemic scuppered a lot of the plans, the IYS has been extended to include 2021 too.

By Angela Lamacraft, ACCON UK Ltd

The IOA marked the IYS by launching a competition for secondary school pupils as an opportunity to introduce them to the concept of soundscapes and encourage them to listen more carefully to the world around them.

Small teams of pupils were asked to produce a map of their local area (covering 1 km²), indicating the different sounds that they could hear at different places. The map had to be accompanied by a supporting description of at least five separate sites (e.g. road junction, park, playground etc), a list of the sounds that could be heard at each of the sites, and photographs or drawings of the different sound sources made up the soundscape at each place.

Innovative entries

The majority of the entries were submitted as electronic documents with embedded photographs and sounds. Considering that embedding media wasn't suggested in the brief, it was a really innovative approach.

The deadline for entries was 31 July 2021 and we received seven entries (which is really good for a new initiative, especially one launched in such challenging times for schools!)

Annual competition

The judging panel is now working through the entries to determine a winner. The winning team will be invited to the annual John Connell Awards ceremony, held by the Noise Abatement Society at the House of Commons in October 2021 (COVID permitting) and receive £500 for their school and an engraved crystal trophy.

The IOA will hold the competition annually and will launch a related competition for primary schools in 2022. ©

2021 is the International Year of Sound (IYS). The Institute of Acoustics is marking the IYS by holding a competition for secondary schools as an opportunity to introduce students to the concept of soundscape and encourage them to listen more carefully to the world around them.

The winners will be invited to the annual awards ceremony held by the Noise Abatement Society at the House of Commons in October 2021 (COVID permitting), with the school receiving a prize of £500 plus an engraved crystal trophy.

There is no limit on the number of entries from a school.

If you have any queries, please do not hesitate to contact us at SchoolsIYS@ioa.org.uk



The Competition

Activity: Make a Sound Walk

This school competition is for a small team of students to produce a map of their local area, indicating the different sounds that can be heard at different places. Students can be from different years and classes, however they need to be from the same school.

Visit ioa.org.uk for further details

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Silbury Court, 406 Silbury Boulevard, Milton Keynes, MK9 2AF UK
Telephone: +44 (0) 300 999 9675 Email: ioa@ioa.org.uk

The Deadline

The deadline for entries will be 31st July 2021. Entries will be judged by a panel of experts. The decision of the judging panel will be final.



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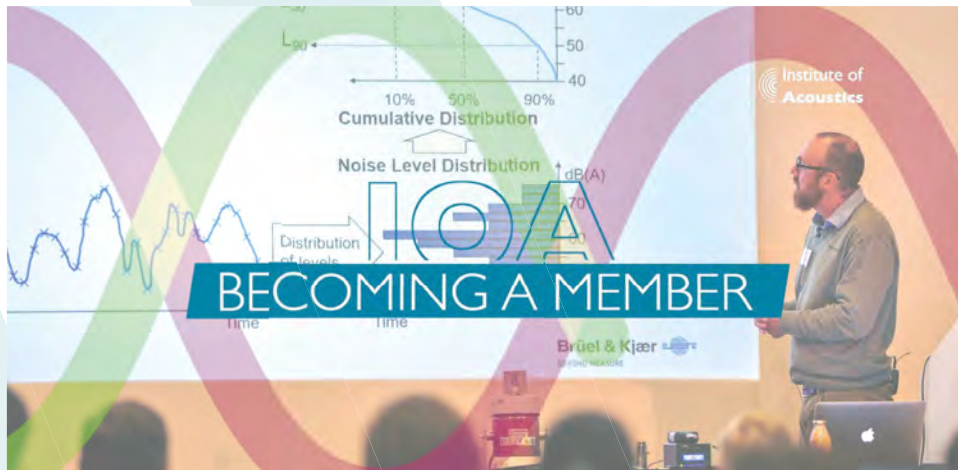
the meeting  **pod co**

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 **KNAUF**

New IOA membership video


Earlier this year, we developed a video to promote the values of IOA membership, specifically, why someone may choose to join the Institute.



The careful editing resulted in a video that closely aligns itself with the IOA's values and approach, and ensures an informal (accessible) as well as, in parts, an appropriate semi-formal tone as benefits the Institute. Watch the video here: <https://vimeo.com/585309012/d4db93baae>

Your feedback

The five-minute video covers a lot of important information. We acknowledged that if someone was keen to watch a video on IOA membership, they were already likely to be interested in joining, so the video goes into detail to provide useful insights into what existing IOA members are up to and how the Institute operates its membership programme.

The video, which sits on the IOA website, YouTube and our different social media channels, outlines the benefits of joining the IOA according to the different contributors. It will be updated at intervals, and we look forward to receiving your feedback. 

With the ongoing pandemic this year, we made a new video based on a series of interviews conducted online. Interviewees included those who have a hand in shaping and managing the membership intake and we were keen to promote the important qualities of diversity and inclusion in our membership aims.

The video opens with our President, Stephen Turner, briefly explaining what the IOA is. Several contributors, including our IOA Membership Chair, Paul Shields, are seen backing this up and adding their own thoughts. The video describes the different membership levels and how the application process works for those interested in joining.

Although the information on different grades of membership is already available on the IOA website, understanding these levels and how to reach them can be confusing, especially if someone is new to the Institute. It was therefore important to make sure that this video helped demystify the different grades of IOA membership and what is required to attain them.

Contributors and editing

There was no pre-determined script, as it was important that contributors provided their own personal insights in the interviews, so they were all sent a series of pre-determined questions

pertaining to their involvement in the IOA membership process. Parts of the video were filmed live using commercial video conferencing platforms like Zoom, while some contributors preferred to send their pre-recorded contributions. These were collated by video editor, Andrew Tomlinson (Seekalook), who has worked on several IOA projects over the past few years, and has helped to shape the IOA's expanding video content portfolio.



More member benefits

You can read more about IOA member benefits on page 16 of the March/April 2021 issue of Acoustics Bulletin.

IOA equality policy

The IOA equality policy statement is at <https://www.ioa.org.uk/about-us/policy-statements>



Due to difficulties in predicting resultant noise levels from impact, in-situ testing can reduce the uncertainty.

We at Mason UK are focused on providing correctly engineering solutions and thus have been supporting acoustic drop tests for prospective projects for many years. Being able to test an impact and vibration mitigation system on site helps reduce project risk by yielding objective performance data which, in our experience, helps tune specific requirements and boosts end user/client confidence. This is especially true in applications such as gymnasiums and exercise studios.

Free weights area of a Gymnasium ▶



The recent Covid pandemic and associated social distancing has hindered such site tests and hence why we are now offering to supply acousticians with their own test bases. Both the lightweight spring and rubber construction types are purposely made to be easily transportable, like for like in construction make-up and robust enough to withstand years of testing.

◀ Mason UK Test Base assembly line



We prefer to directly support any new project where possible however, we would be pleased to supply test bases to any consultant that would like to perform independent testing. If interested, please do get in touch with us.

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Acoustics archive

This article is to remind IOA members of the existence of the national acoustics archive, which is held in the archiving facilities of the University of Southampton library. The archive is part of the Special Collections Division, which is housed on level 4 of the Hartley Library on the University's Highfield site.

By Bridget Shield MBE

The archive was established in the early 2000s, in order to preserve for posterity the papers, letters, records, workings etc of noted acousticians and/or of acoustically significant projects.

The original donations to the archive were mainly papers and records of acoustic consultants who had been involved in the design of the Royal Festival Hall (RFH). When carrying out research

into the history of the RFH design in 2000-2001, I was approached by several families of the original acoustics team who were anxious that a permanent home should be found for boxes of papers that had been hidden away in attics or garages for many years. Much of this material was offered to the Institute of Acoustics but, as the IOA did not have proper archiving facilities, the then IOA librarian, Alison Hill, advised that we

should try to find a more suitable storage location. After contacting several libraries and archives, the University of Southampton library, which has a very large archive department, agreed that they would house the acoustics papers.

The whole university archive is very large; it contains around seven million manuscript items and 50,000 printed books. Most items date from the 19th and 20th century, although the earliest item dates from the [P46](#)



Right:
Hartley Library

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- Public database continuously updated



“The **Original** Noise Modelling Software”



Continued from p44

12th century. Important collections include papers of the first Duke of Wellington, Lord Palmerston and Earl Mountbatten of Burma.

To date, the acoustics archive contains papers of Hope Bagenal, Peter Parkin and Hugh Creighton, among others. A summary of the acoustics material held is shown in the table below.

Summary of acoustics material in archive

Archive reference number	Title	Dates of material	Number of boxes	Examples of material
MS 337	Papers of Dr Raymond Stephens and the British Acoustical Society	1920-1984	9	Correspondence and papers relating to academic career at Chelsea Polytechnic and Imperial College. Research papers. Papers relating to British Acoustical Society and Institute of Acoustics.
MS 339	Papers of Peter Parkin	1940-1982	24	Papers and tape recordings relating to work on a variety of buildings including Royal Festival Hall, Chalk Farm Round House, Fairfield Hall, Colston Hall, St Paul's Cathedral, Salisbury Cathedral, Sadler's Wells Theatre, Wimbledon tennis courts, Belgrade Theatre. Correspondence, books, lecture notes, laboratory notes. Papers and reports on assisted resonance. Press cuttings on the Royal Festival Hall.
MS 340	Papers of (Philip) Hope Edward Bagenal	1867-1868 1903-1975	24	Files including correspondence, working papers, plans, technical data relating to a huge body of work in the UK and around the world. Notebooks, notes, articles and papers on acoustics. Copies and transcripts of correspondence, including with Wallace Sabine, Sir Adrian Boult, Ralph Vaughan Williams, Leo Beranek. Copies of autobiographical writings, short stories, poetry and articles. Details of jobs undertaken from 1930s to 1970s.
MS 341	Working papers of Hugh Creighton	1950-1988	21	Calculations, reports and technical drawings relating to projects including Bath Abbey, Barbican Centre, Chichester Festival Theatre, Crucible Theatre, Liverpool Anglican and Metropolitan Cathedrals, Queen Elizabeth Hall, Royal Shakespeare Theatre, Sadler's Wells Theatre, St Paul's Cathedral, Salisbury Cathedral. Publications by Creighton on the design of buildings, sound insulation and noise.
MS 342	Working papers of Keith Rose	1914-1997	7	Articles and papers on general acoustics plus auditoria, concert halls, theatres, cinemas, conference halls, churches and cathedrals; aircraft and transport noise; noise control; broadcasting and television studios; sound insulation and vibration control in buildings.
MS 373	Papers of P.E.Doak relating to the Turner Sims Memorial Hall	1969-1977	1	Correspondence, notes of meetings, notes, plans, questionnaires photographs and tape recordings relating to design and construction of Turner Sims Memorial Hall.

