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ACOUSTICS BULLETIN

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Technical articles review procedure

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

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

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Dear Member

The wording of our current Memorandum of Association, and the wording of our proposed Royal Charter (hopefully soon – see update below), define the purpose of our activities as being ‘... for the discussion, promotion or advancement of the art, science and technology of acoustics’. These are not mutually exclusive!

Acoustics art?

Have you ever thought of yourself as an ‘artist’? I suppose those of you who are involved in the creative side of acoustics may well have thought of your professional practice in such terms, For example, if involved in sound engineering, musical acoustics (check out the Musical Acoustics Group archive article on page 38), auditoria design and increasingly these days, soundscaping.

Perhaps we should be encouraged to think of ourselves in much broader terms and this was the case for me when attending a course organised by the Early Careers Group. This was *The Art of Being an Acoustic Consultant* and many of the presentations gave examples of making full use of the ‘creative’ side of problem solving in consultancy. But just to be clear, an excellent presentation by Daniela Filipe on the financial side of running a consultancy did not encourage any creative accounting! This course has been running for 20 years now and is as popular as ever. Look out for the course report on page 22 and a photo of the birthday cake which was used as a visual aid by David Watts in his presentation. Thank you Josie Nixon and our Early Careers Group for a course which provided excellent advice and a climate in which free discussion could take place and challenging questions could be asked. One question in particular related to costs of attending and ease of access to IOA educational programmes and I have given a short update on this below.

IOA and education

Developing the future of the education service is one of our key priorities in the current Strategic Plan and Council has approved a high level strategy for managing, expanding and re-shaping our activity in this area. The current provisions will continue to be supported but alongside this, the intent is to deliver additional subject area content, introduce flexible study options, and extend our market reach. I will keep you posted of our progress in this extremely important area of Institute activity.



Charter update

By the time you read this, I hope that you who are members will have received notice of the opportunity to vote on the final submission to apply for the Royal Charter. If not, such a notice will be imminent and the following paragraphs still apply!

A significant amount of work has been put into getting us to this point and I would like to say a big thank you to the Charter Group, Membership Committee, Executive Council and our Chief Executive. There is always a risk in picking out individuals, but I will take the risk in particularly mentioning Russell Richardson as Chair of the Charter Group, and Chris Turner as the person who did the heavy lifting in editorial drafting and liaising with our legal advisor. Our legal advisor is Keith Lawrey and we owe him a huge debt of gratitude for his service in helping us draft our Charter application.

Warm regards,

A handwritten signature in blue ink, reading 'Alistair Somerville'.

Alistair Somerville, IOA President

Engineering Division



The IOA Engineering Division will support you through the process to help you become one of almost 230,000 registrants that hold international professional recognition.

By Blane Judd BEng FCGI CEng FIET FCIBSE, Engineering Manager

We have included profiles of recent successful registrants on page 8. Why wait to get your profile included in a future copy of *Acoustics Bulletin* – there is no time like the present to start the application.

We have been successful in growing the number of interviewers so that we can cover a wider range of acoustics activities. Being an interviewer is a rewarding activity and it is a great way to keep your CPD up to date, as there is always something to learn and reflect on. If you have been through the process and would like the chance to give something back by becoming an interviewer, please drop us a line, we would love to hear from you.

Demonstrating your competencies

It is important to look at UK-SPEC 4 when drafting your report. The better you demonstrate the competencies the more likely you are to get to interview quickly. We still get a few candidates who, once they have paid their invoice, then ask what the next steps are. These are all clearly laid out in the guidance, so please take the time to study it as it will tell you what documents are needed, and which items need to be endorsed by your sponsors. It also explains what to do if you cannot find IOA members to act as your sponsors. The process is not intended to be iterative so please complete all the elements for your submission. The guidance that Emma Lilliman

sends out gives examples of an initial professional development report, which is used to show how you transitioned from a student to a functioning engineer, so make sure you pick good examples of how you developed in those early years.

We are always ready to comment on the content of your professional review report prior to submitting the final draft. We may ask for re-drafted versions, but to avoid an iterative process, try to include evidence that shows you have the underpinning knowledge related to the projects you have submitted. For example, if you have

selected a particular software to conduct modelling, explain why you chose it, what the shortfall are, what results you were expecting and how you validated the outputs. These are all part of the A and B competencies and will save you having to do several rewrites.

Emma has identified several applicants who once they have paid their initial fee have not gone on to make a submission. They have been approached to make sure they still want to progress and the main reason for this is because we have been asked to avoid keeping old data which we do not intend to use.

Below:
We are now interviewing using the Engineering Council UK SPEC version 4

Engineering Council

The UK Standard for Professional Engineering Competence and Commitment (UK-SPEC)

Fourth edition

Published August 2020

Neil Ferguson still helps us with academic equivalence support for those candidates who do not have recognised qualifications. You can check for yourself if your qualifications meet the required specification by visiting the Engineering Council website (<http://www.engc.org.uk/courses>) but please don't panic if your specific qualification is not listed, as we can still help you through the process using individual assessment (see later in the article).

Interviews

We hold several interview events through the year, depending on the number of candidates we have coming forward for registration. Our next set are scheduled for mid-May 2024. If you are interested in taking the next step to becoming a professionally registered engineer, contact us at acousticengineering@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.

There are two routes to registration:

The **recognised qualification** route, if you have achieved the required learning outcomes through recognised qualifications in acoustics. Qualifications which provide the required level of knowledge and understanding are for IEng and accredited Bachelor's degree and for CEng an accredited integrated Master's degree or a combination of accredited Bachelor's and Master's degrees (see table above).

The **individual assessment** route, for applicants who do not have the recognised qualifications and who will have an individual assessment of their qualifications and any other relevant learning such as: formal academic programmes, in-employment training, experiential learning and self-directed learning. In many instances, it is likely to be a combination of some or all these options.

Recognised qualifications

Incorporated Engineer (IEng) One of the following:	Chartered Engineer (CEng) One of the following:
An accredited Bachelor's or honours degree in engineering or technology	An accredited Bachelor's degree with honours in engineering or technology, plus either an appropriate Master's degree or engineering doctorate accredited by a licensee, or appropriate further learning to Master's level*
An accredited Higher National Certificate (HNC) or Higher National Diploma (HND) in engineering or technology started before September 1999	An accredited integrated MEng degree
An HNC or HND started after September 1999 (but before September 2010 in the case of the HNC) or a foundation degree in engineering or technology, plus appropriate further learning to degree level	An accredited Bachelor's degree with honours in engineering or technology started before September 1999
A National Vocational Qualification (NVQ) or Scottish Vocational Qualification (SVQ) at level 4 that has been approved by a licensee, plus appropriate further learning to degree level*	Equivalent qualifications or apprenticeships accredited or approved by a licensee, or at an equivalent level in a relevant national or international qualifications framework†
Equivalent qualifications or apprenticeships accredited or approved by a Licensee, or at an equivalent level in a relevant national or international qualifications framework†	

* See: www.engc.org.uk/ukspec4th for qualification levels and HE reference points.

† For example, UNESCO's International Standard Classification of Education (ISCED) framework.

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

For **individual assessment**, the Institute accepts several courses from certain academic centres in relevant subjects, such as audio technology, 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 Master's 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. If you need to follow the technical route, we will discuss this with you before you embark on that process.

Election process

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 ever-growing number of members holding EC registration and provide the essential peer review process that affirms that you are at the appropriate level for recognition as an Engineering Council Registered Professional Engineer. ☺

Our video explains how members can gain professional recognition and Engineering Council registration through the IOA. <https://www.ioa.org.uk/video/recognising-your-professionalism-0>

Engineering Council

successful candidates

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).

Ashley Leiper



After completing a BMus in music and sound recording (Tonmeister) at University of Surrey, Ashley started working in consultancy in 2015. He spent seven years there working on a range of projects, from small residential sites to national infrastructure projects. During that time he completed a part-time distance learning MSc in environmental acoustics from Salford University. In 2021 he joined SSE Renewables and has been working in the offshore wind energy development team on projects that can result in a broad range of acoustics considerations, including the operation of onshore electrical infrastructure, airborne noise from the offshore turbines, and the effects of underwater noise from piling on marine mammals.

Reflecting on CEng registration process, Ashley said: "I started my CEng journey about two years ago, with the naive hope of getting it wrapped up before my free time was usurped by parenthood. Much has been said in previous columns of the assistance provided by Blane and Emma. In particular, I would like to highlight their patience in responding to emails which very often pointed me back to the IOA's comprehensive guidance documents, containing the answers to many questions candidates may have.

"The guidance and time I received from my mentors was invaluable.

This included reviewing of multiple draft documents and running a mock interview, for which they had both spent a good amount of time preparing questions. I'd strongly encourage any potential candidate to make the most of what mentors can offer and try to arrange a mock interview. One of my mentors is registered as a chartered engineer through a different institute, and I found this brought a different perspective to the competencies that require demonstrating.

"The journey was ultimately rewarding, particularly, to my surprise, the interview stage. It gives candidates a unique experience to explain and defend project work to outside experts. Choose your projects wisely and go for the interesting ones, as you'll need to spend a fair bit of time thinking, writing and talking about them."

Daniel Lurcock



Daniel discovered acoustics as a career path when browsing the UCAS catalogue for interesting engineering undergraduate courses. He went on to study acoustical engineering at the University of Southampton, graduating in 2004.

Shortly after, he joined acoustics researchers and consultants at Edinburgh Napier University (RMP Acoustics), where, as well as completing the IOA's Diploma in Acoustics and Noise Control he worked on research projects

involving sound insulation of open windows, noise from air source heat pumps, and noise from outdoor concerts. He also undertook many consultancy projects, specialising in the application of computer modelling, e.g. noise mapping, building acoustics, and multichannel data acquisition.

He returned to the University of Southampton in 2011 to embark on a doctorate in the area of predicting groundborne noise and vibration in buildings. This was sponsored by Arup, who he worked closely with on some of their relevant projects.

Since joining the University of Southampton's 'ISVR Consulting' unit in 2016, he has led projects in military noise exposure and railway noise and vibration, and leads the development of the Train Noise Expert railway noise prediction software.

On attaining Chartered Engineer status, Daniel said: "Having CEng status is a proud statement to clients (and potential employers), that you are a recognised and trusted professional that they can depend on – not just for technical competence, but with the ability to see the bigger picture when it comes to leadership, sustainability, health and safety, and continuous improvement of your (and their) processes.

"The application was daunting at first but, while the Engineering Council's UK-SPEC manual merely provides the recipe for the ingredients, the support of the IOA was absolutely essential in guiding the report and interview process to give me the best demonstration of my qualities.

"I am very thankful to everyone in the Engineering Committee for their support, and would recommend that anyone considering going for CEng should get in touch with them to start the process as soon as possible!" 



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IOA EVENTS FOR 2024

Organised by London Branch
Supported by UKAN+
ARTIFICIAL INTELLIGENCE FOR ACOUSTICS
22 May 2024
London South Bank University, London

Organised by the Underwater Acoustics Group
ICUA2024
International Conference on Underwater Acoustics
17-20 June 2024
University of Bath
(See below for more details of this event)

ACOUSTICS 2024 - 50TH ANNIVERSARY CONFERENCE
12-13 September 2024
Manchester Metropolitan University

Organised by the Electroacoustics Group
REPRODUCED SOUND 2024 – 40TH ANNIVERSARY
12-14 November 2024
The Bristol Hotel, Bristol

OTHER EVENTS

IPGRC CONFERENCE
28-30 May 2024
University of Salford
<https://hub.salford.ac.uk/ipgrc-conference/>

NOISE-CON
10-12 June
USA

INTERNOISE
25-29 August
Nantes, France

PERCEPTION INFLUENCED DESIGN FOR AIRCRAFT NOISE WORKSHOP
8 September
Manchester

QUIET DRONES
9-11 September
Manchester

ISO WORKING GROUPS AND PLENARY MEETINGS
21-25 October
Berlin, Germany

For up-to-date information visit www.ioa.org.uk

International Conference in Underwater Acoustics

The Institute of Acoustics is holding the International Conference in Underwater Acoustics (ICUA2024) from **17-20 June 2024** at the University of Bath.

The University of Bath is at the forefront of international research in many fields including underwater acoustics.

The conference will take place in the Chancellors' Building on the University's main campus, Claverton Down.

The conference will have a series of oral sessions covering a broad spectrum of international underwater acoustic research, and will also include environmental acoustics, platform acoustics, acoustic



Above: Brunel's SS Great Britain (image courtesy of Brunel's SS Great Britain)



Above: Roman baths (image courtesy of Visit West)

propagation, sonar systems, and signal processing.

There will be two keynote speakers and the A B Wood Medal Lectures.

Conference social events include:

- Welcome reception
- Early Careers event
- SS Great Britain. A visit to the historic SS Great Britain in Bristol
- Reception and Conference Dinner at the Roman Baths and Pump Room.

<https://icua2024.org/>

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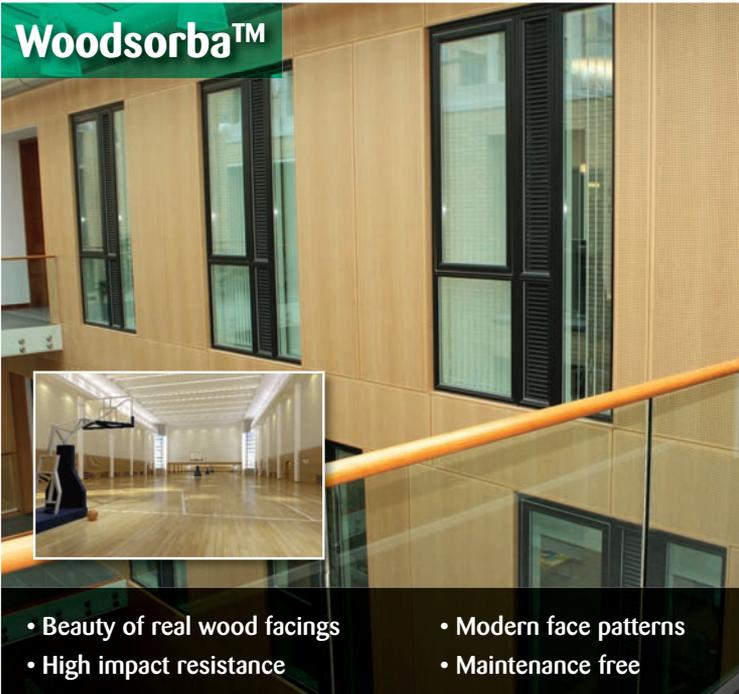
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Institute of Acoustics and Royal Academy of Engineering

The Royal Academy of Engineering (RAEng)¹ is the UK's national academy of engineering, with a responsibility to provide leadership for engineering and technology and technical leadership for wider society. It aims to serve as a progressive force that keeps humanity at the heart of engineering and delivers tangible, meaningful benefits to society².

By Angela Lamacraft, Sustainable Acoustics, Chair of the IOA EDI Working Group

As one of 20 UK professional engineering institutions (PEIs), members of the Institute of Acoustics have attended several workshops and fed into several initiatives recently:

- **Education and skills policy**
Members of the IOA Education Committee and Equity, Diversity and Inclusion (EDI) Working Group attended a discussion and Q&A event with Lord David Blunkett on education and skills policy and how the engineering community can engage with political parties in a general election year and with whoever is the new incoming government
- **Culture+**
A member of the IOA EDI Working Group attended the launch of Culture+³, an interactive EDI platform designed specifically for small and medium sized engineering organisations (more in Bridget Shield's article on the following page).
- **Harnessing the power of diverse thought**
A member of the IOA EDI Working Group attended the RAEng's annual Diversity and Inclusion Conference⁴, with a theme this year of *harnessing the power of diverse thought* (more in Jo Lacy's article on page 16).



- **National Engineering Policy Centre (NEPC)**
The NEPC⁵ is a partnership of 42 professional engineering organisations led by the RAEng and brings engineering thinking to the heart of policymaking, hopefully, creating positive impacts for society. It does this by bringing together engineers from industry and academia to provide valuable depth of expertise, which helps government navigate increasingly complex challenges.
- **Opportunity to shape EDI in NEPC:** the Chair of the EDI Working Group was interviewed as part of the NEPC initiative to understand how PEIs are attempting to improve EDI in their organisations.
- **NEPC Information Exchange:** we provided a deep dive on the work of IOA at one of the regular NEPC Information Exchange meetings, including an introduction to the IOA, how acoustics affects people, an overview of acoustics/ noise policy and regulation, how the IOA is encouraging acousticians to embed equity, diversity, inclusion and sustainability into everything they do.