Searchable

The archive has an excellent searchable website, and it is possible to download pdfs containing details of all the material in the various collections. To do this go to the Southampton University library website <https://www.southampton.ac.uk/library/index.page> and click on the following links:

Special collections > Manuscript collections > Manuscript guide > Browsable guide

When you click on the manuscript collection number of the particular individual that you are interested in, you will see a short biography of them and a broad description of what the collection contains. At the bottom of the page are

downloadable pdfs which list every item or group of items in that person's collection.

Adding to the archive

If you or your colleagues know of any collections of papers which you think would be of interest, please email the archive at Archives@soton.ac.uk.

They will advise on whether or not the material is suitable, and, if so, arrange collection of it. There is no need to sort out the papers in advance as the library will do all the necessary sorting and cataloguing. If you would like to discuss it first, before contacting the archive, then please email me on shieldbm@lsbu.ac.uk, or the IOA office. ☺

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Aviation noise management and research: reflections and challenges in light of the pandemic

In the first part of our article, (published in the July/August 2021 issue of Acoustics Bulletin on page 62), we suggested that as aviation grows back post-pandemic, there should be an opportunity to reduce noise and build trust, leading to a more sustainable future for aviation. That opportunity starts now.

(PART 2)

By Nicole Porter, Robin Monaghan, Chris Wood and Jamie Easton, Anderson Acoustics Ltd

We started to reflect on lessons from this pandemic experience and apply them to aviation noise management.

We were reminded that throughout this pandemic that Government decisions and actions are to be based on what the science says (the scientific evidence). We need to learn from events to increase our understanding and potentially help us take appropriate actions or decisions in future. These principles are being applied to the pandemic challenges and, on reflection, also need to be played out in developing our understanding of many complex topics, including effective aviation noise management. We also need to learn from this and keep building our scientific evidence to ensure this is not a lost opportunity.

We identified some upcoming challenges and tasks that could be considered in the effective management of aviation noise as the industry recovers following the pandemic.



The rest of part 1 of this article focused on the challenge of enhancing and moving the conversation forwards. First and foremost, we need to consider both defining the noise problem and the associated objective for any noise management actions. (This is in line with the requirements of EU 598¹ requiring a 'noise abatement objective' to be set for an airport). Part 1 of this article stated that we also have to consider the most appropriate descriptors/metrics to help describe the noise situation/ answer the questions, effective presentation of these descriptors, conveying the narrative with a

clear story of how all the elements fit together, with clear messages, and allowing for feedback and continued conversation.

In this second part of this article, we will consider the remaining challenges:

Challenge: recognising the importance of non-acoustic factors in effective aviation noise management (and how these may have changed)

We have all reacted to the pandemic in different ways and with different levels of impact on our health, wellbeing and quality of life. Our level of individual response **P50**

References

- 1** REGULATION (EU) No 598/2014 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 16 April 2014 on the establishment of rules and procedures with regard to the introduction of noise-related operating restrictions at Union airports within a Balanced Approach and repealing Directive 2002/30/EC, <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32014R0598>.

Enhance your career prospects in acoustics

The IOA runs a range of certificated short courses nationwide, assessing competence in the areas shown. The courses run twice a year at accredited training centres across the UK (courses are held prior to exam dates and usually run for around five days).

To find out what's right for you and where in the UK the courses are running, contact the IOA at:

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Telephone: +44 (0) 300 999 9675
education@ioa.org.uk
www.ioa.org.uk



Workplace Noise Risk Assessment



Environmental Noise Measurement



Occupational Exposure to Hand Arm Vibration



Building Acoustics Measurement

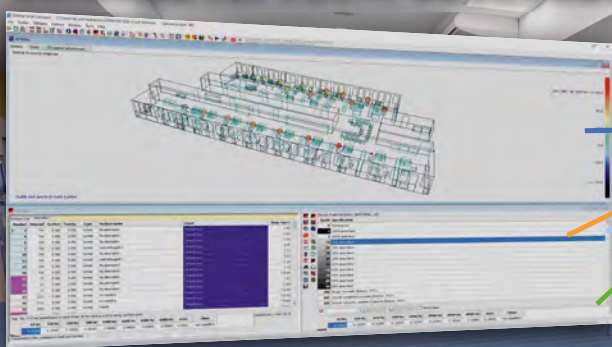


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Continued from p48

to the impacts of the pandemic has been dependent on many variables, such as differences in coping strategies and thresholds, personalities, sensitivities, family support, levels of housing, access to outdoor space, affluence, ethnicity, health inequalities, age, attitudes, mental health status, uncertainty of future, fear, rights for choice, need for trust in decision makers, fairness, belief system, vulnerabilities, levels of communication and so on.



See reference²



Coronavirus: 'Profound' mental health impact prompts calls for urgent research (BBC)³

It is therefore not surprising that that we have learnt that the same is true of our response to other stimuli, such as environmental or aviation noise. There are many factors that determine the level of response. In fact, research has shown that non-acoustic factors may be at least just as important as acoustic factors

Below/right: ©Anderson Acoustics Limited

in determining an annoyance response to a noise source.

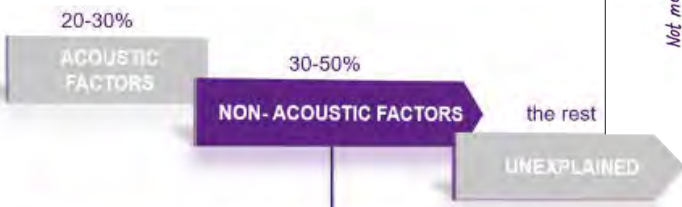
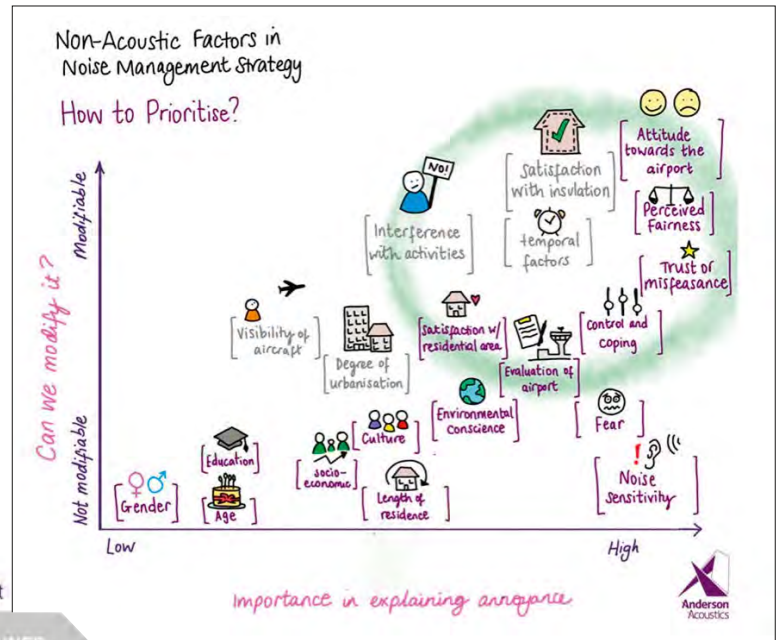
Considering annoyance due to aircraft noise as a technical problem is only addressing one side of the noise challenge. The industry needs to provide effective noise management with workable solutions for all stakeholders, and, previously, we suggested a **new perspective was required**. Non-acoustic factors are significant in determining the level of annoyance to aircraft noise events and must be given a raised priority in the design of noise management strategies. Pre-pandemic, our work focused on the specific challenge of understanding the role of non-acoustic factors and how to integrate these within an airports noise management strategy⁴.

We previously identified these non-acoustic factors that could significantly affect an adverse response, based on an extensive

review of available literature.

But, have expectations now changed? And could this result in a new baseline for future assessment comparisons as a result of changes in expectations and attitudes? In fact, a key challenge now is to consider whether mitigating these non-acoustic factors can actually reduce impacts and improve health outcomes.


On the topic of dose-response relationships, others have also been pausing for thought during this work hiatus and have considered the robustness and use of such relationships in environmental noise management⁵. They seem to agree with the need to take non-acoustic factors into account and that **future work needs to change direction**. They suggest that a new approach to understanding community attitudes to aircraft noise on a relative or comparative basis would also enable researchers



- Personal (e.g. noise sensitivity, evaluation of source)
- Regional (e.g. where they are physically located)
- Economic (e.g. home owners concern about the effect on the value of their property)
- Social (e.g. trust and perceived fairness and control)
- Situational (e.g. time of day / day of week, activity interference)

References

- 2 Coronavirus: The world in lockdown in maps and charts (BBC), <https://www.bbc.co.uk/news/world-52103747>
- 3 Coronavirus: 'Profound' mental health impact prompts calls for urgent research (BBC), <https://www.bbc.co.uk/news/health-52295894>
- 4 D. Sanchez, J. Naumann, N. Porter and A. Knowles, "Current issues in aviation noise management: A non-acoustic factors perspective", Proceedings from ICSV 22, Florence, Italy, 12-16 July 2015
- 5 Ian Flindell, Paul Le Masurier, Harry Le Masurier, Resolving uncertainties in understanding community attitudes to aircraft noise, Applied Acoustics 178 (2021) 108032



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Continued from p52

and policymakers to gain greater insight into the underlying influences on attitudes and tolerances and their [realistic] preferences for future aircraft noise and any other associated consequences that are judged important by communities.

Framework for providing practical guidance

Pre-pandemic we introduced an ‘onion rings’ conceptual framework for providing practical guidance on how to integrate and address the non-acoustic factors within an airport’s noise management strategy (presented in the figure below). This shows the adverse response in the centre, surrounded by core feelings that could lead to that response. The third ring presents principles that have been shown to affect or shape those feelings. The outer circle presents some of the initiatives and actions that, in consideration of those principles, could help to reduce the adverse response. We would note that the overriding principle for an effective non-acoustic strategy would be ‘open engagement’ to understand and address local community priorities – a topic we touched on in the previous

Right:
©Anderson
Acoustics Limited

‘challenge’ in this article as learned from the pandemic parallel. Without this, airports and policymakers could find themselves addressing matters of little concern or value.