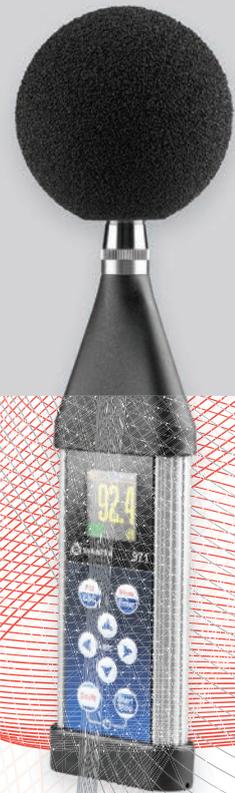
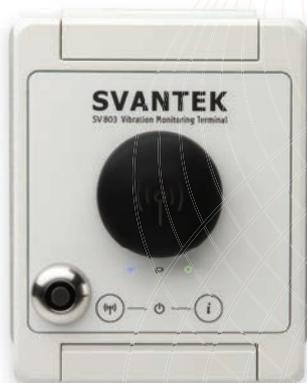
- **NEPC manifesto:**
We provided comments on the NEPC manifesto, which uses systems approaches and long-term solutions throughout, reflecting not only the scale of the challenges the UK faces, but also the scale of opportunity for people across the UK if we can produce better more impactful and more efficient solutions.
- **NEPC Engineers 2030 Engagement⁶:** Engineers 2030 aims to define the skills and behaviours needed to meet global challenges. Success would be a definition of what it means to be an engineer in the 21st Century, focusing on more and greater diversity of talent to enable the engineering skills to deal with the current challenges, for example, climate change and digital transformation. [P14](#)

References

- <https://raeng.org.uk/>
- Royal Academy of Engineering 'Strategy 2020 – 2025: Engineering for a sustainable society and inclusive economy',
- <https://enterprisehub.raeng.org.uk/culture-plus>
- <https://raeng.org.uk/events/2024/march/harnessing-the-power-of-diverse-thought>
- <https://nepc.raeng.org.uk/>
- <https://nepc.raeng.org.uk/policy-work/engineers-2030/engineers-2030-vision-and-principles-coon>

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 **SCAN ME**

Royal Academy of Engineering's Culture+ Initiative

In November 2023 the IOA was invited to attend the launch of a new Royal Academy of Engineering platform, Culture plus, or Culture+. The aim of this initiative is to encourage and enable small engineering companies including start-ups, scale ups and SMEs to introduce a diverse and inclusive culture into their business. Culture+ could therefore be helpful to many of the smaller acoustic companies looking to increase the diversity of their workforce and to create a more inclusive and diverse culture in general.

By Bridget Shield MBE, member of the IOA EDI Working Group

Culture+ has been developed by the Royal Academy of Engineering in partnership with The Honeycomb Works and more information is available on the RAEng website at <https://enterprisehub.raeng.org.uk/culture-plus>.

At the launch the new platform and its aims were introduced and discussed in a series of talks, panel discussions and workshops, the benefits of a diverse and inclusive work environment being emphasised. In short, diversity and inclusion are enablers to success: diverse teams lead to greater success, productivity and economy, and to better design. Furthermore, it can be difficult to retain staff if there is not an inclusive culture in a company.

Bringing different perspectives

It is particularly important that decision making networks within companies and institutions are diverse. Often a very narrow group of people in senior positions hold all the power and this will be reflected in decisions that are made. A diverse group has different perspectives, and people within a more diverse group are more likely to share their opinions.

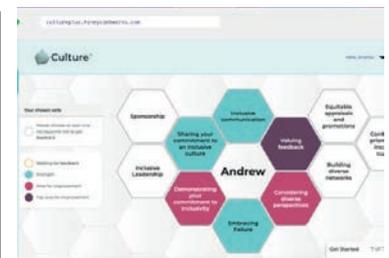
It is estimated that it takes 25% of a group to change its culture. This becomes more difficult as a company grows, particularly if growth is rapid and managers may not have experience of managing in

a diverse and inclusive workplace. Suggestions for improving the diversity within a company include the following:

- thinking about where jobs are advertised so that the recruitment pool can be as wide as possible;
- thinking about other companies that your company has dealings with – are they inclusive?
- challenging your own assumptions in your own company;
- always having balanced panels when making decisions; and
- challenging yourself to be more open and vulnerable.

The importance of monitoring diversity and inclusion was repeatedly emphasised, so ideally data collection will start as early

Right: Royal Academy of Engineering's Culture+ example of cells for feedback



as possible. Companies should promote the fact that they are diverse and inclusive to encourage others to follow suit.

The challenges and solutions for companies of different sizes were discussed in round table workshops, and some results are presented in the table below.

Support and advice on developing a diverse culture is available from the Royal Academy of Engineering, with Culture+ providing many useful training modules. [P16](#)

No of employees	Challenges	What to do
1-3	Everyone knows each other	Create intentional plan
	Affinity bias	Actively gather diverse perspectives
	Lack of diverse perspectives	
4-10	Less social familiarity	Focus on inclusive recruitment
	Fast period of recruitment and growth	Impact measurement: how are people behaving and feeling
	Need for structure – policies and processes	Introduce structures and policies and publicise
11-25	Managers with little or no training	Support managers
	Need to focus on retention through clear, equitable progression opportunities	Build structures for equitable appraisals, promotion and progression Get serious about impact measurement e.g. gender/ethnicity, pay gaps
26+	Maintain shared understanding of culture	Properly resource commitment to culture e.g. have person to do it
	Publicly share commitment to inclusive culture	Position your company as an industry leader (leading to broader impact – e.g. mentoring, funding)

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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- Swiss Re
- Mobil Exxon HQ
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Royal Academy of Engineering Diversity And Inclusion Conference 2024 'Harnessing the Power of Diverse Thought'

I was lucky to remotely attend the Royal Academy of Engineering's Annual Diversity and Inclusion Conference on 6 March 2024. This year's theme was 'Harnessing the power of diverse thought' and featured a variety of speakers both presenting and taking questions, as well as discussions both in-person and online using breakout rooms.

*By Jo Lacy MSc, BEng (Hons), MIOA,
Miller Goodall, member of the IOA EDI Working Group*

Rosa Morgan-Baker hosted the day and introduced the welcome speaker, Joanna Whiteman and keynote speaker, Dr Francesca Happé CBE. The conference included a live sign-language interpreter and the option of closed captions for those who wanted them online.

Dr Francesca Happé discussed diversity of thought, looking primarily at autism and the autistic mind. Neurodiversity was discussed more generally: what it can be, how it can present and ways to support individuals in the workplace. It was also highlighted that society at large is neurodiverse – there is diversity of thought between every single person, but the term is usually applied to those who think differently to the 'societal average'.

Panel discussions

This was followed by a fantastic panel discussion chaired by Luke Logan, exploring cognitive diversity, and featuring Dr Francesca Happé, Robert Mitchell, Rosie Brighty and Moji Banjo. This group collectively replied to audience questions such as how to address the issue

of letting go of neurotypical expectations to get the best out of employees and they provided some examples of accommodations for neurodiversity in the workplace.

Dame Sue Gray DBE hosted a discussion on breaking bias and building understanding. This panel featured Pareisse Wilson, Neil Smith, Natasha Whitehurst, and Lesley Lawrenson. The questions faced by this panel were especially challenging and included "How do you create habitual inclusive behaviours?" and "How do we make leaders not just see EDI work as a box ticking exercise?"

These panel discussions were then taken by the tables and the online breakout rooms to specifically consider the practical applications of what had been discussed. Answers from each table were then shared with the conference, including a conference representative summarising each of the online discussions of the same questions.

Innovation and positive outcomes

Three short form presentations on the topic of innovation and positive outcomes were delivered by Andrew Aylesbury, Martin Scragg

and Dr Elizabeth Ratcliffe looking at electric vehicle charging systems, different thinking in project management and designing student-led support groups in university respectively. This was followed by another panel discussion, led this time by Aleida Rios, which again faced some challenging questions. "How do you manage the risk of 'diversity tax' on voluntary employee representation group members?" and "How do you manage projects going bad without losing investment/support for the inclusion/innovation you're trying to achieve?"

Larissa Suzuki delivered the closing remarks and summarised some of the most inspirational quotes from the day, including: "Neurotypical digital meeting fatigue is similar to neurodivergent face-to-face interaction fatigue." Working with a diverse group of people should be a process of translation between equal but different minds." A final quote from the day, that we should all take note of is this: **"When we design well for people of ALL abilities, we design well for EVERYONE."**

When designing schools for example, acoustic consultants automatically consider designing for all abilities – all spaces have reverberation targets to aid speech intelligibility, noise ingress is controlled to limit distraction and disruption, partitions control noise egress from loud spaces to more sensitive ones. Some aspects of acoustics are great at inclusivity with respect to neurodivergence and I would like to see us continue to improve our industry and to be more inclusive in all areas of our work. 🌐

Below:
First panel discussion



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Listen and learn

In this article Mat Tuora describes how he has been encouraging school students with learning difficulties consider the sounds they hear around them at school and how they might be impacted by them.



I was incredibly impressed with the level of understanding and questions that were being raised throughout the walk. Although not part of the original lesson plan, I decided to do the music box demo at the end of the lesson. I asked how we can make it quieter, and the first answer was to pick it up! Indeed one of the best ways to remove the reradiated sound through the table and an excellent answer.

Work placement

Throughout my time working with the school I have experienced an array of polite and personable students, with a range of interests and talents. In my opinion, it truly is a shame that many of these students currently don't have access to apprenticeship pathways.

I am delighted to say that the company I work for has offered a work experience placement to a suitable student at the school, and I would love to take this opportunity to encourage every company reading this to actively engage with their local SEN school, and hopefully to do the same.

Project Reverb volunteers

For the past few years, IOA has been working on STEM projects for schools and is planning something very ambitious for Science Week 2025. We would like to get as many acousticians as possible to do STEM outreach at a local school during the week in March. The STEM Committee will provide lesson plans, handout materials and will support those volunteers looking to become STEM ambassadors. The Committee is also looking for reviewers, creatives and organisers. 🗨️

Over the past year, I have been involved as a careers enterprise advisor at the **Ashley School Academy Trust in Lowestoft**. The school accommodates students with moderate to complex learning difficulties from Year three through to Year 11. The role involves supporting the transition worker responsible for the careers programme by finding opportunities for the students in different industries, ideally, local to the area. And, importantly, not just in acoustics!

For most students across the UK in Years 10 and 11, this will be where they prepare for A Levels, college, an apprenticeship or on the job training. However, the entry requirements for many of these pathways are not always well suited to students with learning difficulties because of the primary emphasis leaning towards GCSE maths and English.

School sound walk

In March 2024, I supported a Year 8 lesson where we discussed how we perceive sound and how we can categorise it. I was particularly interested in understanding how the students felt their school sounded, and hoped that this would give me a deeper insight into how students are impacted by design choices we make as professionals.

Above:
Mat Tuora at the
Ashley School
Academy Trust,
Lowestoft

The first question raised by one of the staff members was: "Can you give examples of good and bad sounds?" One student mentioned that the corridor to the school hall had a 'bad sound'. As an acoustic consultant, this interested me and the student explained how noisy it was during lessons and how they didn't like this. Many students in the group agreed.

After further discussions and playing some examples of different sounds, we took a short sound walk around the school. The purpose was to encourage them to use their ears and try to pick up on the sounds of the area surrounding the school, but also to listen to the difference in sounds between different rooms in the school. Unfortunately, it was raining during the sound walk so the more distant environmental sounds were difficult to pick up, but this didn't stop them from finding more than just 'the sound of rain'.

When walking through the main dining hall, with an interesting 'live end/dead end' acoustic feature, one student picked up on how the reverberant field changed almost exactly as I heard it. We also explored how a small music box sounded different in each space.

Find out more about Project Reverb here (<https://vimeo.com/925921450/bf1cb2150d?share=copy>) and volunteers can sign up at <https://tinyurl.com/ProjectReverbForm> or email: stem@ioa.org.uk

First four CPD courses for members to be released June 2024

Refreshers based on the IOA Diploma content were published on the IOA website towards the end of last year and members can read up on them in the article by Keith Attenborough in May/June 2023 issue of Acoustics Bulletin. Members can also log into their account on the IOA website and check out the videos directly at <https://qrco.de/ioarefreshers> or use the QR code below.

By Professor K Attenborough, HonFIOA (IOA Education Manager)

Here is a short summary of four new CPD courses due to be released in June 2024:

CPD 1 – Measurement of outdoor sound

This course, developed by Chris Barlow and Juan Battaner-Moro from KP Acoustics Research Labs, introduces basic aspects of the measurement of environmental sound. It offers an excellent primer for new technician or graduate employees, or for those moving into a new discipline within acoustics. The course has six videos each lasting between 10 and 15 minutes, entitled *Outdoor Sound Propagation, Noise Indices, Undertaking Measurements, Examples of Measurement Scenarios, Data Management and Collection and Uncertainty in Measurement*.

CPD 2 – School and healthcare acoustics

This course, also developed by Chris Barlow and Juan Battaner-Moro of KP Acoustics Research Labs, is aimed at those working in acoustics and related fields, particularly those with some experience in building acoustics, who wish to gain or refresh their knowledge of acoustics for schools and healthcare settings. The course looks at the impacts of acoustic design (or lack of) in both settings, and the challenges faced in terms of both controlling noise and optimising the acoustic environment. The four videos, each of around 15 minutes duration, are entitled *Principles of Acoustics*

for Schools, Acoustical Issues in Schools, Acoustical Performance Standards for Schools, Healthcare Acoustics and Healthcare Performance Standards.

CPD 3 – Sustainability

This course, developed by Peter Rogers and colleagues at Sustainable Acoustics, starts with the *UNEP Frontier Report* and explains how sustainability and acoustics fit together. It describes how companies involved with acoustics can increase their direct and indirect impacts by achieving carbon neutrality and delivering regenerative designs. There is a single video covering: *What is sustainability? How acoustics fits in to a sustainable future, how we can help to tackle climate change and the 'five Ps' of acoustics for sustainability*. This CPD should be of value to every acoustician wishing to remain informed and relevant in the context of a sustainable future.

CPD 4 – Gym acoustics

This CPD, developed by Sustainable Acoustics and presented by Sebastian Woodhams of Sustainable Acoustics and the Gym Acoustics Working Group, is related to the second ProPG (Professional Practice Guidance) published by the IOA aimed at responding to problems caused by the common practice of placing gyms in lightweight buildings as part of change of uses to accommodate the trend for bringing health-enhancing businesses

close to where people live. Its single video introduces the newly released *Gym Acoustics Guidance*, and covers *Criteria and Good Practice, Testing and Methodology, Prediction Methodology, Specification of Mitigation and Guidance for Developers*.

An e-Learning course on 'Why do CPD?' along with more CPD courses are in the pipeline. IOA members will be canvassed for suggestions for further possible topics to develop in future. If you have suggestions for CPD course topics, please send them to education@ioa.org.uk

Potentially, these courses will be made available to non-members. However, non-members will need to pay a fee to gain access. If assessment and certification components of these CPDs are developed, there may be a small charge for obtaining one's certificate even for members. Nevertheless, IOA members will be able to enjoy free access to all CPD course content on the IOA website. ☺

Right:
Scan the QR code for more information on the IOA refresher courses



IOA primary school art competition 2023

Each year the IOA runs an art competition for children aged between seven and 11. Last year children had to produce a hand-made drawing, picture, patchwork, collage or similar, to illustrate a sound they don't like to hear and an idea for how to improve it. The prize for the competition is £25 for each participant and £500 and an engraved trophy for the school.

By June McClung, Edinburgh Airport

St Mary's Primary School in Largs, Scotland were the winners; the judges were blown away by the creativity of the art, the thoughtfulness of the sounds and the compassion for their friends.

The children worked hard on their entry and presented a thoughtful and intuitive piece of artwork that was well thought through and highlighted their appreciation of how noise can affect mood, learning and social interaction. I was very happy to present their prize on behalf of the IOA.

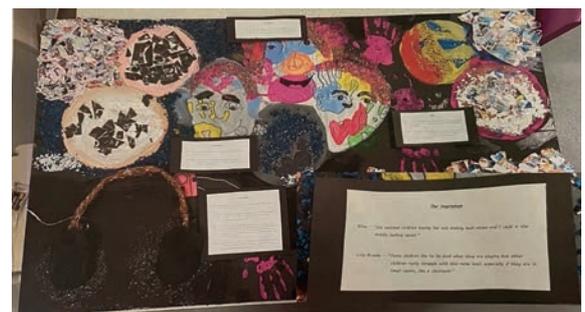
As well as awarding the prize, I was delighted to talk to around 100 pupils about the 'world of work', my job at Edinburgh Airport,

and how noise is monitored and managed. We viewed and chatted about Edinburgh Airport's Noise Lab and in what way they can use this to access lots of noise related material and data, and how my role relates to the science, technology, engineering and mathematics; subjects they are currently studying.

The children and teachers were thrilled to have not only won the competition, but to have the opportunity to show their prizes off to the rest of the school, their award will sit proudly on display in the entry hall to the school for all to see. The children are currently making plans on how they can spend their £25 each wisely.