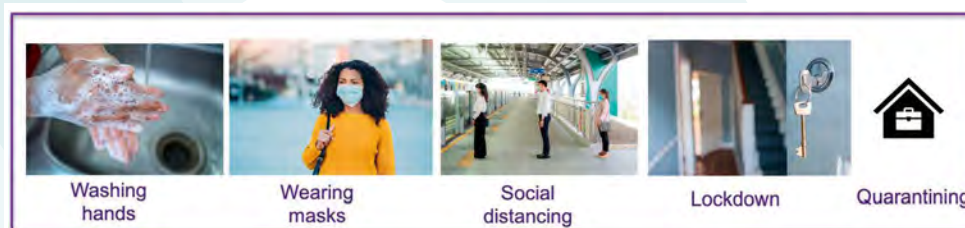
The EU project, ANIMA,⁶ is also looking at the understanding of the role of non-acoustic factors in aviation noise annoyance, with the project focused around how to alleviate the annoyance endured by communities through non-acoustical factors rather than by lowering noise itself. In the work, the researchers regard communication as an intervention in its own right.

In summary, therefore, we reconfirm that there is an important challenge of improving our understanding the role of non-acoustic factors and how to integrate these effectively within an airports noise management strategy moving forward.

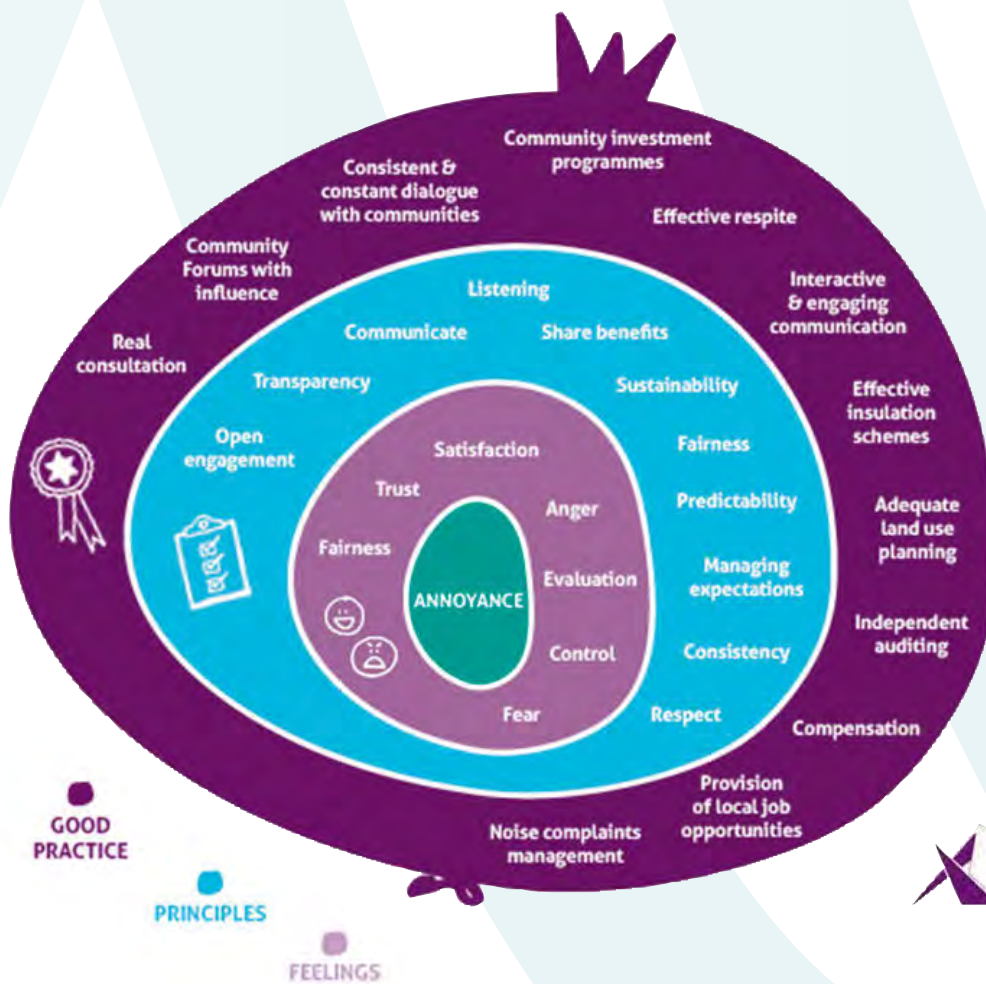
Challenge: developing and evaluating effective interventions

One definition of intervention is: *the act of interfering with the outcome or course especially of a condition or process (as to prevent harm or improve functioning).*

Below:
Different pandemic interventions



P54



References

6 <https://anima-project.eu/>

FZH MODIFIED
FOR THIS PROJECT



① Modified dimensions ② New Sylomer® compound

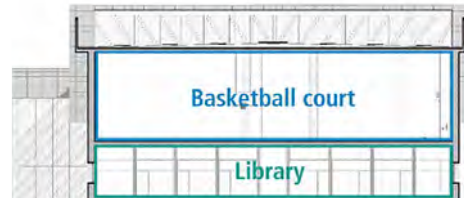


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ELASTIC SUSPENSION OF A MULTI-SPORTS ROOM OVER A LIBRARY



Complete report



Time-lapse installation video



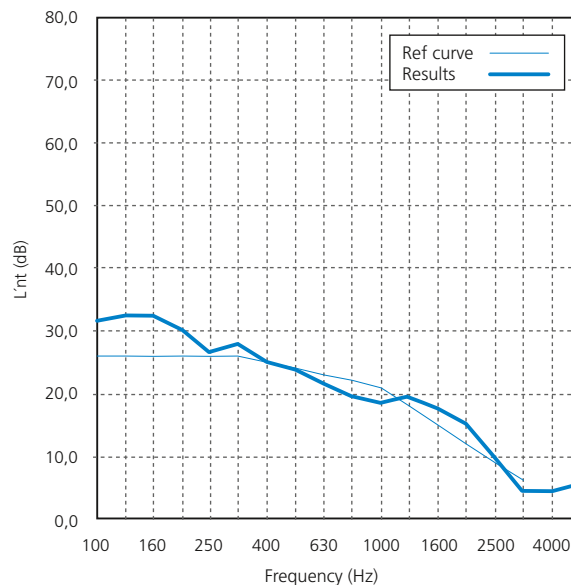
In order to improve the campus life, the University of Deusto decided to add a Library and a multi-sport room at its headquarters in San Sebastian (Spain). Having limited space, it was decided that the multi-sport room is to be located on the upper floor and the library on the lower floor, facing a challenge of conditioning & acoustic insulation.

AMC MECANOCAUCHO was contacted to provide guidance and support; the AMC MECANOCAUCHO team carried out the corresponding calculations and simulations to find the appropriate product that would meet the high demands of the specifications and durability.

The anti-vibration support had to allow the room to obtain the highest possible volume, for this AMC-MECANOCAUCHO had to develop a new Floor Support based on its FZH + Sylomer®, altering dimensions and adding a new, more resilient micro-cellular PU compound from Getzner Werkstoffe GmbH. The installation was completed with AMC mounts type EP400 for the wall surface and AMC mounts type EP500 for the connecting areas between the wall and the ceiling or the concrete slab and the wall.

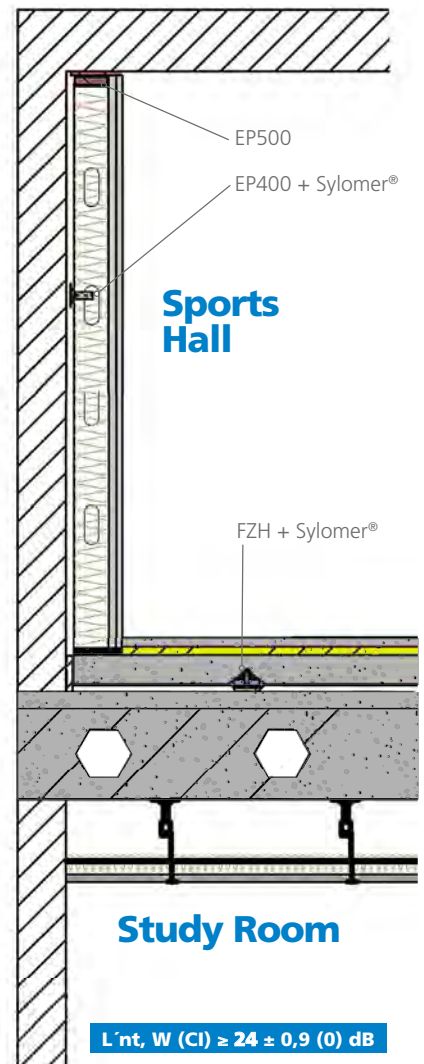
Acoustical isolation results from impact noise are shown below:

FREQ Hz	L'nt ± U
100	≥ 31,4 ± 1,4
125	32,2 ± 1,3
160	32,4 ± 1,3
200	30,1 ± 1,2
250	26,7 ± 1,3
315	27,8 ± 1,4
400	24,7 ± 1,3
500	23,6 ± 1,3
630	21,4 ± 1,3
800	19,4 ± 1,3
1000	18,3 ± 1,6
1250	19,3 ± 1,4
1600	17,6 ± 1,5
2000	15,3 ± 1,6
2500	≥ 9,7 ± 1,5
3150	≥ 4,3 ± 1,2
4000	≥ 4,3 ± 1,2
5000	≥ 5,4 ± 1,2



L'nt, W (CI) ≥ 24 ± 0,9 (0) dB

INSTALLATION LAYOUT



L'nt, W (CI) ≥ 24 ± 0,9 (0) dB


Continued from p52

During the pandemic we have witnessed a number of interventions:

However, the intervention that has really interested us is the introduction of vaccinations. At the time of writing, the vaccination programme in the UK is being deemed a huge success. What led to this accomplishment, and what lessons could we learn from it?

As a potential vaccine recipient, we are likely to ask a large number of questions such as:

Below:
Potential questions that may be asked about a vaccination

- 
- Is it safe?
 - Will it protect me or what is the level of protection it offers?
 - How will it impact my health in short, medium and long term?
 - How will it be administered and by whom?
 - What are the side effects or unintended
 - What is the scientific evidence showing it works and can I really trust it?
 - Do I have a choice?
 - What is the best one?
 - How much does it cost and is it cost effective?
 - Does one size fit all or does it protect just the vulnerable groups?
 - Does its performance decrease over time?
 - Does it need regular boosters?
 - Should I delay - Are later versions more effective?
 - Risks to others - does it stop me impacting, or can it protect, other people?
 - Can it be supplied or sourced locally and how does that affect the local economy?
 - How can it be effectively be rolled out in a timely manner?
 - What is the critical path to delivery?
 - How do we judge its success?