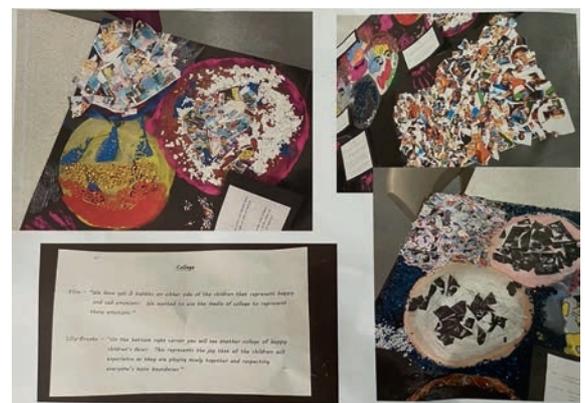


Above: Pupils at St Mary's Primary School receiving their IOA art competition prize



The children painted this board with black point and then began to sketch their ideas onto the board. They enjoy brainstorming and sketching ideas together with chalk because they could easily be wiped away and replaced with something else. They soon agreed on the inspiration for their art work.

Above: St Mary's Primary School thoughtful and intuitive entry



Above: The children's collage represents 'happy and sad' emotions

2024 competition

This year's competition asks 'Where sounds best?' and encourages children to think about somewhere with sounds they like. Children are asked to produce an artwork to illustrate what they like about the place and the sounds.

The deadline is 30 June 2024 and more information can be found at <https://www.ioa.org.uk/news/where-sounds-best-ioa-primary-schools-competition-2024>. ©

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The Art Of Being a Consultant conference

This year's Art Of Being A Consultant conference was held at the National Oceanography Centre, Southampton on 21 March and was followed by the Art Of Being An Acoustician conference arranged by UKAN+ the following day. It was great to have support from the ANC's Future Acousticians Group at the conferences.

By Josie Nixon, Chair of the IOA Early Careers Group



Above:
Presenters at Art of Being a Consultant:
(Back row):
Mike Hewitt,
Ed Clarke,
Alistair Sommerville,
Stephen Turner
(Middle row):
Josie Nixon,
Angela Lamacraft,
Robert Adnitt,
Russell Richardson,
Daniela Felipe,
Linda Canty,
Paul Shields
(Front): David Watts

This year's 'Art of Being A' marked 20 years since the first conference was held. The event has developed over the past 20 years, and now travels between London, Southampton and Manchester.

The day started with David Watts giving his fantastic presentation where he likens 'What is acoustics consultancy' to baking a cake (see the finished item in the photo!). Daniela Felipe spoke on negotiating contracts and Russell Richardson provided a session called *Doing the Jon*. Mike Hewitt spoke on working with teams and Angela Lamacraft presented on equity, diversity and inclusion within the IOA.

Stephen Turner spoke on writing reports and had everyone thinking about our use of language.

Ed Clarke then discussed quality issues. Robert Adnitt provided an interactive presentation on the *Ethics of consultancy* and Paul Shield finished with CPD – *why it matters*.

The event was well attended by students and acousticians starting out their careers, all of who seemed to enjoy the day. The delegates asked interesting questions, and got involved in the presentations, discussions and networking.

Thank you to all the speakers who presented at the event and to Linda for organising such a successful event.

Keep your eyes open for the 2025 event in Manchester. It really is a very useful day for anyone starting out their careers or wanting a refresher.

Other recent activity

BS8233: 2014 – read through

Aaron Tomlinson, from SLR consulting and the ECG South West Rep lead us on a read through of BS8233: 2014 in March. We read through to the beginning of Section 6 and have plans to continue reading through the rest soon. The read through allows for a refresher on the commonly used standard and for sections of the standard that are less visited to be considered.

We will be considering read throughs of other standards, so please let us know what you feel needs tackling at earlycareers@ioa.org.uk

Becoming an expert witness

The IOA Central Branch and the Early Careers Group held a well-attended hybrid in-person/online joint meeting in March, on becoming an expert witness.

By Aaron Tomlinson

Barrister and expert witness trainer, Nick Deal of Bond Solon, was the speaker and did a fantastic job of debunking the misconceptions that many in their early careers may think about the role of expert witnesses:

- Your duty, despite being paid by your client, is to the inspector/judge/decision-maker in the case and it begins upon appointment, not the moment you step into the court room or witness box.
- To be an expert witness, you just need relevant experience in the field/topic in question. However, it is your responsibility to ensure

that you do not stray outside of the bounds of your professional competencies. Being very clear about the areas of your expertise in any written representations can help to focus the attention of decision-makers as to your relevance to a case.

- In case law a judge found that an expert witness is someone who can be instructed to provide evidence that will allow the court to understand specific issues. i.e. the judge, inspector, or decision-maker may not be an expert in acoustics, so will allow the appointment of an expert to present evidence that helps them to understand specific acoustics-related issues.

If you would like to present at a webinar, or have a topic suggestion please get in touch at earlycareers@ioa.org.uk

The ECG is open to all members of the IOA 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>

You can watch the recording of the ECG expert witness session at: <https://www.ioa.org.uk/video/becoming-expert-witness>

Make sure you have registered as an ECG to find out about all upcoming webinars and events.

IOA Student Representative Group

The IOA Student Representative Group is a new sub-committee dedicated to encouraging greater engagement between university students and the wider UK acoustics community.

By George Mackenzie and Ellen Crockett

The programme is open to any university student studying acoustics, or in an acoustics-related field, who is keen to represent their cohort and have their voices heard at the IOA.

Engaging undergraduate students in professional development

A recent collaborative IOA and UKAN+ event titled **Getting Involved with the IOA and UKAN+**, organised jointly by two IOA student representatives, George Mackenzie and Ellen Crockett, aimed to engage undergraduate students with professional development events and future career opportunities within the field of acoustics.

Career paths

One of the key themes of the event was the exploration of future career paths in acoustics with industry speakers highlighting the diverse opportunities

(Tomasz Galikowski, Bickerdike Allen, and James Evans, WSP). Attendees gained valuable insights into potential career trajectories and the skills required to succeed.

Postgraduate research was another focal point of the event, with an exciting presentation by ECG Committee member, Zachary Simcox, on his industry-funded PhD in blast noise control.

Undergraduate student, Adam Cavanagh, shared strategies for tackling final year projects and drawing from personal experiences, the presentation provided practical guidance and support for students embarking on their own future research projects.

The event was a resounding success and following the formal proceedings, many participants continued the discussions at a local pub, further strengthening connections within the acoustics community.

Professional development

This collaborative event exemplifies a commitment to promoting professional development and fostering a vibrant community of acoustics enthusiasts. By providing valuable experience, insights, and networking opportunities, such events play a crucial role in inspiring and empowering the next generation of acoustics professionals. The Student Representative sub-committee hopes this type of event can be replicated annually, engaging students at universities throughout the UK.

Get in touch

If you are interested in participating, wish to join the sub-committee or simply want more information, please contact Josie Nixon or Alec Korchev at earlycareers@ioa.org.uk 



School planning application granted – with conditions

In this article, Dani Fiumicelli runs through several substantive issues relating to planning policy and guidance in England regarding noise, that were examined in the judicial review at the High Court in the case of *Cook & Anor v Royal Borough of Kensington and Chelsea* [2024] EWHC 42 (Admin) in a decision dated 16 January 2024.

By Dani Fiumicelli

Two residents challenged the granting of planning permission for a site to be used as a school for children aged four to 11 years old.

Both claimants live near the site and objected to the planning application due to fears that noise from the school's playgrounds would affect the enjoyment of their properties.

The school's application was supported by a professional

acoustic report that concluded noise levels were generally below an identified Significant Observed Adverse Effect Level (SOAEL) guideline for all neighbouring properties except for one where the predicted noise levels exceeded the identified SOAEL guideline. However, the report said it was reasonably practicable to mitigate the level of noise at the property by providing acoustic glazing.

The local EHO expressed concerns regarding noise and a later report from a different acoustic consultant commissioned by one of the claimants disagreed with the initial consultant and recommended permission be refused due to the noise exceeding SOAEL.

In a report to the council's planning committee, the planning officer concluded that considering proposed noise mitigation [P26](#)



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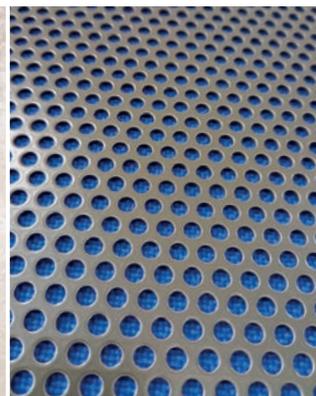
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and management measures, the level of noise and disturbance to neighbours would be *'reasonably minimised and mitigated'*, and the harm caused by noise would be outweighed by the societal benefits of provision of the school.

The officer's recommendations were accepted, and the planning committee approved the planning application with conditions requiring noise mitigation and management measures.

Planning application approved

The court dismissed the challenge to the granting of planning permission and, as part of the decision, the judge provides a review of national and local planning policy and guidance, which highlights several cogent points, including the following:

- There is a need to integrate consideration of the economic and social benefit of the activity or policy under examination with proper consideration of the adverse environmental effects, including the impact of noise on health and quality of life. This should avoid noise being treated in isolation in any particular situation, i.e. not focusing solely on the noise impact without taking into account other related factors (Noise Policy Statement for England (NPSE)).
- The first noise policy aim is concerned with avoiding significant adverse impacts, whilst also taking into account the guiding principles of sustainable development. The second noise policy aim refers to the situation where the impact lies somewhere between LOAEL and SOAEL. It requires that all reasonable steps should be taken to mitigate and minimise adverse effects on health and quality of life but it does not mean that such adverse effects cannot occur (NPSE).
- In considering the planning officer's advice, in their report and at the planning committee meeting, this should not *'not to be read with undue rigour, but with reasonable benevolence'* and should not be subjected to *'hypercritical scrutiny'* and *'laboriously dissected in an effort to find fault'*.
- On a fair and benevolent reading, the planning officer gave careful consideration to the EHO's advice, but ultimately, she did not accept it.
- The planning officer acknowledged that, even with mitigation, the noise impacts of the school would cause *'harm to the quality of life of neighbouring properties'*. However, she considered that this reduced level of noise, which had been reasonably minimised and mitigated, would be outweighed by the benefit of the school. Again, this was a planning judgment which she was entitled to make, and with which the planning committee agreed.
- The second part of the NPSE says that noise impact is to be minimised *'within the context of Government policy on sustainable development'*. In other words, it is not a free-standing requirement. Moreover, as paragraph 2.3 of the Noise Policy Statement points out; the statement that noise must be *'minimised'* cannot be taken in isolation or literally, because *'noise minimisation would mean no noise at all.'* Rather, the policy is to be interpreted as minimising noise as far as reasonably practicable.
- The Noise Policy Statement also makes it clear that considerations of noise do not trump everything else, because it says in terms that the relevant part of the policy does not mean that adverse effects from noise cannot occur. Furthermore, the opening part of NPPF [123] describes the noise policy as an *'aim'* rather than as a rule (in contrast, for example, to those parts of the NPPF which require decision-makers to apply a sequential test to applications for town centre uses).
- Consistently with the approach taken in the Court of Appeal decision in *R (May) v Rother DC [2015] EWCA Civ 610*, the benefits of a proposed development, as well as the noise that it generates, may be considered in the overall balance when determining a planning application. The NPSE policy aim is to consider adverse noise impacts together with the

economic and social benefit of the development that is generating the noise.

Judge's decision

In handing down her decision, Lang J said: "My conclusion is that the planning officer and the planning committee lawfully applied the relevant policies and made a series of planning judgments, evaluating the noise impacts on the claimants and other neighbours, and the likely effect of the mitigating measures, and balancing them against the benefits of the school."

The judge said: "There was conflicting expert evidence before them, which they had to assess. The only empirical evidence before the council which set out predicted noise levels was in the [initial] report, which found SOAEL at only one property.

"The claimants clearly disagree with the planning judgments that the council made, but in my judgment, they have not been able to establish any error of law in the council's decision."

The case highlights that although acoustics are typically described in precisely quantified decibel-based parameters, policy requires that whilst the significant adverse effects of noise should be avoided and the lesser adverse effects mitigated and minimised, these aims should be balanced with the benefits of the noise generating proposal. Such a process is a qualitative judgement and decision makers are not fettered in what they may decide, provided rational reasoning which considers policy is applied in the circumstances of each case.

The decision can be read in full at [https://www.bailii.org/cgi-bin/format.cgi?doc=/ew/cases/EWHC/Admin/2024/42.html&query=\(%22noise%22\)](https://www.bailii.org/cgi-bin/format.cgi?doc=/ew/cases/EWHC/Admin/2024/42.html&query=(%22noise%22)) ©



Author:
Dani Fiumicelli

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Acoustic fish deflection systems and nuclear power station intakes

Acoustic fish deflection (AFD) systems are not new; they have been installed and in operation for more than 30 years. They originate from the desire in the 1980s to build a tidal barrage across the River Severn, which has the second highest tidal range in the world.

By Dr David R Lambert, MD at Fish Guidance Systems

It was apparent at that time that traditional physical screens would not be suitable for screening the fish from the intakes and so the Central Electricity Generating Board, the nationalised power generating company at that time, carried out research into fish hearing that led into the development of the first AFD systems.

This continued after the privatisation of the power industry and one of the first AFD systems was installed at Doel Nuclear Power Plant in 1996, which is still in operation today.

Hearing ability of fish

The system was independently assessed by a local university and the results demonstrated that more

than 90% of the key fish species (herring and sprat) were deflected from the intake and more than 80% of all fish species were deterred from entering.

The deflection efficiency of a system is dependent upon several factors, including the hearing ability of fish. The audible spectrum in most fish lies somewhere between 10 Hz and 3 KHz, although some [P30](#)

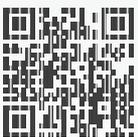
Below:
AFD system on
the intake of Doel
Nuclear Power Plant



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www.head-acoustics.com   



The swimming speed of the fish and their ability to move away from an intake also needs to be considered when designing an AFD for an intake. While some intakes are still designed with very high intake velocities, approaching 2m/s, with the inevitable consequence that any fish which approach the intake are sucked in with no chance of escaping the flow, the Environment Agency’s best practice guide for the screening of intakes recommends the maximum intake velocity should be 0.3m/s.

The guide recommends that AFD systems are installed on estuarine intakes in order to provide a cue for fish of approaching danger, enabling them to orientate themselves and swim away from an intake. This is especially useful in an estuarine environment where there may be zero visibility due to high turbidity.

Recovery and return

It also recommends that the AFD is accompanied by a fish recovery and return system, located on the drum screens, so any fish which are drawn into an intake can be washed off the screens and safely returned to the sea. In this way, the best practice is based upon a two stage approach. The first stage is an AFD at the end of the intake, which deflects the fragile fish who respond very well to the acoustic signal, but will be killed by the second stage. The second stage is the accompanying fish recovery and return system, which is able to recover the fish that are less attuned to the AFD but [P32](#)

clupeid fish are known to sense ultrasound frequencies. Sound can be detected by fish as a vibration of the water (particle velocity), or as a change in pressure (sound pressure). Fish detect sound via the lateral line and inner ear, as both detect low frequency vibrations. However, the lateral line can only detect vibration from sources within a few body lengths of the fish; since they must be close to a sound before they sense the vibration, acoustic systems cannot rely on the lateral line to deflect fish from an intake.

In most teleost (bony) fish, the inner ear is connected to a swim bladder, which is used to maintain buoyancy. This is susceptible to changes in pressure and consequently the inner ear is able to detect sound pressure via the swim bladder. A fish’s ability to sense sound pressure is dependent on the connection between the inner ear and swim bladder and it is possible to divide fish into three groups to define their sensitivity to sound. The effectiveness of an AFD system differs between these groups accordingly.

- **Highly sensitive to sound** – these are fish where the inner ear and swim bladder are closely connected. These fish are known as ‘hearing specialists’ and examples include clupeids (e.g. herring and sprat), as well as cyprinids (carp and others). The clupeids are very sensitive to handling and are typically described as ‘fragile fish’.

Above: AFD system installed to deflect salmon smolt in the Sacramento River, USA

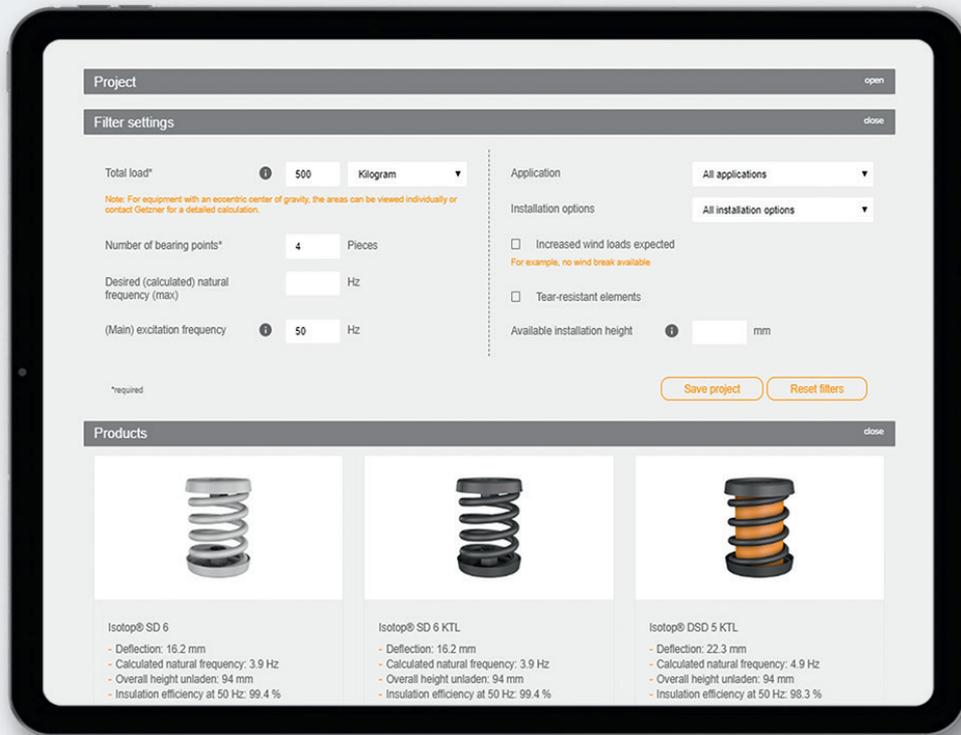
- **Moderately sensitive to sound** – these fish have a swim bladder, but lack a special connection between that and the inner ear. These fish include salmonids (salmon and sea trout) and whiting species (such as cod).
- **Low sensitivity to sound** – these fish don’t have a swim bladder, for example flat fish and cartilaginous fish (sharks and rays).

AFD design

The deflection efficiency of an AFD system is also dependent on other factors, including the background noise, which can be increased when pumps or other mechanical systems are located close to an intake. For repulsion to occur, the sound level needs to be substantially above the background noise level, typically 20 dB to 40 dB above.

Right: Installation of an AFD to deter invasive carp in Kentucky, USA





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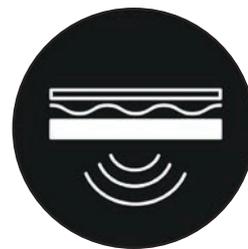
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more capable of surviving the handling of the fish return system, due to their behavioural characteristic of living in contact with the sea bed. The AFD also deflects the non-fragile fish, doubling up the protection.

The development of the new nuclear stations around the UK poses challenges to fish populations, as the intakes are expected to draw in 125 cumecs (a cumec is a measure of the rate of flow of fluid, especially through a pipeline, equal to one cubic metre per second). For example, 76% of the fish expected to be drawn into the new Sizewell C power station will be herring and sprat, which will all be killed when they enter the intake. It was successfully argued by the developer that this would be a 'sustainable loss' so, despite being considered best practice, there are no plans to install an AFD system at the new station.

Proposed AFD system at Hinkley Point C under threat

The number of herring and sprat expected to be affected by the new Hinkley Point C (HPC) nuclear power plant is less than at Sizewell C, but the presence of several protected fish species, including salmon and twaite shad, in the vicinity of the intake has meant that the conclusion of the government after a public enquiry was that an AFD system should be installed.

However HPC's developer has argued that having located the intakes more than three kilometres off shore with no incorporated means of raising an AFD system for maintenance work, this means the risks to maintenance divers will be too great and the system should not therefore be installed. This is a matter for some dispute, as over the last 30 years AFD systems have continued to be improved and updated. They now incorporate sophisticated electronic systems, providing real time diagnostic and monitoring system, with the ability to control systems anywhere around the world.

More recently, 100% redundancy for components¹ have been developed along with active pressure compensation systems



Above: Maintenance of an AFD system

which monitor the internal pressure within the underwater sound projector, in comparison to the external pressure, continually adjusting the pressure to optimise the output of the sound projectors and increasing maintenance periods. These are ideally suited to deployment in the Bristol Channel, with its especially high tidal range.

This, accompanied by recent developments in remote operated vehicles, offers a practical option for the installation of an AFD at Hinkley. Time will tell if the environmental organisations that support this will prevail, or if the developer will be successful later this year in removing the requirement for an AFD from the Development Consent Order of the project. ©

Right: AFD system installed on power station intake, UK



About the author:

Dr David R Lambert BSc (Hons), PhD, MCIWEM C.WEM MD, Fish Guidance Systems

Dr Lambert is an environmental scientist and a Chartered Water and Environmental Manager. Over the past 25 years he has overseen the development of a number of behavioural fish deflection systems and has been responsible for the installation of more than 150 acoustic fish systems around the world.

¹ 100% redundancy refers to a second set of systems in the power and communications hub to back up the first. This means if there is a fault operators can swap the unit to use the secondary set of components, so the system keeps operating without any diver/physical swap out required.



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Credit to TP Bennett. Photo by Hufton+Crow.



OSCAR
acoustics

Nudging the nineties

This year, we celebrate the 50th anniversary of the Institute of Acoustics. So in each issue of Acoustics Bulletin during 2024, we travel back in time to see how we have progressed over the decades to become the highly topical, balanced, impartial and respected institution we are proud to be members of today. In this issue we have reached the 1990s, a decade of ambition and growth.

This is the third in our series of celebratory issues of Acoustics Bulletin to mark the IOA's 50th anniversary.

This time, we have reproduced some excerpts from the 1990's archives and we feature two more IOA Specialist Groups, the Measurement and Instrumentation Group and the Musical Acoustics Group, where authors have been brave enough to make a few predictions.

Bernard Berry, who was IOA President from 1996 to 1998, remembers some significant milestones in the IOA's history, including the beginnings of strengthening the ties with other important and significant, like-minded world organisations, as well as the growing influence of the IOA with relevant government departments.

Articles from the archives

The 1990s was the decade when we started to see colour images printed in Acoustics Bulletin – not many, but it was a start.

Quite appropriately for the archive section in this issue, a technical article published in the July 1990 issue looked back 50 years focusing on the accurate measurement of engine noise experienced by car passengers.

And an article in the July/August 1992 issue brought car noise up-to-date with a report on proposed new legislation aiming to reduce road traffic noise. Concerns were raised though over if it would be possible to 'maintain a sporty' sound character and still meet the new sound levels.

Above: The July 1990 issue looked back to the 1940s and the drive for car passenger comfort

External Vehicle Noise and Impending Legislation

(organised by the Industrial Noise Group)

London, 3 December 1992

There is a recommendation before the European Commission that vehicle drive by noise be reduced to 74 dB(A) for cars and light trucks, to take effect from October 1994. Also a standard road surface has been established by ISO and this will have to be used for all future type approval testing. This topic should therefore be of special interest to vehicle manufacturers, tyre and exhaust companies, research organisations, consultancies and acousticians involved with the measurement and limitation of engine and traffic noise.

Papers are invited on any relevant topic but particularly on the following.

Noise Legislation: Is it heading in the wrong direction? Is the test method satisfactory?

Engineering Solutions: tyre noise, exhaust systems, engine noise, intake noise, analysis equipment, special techniques

Noise Prediction: tyre noise, intake and exhaust noise, QHV 90 project

ISO Standard for Test Sites: experience and comment, TRRL 'round robin' test

Noise Quality: Is it possible to maintain a 'sporty' sound character and still meet the new levels?

The Programme Committee comprises David Bull of the Colchester Institute, David Balcombe from Lotus Engineering and John Tyler of TRRL. Papers presented at this meeting will be published in Volume 14 of the Proceedings of the Institute of Acoustics. Offers of contributions may be sent to the Institute office.

Above: July/August 1992 issue – can sporty cars still sound right?

In the last issue of Acoustics Bulletin in the 20th century (with its eye-wateringly bright blue cover and some adverts in full colour) you'd expect to read at least some predictions for the new millennium, but nothing, not even a hint of what might be in store for the industry. There was an advert on page 11 for a 'spray-on acoustic treatment' for the Millennium Dome, and that's as close as we got.



Above: The last issue of the 20th century

Recollections of a 1990s President

Bernard Berry, President from 1996 to 1998

In 1993, I was Chair of the IOA Meetings Committee and during one of the breaks in a regular Council meeting (then at Agriculture House, St Albans) Peter Wheeler asked if he could have a quiet word. He said: "How do you feel about being the next President-Elect?"

The rest, as they say, is history.

My term of office started formally in April 1996, at the IOA AGM and dinner. Looking at the picture, some might say this looks as if I am taking on a heavy burden, but in fact I was smiling and looking forward to the challenges ahead. I felt honoured then, and remain so to this day.

When writing my first President's letter for Acoustics Bulletin, I noted that it was customary for the incoming President to set out aims and objectives for the coming years. I stated my strategic objectives as:

- raising the profile of the IOA within the general scientific community in the UK and beyond; and
- developing a more systematic approach to interaction between the IOA and related professional societies within the UK, including the Institute of Physics and the British Society of Audiology.

I noted then that the IOA membership came from a diverse range of scientific and engineering

Acoustics Bulletin November / December 1999

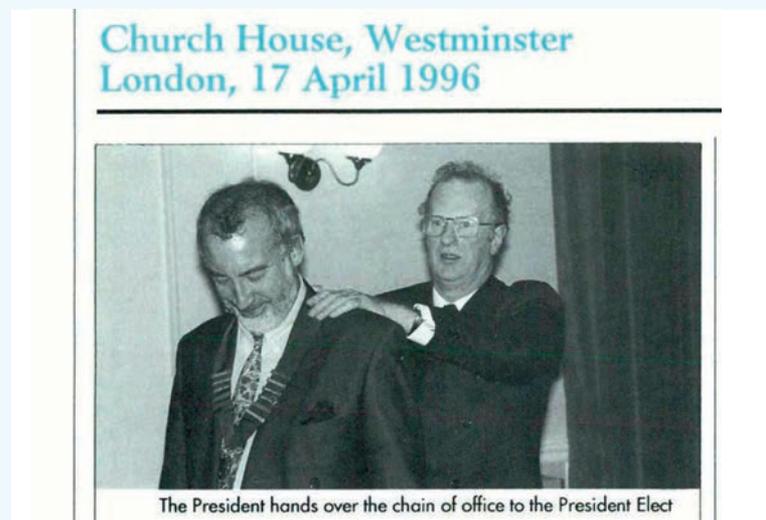
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All archived issues can be read by members at www.ioa.org.uk but be careful, once you start reading them, they become very addictive!



Left: Inter-Noise '96 session chairs, along with Bernard Berry, his wife Penny, and NPL colleague Nicole Porter

backgrounds, and worked in the subject area of acoustics, which had widespread significance in people's daily lives – from the effects of aircraft noise to the safe use of medical ultrasound.

A few months after taking office,

and after several years of effort and hard work by many, I had the opportunity to put some of these aims into practice when the Institute hosted the 25th anniversary conference of the Inter-Noise series (Inter-Noise '96 in Liverpool).

P36

A report of this event by John Tyler, was published in the September/October 1996 issue of *Acoustics Bulletin*. It gave a very vivid account of all aspects of the conference that involved a record delegate attendance of more than 1,200 and 57 technical sessions, which had been organised over many preceding months by over 120 session chairs through a 'targeted' campaign by myself, my very able technical programme manager, Nicole Porter and many others.

The conference was acknowledged by Professor William Lang, then President of INCE, as having introduced several innovative features and being an inspiration for future events. I like to think that all the hard work by so many people helped to raise the profile of the Institute, and enhanced its image and reputation.

Significant changes

1997 brought new challenges and saw several significant changes within the Institute.

The Executive Committee, including myself, the President-Elect Ian Campbell, Dr Tony Jones, Hon Secretary, and others worked hard in setting up new contracts of employment for staff at IOA HQ, and a new agreement for the coming 12 months with Cathy Mackenzie Management Services. Cathy was designated as Chief Executive/Secretary and Dr Roy Lawrence as Special Projects Coordinator.

The IOA also began to set up closer ties with the European Acoustics Association, with meetings being held with key figures in that organisation such as Professor Jens Blauert from Germany and Professor Mannell Zachariah from France. The European Commission had published its influential Green Paper on Noise Policy in late 1996, and the IOA played a key role early in 1997 in publicising this, gathering the views of members and communicating with the relevant UK government departments.

Further changes to the way the Institute was managed occurred in 1997. Cathy Mackenzie and Dr Roy Lawrence had, earlier in the year indicated that they wished to be released from their contracts by 31 October so their retirement was very reluctantly accepted. They had been vital forces in the IOA since its foundation and a full appreciation

Some 1990 significant world events

- The Persian Gulf War begins as Iraq invaded neighbouring Kuwait (2 August 1990)
- The Hubble Space Telescope was launched (24 April 1990)
- The Soviet Union dissolved and was replaced by 15 independent countries (31 December 1991)
- Mathematician Andrew Wiles announced a proof of Fermat's last theorem, one of the oldest puzzles in mathematics (23 June 1993)
- Nelson Mandela became the first Black president of South Africa (10 May 1994)
- Jeff Bezos launched Amazon (5 July 1994)
- Pixar's *Toy Story* was released in America (25 November 1995)
- J.K. Rowling published the first novel in her Harry Potter series (26 June 1997)
- Google was founded by Sergey Brin and Larry Page (4 September 1998)

written by John Tyler FIOA was published in the September/October 1996 issue of *Acoustics Bulletin*.

Roy Bratby, who had been appointed as Deputy Chief Executive in June 1997, was confirmed as Chief Executive from 1 November 1997, and so began another significant phase in our history, which is fully documented in the 2016 special publication *IOA, The First 40 Years* (page 35).

Early in 1998 I used my President's letter to note a steady growth in membership and to provide reminder of all the significant benefits of IOA membership. Later I was pleased to note an increase of 30 potential members as a result of various efforts by the Membership Committee and others. One applicant from Brazil suggested that the Institute might provide its forms in an electronic format – a reminder, if needed of just how much times have changed. I was delighted to receive a letter from the President of the Peruvian Acoustical Society in which he wrote to thank the Institute and Dr Roy Lawrence. He wrote:

'...for the wonderful contribution Acoustics Bulletin had made to members of his Society and all those involved in acoustics in his country.'

One particularly pleasant duty as President was being able to present some of the Institute medals and awards. At the 1998 Spring Conference at Cranfield, I presented the 1997 Tyndall Medal to Jim Griffiths (now a Director at Vanguardia, and still an avid Spurs fan). In particular, I still recall Jim's sense of gratitude that his kind of consultancy work was being recognised with this award.

Since the end of my term of office, in June 1998, when I handed over

the Presidency to Ian Campbell, and through further roles as Immediate Past President until the year 2000, and later as Vice President, International Relations 2001-2007, I have seen the IOA thrive and expand, and seen it take on an even more important role in modern society, in the UK and on the international scene. I like to think I played a part in this and that my initial aims and objectives were realised. Long may the Institute continue to thrive!

To get in touch with Bernard, please email him at bernard@bel-acoustics.co.uk

SPECIALIST GROUPS

As the IOA celebrates its 50th anniversary, its specialist groups have been looking back at key developments in their sectors over the past five decades and looking ahead to what the future might hold. In this first series of reviews, we look at the work within measurement and instrumentation and musical acoustics

Measurement and Instrumentation Group By John Shelton, Chair of the IOA Measurement and Instrumentation Group

Ten years ago, in *IOA, The First 40 Years*, the then Chair of the M&I Group, Richard Tyler, gave a detailed overview of the rationale of the Group and how it became to be formed in 1995. Rather than repeat the detail, I will lean heavily on Richard's words to describe the early activities of the Group, and bring things up-to-date with recent publications and events.

The group was formed in 1995, meeting a need to promote best measurement techniques, and current and new instrumentation developments across many



You can read *IOA, The First 40 Years* here
<https://bit.ly/IOAfirst40>

disciplines. The IOA itself covers a wide range of applications and interests through its other specialist groups; so the M&I Group found itself impinging on all those disciplines with the exception, perhaps, of underwater acoustics and musical acoustics.

For example, good measurements in building acoustics require particular knowledge of reverberation time determination, or performance of tapping machines; and accurate measurements of ground vibration (falling into the remit of the environmental noise group) require a knowledge of the performance of geophones, accelerometers and filter networks.

In that sense then, the M&I Group exists to educate the membership on all aspects of measurement quality and instrumentation technologies.

When the group was set up, there was a sense that instrumentation manufacturers could 'prey' on the membership, in order to promote or sell their wares by the back door. It was therefore decided to ensure that where possible, all documentation, events and Acoustics Bulletin articles would be as unbiased as possible, with no leaning towards one or other manufacturer. This is still very much the case, with the group taking an active part in sharing information for the good of the membership.

The original committee consisted of manufacturers such as Bruel & Kjaer and Cirrus Research, with representatives from Norsonic, Castle Group, Svantek and others, in fact anyone who was anyone in the business! We also had contributions from consultants, calibration laboratories and standards committees. This is still very much the case, although the nine original founding members have been whittled down to one, with the torch being passed on to new faces through retirements.