These questions all centre around the effectiveness of the vaccine as a successful intervention to meet the objective of protecting us against COVID-19. These questions are not dissimilar to those we would ask for many other interventions – medical or otherwise. We can learn from the vaccination experience that this line of questions could also be similar when considering the effectiveness and value of noise reduction interventions against impacts from exposure to aviation noise. This could be both in terms of acoustic or quality of life impacts reductions as well as (optimistically) improvements in health outcomes and tolerance. This, of course, relates to meeting an agreed objective for any noise management actions. What are the most effective intervention options to meet the objective?

Investing in mitigation

The aviation industry is under financial pressure and, when in a position to move forward with investing in mitigation, it must consider the most cost-effective intervention options. Research is lacking in this area (just as research was lacking in ways of mitigating impacts of COVID-19), do airports really know if their mitigation efforts are/were reducing overall impacts? For example, airports have spent considerable sums on noise insulation, but how effective has this been? Has this intervention met (or does it continue to meet) the needs demanded of it? A challenge, therefore, is to enable the aviation industry to make informed decisions on how best to spend its reduced funds in controlling its noise impacts.

Another key lesson taken from the vaccination programme is the speed at which the vaccines were

Potential Reasons for Rapid Process:

- people were working towards and believed in a common goal ,
- the success of the outcome not just important but critical in nature,
- many of the top brains across the world worked together rather than competed,
- previous approaches evaluated,
- innovative approaches considered,
- information and lessons were shared,
- funds were maximised
- bureaucracy was minimised
- barriers were overcome quickly and
- the world was not judging the outcomes but were depending on them.

developed, tested and rolled out; a timescale that would have been deemed impossible only a few years ago.

We can learn from this about some potential ways of optimising the research and development of effective interventions (accepting of course that the world is not depending on outcome in same way!).

Interventions

We have certainly learnt from the pandemic that intervention effectiveness is best evaluated over a timeline from before to after the intervention has been implemented. For aircraft noise management, this requires longitudinal studies to establish baselines (acoustic and non-acoustic) and related changes. This offers the chance to evaluate baseline data and establish the characteristics of the ambient or background noise environment. For example, we can continue to monitor and collate data on the noise environment for later analysis, but we are missing out on collating information on current and passing attitudes, opinions and other subjective perceptions, wellbeing or quality of life data. The research fraternity have been crying out for longitudinal studies to better study change (far superior in many ways to cross sectional analysis), but now we have that chance, we might be missing the boat – a lost opportunity. This needs to track the changing trends as they happen, on a regular basis, not just before the pandemic and after a ‘full’ recovery.

The challenge is to ensure we do not miss this opportunity to study noise environment and impacts as more changes occur moving forward, as well as understand and learn from the effects of the pandemic on noise exposure to date.

Challenge: establishing a new baseline (a new normal?)

The average daily flights at Heathrow in March 2020 reduced by more than 85% compared to 2019, and complaints, on average, were down by 50%, so, have expectations and attitudes changed

as a result of the pandemic?

In its aviation noise lockdown survey⁷, ICCAN reported that:

- Of those surveyed, those bothered by aviation noise during the day and evening fell from 66% before lockdown to 28% during lockdown.
- 48% of respondents agreed that they do not mind if aviation noise goes back to what it was before lockdown, while 38% disagreed.
- 66% of respondents agreed that the environment should be given higher priority than supporting the recovery of the aviation industry, while only 15% disagreed.

We certainly agree with ICCAN that ‘tracking people’s views about the impact of noise on them will be crucial in building a sustainable recovery, where noise and its effects are at the heart of decisions about aviation’.

Changing expectations

Will there be a new baseline to use in future assessment comparisons as a result of changes in expectations and attitudes? If so, how will this be defined, and will it change after we move to a ‘recovered state’? This has far-reaching implications, particularly in relation to how we assess the impacts of change in the future, which is very pertinent for planned airspace change. Such assessments not only need to look at overall noise levels, but also the change in noise exposure that different communities might experience.

As mentioned earlier, longitudinal studies could help provide information on changing attitudes to aircraft noise. There have been few studies looking at the time it takes to adapt and habituate to aircraft noise – another gap in our knowledge.

It is probably worth considering some of the data that is already collated, such as complaint data. One of our colleagues at Anderson Acoustics has already been making headway into exploring this data (not just limited to aircraft noise sources, but domestic noise as well), and is already seeing some interesting trends. We hope to

publish some of these findings in the future.

The challenge here, then, is to better establish the baseline for future assessment comparisons and understand future influences on it over time. This will include tasks to better understand existing complaint data and understand changing attitudes to aircraft noise. This is essential for assessing airspace change and it requires longitudinal data.

Challenge: increasing our understanding of effects of noise from future airspace design and use

Airspace has to be managed so that those using it can do so safely and efficiently. Airspace is being modernised and the process continues despite the pandemic. The reformation of UK airspace policy aims to make the most of advances in technology while helping to manage negative impacts, such as noise. Changes to the design of UK airspace are proposed by an airspace change sponsor (anyone can become an airspace change sponsor and CAP 1616⁸ is a CAA document that sets out the process for change sponsors to follow). However, at the time of writing this article, no full CAP 1616 airspace redesigns have been completed.

The modernisation includes the use of Performance-Based Navigation (PBN), which is a capability meaning that aircraft can now be flown much more consistently on specified paths; giving the airport greater control over the noise impacts of aircraft. Purported benefits of PBN include savings in fuel and fuel burn, effective ending of holding stacks and decreased delays.

However, PBN raises issues such as:

- concentration vs dispersion;
- what constitutes sharing and fairness;
- what is relief;
- how to deal with different areas of population density;
- how to deal with a new noise; and
- how to provide consistency. **P56**

References

- 7 ICCAN survey on people’s experience of aviation noise during lockdown, October 8, 2020, <https://iccan.gov.uk/aviation-noise-lockdown-survey/>
- 8 CAP1616: Airspace change: Guidance on the regulatory process for changing the notified airspace design and planned and permanent redistribution of air traffic, and on providing airspace information, CAA, March 2021, https://publicapps.caa.co.uk/docs/33/CAA_Airspace%20Change%20Doc_Mar2021.pdf

It is likely that the noise implications of airspace design principles are not fully understood, and we need to consider how we design sustainable airspace to share the benefits of PBN. The challenge is to develop this understanding and, in doing so, learning how to incorporate effective airspace optioneering and evaluation tools. This needs to consider best practice on noise envelopes and the implementation of EU 598. Much progress was made on this before the pandemic in the Heathrow expansion work, and we need to make sure that the lessons that were learnt from that work are not lost!

Challenge: introducing an effective respite strategy – has our appreciation of respite changed?

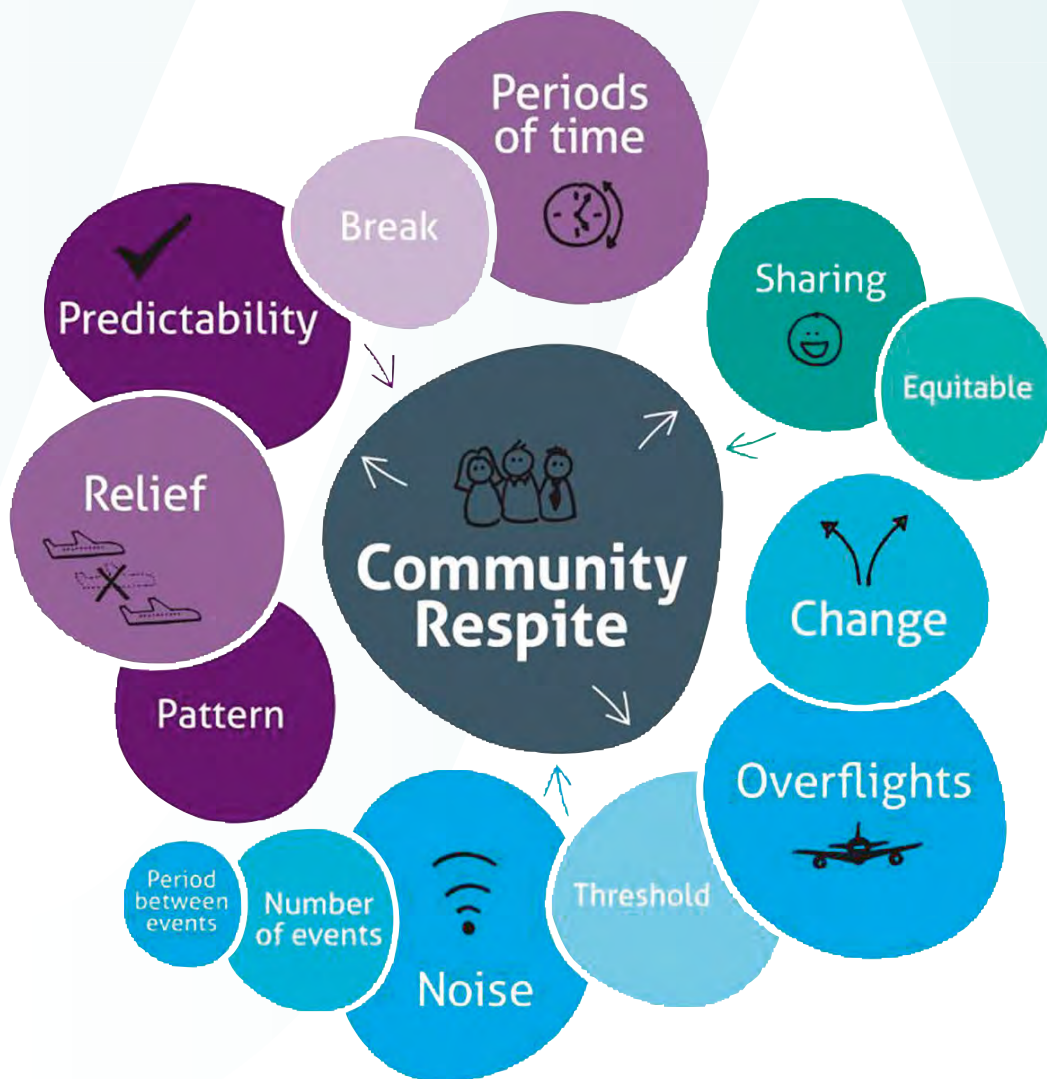
The impacts of using PBN capability depend on how it is used through adopting different:

- routes;
- alternation/respite procedures;
- dispersion patterns; and
- operating procedures.