M&I Group activities

Over the years, the Group has organised many one- or two-day meetings, typically one or two per year, on subjects as wide apart as ground vibration, noise at work, building acoustics, weather effects on measurements and noise prediction. In fact, anywhere there is a need for discussing accuracy, precision and uncertainty. Where possible, we follow areas of current interest, such as areas where new guidance or standards have been released.

As well as meetings, the group produces a technical article (Instrumentation Corner) for Acoustics Bulletin in every issue, on subjects as diverse as MEMS microphones, artificial intelligence and windscreens. This forms the basis of a reference library, which is available to members through the IOA website. It's fair to say that the depth of experience on the committee is second to none on instrumentation issues.

The Group committee also has representatives from the ANC, and IOA Early Careers Group, so we can stay current with needs across the industry.

Standardisation

Another key area of interest is standardisation, and a standing item on our agenda is publication of new standards and input to standards committees, to reflect good measurement practice.

One key publication was *A Guide to Sound Level Meters* produced by the Group with contributions from Sue Dowson (late of NPL), Richard Tyler (late of AV Calibration), ex-IOA President, Ian Campbell of Campbell Associates and Ben Piper of Acoustic Sensor Networks. This formed a reference document for members to find out the key issues arising from the IEC 61672 series of standards, which have tightened up the tolerances for all [P38](#)

Memories differ

All our contributors to this section will remember events differently and as we feature *their* memories, and they might not be exactly how others remember them!

Conference & Awards 2024

Wednesday 3rd July 2024
Crowne Plaza, Birmingham
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This year's conference will cover:

- Internal acoustic environments
- Aligning acoustics with the net zero agenda
- Construction noise

More details and the booking form are available at www.theanc.co.uk/events

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Shortlisted Awards entrants will present their projects during the conference and the results will be announced at dinner.

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sound level meters, and ensures the measurement integrity across the industry.

Further guidance documents are currently in preparation.

The pandemic

As with the rest of the IOA, COVID curtailed our face-to-face activities, leading us to explore the use of Zoom/Teams for committee meetings and presentations. As a result, we developed a new theme, called *Ask the Instrumentation Expert* arranged in a 'Question Time' format, where members of the committee made themselves available to answer burning questions from IOA members on instrumentation and practices.

Chaired by Simon Bull of Castle Group, they proved to be very popular with more than 70 members joining online for a lively discussion on current issues from statistical calculations to ground vibration measurements. This idea was further developed into live events as part of the Annual Conference after lockdown ended, and it is hoped to continue this idea in the future.

M&I Group one-day meetings

Now the dust has settled, we can return to live in-person, one-day meetings, the most recent being *Good Practice in Building Acoustic Measurements* where we discussed calibration of BA equipment in the field and laboratory, along with current issues such as Document O and acoustic comfort. As part of this session, we went back to the format of taking actual measurements, where attendees could discuss real results on (e.g.) directivity of sound sources, reverberation time determination and tracking down acoustic leaks.

A full programme for the next year or so is being developed by the committee, and all the members provide valuable input, with offers of presenters and subject matter. The IOA 50th anniversary conference will once again feature *Instrumentation Corner – Live* as we continue to contribute to Acoustics Bulletin on issues as diverse as sustainability, PPV determination, sound intensity basics and CE marked noise barriers!

My thanks go as ever to the members of the committee, and we hope that our activities contribute to better measurement practice throughout the IOA membership!



Above:
The London Philharmonic Orchestra rehearsing at the Henry Wood Hall

Musical Acoustics Group

By Stephen Dance, Chair of the IOA Musical Acoustics Group

The Musical Acoustics Group (MAG) was re-constituted by Michael Wright in 2012 after some time in abeyance. The impetus came from Murray Campbell in the form of an EPSRC funded Musical Acoustics Network grant (2005-2007). In all that time, David Sharp has acted as our secretary, and never have meeting minutes been so efficiently produced. Our thoughts being at least half of acousticians are failed/ still aspiring musicians!

Annual meetings, usually in the autumn, have been held across the country and we have had excellent engagement with the early career membership. Thanks goes to Jemma Jones, Celia Diaz Brito, Sara Rubio and Connor Magennis for all their help. We have been lucky to be hosted by Henry Wood Hall, Royal Academy of Music, University of Nottingham, University of Edinburgh, and Birmingham City University.

The MAG committee were one of the first to embrace new technology. This was expedient with the interest in musical acoustics being distributed across the country. Video conferencing was the most effective solution to the effective management of the committee and this knowledge and experience put us in a good position when COVID hit.

MAG predictions

We are expecting the next 10 years to be full of exciting developments. Music is no longer purchased but 'experienced', hence the money is

now in performance, resulting in concert venues becoming enormous and very expensive, for example the Sphere in Las Vegas and the virtual ABBA show in London. Luckily, this produces new challenges for acousticians to deliver, or, in the case of Beyonce: tickets **without a view** for the August 2023 Renaissance Tour selling for £122 each.

On the creative side, AI will continue to evolve rapidly. This started with the useful smartphone app *Shazam*, which is used to identify songs. Now songs are being written using machine learning, Splice AI, and no one is sure who owns the rights! In the near future, it will be possible to voice a song artificially, so maybe Elvis was working in that Chip Shop, just a different kind of chip!

The consumption of music has recently rapidly changed to wireless technology, Apple 2017 and this is set to continue and in the far distant future, room acoustics may become a thing of the past. It would be simpler to deliver the signal using in-ear technology through electromagnetic waves, probably using a multi-cast Bluetooth platform. The signal could be tailored for the best auditory experience, which would also allow speech to be auto translated for better international communication, the UN building in your ear! Electromagnetic waves are a lot easier to deal with than sound propagation through the air, as after more than 100 years, we are still having trouble dealing with the difficulties this creates!

Technical terms

In this archive section, we use technical terms 'of the day.' These terms may not be what we use now.

If you have any IOA memories or photos you'd like to share in future 2024 issues, contact the editor, Nicky Rogers at nicky@warnersgroup.co.uk ©



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Alan Cummings, FIOA (1943-2024)

It is with deep sadness that we report the passing of Alan Cummings during his sleep early in the morning of 20 February 2024 in Church Stretton, Shropshire.

By Professor Keith Attenborough



Alan was born in Newcastle-Upon-Tyne in 1943. Despite a relatively humble home background, Alan was an extremely bright student obtaining an external London University double honours degree in physics and chemistry at Sunderland Technical College in 1965.

Subsequently Alan obtained an MSc and a PhD in building acoustics at the University of Liverpool. It was during this time that he met and married Sue (from Birkenhead) who was doing a BEd at Liverpool.

While he was at Liverpool Alan struck up a friendship with the late Ken Mulholland, and this was maintained after Ken moved to Aston University. Since I worked with Ken also as a post-doc in 1969, I was fortunate to join in with this friendship, which lasted for several years, and we shared many fun weekends at each other's homes.

Alan's first job was with the consultancy Bolt Beranek and

Newman Inc in New York. In 1968, He returned to the UK after a year to lead the Acoustics Group at the Gas Council Midlands Research Station in Solihull.

Between 1972 and 1974 Alan had a post-doctoral appointment at ISVR where he worked on combustion noise, duct acoustics and aerodynamics. Alan's appointment at ISVR was the start of a long and distinguished academic career.

In 1974, Alan was appointed as Principal Lecturer at the Polytechnic of the South Bank (now London South Bank University). Stuart Bolton, a researcher at ISVR at the same time as Alan and now a Professor at Purdue University, recalls Alan telling him that he did most of his journal paper writing on the train between Winchester and Waterloo!

USA and home brewing

Clearly their year in New York gave Alan and Sue a taste for the American way of life. In 1980 Alan returned to the USA to be

Associate Professor of Mechanical Engineering at the University of Missouri in Rolla (now Missouri University of Science and Technology) where he was awarded several grants to work on high amplitude absorption by perforated plates, low frequency noise radiation from air conditioning ducts, design methods for duct mufflers at high amplitudes, the acoustical properties of porous materials in mean flow, the acoustics of the grinding process and active noise control in ducts. He became a full professor in 1984.

One of Alan's colleagues in Missouri, Walt Eversman, has commented that Alan and Sue,

"made a big impact on Rolla in the social sense and had many friends attracted by the uniqueness of their personalities and varied interests". Stuart Bolton relates how Alan added British culture to this locality because of his enthusiasm and accomplishment as a home brewer. This impressed the locals to the extent that Alan was encouraged to contribute an article explaining his craft for the local paper which featured it on its front page. Shortly afterwards, he was visited by the local Sheriff, who explained that although, strictly, home brewing was illegal in Missouri, he didn't really care about Alan's activities, so long as there were no more front-page appearances! This story is confirmed by Jeremy Astley, currently Emeritus Professor of Computational Acoustics at ISVR and a lifelong family friend of the Cummings, who was staying with them in Rolla at the time.

Back to the UK

In 1987, Alan returned to the UK as British Aerospace Reader in Mechanical Engineering at the University of Hull. He gained

research on resonance in fully mixed burners, and two grants for SERC (now EPSRC) for research on duct acoustics, the second of which funded a six-month visiting fellowship for Jeremy.

Alan was partly responsible for enticing me to Hull to be Head of the School of Engineering (shortly thereafter to be reduced to Department of Engineering) in 1999. He helped me to gain and execute research contracts from the US Army Corps of Engineers on blast sound absorption, from the EC on the propagation of sonic booms, and from Qinetiq, on nonlinear detection of buried objects. During this period, Alan obtained further grants in his own right from DOT Link and the EU Brite-Euram project on silencer design and on nonlinear behaviour of porous materials from EPSRC. Alan had formed an acoustics research group and had installed a flow duct silencer test facility at Hull before I joined him. One outcome of our subsequent collaboration was the creation of the University of Hull Acoustics Research Centre (UHARC). This continued to operate, initially under the guidance of Professor P Rubini, then Professor S K Tang and Dr Qin Qin who worked with Alan and me as a post-doc on several projects.

While I was in Hull, Alan helped to persuade a distinguished researcher Philippe Leclaire, who, was working at Bradford with Kirill Horoshenkov, to take up a post of lecturer at Hull. Philippe is now a Professor at the University of Bourgogne. Among others who worked with Alan in Hull were Robin Wilson who is in the Architecture Department at the University of Nottingham and

Ray Kirby, now Dean of Engineering at the Royal Melbourne Institute of Technology. Ray says of Alan: "He gave me my first position on the academic ladder, and I will always be grateful for that. He taught me an awful lot and was always generous with his time and support. I will always have very fond memories of my early career working with Alan."

Away from work

Alan and Sue were incredibly kind to me and to my wife, Jean, while I was in Hull. Frequently we were invited to spend weekends at the Cummings' house, which was a small farm in Lelley, in the wilds of East Yorkshire. Entertainment at the Cummings' household always featured excellent gourmet food, the lengthy preparation of which couldn't be rushed and any comments about this preparation time resulted in pithy chastisements. There was always an excessive amount to drink and great music with Alan on guitar and Sue on 'stride' piano. On more than one occasion I remember enjoying a starter of homemade humus and warm pitta bread with a glass or two of white wine outside on their patio, and, after a wonderful meal, which often featured Alan's culinary expertise and more wine, being invited to explore their well-stocked drinks cupboard, which was large enough to crawl into, for a liqueur or whisky.

Alan's research

Alan was a versatile and thorough researcher authoring and co-authoring more than 90 papers in refereed journals making important contributions on attenuation, noise breakout and

active control in ducts, acoustical properties of porous materials and perforated plates including effects of mean flow and behaviour at high intensities. Olga Umnova, Reader in Acoustics at Salford University, who worked as a postdoc with Alan and me in Hull, tells me that she has made a point of collecting all of Alan's papers. Stuart Bolton has recalled that: "I always admired his work – very methodical and super well written".

Alan was highly regarded as a Professional Engineer and as an engineering intellectual with extensive experience in advanced engineering research and in the product design and development process in industry. As well as being a Fellow of the IOA, Alan was a Fellow of the Institute of Mechanical Engineers.

Hobbies

Alan's hobbies have featured among his scientific publications. In 1972 Alan published a paper in Applied Acoustics on the 'Acoustics of the cider bottle' and, in 1997, he had a paper published in the European Journal of Physics on 'Cycling into the wind'.

Yet another side to Alan, was the green-fingered homesteader who brought plants and eggs into the Department at Hull, much appreciated and enjoyed by other members of staff. Also, Alan and Sue gloried in coming up with unusual cross-breeds. I remember how proud they were of a 'fowl' of somewhat dubious parentage who was treated as a household pet and called 'Dymchurch'.

As well as being a great loss to acoustics internationally, Alan is a great loss as a person to all who knew him. Despite his many accomplishments and international reputation, Alan was a humble and self-effacing man and always an amusing companion. Stuart Bolton says that "in his very dry style, he was the funniest person I've ever met". I wholeheartedly agree. He will be sorely missed.

Alan took early retirement from Hull in 2005 and he and Sue moved to Shropshire.

Alan is survived by his wife Sue, who is in a care home in Shropshire, their son Ben, his wife Rowena and two grandchildren, Freyja and Felix, who live in New South Wales Australia, where Ben is a Senior Technical Officer at Southern Cross University at Lismore. ☺



Professor Brian Leonard Clarkson (1930-2023)

Professor Brian Leonard Clarkson, IOA President between 1980 and 1982 and Vice President from 1976 to 78, died peacefully in his sleep last September. The funeral took place at Holy Trinity Church, Bradford on Avon, on 26 October 2023.

Contributions to this obituary from Neil Ferguson, Mike Lower and Chris Rice



Left:
(Standing L to R): Chris Rice and John Large, (seated L to R): Brian Clarkson, Elfyn Richards and Bob White. (All were former Directors of the ISVR. Chris Rice was IOA president 1988-90, Bob White was IOA Vice President 1998-2000, and Elfyn Richards was the founder of the ISVR)

Chris Rice was IOA President between 1988 and 1990 and formally represented the Institute at the funeral together with colleagues from ISVR. He writes:

I can remember at the time when Professor Lord was President of the IOA, Professor Clarkson said that he was spending a lot of time helping him resolve the financial difficulties which the IOA was facing. This would be about 1979/80. Reading through the history of the Institute I note this was a period of great change, and his own presidency proved to be a very influential time for the future. This is because it was the start of a new consolidation and growth period when affairs were about to be heavily influenced by the Cathy MacKenzie, Geoff Leventhall and Roy Lawrence era. Anyone initiating this trio deserves an accolade as these people set, through dedication and hard work, the foundation of the Institute as we know it today. I have the distinct feeling Brian must have been behind these developments. On a personal note, and in addition to his interest in golf, I can vouch at first hand that he loved a hand of bridge and together with our wives, we spent many happy hours together. 🌐

Brian Clarkson started his career as an aeronautical engineer at the de Havilland Aircraft Company.

In 1957 he joined the Aeronautics Department at the University of Southampton as a research fellow after a PhD at Leeds, before being appointed lecturer. He transferred from aeronautics to become a founder member of the Institute of Sound & Vibration Research (ISVR), becoming Professor of Vibration Studies in 1966 and succeeding Professor Richards as Director of the ISVR in 1967.

He was Dean of Engineering from 1978 to 1980 and Deputy Vice Chancellor of the University of Southampton from 1980 to 1982. He was also President of the Institute of Acoustics from 1980 to 1982. He was Principal of the University College of, Swansea, between 1982 to 1994, and Vice-Chancellor of the University of Wales from 1987 to 1989.

He was awarded numerous honorary DSc and LLD degrees including from the Universities of Leeds (1984) Southampton (1987) and the University of Wales (1996). He received the IOA's Honorary Fellowship in 1993.

He was awarded the gold medal of the Royal Aeronautical Society in 1963 for his contributions and pioneering research on acoustic fatigue. He was elected to the Fellowship of the Royal Academy of Engineering in 1986 and in his later years he made significant contributions to experimental statistical energy analysis before retiring from Swansea in 1994. He is warmly remembered and respected by his previous colleagues for his friendly and positive encouragement, which reflected his straightforward and honest approach.

Professor Clarkson had a happy and long retirement in South Wales and he is survived by his wife Margaret, daughter Carol and sons Stephen, John, and Paul.



50th Anniversary events

TUESDAY 14 MAY 2024 – 13:00-17:00

Southern Branch – hybrid event

Railway noise and vibration control, focused on HS2
Green Park Conference Centre, Reading

TUESDAY 11 JUNE 2024 – 12:30-13:30

Environmental Sound Group

History of environmental noise management
Rupert Thornely-Taylor

THURSDAY 13 JUNE 2024 – 13:00-16:30

Scottish Branch

Presentations followed by a BE-ST factory tour
(Built Environment – Smarter Transformation)

THURSDAY 20 JUNE 2024 – 13:00-14:00

Measurement & Instrumentation Group

50th Anniversary webinar
John Shelton

WEDNESDAY 26 JUNE 2024 – 13:00-16:00

Yorkshire & North East Branch

Acoustics and soundscape of museums
Great North Museum, Newcastle

THURSDAY 4 JULY 2024 – 16:00-20:00

North West Branch

Electric go-kart racing event

THURSDAY 11 JULY 2024 – 12:30-13:30

Sound Noise and Health Group

50 years of research, policy and guidance
on the health effects of sound

WEDNESDAY 17 JULY 2024 – 12:00-17:00

Central Branch

WEDNESDAY 4 SEPTEMBER 2024

London Branch

WEDNESDAY 18 SEPTEMBER 2024

Midlands Branch

26 SEPTEMBER 2024 – 12:30-16:00

Welsh Branch

Presentation and lunch, Nick Jenkins, Natural Resources Wales
Tomos Jenkins, Acoustic Consultant

TUESDAY 15 OCTOBER 2024 – 16:00-17:00

Musical Acoustics: Instruments, People and Places
Murray Campbell, Stephen Dance and David Sharp

27 NOVEMBER 2024

50th anniversary dinner
Vintners Hall, London



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Good practice in building acoustic measurements

The IOA Measurement and Instrumentation (M&I) Group organised a one-day meeting at The Building Performance Hub in Loudwater on Tuesday 27 February to discuss and advise on performing reliable and repeatable building acoustic measurements.

By Charles Greene, NTi Audio UK and M&I Group Member

It's been a few years since the last IOA M&I Group one-day meeting where the format consisting of presentations and practical measurement sessions had proved popular. With an increasing awareness of room acoustic comfort, evolving requirements in sound insulation testing and significant recent advances in instrument technology it seemed a one-day seminar on building acoustics would probably have wide appeal, and so it proved with the 'sold out' signs being put up within a couple of weeks of the meeting announcement.

The Building Performance Hub in Loudwater provided an impressive backdrop to the days' activities with a 60-seater presentation area, a classroom for practical exercises and a transmission suite also used for practical measurement tasks along with a large open area for the six exhibitors in attendance.

I welcomed everyone to the meeting and outlined the programme of five presentations for the morning session and four practical measurement exercises in the afternoon, each of which ran concurrently allowing the delegates who had been split into four groups to rotate between the four test stations. The small groups at each test station certainly helped create a comfortable and informal setting for discussions and measurement tasks.

Right:
Charles Greene opened the meeting and chaired the morning session of presentations



Below:
John Shelton demonstrating how to do rudimentary checks on a sound source



Sound source checks – John Shelton, AcSoft

John began the series of presentations with a talk on the common types of airborne and impact sound sources. The technologies currently used in dodecahedron sound sources and their associated amplifiers along with a description of the component parts of the long serving tapping machine were all described with a sprinkling of interesting anecdotes. Guidance on how to maintain reliable and consistent operation was outlined along with a description of the process for checking the sound source stability and omnidirectional performance.

Laboratory calibration – Ian Campbell, Campbell Associates

For many, calibration is the unloved task in acoustic measurements, however, Ian Campbell gave a valuable insight into the importance of field and laboratory calibration, in undertaking precision grade noise measurements. Ian's vast experience of acoustic instrumentation was clearly evident as his talk addressed the many tests and processes that form part of a standard laboratory calibration and the legacy processes upon which many of the current practices are built.

Understanding the calibration certificate and what it conveys to the equipment owner was certainly one of the main ‘take-aways’ from Ian’s presentation

Room acoustic comfort – Shane Cryer, Ecophon

Acoustic comfort in all types of enclosed spaces has become much more appreciated by those that live, work and pray in those spaces. Shane Cryer discussed the principles of how we hear and how our environment affects how we hear with a wonderful mix of real-world examples supplemented by many and varied audio recordings to help reinforce our understanding of the principles being discussed.

When sound insulation tests fail – Blake Lucas, Acoustic Consultants Ltd

It is indeed the case that the vast majority of sound insulation tests ‘pass’ but when tests do indicate a ‘fail’ what are the most common causes for the poor sound insulation performance? Blake shared the most commonly occurring causes for airborne and impact test failures in new build properties and also conversions where there is a slightly higher fail rate than found in new buildings. Many and varied examples were presented with photos of wall ties incorrectly used, bridging of resilient bars, back-to-back sockets and many other real-world cases.

Approved Document O – James Healey, Peninsular Acoustics

The final presentation of the day was a talk from James on overheating and noise in residential buildings with particular reference to Approved Document O, which was introduced in June 2022 and the Acoustics Ventilation and Overheating (AVO) Residential Design Guide. (The joint IOA and ANC guide is a good source of advice.) The main conclusions from James’s presentation were that the submission of evidence at the design stage is strongly recommended and if measurements are required, measure outdoors for an eight-hour night, measure simultaneously at outdoor and indoor locations using traffic noise as a source, and record room, façade opening and environmental information.

Right:
The lively and informative panel discussion



Panel discussion

Delegates were encouraged to keep their questions for the panel discussion scheduled to be just before lunch when all presenters were seated facing the audience. A lively and informative discussion ensued. The discussions over-ran considerably which is not surprising as the energetic interest from the delegates and the presenters alike was extremely valuable.

Practical sessions

After lunch delegates were divided into four groups of around 14 and spent 30 minutes at each of the measurement test stations discussing the measurement type being demonstrated and trying out a measurement with the supplied equipment or, indeed, with their own sound level meters which they were encouraged to bring along.

Practical session 1: Sound source stability and directivity

The classroom test station was used to demonstrate some of the simple checks that noise measurement practitioners can do to check their noise source equipment. The session also outlined the process for stability and directivity checks on omnidirectional sound sources.

Practical session 2:

Good practice in reverberation time measurements

One side of the transmission suite was used to illustrate good practice in reverberation time measurement using both the interrupted noise method and a clapper device for the impulsive noise method. Varying amounts of absorption were then introduced into the room to measure the effect on the reverberation time.

Practical session 3:

Locating acoustically weak areas with acoustic cameras

The remaining half of the transmission suite contained a high-level pink noise source which was switched on and with delegates on the outside of the room, the door to the suite was closed and a hand-held acoustic camera was used to identify acoustically weak areas between the closed door and the door frame.

Practical session 4:

Good practice in speech intelligibility measurements

The highly prescriptive method of measuring the speech intelligibility of a TalkBox reference source using the STIPA methodology was the measurement task on the fourth test station. The importance of minimising background noise and reverberation time to maximise the speech intelligibility was briefly demonstrated

As Chair of the meeting, I would very much like to thank presenters, hosts, organisers and of course delegates for an excellent day of discussions, practical sessions and socialising.

Until next time. 🌐

Below:
The Building Performance Hub, Loudwater





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- Environmental Noise: Measurement, Prediction & Control
- Noise and Vibration Control Engineering

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Institute of Acoustics, Silbury Court, 406 Silbury Boulevard, Milton Keynes MK9 2AF



Can you make a connection between acoustics and ecology?



The Competition

Have you ever considered how different soundscapes can influence the wildlife around you? Enter our competition and use the BirdNET app to identify different species that live nearby.

This competition is for a small team of up to three students between 11 and 16 years of age.

The Prize

The winning entrant(s) will each receive a prize of £25 plus £500 for their school. The winning school will also receive an engraved crystal trophy.

Entry Deadline

The deadline for entries is 31st July 2024. Entries will be judged by a panel of experts. Age of the entrants will be taken into account. The decisions of the judging panel will be final.

Please check the IOA website for further details, terms and conditions.



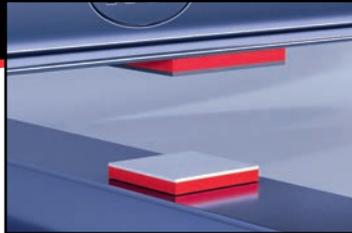
Prizes to be won!



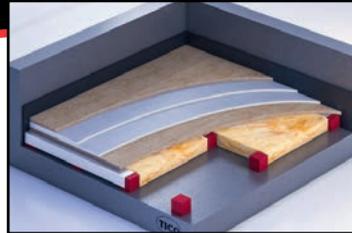
Isolation Solutions for a quieter world



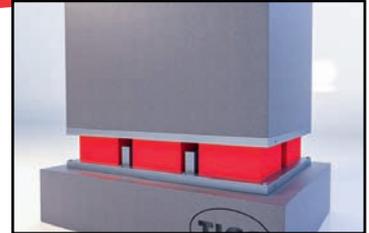
Machine Mounting



Movement Bearings



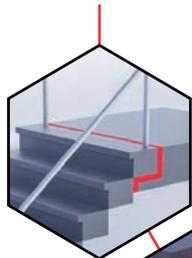
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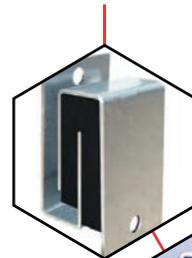
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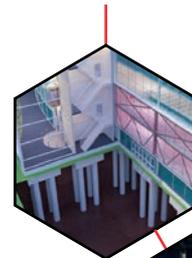
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Stairwells



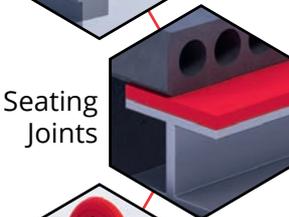
Walls



Foundation Isolation



Heavy Duty



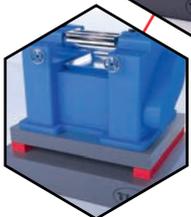
Seating Joints



Ceilings



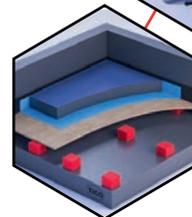
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Current parliamentary and policy news

A consultation by the Department for Levelling Up, Housing and Communities on various permitted development rights in England has kept members busy.



Proposals cover air source heat pumps, electric vehicle charging, residential development and demolition.

In our response, we recommend that robust prior approvals for noise risk assessments must be a key consideration in any changes to permitted development rights, to protect health and wellbeing alongside economic and cultural prosperity. Results of last years' roadside noise camera trials are published and in Wales considering soundscapes is now a duty for local authorities.

England: Proposed permitted development changes including ASHP

The Government in England have consulted on a range of changes to various permitted development rights (PDR) impacting planning rules. The measures include rules for air source heat pumps (ASHPs), electric vehicle (EV) charging points and home extensions. These proposals raise potential acoustic issues around noise nuisance and the agent of change. A working group of members – Jeremy Butt, Jack Harvie-Clark, James Healey, Rebecca Hogg, Antonio Torija Martinez, Esteban Olmos, Peter Rogers and Matt Torjussen – considered the proposals and submitted the IOA response.

On ASHPs, specific comments include our recommendation that ASHPs should be added to a proposal for permitting development in front gardens, as these are often the least noise sensitive façade.

We also agree that removing the blanket limit of one metre from the boundary of a neighbouring property could be reasonable – given a fixed setback distance is overly simplistic for noise management. We propose a performance-based approach allowing heat pumps to be situated closer to boundaries, if they comply with an appropriate noise criterion at nearby receptors, this aligns better with noise control practice. In addition, IOA agrees that removing the existing 0.6 cubic meter volume restraint for ASHPs would be beneficial. Larger casing provides more internal space for vibration isolation, enhanced exhaust silencing and increased fan/compressor encapsulation. It would also allow noisier units to be acoustically enclosed, enabling use in challenging locations, such as terraces, tenements and flats. IOA does not support the proposal to allow unrestricted installations of multiple ASHP units on blocks of flats through PDR alone. Installing multiple separate ASHPs requires a mechanism to assess the cumulative noise. The current MCS noise limit applies to each individual heat pump but does not explicitly address the effect when numerous units are operating simultaneously. Overall, we believe that by creating a supportive regulatory framework, the Government can harness the ingenuity of industry to deliver heat pump solutions that are both sustainable and acoustically acceptable.

We also comment that the suggested PDR amendments would have implications for local planning

authorities in terms of registering and monitoring developments. The workload may be increased by requiring prior approvals for multiple ASHPs within the curtilage of a block of flats. If the proposed changes lead to a rise in noise complaints from poorly sited or cumulatively noisy heat pump installations, local authority environmental health officers may experience an increased burden in investigating and enforcing against statutory noise nuisances. We therefore recommend that any amended PDR provides clear mechanisms for local authorities to assess and control noise impacts through tools like prior approval or standardised noise limits.

Electric vehicle charging units

For electric vehicle (EV) charging units, the IOA disagrees with proposals to allow PDR for increasing the height of EV charging upstands and for equipment housing for EV in residential car parks, without any review of potential noise impact. We recommend a considered implementation approach given public acceptance will be crucial to accelerating EV charging infrastructure growth. Permitted development that potentially allows noise nuisance from equipment installs could undermine that acceptance.

Residential extensions

We object to allowing further relaxation of planning controls for residential extensions to permit residential extensions up to adjacent non-residential properties,

given it could lead to noise nuisance for residents, and/or a residence becoming an agent of change. We also object to the proposal to allow demolition of newer buildings under PDR. Buildings can act as barriers between existing noise producing and noise-sensitive uses, therefore, the demolition of a building can potentially create noise nuisance conditions and compromise the freedom of existing businesses to operate without restrictions. Prior approval requiring a noise impact assessment by a suitably qualified acoustician would address this.

Overall, IOA recommend that robust prior approvals for noise risk assessments must be a key consideration in any changes to PDRs. Protecting existing businesses and ensuring appropriate acoustic design should be prioritised over marginal procedural streamlining. Getting this balance right is essential for promoting housing and sustainable technologies, while avoiding severe noise conflicts that harm health and wellbeing of residents and causing businesses economic harm and potentially a wider harm to cultural prosperity.

See our full response:

<https://www.ioa.org.uk/publications/response-consultations>

And the scope of the consultation here: <https://tinyurl.com/pdrscope>

Noise camera trial results

Research for the Department for Transport (DfT) into the use of noise cameras to tackle excessive noise from vehicle exhausts has been published. It is one of a suite of measures announced in the government's *Plan for Drivers*. Trials of noise cameras took place between October 2022 and February 2023, at sites selected from nominations made by local MPs in April 2022, to cover rural, suburban and urban areas known to be affected by excessively noisy vehicles. Locations in Keighley, South Gloucestershire, Great Yarmouth, and Rubery (Birmingham) were selected. In total 1,777 noise camera activations were recorded, with 4% of these considered attributable to excessively noisy vehicles, using the noise threshold identified in the research. Residents and researchers also noticed that deployment of the noise camera was

a deterrent, with drivers changing their behaviour. The project's outcomes support a noise level of 95 dB LAmax at 7.5m being used for roads with 50 mph speed limits or lower, to help inform a decision on whether enforcement action should be taken against a vehicle. A cost benefit assessment of noise camera use concluded that at least two genuine noise camera activations per day would result in a cost neutral system. The research was undertaken by the Atkins Jacobs Joint Venture (AJJV). DfT say they plan to issue guidance to local authorities setting out minimum requirements and best practice for the use of noise cameras.

Read the trial reports here:

<https://www.gov.uk/government/publications/noise-camera-technology-roadside-trial>

Read the Government announcement here:

<https://tinyurl.com/roadschemes>

Consultation: firearms sound moderators

The Home Office has consulted on removal of licensing for firearms sound moderators. These are an accessory attached to a rifle barrel to reduce audible sound when a rifle is fired by around three quarters. To date sound moderators have been controlled under section 57(1)(d) of the Firearms Act 1968, with a firearms certificate from the police required. The gun trade estimate around 12,000 sound moderators are sold each year to firearms certificate holders. In our response to the consultation, the IOA support the removal of licensing, as there are potential public health benefits in reducing the noise dose for those enjoying shooting as a sport and as part of their living. Removing the licensing obligation also has the benefit of encouraging organised shoots to reduce the impact of noise pollution to a minimum (in line with current the Noise Policy Statement for England (2010)). We consider the measure to be a reasonable offset to the risk of encouraging poaching and other illegal activities, where licensing may be less effective.

This proposal covers England, Scotland and Wales and you can read it here:

<https://tinyurl.com/soundmoderator>

Consultation: Night flights Heathrow, Gatwick, Stansted

Proposals for the next regime for night flights, for Heathrow, Gatwick and Stansted airports have been set out by the Department for Transport. A consultation sets out to confirm a decision on a night-time noise abatement objective for the three airports. This follows analysis of responses to a consultation in Spring 2023. It is proposed that the night-time noise abatement objective for the next regime should be *'To limit and where possible reduce, the adverse effects of aviation noise at night on health and quality of life, while supporting sustainable growth and recognising the importance to the UK of commercial passenger and freight services.'* Further details on the night time noise objective are in the consultation document. The next night flight regime is due to commence in October 2025.

The consultation is open until 22 May and you can access it here: <https://tinyurl.com/nightflights2025>

Wales: Soundscapes Act comes into force

The Environment (Air Quality and Soundscapes) (Wales) Act 2024 is now published, receiving royal assent on 14 February 2024. From 14 April 2024, this act places a duty on local authorities to have regard to the policies in the Noise and Soundscape plan 2023-2028 when exercising any function of a public nature that could affect soundscapes in Wales. The IOA contributed to the development of policies on soundscapes in the Act presenting written and verbal evidence. Wales remains the first UK government to recognise soundscapes in law.