In particular, it gives added impetus to assessing the value to residents of sharing aircraft noise between communities so that at any given time, some communities experience respite (i.e. airport-managed perceptible relief from

aircraft noise). One area that was at the forefront of research before the pandemic was effective respite. The concept of providing respite from aircraft noise had taken on increasing importance as a useful and effective strategy for providing a break from aviation noise. Another key challenge, therefore, is to consider how to introduce an effective respite strategy.

Heathrow Airport Ltd (HAL) identified a need to improve its understanding of respite from aviation noise, and Anderson Acoustics worked with them on their respite research work programme. The overall objective was 'to better understand the



key characteristics of an effective respite strategy for Heathrow Airport and its local communities, consistent with efficient operations’.

Some of this work has been published⁹ and a consolidation report was planned before the pandemic. However, this was put on hold during the hiatus.

Before the pandemic, we were reflecting on some questions being asked by a range of stakeholders including:

- What do we understand respite to actually mean?
- How is it best measured, subjectively perceived and described?
- What are the options for delivering respite?
- How is respite appraised or evaluated?
- How is it best reported and communicated?
- What are the pros and cons of delivering managed respite?
- How do we ensure respite is delivered effectively moving forward?

But has our expectation or appreciation of respite now changed as a consequence of the pandemic? For some, the pandemic brought about a change or a respite from normal busy life. It offered a chance to regroup and pause for thought, look at life differently, spend quality time with immediate

family and appreciate the outdoors. Many enjoyed the peace brought about by cessation of intrusive environmental noise. The pandemic taught us a little about the benefits of respite. Of course, respite from a stimulus such as environmental noise can be time, situationally and personally dependent (the non-acoustic factors). Its importance and perceived benefit may have changed over time as the impact and implications for the reason for ‘respite’ evolved, such as those due to habituation and adaptation, personal impacts of conditions leading to this respite etc.

An important challenge is therefore to continue our work into understanding effective respite and how to best implement an effective respite strategy in designing future airspace. Early tasks would be to

- complete a consolidation report;
- update the current state of the art; and
- set out priorities for filling in gaps in knowledge.

This would help our understanding and further assemble the pieces of the ‘respite puzzle’. We would have to take into account how expectations may have changed and respond to the demands of delivering a new airspace consistent with the effective management of its consequences. **P58**

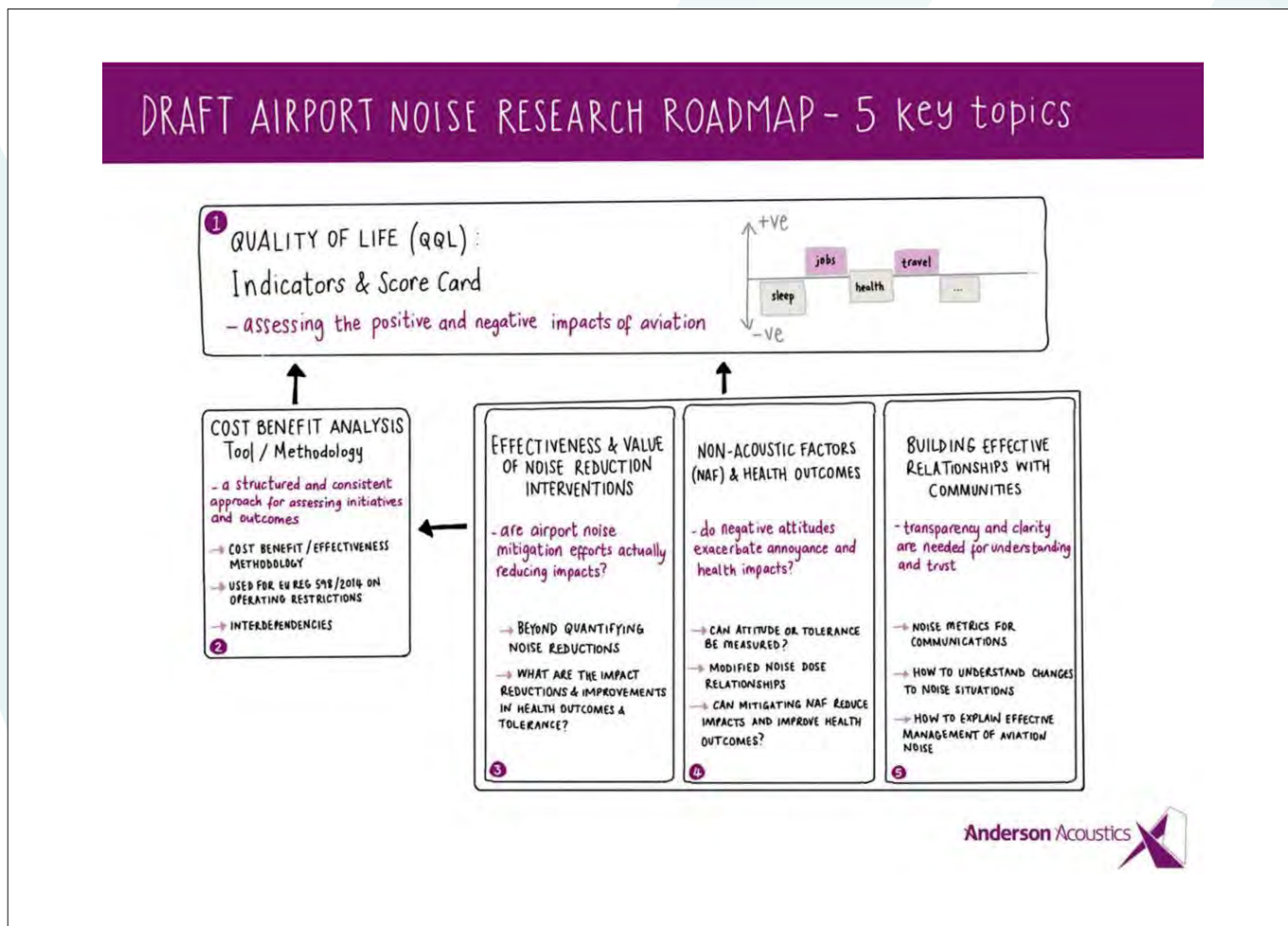


References

⁹ Heathrow's Respite Research, <https://www.heathrow.com/company/local-community/noise/making-heathrow-quieter/respite-research>

Challenge: reconsider the research roadmap and reset priorities to reflect post-covid need

In 2017, Anderson Acoustics was involved with HAL and its work with other airports, in partnership with ACI-Europe, to consider how best to influence the international research agenda – ultimately aiming to enhance the quality of life around airports and recognising the need to focus on the local communities. Together, we presented a research roadmap to identify research gaps and to build consensus on priority areas for study¹⁰ – as presented below:



This article has touched on a number of these issues as forthcoming challenges as we recover from the breakdown of the aviation industry. It may now be time to reconsider and reenergise the elements of the research roadmap – discuss and reset priorities with interested stakeholders on the development of a strategic plan to help on the road to building back better. This article has talked about need for scientific evidence to underpin decisions and also lessons learnt about how to potentially optimise research. Before the pandemic,

research was still rather piecemeal and perhaps more reactive than proactive in design – imagine a set of arrows all moving in different directions. What if these were aligned and coalesced in the same strong and powerful direction?

We need to consider how we help build knowledge for the future, how to best to protect the future health wellbeing and quality of life for us and others, and consider what scientific evidence we need to make informed decisions in the future.

Experience has shown that we need to work together towards common goals to maximise success.

Final comments

The aviation industry collapsed as a result of the worldwide pandemic. It devastated travel, industry expansion and innovative ground-breaking research. In this two part article we have reflected on the lessons taken from the pandemic experience and identified some upcoming challenges and tasks that could be considered in the effective management of aviation noise as the industry recovers.

There will be many views on actions and priorities moving forward, and here we have presented some views as food for thought. We will continue to publish our thoughts on our website www.andersonacoustics.co.uk/our-news and we would like to continue the conversation and hear your ideas. ©

References

¹⁰ N Porter, R. Norman 'Research Roadmap for Aviation Noise', Internoise 2018, Chicago 2018.

Saluting Geoff Kerry

as he says he's retiring...

As Geoff Kerry is set to hang up his lab coat for good, his many colleagues wanted to pay tribute to him for all his years at Salford, with a review of his career and many achievements.



G Geoff has been the person perhaps most responsible for documenting and communicating the history of not only the IOA, but acoustics itself. The development of acoustics in the UK has run hand-in-hand with Geoff's career; and as everyone who has ever spoken to him knows very well, he is an impressive advocate.

Geoff has been linked with acoustics at the University of Salford since 1963. Even though he formally retired in 2005, Geoff never quite left and has continued to play an invaluable role in the commercial laboratories he was responsible for establishing with Peter Lord. His expertise, attention to detail, enthusiasm and guidance has been an ever-present feature of acoustics

at Salford for 58 years. However, the time has come for Geoff to retire, and this year he will step away from his final role as internal auditor of the UKAS laboratories at Salford. We will be surprised if he manages it completely but know it will give him more time to enjoy his walking trips (and his wife, Joan, will be relieved so long as he stays out of her kitchen!)

Geoff's career

Geoff gained a BSc in applied physics from the University of Salford in 1967 while working at Hawker Siddeley Aviation at Woodford. At Hawker Siddeley, Geoff would often take to the air armed with a sound level meter, having successfully completed the flight observer course at RAF Boscombe Down.

Above left:
Presenting a paper at an IOA conference

Above:
Vignette for President's letters (Acoustics Bulletins 2000-2002)

Above right:
President's speech at early 2000s IOA spring conference

In 1969, Geoff joined Peter Lord and colleagues at the University of Salford as Scientific Officer in the newly formed Department of Applied Acoustics. At Salford, working with Peter Lord and later with Peter Wheeler, Geoff oversaw the design, construction and commissioning of three successive generations of acoustic test facilities, taking responsibility for UKAS accreditation and the numerous commercial and governmental research and development projects awarded to the department, and helping to build its international reputation for teaching, research and consultancy.