See <https://www.gov.wales/noise-and-soundscape-plan-for-wales-2023-2028> and <https://www.legislation.gov.uk/asc/2024/2/section/26/enacted>



About the author: Mary Stevens supports the IOA to bring acoustics to the attention of policy-makers.

Temporary school buildings and BB93 acoustics compliance

With the risks posed by reinforced autoclaved aerated concrete (RAAC) leading to the sudden closure of many existing school buildings, headteachers and school managers have been forced to find alternative ways to accommodate students until the issue can be resolved.

By Andy Hayes, IOA Associate Member and Technical Manager at CMS Danskin Acoustics

For many, the only way to continue providing high quality teaching spaces has been to hire temporary buildings. While this may be an excellent short-term solution in principle, it is important to understand that bringing in a modular building for temporary use may still be subject to Building Regulations and planning permission requirements – particularly in relation to acoustic performance, as detailed in *Acoustic design of schools: performance standards Building Bulletin 93 (BB93)*.

Modular buildings represent an excellent turnkey solution for education when urgent building repairs are needed, with many manufacturers usually able to provide well-equipped teaching spaces that can be installed quickly and easily.

Given the scale of the RAAC issue and the complexity of remediation in many cases, schools are likely to require their temporary buildings for an extended period – perhaps several years. This has implications in respect of Building Regulation compliance.

Right: Acoustic 'art' wall panels improve acoustic conditions in classrooms (image courtesy of CMS Danskin Acoustics)



Why minimum acoustic standards apply to schools

Studies from around the world have concluded that there is a link between poor acoustic conditions inside classrooms and poor educational outcomes¹.

Classroom noise can impact on a child's learning outcomes in two ways:

1. impairing teacher-pupil communication; and
2. the child's task performance² such exposure to continuous disruptive noise can have a detrimental effect upon the learning and attainments of school children³.

1 Astolfi, A., Puglisi, G. E., Murgia, S., Minelli, G., Pellerey, F., Prato, A., & Sacco, T. (2019). Influence of Classroom Acoustics on Noise Disturbance and Well-Being for First Graders. *Frontiers in psychology*, 10, 2736

2 Klatte, M., Bergström, K., & Lachmann, T. (2013). Does noise affect learning? A short review on noise effects on cognitive performance in children. *Frontiers in Psychology*, 4, Article 578

3 Evans, G.W. and Lepore, S.J. (1993) Nonauditory effects of noise on children: a critical review. *Children's Environments*, 10(1), 31-51.

The amount of background noise pupils can be exposed to should not exceed 35dB ($L_{Aeq,30min}$) according to the World Health Organization and a reverberation time between 0.4-0.6 seconds, above which the cognitive abilities of students in schools reduces⁴.

One of the most cited negative impacts of excessive noise in schools is disengagement from the learning process. Children can become disengaged when they can't hear what is being said by teachers⁵ and that noise interferes with their ability to process language, as well as impairing concentration and reducing speech intelligibility⁶. It can also lead to an increase in incidences of 'dysfunctional behaviour', as well as elevating blood pressure, stress levels and causing disruption to sleep patterns⁷.

BB93 – what is it and why was it developed?

The Building Regulations document relating to the acoustic performance of buildings in England and Wales is Approved Document E, *Resistance to the Passage of Sound*, with one section relating specifically to schools – Part E4.

Under section E4 *Acoustic conditions in schools* of The Building Regulations 2010, Approved Document E:

(1) Each room or other space in a school building shall be designed and constructed in such a way that it has the acoustic conditions and the insulation against disturbance by noise appropriate to its intended use.

As this does not define acoustic performance explicitly, a separate document was published in 2003 (last published 2015) identified as BB93 (<https://www.gov.uk/government/publications/bb93-acoustic-design-of-schools-performance-standards>) to detail the standards that must be met.

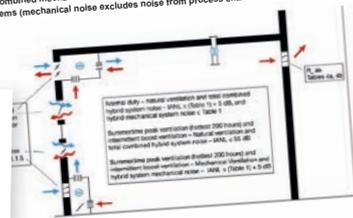
BB93 sets out the minimum performance standards for the acoustics of school buildings and describes the normal means of demonstrating compliance with the Building Regulations. While it does not apply to schools in Scotland and Northern Ireland, the general principles are often still followed to deliver appropriate acoustic comfort.

Acoustic requirements for temporary school buildings

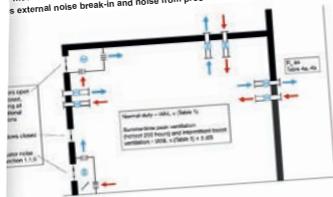
To be able to commission and install or erect a temporary building, schools may need to apply for planning permission, subject to certain parameters. And, as with permanent buildings in England and Wales, temporary school buildings that are to be used for more than 28 days must comply with BB93 and, thus, Approved Document E.

This is covered specifically in section 0.3.2 which states: *'Buildings that are in place for 28 days or less are exempt from the Building Regulations including Requirement E4... New school buildings and extensions with a site life of more than 28 days should comply with all applicable Building Regulations including Requirement E4. Many buildings in schools have only temporary planning permission, which usually lasts for two years. These buildings are subject to the Building Regulations.'* **P52**

Figure 1: combined mechanical noise and external noise break-in – natural and hybridised mode systems (mechanical noise excludes noise from process extract fans)



mechanically generated noise levels – mechanical and hybridised mode systems & external noise break-in and noise from process extract



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the design of these buildings. Part E4 does apply to sixth-form units forming part of a school.

0.3.6. When do the regulations apply?

Type of space	New build including extensions, pre-fab. buildings	Material change of use (from non-school building)	Refurbishment of existing school buildings including Material Alterations ⁸	Temporary buildings in place for up to 28 days ⁹
Schools ^{1, 2}	Building Regulation E4: applicable	Building Regulation E4: applicable	Building Regulation E4: exempt	Building Regulation E4: exempt
Admin and ancillary areas	School Premises Regulations/Independent Schools Standards: applicable	School Premises Regulations/Independent Schools Standards: applicable	School Premises Regulations/Independent Schools Standards: applicable	School Premises Regulations/Independent Schools Standards: applicable
Nursery schools ² (not within school complexes)	Building Regulation E4: exempt	Building Regulation E4: exempt	Building Regulation E4: exempt	Building Regulation E4: exempt
Colleges/sixth-form colleges	School Premises Regulations/Independent Schools Standards: applicable	School Premises Regulations/Independent Schools Standards: applicable	School Premises Regulations/Independent Schools Standards: applicable	School Premises Regulations/Independent Schools Standards: applicable
Other education	Building Regulation E4: exempt	Building Regulation E4: exempt	Building Regulation E4: exempt	Building Regulation E4: exempt
Universities	School Premises Regulations/Independent Schools Standards: not applicable	School Premises Regulations/Independent Schools Standards: not applicable	School Premises Regulations/Independent Schools Standards: not applicable	School Premises Regulations/Independent Schools Standards: not applicable
Community and adult education (within school complexes)	School Premises Regulations/Independent Schools Standards: not applicable	School Premises Regulations/Independent Schools Standards: not applicable	School Premises Regulations/Independent Schools Standards: not applicable	School Premises Regulations/Independent Schools Standards: not applicable

¹Schools includes independent schools, academies, free schools, university technical colleges, sixth-form colleges attached to schools, and nursery/community and adult education spaces within school complexes.

²School Premises Regulations apply to all schools, including community special schools and all referral units, which are treated as 'schools' in the table above.

⁹Temporary buildings are those not intended to remain in place for longer than 28 days. All buildings that remain in place longer than 28 days must comply with the Building Regulations.

12



Acoustic design of schools: performance standards

Building bulletin 93

February 2015

- Acoustical Society of America, 2010; Education Funding Agency, 2015
- Klatte M, Lachmann T, Meis M. Effects of noise and reverberation on speech perception and listening comprehension of children and adults in a classroom-like setting. *Noise Health* 2010; 12(49): 270–282
- Whitlock, J.A.T., *Acoustical Mechanisms Influencing Speech Intelligibility for Primary School Children*, Masters' Thesis, Acoustics Research Centre, University of Auckland, 2003
- Evans GW, Lercher P, Meis M, Ising H, Kofler WW. Community noise exposure and stress in children. *The Journal of the Acoustical Society of America*. 2001

Focus on addressing internal noise issues in temporary classrooms

Key to ensuring temporary buildings meet the minimum standards set out in BB93 is the acoustic performance of the external structure, including elements such as the walls, floor, ceiling and roof, as well as external windows and doors. The location of the temporary building also contributes to the acoustic conditions, so siting it next to a busy road, factory or railway track should be avoided.

One acoustics consideration, however, that often needs to be addressed after the temporary building has been installed is sound reverberation. As with permanent school buildings, temporary buildings are likely to be constructed using materials to maximise durability in-use and

minimise cleaning and maintenance requirements. These mostly hard surfaces offer very limited sound absorption, causing sounds resulting from speech, music, etc. to reflect back in to the room.

The result is a high reverberation time (or 'live' room), Reverberation time (RT) is the time required for the sound in a room to decay over a specific dynamic range, usually taken to be 60dB, when a source is suddenly interrupted⁸.

How to reduce reverberation in temporary school buildings

If reverberation and echo issues inside temporary classrooms are left unaddressed, there is the potential for the quality of teaching to suffer. This may compound the effects of disruption already resulting from having to move to an unfamiliar and potentially smaller room.

One of the easiest and quickest ways to improve the internal acoustic conditions is by using wall and ceiling mounted sound absorber panel solutions that can easily be installed to any type of space within an educational setting to reduce the amount of noise reverberating around the room. Acoustic wall panels, ceiling rafts and ceiling baffles are solutions for reducing sound reverberation resulting in lower volumes of noise and an increase in the clarity of sound providing an environment for students to thrive.

Key to achieving an effective reverberation solution is determining which types of absorbers will work best for the room, how many will be needed to meet the coverage requirements and where they should be positioned. ©



8 Allan J. Zuckerwar, in Encyclopaedia of Physical Science and Technology (Third Edition), 2003

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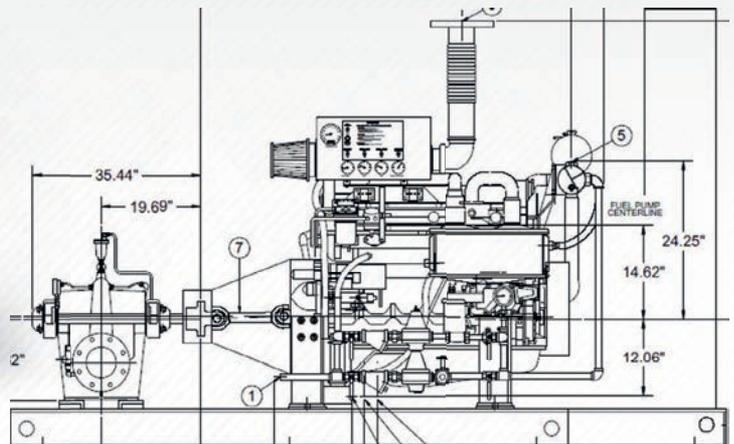


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Standardised soundwalks for managing human sonic activity in protected natural areas

Protected natural areas are famous for their natural beauty spots and tourist attractions (capable of generating significant revenue and jobs, where the former is measured in tens of billions of dollars a year in the USA only) and, at the same time, for ensuring protection of endangered landscapes and wildlife.

By *Tin Oberman and Simone Torresin*

Protected natural areas are also an essential wellbeing resource for people. But can the increase in popularity and the number of visits have an adverse effect, not only on the nature but on the visitors themselves? People chatting loudly next to a beautiful lake, out there in the wild, might be causing same level of annoyance

as the lorries and emergency vehicles' sirens do in the city. On the other hand, the positive and unique sounds can bring restoration and joy if they are not impacted by noise. National parks and other protected natural areas need a new approach to monitor and manage the impact of anthropogenic sounds and preserve positive sound environments.

Background

The first natural area in the UK that received legal protection with the aim of preserving nature and its wildlife was a private estate in Yorkshire in the 19th century (around the time when Yellowstone, the first national park in the USA was established), while the Peak District was proclaimed the first UK national park almost a century later. Since then, the International Union for Conservation of Nature has developed a range of protection levels that can be applied to valuable natural areas around the world – from nature reserves, wilderness areas, natural monuments and national parks to protected areas that allow sustainable use of resources – all of which require different management strategies and share the risk of overtourism. While natural sounds and noise occasionally get mentioned in the natural areas' management documents, those mentions provide few or no actionable points.

We visit nature to find relief from the stress induced by living in noisy urban environments. The impact of sounds generated by humans on 'the nature we visit' has been in the focus of acoustic ecology and bioacoustics. The effect of sounds generated by humans, on humans, is investigated by soundscape researchers, within a field that's providing knowledge about the effect of environmental sounds on human perception. Therefore, collecting soundscape data describing human perception of an acoustic environment of

Below:

Figure 1: A soundwalk that took place during the Silenzi in Scotland project: participants filling in the questionnaire simultaneously with binaural measurements taking place at an evaluation point in Glen Lui, Gairngorms National Park, Scotland. *Image credit: Mario Pedron, Silenzi in Quota (by permission)*



a place requires people to be present and the sound sources to be audible. Soundscape research and the related ISO 12913 standard for soundscape data collection and analysis mostly dealt with case studies in urban areas where sourcing participants is practical. Those studies relied on human understanding of an urban context. The context provided by people's interpretation of various urban settings has proven to have a large effect on the perception, often independent of the noise levels. The effect of a natural context such as wilderness remained insufficiently investigated from the aspect of the ISO 12913 series.

The project

An initiative started in the north of Italy with the aim of addressing these phenomena – Silenzi in Quota – Silence at High Altitudes – is an arts-driven collective in the Trentino province, led by the sound engineer and musician Giacomo Gozzi and photographer Mario Pedron. The initiative soon expanded into a larger movement gathering soundscape researchers and artists, with Dr Simone Torresin at University of Trento leading the research activities on the Italian side and Dr Tin Oberman at the University College London (UCL) bringing Silenzi in Quota to the UK, working together with Professor Jian Kang.

The key idea was to bring participants to an attractive natural site and ask them to complete an ISO 12913-type questionnaire while listening to the surrounding landscape in silence – in a natural context where it would be expected to find little sound and even less people. During a three to four-hour long soundwalk, the group would evaluate soundscape at around six evaluation spots. These would be curated by the research team to provide a range of ambiances, likely including parts that feature a large number of visitors and also those that could ideally provide an experience closer to pristine nature. The natural site would be within a protected natural area where a management plan exists so the message about noise issues, if detected, would be stronger. At the evaluation points, calibrated binaural measurements would be made together with 3D audio and video recordings for evidence and future use in the laboratory



Above: Figure 2: Silenzi in Quota team led by Dr Simone Torresin (in the middle, white) is getting ready for a soundscape assessment with the participants of the soundwalk at the Forcella Lavaredo viewpoint, in the Parco naturale Tre Cime, Italy, while Dr Tin Oberman, UCL is setting up the 3D audio and video measurement kit (on the right, red). Image credit: Mario Pedron, Silenzi in Quota (by permission)

experiments. Such activities are difficult to complete successfully without access to local support and knowledge so engaging with the local community is essential for each soundwalk.

The soundscape data collected during the soundwalks will be made openly accessible in due course, while pictures and the unprocessed binaural recordings are made available via the Silenzi in Quota website <https://silenziinquota.mypixieset.com/our-soundwalks/> and the researchers' Soundcloud pages respectively (<https://soundcloud.com/simone-torresin> and <https://tinyurl.com/TinOberman>

Works underway

In the past two years, the team members have completed group soundwalks in protected natural areas in the Dolomites (IT), Cairngorms (UK) and the north of Lapland (FI) and held workshops on soundscape research. At the time of writing, seven campaigns were conducted. The latest campaign took place in the Mallan Luonnopuisto, a strict natural reserve in the north of Lapland (FI) in collaboration with University of Helsinki and the Norwegian Institute for Nature Research.

This collaborative work brought together soundscape researchers with musicians, photographers and video makers to document public engagement in critical listening soundwalks. A documentary movie is being produced and is expected to

be published in early 2025. For this work, the UCL and the University of Trento teams won the John Connell Highly Commended soundscape award in October 2023. The project received support by the UK Acoustics Network Plus (via EPSRC) and UCL Global Engagement Fund (as Silenzi in Scotland) and attracted sponsorship by HEAD Acoustics GmbH and Montura.