Speak with any outdoor sound propagation researcher in the world and they will praise the excellence of Salford's field measurement personnel and capabilities over the decades. These qualities are a direct result of Geoff's uncompromising and meticulous attention to preparation, execution and comprehensive reporting of noise propagation field trials. [PGO](#)

Beginning in 1977 with work for ICI, impulse noise research at Salford continues to this day. Between 1987 and 1996, Geoff led the teams from the University of Salford that carried out a series of field trials for the MOD, RAF and DRA. The measurements were primarily aimed at providing data for investigations into the effect of meteorology and topography/ground conditions on the propagation of impulse sound over both short and long distances. The purpose of the research was to provide a tool for the management of explosive noise on and around military and PE ranges. The sources mainly comprised explosive charges in the weight range 125g to 64kg and several of the trials investigated the application of the scaling laws to the waveforms generated by such charges in the 'high acoustic noise region' from 100 dB to 160 dB (re 20 uPa). Extensive meteorological measurements were also made on each trial.

The main series of trials were carried out on the ranges at Porton Down and Shoeburyness, the former with typical rolling chalk downland and the latter with flat, open farmland. Several trials at Shoeburyness investigated propagation across water, both short range across a lagoon and long range across the sea. A special trial held at RAF Binbrook looked at propagation of blast noise across a hard surface and a number of trials investigated the effect of changes of surface on waveforms.

The second series was carried out in Norway, at the invitation of

the Norwegian Government and with the assistance of several international groups of researchers. The Norwegian trials were held in forested hilly terrain but a number of short-range trials were carried out on flat land under more controlled conditions. This series was supported by an extensive set of measurements to characterise the ground surface including detailed measurements of ground impedance and the influence of snow and ice in winter conditions, as well as measurements to quantify the nature of the ground cover and trees etc. There was also a detailed topographical survey of the sites and full sets of meteorological measurements were made during the trials.

Mentoring

Geoff passed on his ethos for painstaking planning and laborious attention to detail to Salford's generations of researchers. This ethos requires comprehensive field trial plans and rigorous shakedown trials before travelling to site. Between 1999 and 2005, Geoff's mentoring was vital to a series of highly successful environmental projects in collaboration with Qinetiq and the RAF, and from 2005 with Defra on the management of human response to vibration and noise. At the same time, laboratory and field work continued Geoff's work to manage hearing impacts from blast noise. Investigations to improve the management of blast noise impacts building on Geoff's legacy continues to this day with the wePhD research of Salford's Gethin Manuel working with the company, DNV.

IOA

Alongside his work at Salford, Geoff has been a constant at the IOA since its foundation in 1974 and has served in many roles, including President from 2002-2004. Geoff was a founder member of the Institute's North West Branch and of the Industrial Noise Group (now the Noise and Vibration Engineering Group), and was elected a Fellow of the Institute in 1981, he has served the IOA tirelessly for many years on the Membership Committee.

As President, he served through a key period of the Institute's development. He was Vice President, Groups and Branches from 1985 to 1990, Treasurer from 1990 until 1998 and then Vice President again from 2011 to 2016, the period which saw the inauguration and early years of the Senior Members' Group. During this period Geoff also provided the impetus to ensure that the IOA history book was collated and published.

In 2008 he was awarded an Honorary Fellowship and in recognition of his long and distinguished service to the Institute and his valuable contribution to the development of acoustics as a profession, the Institute introduced the Geoff Kerry Distinguished Service Medal with Geoff as the first recipient.

UKAS

He has always been active in British and International Standards development, and since his retirement from the university he continued to act for UKAS until 2019 as a specialist technical assessor.



Far left: Discussing Acoustics Bulletin matters with the then editor, Ian Bennett

Left: Past presidents in the Salford anechoic room, (L_R) Terry Jones, Geoff Kerry, Ian Campbell and Peter Wheeler

In 1994, Geoff gained Chartered Engineer status through the Institute and was also awarded CPhys and FInstP through the Institute of Physics.

What his colleagues say

Peter Wheeler:

I first met Geoff at the IOA then continued our friendship when I came to Salford. Geoff was one of the most efficient members and colleagues of the department. We spent many happy years holidaying with Geoff and Joan and also going to several conferences together.

Dave Saunders, Head of the Department of Acoustics from 1997 to 2000 and Head of the School of Acoustics and Electronic Engineering from 2000 to 2002:

My overriding memory of Geoff is his enthusiasm, attention to detail and being a passionate advocate for acoustics. You knew that if you were going on a field trip with Geoff you would have all the equipment that was required plus at least one back up set. He was a joy to work with.

Please give him my best wishes and tell him it's about bloody time.

Keith Vickers, Bruel & Kjaer:

Unfortunately, I can't call to mind any particularly funny anecdotes regarding Geoff. That doesn't mean there haven't been any, it just means I can't remember them – which is a shame, as I am sure there must have been many, particularly at the now legendary annual IOA conferences in Windermere.

I first met Geoff when I came to Salford's Meadow Road back in the autumn of 1976, having found myself, quite by surprise, on a then new undergraduate course called Electroacoustics. This came about totally on the basis of Peter Lord briefly popping his head round the door of a lecture room in Maxwell, which at the time was filled by around 80 rather over-excitable electrical engineering science students, of whom I was one (but that's another story).

I remember forming the opinion quite early on, that one of Geoff's roles must have been to keep us lowly undergraduates from ever touching any of the department's clearly valuable measuring equipment – which for some reason seemed largely to be green-coloured. When we had practical

Above:

With colleague, David Warrington, being filmed by a BBC 'Tomorrow's World' crew at Shoeburyness



lectures in the Meadow Road labs, which included such tasks as measuring the absorption coefficient of various materials (by a rather laborious process), we had to use much more modest-looking and presumably student-proof equipment.

Little could I have known at that point, that in later years, I would be back at Salford (wearing a different hat – by chance a green one) visiting Geoff to discuss later versions of those very instruments – or as I came to know them “green boxes”. It's quite ironic really. I now understand why Geoff was so keen to keep us away from those instruments and why they were precious. In those pre-personal computer days, precise measuring instruments represented a very different £ to function proposition to what they do today.

Since first meeting Geoff, some 45 years ago, and after many meetings at Salford (in three different Acoustics Department buildings) and at IOA-related events; including the NW Branch, I have come to like and respect him in equal measure. I have particularly enjoyed learning from Geoff about the early days of acoustics at Salford, and the interactions between the then key players in acoustics in academia and industry. The greatest irony, is that the best person to ask for really interesting and doubtless amusing anecdotes, is Geoff himself!

Professor Andy Moorhouse, current Laboratory Director of the University of Salford Acoustic Test & Calibration Laboratory:

I was always aware of just how much we owed to Geoff and, in particular, for his contribution to the acoustics labs. The labs have always been so central to acoustics at Salford – they form a focus around which the whole group coheres and the

facilities enable us to attract world-class talent. From Geoff and the late Peter Lord we inherited a model of using the labs for commercial work when not being used for research and teaching. This was consolidated by gaining accreditation for the commercial activities, giving them real credibility. This way of working was decades ahead of its time and even today, the university aspires to reproduce this formula in other disciplines. But things might have been very different; when I joined Salford in 2004, we were about to move to new labs. It did not become evident until later just how close we came to not getting funding for new facilities and it was only an intervention from Geoff at a crucial time that made the difference. 17 years later, we are again planning a move to new labs. Thanks to his legacy we are much better placed now – let's hope we can live up to Geoff's standards.

Stephen Turner, current IOA President:

I cannot remember a time when Geoff's name was not associated in my mind with the Institute. I had the pleasure of serving on Council with him and even today, even though the day-to-day running of the IOA occurs without him being present, the “Geoff Kerry Principle” is still regularly mentioned. (You'll have to ask him about that). His interest in the Institute has not waned with him recently expressing concern about the relative lack of activity in the Institute's North-West Branch. He has also been a regular attendee at our on-line Members' Forum, imparting words of wisdom to those assembled. Thank you Geoff, for all you have done – and I look forward to catching up with you again when the Forum resumes this autumn. ☺

Geoff was always grateful for the guidance and tremendous support from his colleagues at Salford.

Innovation and enterprise in design



Troldekt's wood wool acoustic ceiling panels have made a major contribution to the Enterprise Centre at the University of East Anglia. Dubbed the greenest building in the UK, it is also one of the most sustainable.

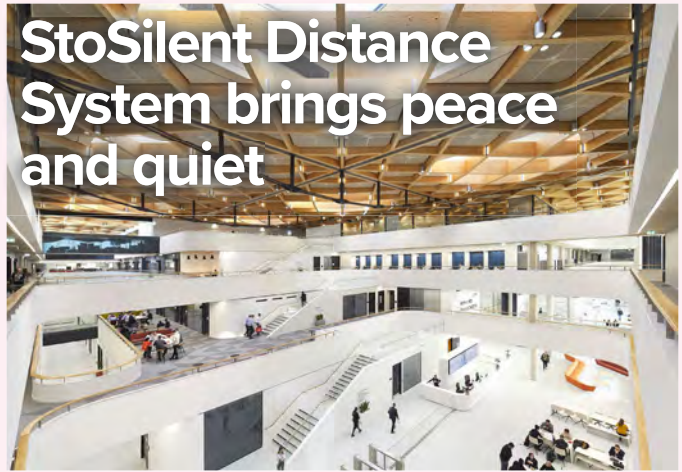
Designed by sustainable architects, Architype, in collaboration with contractor, Morgan Sindall, it is recognised as the first large scale project to target both Passivhaus Certification and BREEAM Outstanding and one which meets the highest energy and environmental standards.

The rationale behind the decision was to make the Centre a live and educational demonstrator of the performance of renewable materials. Here it would be possible to see any changes over time and to understand their impact, including energy efficiency and carbon offsetting. The building has become a source of knowledge for designers and builders.

Founded on the Cradle-to-Cradle design concept, Troldekt's natural and inherently sustainable panels are available in a variety of different surfaces and colours and contribute positively to a building's BREEAM, DGNB and LEED ratings. In addition to their high sound absorption and tactile surface, they offer high durability and low-cost lifecycle performance. Available in various sizes and in four grades from extreme fine to coarse, the panels can be left untreated or painted in virtually any RAL colour.



StoSilent Distance System brings peace and quiet



Above: Sto's StoSilent Distance acoustic system has been installed at the new Prof. Lord Bhattacharyya Building, home of the National Automotive Innovation Centre on the University of Warwick campus

The need for carefully designed and balanced acoustics within a vast open space has led to an acoustic system from Sto being specified for a major automotive research and development centre in the Midlands.

The StoSilent Distance system has been installed at the new Prof. Lord Bhattacharyya Building, home of the National Automotive Innovation Centre (NAIC), on the University of Warwick campus.

The NAIC is a unique research and development facility where academic and industrial teams work together to develop the future of transport. "The architects, Cullinan Studio, wanted to encourage people to come together for research, demonstrations, meetings and breakout sessions, so acoustics were a key consideration within this multiple-use building", explains Sto Technical Consultant for Acoustics, James Gosling.

"It was especially important in the large, open atrium area which forms the centrepiece of the building. This was designed to be a flexible space, and so it was a requirement to correctly balance the challenges of attenuation, reverberation, speech intelligibility and foot traffic. The aim was to create an acoustic environment that was reliable and practical, while also achieving a very distinctive design aesthetic."

Over 2,000m² of the StoSilent Distance system was installed around the curving balustrades and street level ceilings, which feature in the multi-level atrium area.

The StoSilent Distance system includes the Sto minimal void SW150 metal profile sub-construction, which can be installed and adjusted to suit a very wide variety of application requirements. The acoustic boards are made from 96% recycled glass, making them lightweight and easy to install. They provide excellent acoustics, and provide a modern, clean, monolithic appearance. The boards are fixed to the sub-construction, creating a seamless surface, appealing to both the architect and client and perfect for the type of dramatic architecture featured in the NAIC atrium.

The system was completed with the application of StoSilent Décor M. This spray-applied finish can be tinted to match an extensive range of shades from the StoColor system, allowing architects and designers to incorporate an acoustic solution which complements their visual design aesthetic.

StoSilent Décor M is easy to refurbish, and being both inert and Natureplus approved it is also environmentally friendly. This was a particularly appropriate consideration for this project, as the NAIC facility will be used to research technological advances that help the environment, such as reducing dependency on fossil fuels and reducing CO₂ emissions.

How an engineer deals with an elephant in the room



What do you do with an elephant in the room? When most of us face this question, we are only talking about a metaphorical elephant.

For engineers at Mason Industries however, it was the prospect of a live elephant in a TV studio that helped inspire the invention of the jack-up floating floor.

The largest male elephants can weigh up to 15,000 lbs so having a live elephant in the room can create a significant engineering problem, if you need to isolate the impact or vibration that such a large animal might transmit through the building.

Adam Fox, Director of vibration isolation specialist, Mason UK, explains that in the early 1960s, engineers set out to solve precisely this kind of problem. Columbia Broadcasting System (CBS) wanted to install a new studio that was capable of handling a room full of live elephants, so the acoustic consultants working on the project contacted Norm Mason.

Norm, who dedicated his life to acoustic engineering, developed the concept of a jack-up floating floor. Although never patented, the design formed the industry's template for this efficient and swift construction method.

A floating floor is a purpose-built floor designed to limit the transmission of noise and vibration. There are no rigid or solid connections between the floating floor and the structural floor beneath it and although there are many floating floor types, they fall into two main categories:

- reinforced concrete jack-up floating floors are systems constructed on the slab and then raised, or jacked up, to the desired height; and
- timber or formwork floating floors usually involve multiple layers of board, supported by low profile rubber or spring elements. The latter system has been around longer, but is more costly in resources and time and carries greater acoustic risk.

Today, floating floors are used for many purposes and are recommended where there is a need to reduce the transmission of noise, vibration or impact. For example, a gym being built in a residential building, recording studios built near a tube line or, in rare circumstances, an elephant in the room.

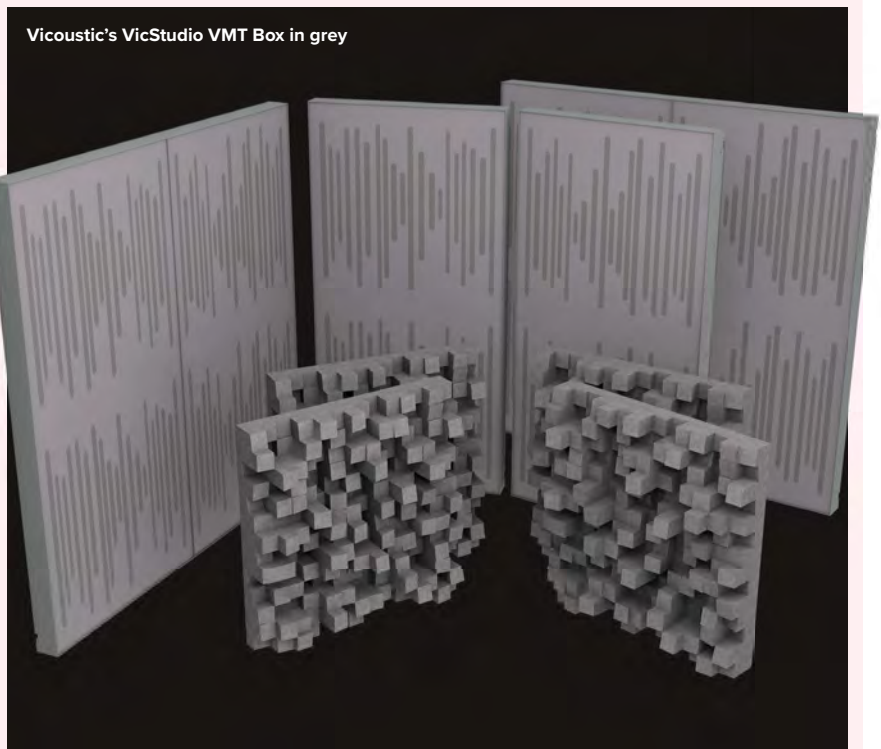
VicStudio VMT Box aims to make a studio sustainable

Vicoustic's VicStudio VMT Box, is an upgradable acoustic kit for home and project studios with the latest virtual material technology (VMT).

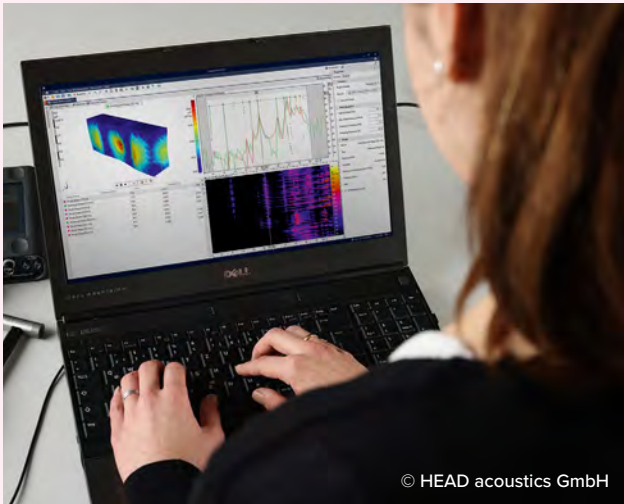
It is designed to maximise the acoustic conditions of a room used for a project studio, without compromising health and comfort.

The Flat Panel VMT available on this kit is a sustainable alternative to standard absorbing foams. Vicoustic developed VMT with a holistic approach by fully integrating its acoustic performance with other sustainability goals, such as human health (air quality), human safety (fire), and the use of recycled materials (VMT is made of VicPET Wool, produced mostly from recycled plastic) that are also recyclable.

VicStudio VMT Box improves room acoustics using six Flat Panel VMT with VicSpacer Plus for enhanced absorption performance, and four units of Multifuser DC2 for sound diffusion. It's available in three different finishes (grey, black and white).



HEAD acoustics releases intuitive structural analysis software package



With release 12.5 of the ArtemiS SUITE software for sound and vibration analysis, HEAD acoustics has launched an integrated modal analysis tool, thus completing its structural analysis package.

With this tool, troubleshooters, simulation and project engineers can use all relevant analyses related to structural dynamic issues directly in one interactive software

environment. In addition to efficiently performing modal and operational deflection shape analyses (ODS), ArtemiS SUITE enables users to animate vibration shapes and compare numerical simulation data with real measured data (shape comparison).

Dr Aulis Telle, Managing Director Sound, Vibration and Perception at HEAD acoustics GmbH, said: "The analysis of vibration shapes provides information on the sources and transmission paths of acoustic phenomena and noise and makes it possible to identify and eliminate structural weak points and to improve durability, for example.

"Structural analysis must therefore be incorporated into any development process as early as possible; in an early phase based on simulation models and later on for verification with the prototype."

At the core of the new software solution are vivid representations in the form of a powerful 3D visualisation. It can be used to analyse the dynamic behavior of components quickly and, above all, plastically. Transfer functions can be animated and compared with measurements and simulation data in the form of 3D oscillating shapes in the shape comparison tool. An integrated and universally applicable measuring point library makes data acquisition time-saving and economical. The examination of ODS or impact measurement data in the interactive software environment is easy and intuitive. ☺



ACOUSTICS 2021

11-12 October 2021 Hybrid Conference

The Institute of Acoustic's Annual Conference will be held over two days with sessions on Building Acoustics, Physical Acoustics, Environmental Noise, Musical, Speech & Hearing and Noise & Vibration Engineering.

The programme is available on the IOA website www.ioa.org.uk

Delegates will be able to join remotely by Zoom or at a local hub, the list of hubs will be published along with registration details on the IOA website.

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BRANCH NEWS

SOUTHERN BRANCH NEWS

By Sebastian Woodhams

On Wednesday 7 July the Southern Branch hosted the gym acoustics working group who presented a draft of the upcoming Gym Acoustics Guidance, a candidate to be the second ProPG after Planning & Noise in 2017.

The guidance comes at the moment that changes of use planning classes mean that locations for gyms in close proximity to residents in lightweight buildings is becoming more of a challenge. The guidance seeks to bring together the practical approaches of well-respected practitioners into a standardised methodology, and blends with a simplified prediction method to provide the current state of knowledge for assessment of gyms.

The presentation was led by the Chair of the working group, Peter Rogers of Sustainable Acoustics, with sections on criteria, practical testing methodology and prediction methodology presented by Anthony Robinson (Westminster City Council), James Stokes (RBA Acoustics) and Martin McNulty (Hoare Lea) respectively.

The document aims to provide a robust method aiming particularly to assess the viability of sites and to create consistency in testing and reporting.

The guidance will be made available soon to IOA members for review and comment before the final version is published later this year.

EASTERN BRANCH NEWS

By Josie Nixon

The Eastern Region Branch recently held an online meeting on 'The Quiet Project', which was expertly delivered by Professor Stephen Dance, who has our thanks. The event was held remotely on Thursday 24 June 2021 and attended by 25 members.

The meeting was a great way to look back over the past year and of half at how the pandemic has affected our relationship with noise. The presentation explored how noise levels changed with the different lockdowns and how quiet levels were in the first lockdown compared to the latter. The presentation provided attendees with the chance to think about how 'quiet' can be achieved within society going forwards and provided thought-provoking ideas, such as should there be an annual day of quiet as a memorial for those that have been lost, providing time for contemplation and remembrance for when it was quiet?

The Eastern Branch is currently on the summer break but committee members are looking forward to providing more events in the autumn and, fingers crossed, they may even be in person!

Senior Members' Group

By Mike Sugiura

The Senior Members' Group (SMG) held a virtual meeting on 26 July 2021 with a very interesting presentation from Steve Barnes, GRAMM UK. GRAMM UK are noise barrier specialists who have engaged in the design, supply and installation of barriers in the infrastructure, transportation and industrial sectors for more than 27 years.

Steve covered many aspects of acoustic barriers covering best practice, the compliance of barriers for use on UK highways and roads, the structural requirements of noise barriers, the various materials available and the benefits each possess offering sustainable solutions. The talk discussed the development of combined noise barrier systems, which deliver a combination of sound reduction, air pollution removal, vehicle safety, and greener and more efficient barriers.

There is a gradual move away from the traditional timber noise barriers to more sustainable long-life (upwards of 60 years) maintenance free barriers thus reducing the environmental impact and carbon footprint.

Steve's talk also gave an overview of the development of acoustics – including where it has failed. Steve highlighted that in many cases there are sites with non-compliant noise barriers in England and also sites where it has succeeded.

The talk highlighted that many acoustic reports lack sufficient advice/direction, information and the detail on the design and performance required from a proposed barrier system.

The next SMG meeting and AGM will be held on 20 September 2021.

Health and whole life cost benefits of highways noise barriers

As with any asset on the highways network, it is common sense to allow for realistic maintenance costs when choosing and procuring a noise barrier system. But a short-term approach of focusing on newly installed prices alone creates a false economy and potentially stores up financial hardship for the future.

By Giles Parker, Sound Barrier Solutions Ltd

The quietest road in the UK, however you measure it, is the A166 in North Yorkshire. It is a 60-year old, single lane, single carriageway road. The road is quiet because of its location, but also because of its design. The road is built on a raised embankment, which means that the road is elevated above the surrounding area. This means that the road is protected from noise and air pollution. The road is also built with a high level of sound insulation, which means that the road is very quiet. The road is a good example of how a well-designed road can be quiet and healthy.

Turn to page 36 for the Instrumentation Corner article on the health and whole life cost benefits of highways noise barriers

NEWS

Pioneering 'sound blinds' to be trialed

A new material that allows scientists to turn plastic sheets into noise cancelling panels is to be trialed in UK hospitals and beside motorways.

The plastic panels have the same noise reduction effect as two inches of plywood but weigh four to six times less. The company behind the Sonoblind panels, Metasonix, is a spin-out from the Universities of Sussex and Bristol.

One of the founders of the company, Dr Gianluca Memoli, from the School of Engineering of Informatics of the University of Sussex, said: "Our panels are much lighter than traditional solutions for noise abatement and, if required, can even let air and light through. Some of the panels can be used as grilles to silence air conditioning units and extractor fans or as part of blinds, to keep the noise out while the window stays open."

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David Watts CEng FIOA becomes AIRO's Technical Director



David Watts has joined AIRO's Board as Technical Director. David's career at AIRO started as an Assistant Engineer in 1990 shortly after graduation and progressed to Principal Consultant by 2003. His professional development has encompassed all aspects of AIRO's consultancy and testing activities, further education and training through the IOA including the Diploma in Acoustics and

Noise Control, qualifying as a Chartered Engineer and attaining Fellowship of the Institute. David has also made significant contributions in the voluntary sector including IOA committees at national and branch level, together with Association of Noise Consultants and BSI committee work. AIRO's MD and former IOA President, Dr Tony Jones HonFIOA, has welcomed David's appointment as strengthening AIRO's board of directors and looks forward to David continuing to apply his dedication and enthusiasm to progress both AIRO's ongoing development and the profession of acoustics in general.

Mind music

IOA member, Cam Salisbury and his friend, Dom Taylor, have held a 'digital bake sale' to raise funds for mental health charity, Mind (www.mind.org.uk) because, they worked out, music travels better than cakes over the internet.

Mind provides advice and support to empower anyone experiencing a change to their mental health. The charity campaigns to improve services, raise awareness and promote understanding.

Cam said: "Rather than bake brownies to raise funds and take them to what may still be a mainly empty office, we took a different, digital approach.

"As way of thanking the supportive people I have had surrounding me throughout this difficult pandemic period, I worked with my good friend, Dom, to write and record a piece of music, *Feel Alive*, during the lockdown period to keep ourselves sane if nothing else."

"*Feel Alive* is listed on iTunes, Amazon, Spotify, Deezer and YouTube. All proceeds are being donated to MIND, so each time the track is added to a playlist and somebody listens, it generates money for a fantastic cause and helps to support the conversations surrounding mental health and wellbeing as we begin to emerge from what has been a very testing time."

Listen here: <https://youtu.be/ggovsy6dRsk>
www.justgiving.com/fundraising/digitalbakesale



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Phil Evans joins Savills



Phil Evans

Phil Evans, formerly at RPS and founder of Evans Acoustics, has now joined Savills Planning and Environment Team to expand its environmental capability. Savills operates the largest planning consultancy in the UK and Phil has established an acoustics, sound and vibration team that will initially be based in Brighton before expanding into the Leeds and Manchester offices.

Jordi Femenia joins vibration control specialist, Mason UK

Acoustics and vibration specialist, Mason UK, has appointed Jordi Femenia as its new Sales Manager.

Jordi brings both technical knowledge of acoustics and extensive experience in sales and customer supporting roles. He began his career as an acoustic engineer and has since amassed two decades of experience in the sector. In addition to his engineering background, Jordi also holds a master's degree in Business Administration. He has vast experience in a sales environment, having brought his energy and enthusiasm for acoustics into sales roles and used his technical knowledge of acoustics to build relationships with customers.



Jordi Femenia

Campbell Associates NEW CadnaA training

Campbell Associates training for CadnaA noise prediction software was inevitably interrupted by pandemic safety measures, and their 2020 face-to-face programme was cancelled. However, they have now created an online training programme, that can be delivered effectively via a live webinar platform.

Topics covered in the first sessions, delivered in March, included the basics of sound calculation, modelling, source types and results, and included data import, object handling and project organisation, modelling radiating buildings, outdoor sound systems, bridges, barriers and tunnels. Delegate notes and training files were provided and the sessions were CPD certified.

The CadnaA live webinar training is being repeated this September. If you would like to be advised of future training dates, please email Jo May on joanne@campbell-associates.co.uk

NTi opens offices in France

NTi Audio has opened new offices in Limonest near Lyon, France, with Erik Aflalo at the helm. Erik brings 30 years' experience and expertise in acoustic measurement solutions which he will use to build the NTi Audio brand and provide expert support to customers in France. Erik will be primarily responsible for the industrial markets and applications related to noise measurements and room and building acoustics.

Acoustic Associates Sussex Ltd is now an employee owned company



Acoustic Associates Sussex Ltd

After more than 25 years of consultancy practise under the leadership of Peter Attwood, Acoustic Associates Sussex Ltd has now transitioned into an employee ownership trust. The employees are the majority owners of the company via the holding company Acoustic Associates Trustees Ltd. Peter will still be a part of the company and will continue to work on a part-time basis while George and Scott, as fellow directors, will steer the day-to-day operations along with Sue, the office manager.

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David Watts

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0296

The ideal setting for a wedding ceremony made more peaceful with secondary glazing

Deep in the heart of Reading, close to Reading Abbey in Berkshire, is the historic Reading Town Hall. This magnificent Grade II Listed building was built in phases between 1786 and 1897. The main façade was designed in 1875 by renowned architect, Alfred Waterhouse, in the Victorian Gothic style; this particular area of the building is Grade II*.

The Town Hall's Grade II Listed facilities offer space for conferencing, weddings, parties and Christmas events. One such area, the Registry Office's Ceremony Room, in the Grade II* part of the building required better acoustic insulation on seven of the primary windows, to ensure minimal breakthrough of outside noise during wedding registries. As the building is Listed, the traditional single glazed sash windows were retained as an important architectural feature and secondary glazing was chosen as a way of dealing with mitigating noise from the busy thoroughfare.

Selectaglaze worked closely with main contractor, Lakehouse, and Reading Borough Council to devise appropriate designs. These needed to be engineered to meet the acoustic requirements but also had to be as unobtrusive as possible.

23 units were installed to seven enormous original windows in the Ceremonies Room. The very large gothic arched primary windows were just over four metres high, so had to be treated with a combination of units to ensure the perfect acoustic insulation. Each opening was treated with a combination of three or four transom coupled secondary glazed units, with a Series 42 curved fixed light system affixed at the top. The slimline Series 10 horizontal sliding units were specified for the lower units on the



wider windows, whereas the Series 45 side hung casement was selected for the narrower windows. This ensured that sightlines from the primary windows were not compromised irrespective of their differing widths. 6.4mm acoustic laminate glass was specified for each and a cavity of 100mm from the original windows ensured that the secondary glazing units reduced noise levels by between 40-45 dB. An additional benefit of this treatment was that the thermal controls were also enhanced, making the room warmer. ☺

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Committee meetings 2021

DAY	DATE	TIME	MEETING
Wednesday	8 September	10.30	Executive
Wednesday	22 September	10.30	Council
Tuesday	28 September	11.00	CPD Committee
Thursday	14 October	11.00	Publications
Tuesday	19 October	10.30	Engineering
Wednesday	20 October	10.30	Engineering
Thursday	21 October	10.30	Meetings
Thursday	28 October	10.30	Membership
Tuesday	2 November	10.30	Research Co-ordination(London)
Tuesday	9 November	10.30	CCWPNA Examiners
Tuesday	9 November	13.30	CCWPNA Committee
Wednesday	10 November	09.30	CCBAM Examiners
Wednesday	10 November	10.30	CCENM Examiners
Wednesday	10 November	13.30	CCENM Committee
Thursday	11 November	10.30	Diploma Tutors and Examiners
Thursday	11 November	13.30	Education
Tuesday	23 November	10.30	ASBA Examiners (Edinburgh)
Tuesday	23 November	13.30	ASBA Committee (Edinburgh)
Wednesday	24 November	10.30	Executive
Wednesday	8 December	10.30	Council

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