The research results are showing that a human speech-dominated acoustic environment such as the one which would be considered neutral or pleasant in a city, in a protected natural area it is being perceived as chaotic. It is hoped that the scientific evidence collected in these campaigns will help raise awareness of soundscape quality amongst the tourists and offer new tools to the authorities managing those precious areas to monitor and manage visitors' environmental impact. 🌐

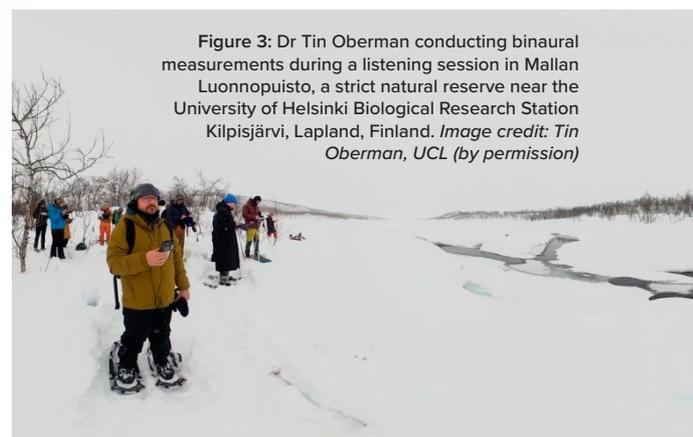


Figure 3: Dr Tin Oberman conducting binaural measurements during a listening session in Mallan Luonnopuisto, a strict natural reserve near the University of Helsinki Biological Research Station Kilpisjärvi, Lapland, Finland. Image credit: Tin Oberman, UCL (by permission)

References

Soundwalks conducted by Silenzi in Quota, <https://silenziinquota.mypixieset.com/our-soundwalks/> Soundscape Indices <https://tinyurl.com/soundscapeindices>

The Art of Being an Acoustician conference

Stephen Dance reports on the Art of Being an Acoustician conference held on 22 March 2024 at the National Oceanographic Centre.



UKAN's Early Career Specialist Interest Group supported the event which again showed how careers in acoustic seem to follow a winding path, but all provide interesting challenges.

The second Art of Being an Acoustician conference followed the 20th Art of Being a consultant conference, so this time, we could eat their cake!

The experience of senior acousticians and current practitioners were shared with new recruits. To this end presenters were invited from as broad a background as possible. I introduced the event, beginning with a description of the UK Acoustics Network (always thank the money).

Above: Peter Rogers describing the route he took to become an acoustician

'Old Hands'

The senior session, *Old Hands*, started with Phil Nelson who described his early years in acoustics. He was sponsored by Sound Attenuators and this allowed him to study engineering at the University of Southampton returning to Essex between terms to continue working. He then had a call to return to Southampton but as a lecturer – becoming a life-long academic. Phil described being an analogue researcher working on active noise control. Then years as an administrator (we'll skip over that bit) before returning to research utilising machine learning.

I followed Phil and explained that I started out as a computer scientist and mathematician. At this year's

conference, I focused on teaching, using the example of the acoustic camera and showed a video made with John Campell using an early acoustic camera to measure/record a 2013 concert at the Royal Academy of Music. This video was shown to the Diploma students one of who was from a Local Authority. The idea was taken and spun to monitor the noise from high performance cars prowling around Kensington and Chelsea. I then showed a clip from David Attenborough's *Secret World of Sound* which used a much smaller camera to show how grey owls hunt voles.

The Old Hands session was rounded out by Ken Marriott, a mathematician by education. He described small noise problems that are anything but small, mainly focused on oil and gas platforms and an oil refinery. Ken described three types of problems:

- those you had seen before;
- those that are like those you had seen before; and
- those that are new.

He then demonstrated how he solved vibro-acoustic problems, modelled sound propagation using models he had written himself, and built devices to solve diagnose problems, so he could work out where to start on the solution!

Current Acousticians session

Ed Clark of Clarke Saunders opened the, *Current Acousticians* session and described his background – he studied at ISVR in the University of Southampton then worked in consultancy before he decided he wanted to run his

own business, joining up with Alan Saunders. Ed provided an honest appraisal of the life of an acoustic consultant with plenty of examples of the highs and lows. For example, a diesel generator in the corner of a field being used to power electric delivery vans whilst Network Power organised the necessary electrical power connection. Residents complained of the low frequency noise being produced by the generator but were understanding. However, the site owner decided to erect a noise barrier out of haybales and the haybales caught fire!

Bradford Backus of Audio-3 detailed his formative years wanting to build things by going to Radio Shack to buy the bits he needed to make his own loudspeakers. Brad studied Electrical and electrical engineering at Dartmouth. His PhD was in otoacoustics and where he was taught acoustics by Dr Bose at MIT. Now an entrepreneur, he showed a video of a prototype paediatric audiometer that used music to assess the hearing of a normally unresponsive toddler.

After lunch, Peter Rogers described his beginnings as an art student before moving to work for a Local Authority. Pete then decided his future lay in acoustics and he took the IOA Diploma route. He then worked in consultancy before setting up his own business, Sustainable Acoustics. He combined this with multiple voluntary roles at the IOA mainly around the Parliamentary Liaison Group and the Sustainability Working Group.

Acoustics research

After lunch I covered the diverse nature of acoustics research evidenced by the 25 (out of 6,781) Research Excellence Framework Impact Case Studies, 2014-2020. This demonstrated that acoustics has been funded by all but one of the UK Research Councils. I described four large grant successes, all occurred in early 2024. These will require 80 new PhD students in 2025, so acoustics research is expanding rapidly!

New to Acoustics session

The *New to Acoustics* session started with Alec Korchev describing his first experience of acoustics, as part of his visual arts degree in Vancouver. He went on to



Above: Alec Korchev presenting at the New to Acoustics session

enthusiastically detail his studies at London South Bank University, first on the Masters programme, before joining as a part-time PhD student. He described his research into wind induced noise in tall buildings as a much experienced but under-reported area of acoustics, and the challenges of combining part-time study with working in consultancy for Clarke Saunders.

Alec was followed by Josie Nixon, the current Chair of the IOA Early Careers Group. She came from a geography background and 'found' acoustics through the environmental management route and went on to take the IOA Diploma before joining the Masters programme at LSBU. She showed the results of her quiet drone research created through empirical testing of blade designs. Josie finished with a story about how she conquered her fear of public enquires with the kind

Above: The presenters at the Art of Being an Acoustics, (L-R) Arshdeep Singh, Peter Rogers, Josie Nixon, Ken Marriott, Brad Backus, Stephen Dance, Phil Nelson, Ed Clarke and Alec Korchev

support of a colleague from another consultancy, thanks Ed.

Arshdeep Singh finished the session. His research used AI for sound classification as part of a post-doc at the University of Surrey. He studied computer science and engineering at IIT in India and also worked as an intern at Intel. He showed videos of how AI could analyse audio content in real-time and how neural networks could be compressed to a reasonable size.

I closed the conference by telling delegates how I got to know each of the presenters over a 30 year period, and suggested that perhaps it would be more efficient if we talked to people and did the networking in three years instead. We are now all acousticians and there isn't a friendlier bunch of people. Holding with tradition, discussions continued over drinks at the bar. ☺



Tackling the challenges of exposed ceilings

Popular brutalist-inspired environments involving exposed ceilings and visible building services may seem daunting for those concerned with acoustics. However, with the right preparation and careful selection of the right equipment, designers need not fear poor sound quality or problematic air management in these spaces.

By Tim Tanner, Product Technical Manager – Ventilation Technology, TROX UK

The trend for exposed ceilings, where building services such as ducts and fans are left visible, continue to be popular. Exposed ceilings can cause significant challenges for HVAC system designers however – the absence of a ceiling surface can lead to air management problems, making it difficult to achieve the required levels of occupancy comfort because of uneven temperatures and draughts.



Above:
Tim Tanner

Below:
RFD-V cooling function

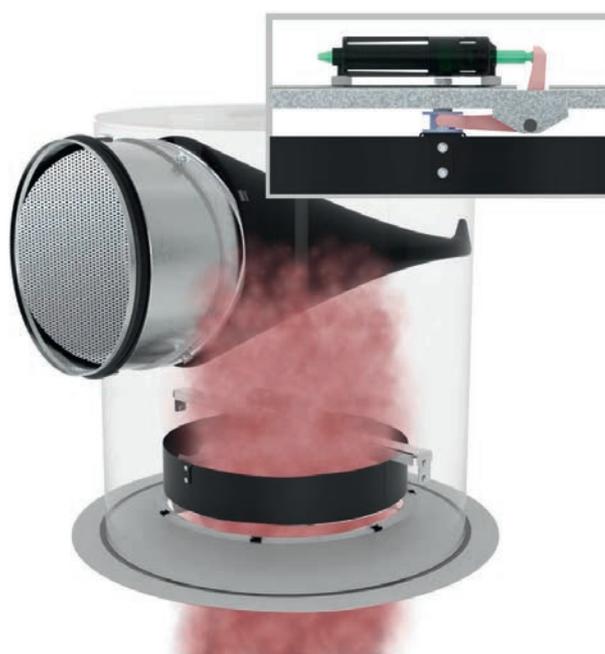
Below right:
RFD-V heating function

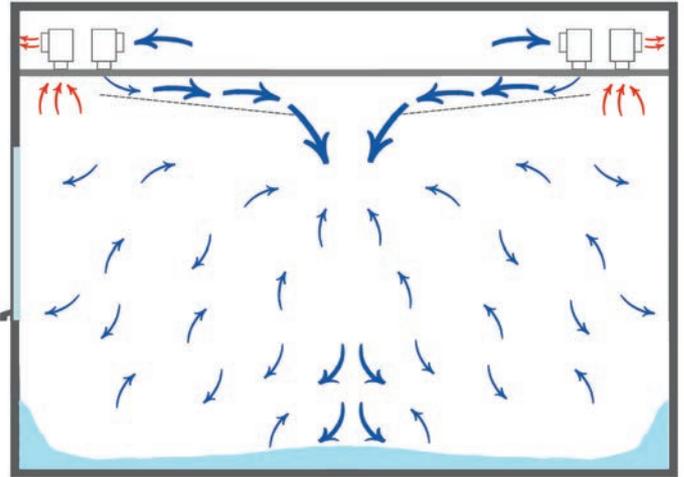
It also introduces additional challenges for acoustics, and can lead to unwelcome noise levels relating to building services. The key to overcoming these challenges lies very much in the diagnostic and commissioning process.

Acoustic challenges

Typically, a suspended ceiling provides an opportunity to sub-divide the services zone from the room occupants, which can mitigate noise from heating,

ventilation and air conditioning systems. These suspended ceilings can incorporate materials to absorb sound, minimising noise and reducing the reverberation time within the occupied space. Removal of a suspended ceiling can, therefore, cause noise levels relating to HVAC to rise so the acoustic effects of HVAC elements, normally installed behind a false ceiling, need to be considered. These include common extract (e.g. bell mouths) and CAV/VAV devices, in addition





to equipment further upstream that now has a direct sound path to occupants, such as air handling units.

If the appropriate calculations are made correctly and equipment with the correct silencers is sourced, there is no need to fear poor acoustic quality in these spaces. To assess and address the challenging aspects of the exposed ceiling environment, it is imperative that designers undergo a process of analysis of direct noise contribution. To calculate this properly, an assessment is required for:

- % leaving outlet;
- distance to listener;
- directivity; and
- reverberation time

Various opportunities can be taken along the way, including utilising a key aspect of the diffusers necessary in these spaces, which need a higher discharge velocity, to oversize VAV, which can mitigate acoustic issues.

Air movement challenges

Choosing diffusers with the right geometry is also key to achieving effective air movement in spaces with exposed ceilings. In spaces with suspended ceilings, Coanda effect prevents ‘dumping’ of cold air into the room. A typical air distribution approach would see the supply air ‘attach’ to the ceiling due to the low-pressure differential between the jet and the ceiling. This keeps the cooler and denser supply air, higher for longer. As it travels, the jet of air expands and mixes with the warmer room air, reducing the temperature differential and the velocity.

So when it hits the wall (Figure 1) or a jet travelling from the opposite direction (Figure 2) and descends into the occupied zone it is more comfortable for occupants.

Standard ceiling diffusers are only designed to work with an adjacent ceiling surface. If the ceiling system is removed, for an exposed ceiling, almost all standard diffusers will be unable to function correctly. The loss of Coanda effect/ceiling attachment will result in near vertical discharge of cooler air into the space, and therefore insufficient time for air to mix.

A traditional solution offered to HVAC system designers has been the addition of an extended face plate to diffusers adding a Coanda surface. While this will offer some improvement, air distribution may still be far more ideal. A more effective approach is to employ swirl diffusers designed with exposed ceilings in mind. These swirl models are designed with a gap between the diffuser face and the plenum, this allows for the air to discharge horizontally and form a ‘Coanda jet’. The air flowing through the swirl pattern face connects to this jet, increasing the throw distance.

Solutions for heating and cooling

In a room without a false ceiling the warm air is free to stratify. This means the space above the diffusers will be heated before the occupied zone, wasting energy, slowing the rate temperature change and possibly creating discomfort (due to high temperature gradients between head and ankle).

Above left:
Figure 1: Exposed ceilings Coanda effect air hits the wall

Above right:
Figure 2: Exposed ceilings Coanda effect jet opposite direction

Until recently, this had remained a problem for HVAC designers, but the introduction of variable geometry diffusers in recent months has brought an effective solution such as a swirl air diffuser unit with an integral thermal actuator. During cooling the air discharge is horizontal and radial, as the supply temperature increases the discharge pattern will switch automatically to vertical, directing warmer air more effectively into the occupied space. Once the supply temperature decreases, the air discharge switches back to horizontal once more. These changes to air discharge are controlled by an integral thermal actuator, within the diffuser which, in turn, controls the internal sleeve. The supply air to room air temperature difference may range from -10 to +15K. By facilitating the ability to move automatically between cooling and heating, a variable geometry diffuser enables the comfort conditions for the occupied space to be managed much more effectively. ©

Letter to the editor

This letter on onshore wind turbine noise guidance, written by Richard Cox on behalf of the Independent Noise Working Group (INWG), is in response to the two articles we published on the topic in the September/October 2023 and November/December 2023 issues of *Acoustics Bulletin*.

Dear Editor

Mounting evidence that the current means of controlling wind turbine noise, known as ETSU-R-97, is failing to protect public health and wellbeing, points to the need to replace ETSU-R-97 with BS4142. This would afford wind turbine neighbours the same degree of protection from noise, as neighbours of a majority of other industrial and commercial noise sources.

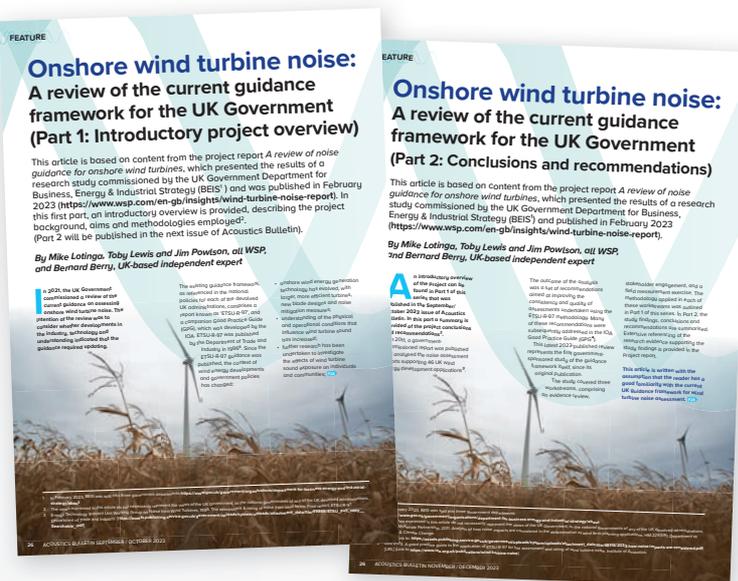
In 2022, DBEIS (the then UK Government Department for Business, Energy & Industrial Strategy) commissioned consultants WSP to assess whether the ETSU-R-97 noise guidance from 1996, and its associated 2013 Good Practice Guide, are fit-for-purpose. WSP's subsequent report recommended that the guidance would benefit from further review and updating, with roughly half of the consulted stakeholders of the view that it requires a substantial revision.

The INWG conducted a detailed analysis of the 400-page WSP report and prepared a covering report of their analysis, *INWG Analysis of WSP report* which was submitted, 17 April 2023, to DESNZ (Department of Energy Security and Net Zero) with the recommendation to replace ETSU-R-97 with BS4142.

Following WSP's subsequent two-part article in the *Acoustics Bulletin* (Autumn 2023 editions), summarising their report, the INWG submitted their own Briefing Paper, *Onshore wind turbine noise guidance* to DESNZ which summarised the WSP report analysis, commented on the WSP *Acoustics Bulletin* articles, and updated the argument for the adoption of BS4142.

The criticisms of the ETSU-R-97 guidance identified in the WSP report, especially from the stakeholder survey, suggests faults with the fundamental methodology underlying ETSU-R-97. These critical stakeholder responses go to the heart of ETSU-R-97 and its underlying assessment methodology centred on derived noise limit curves.

The INWG believes that these are faults that cannot be fixed by more revisions or studies and call for the replacement of ETSU with BS4142.



The INWG tested BS4142 with wind turbine noise data and recommended that ETSU-R-97 be replaced with the BS4142 noise assessment standard during 2015, see INWG AM work package 5. Additionally, the paper presented at the 2015 INCE conference at Glasgow *Cotton Farm Wind Farm – Long term community noise monitoring* by Stigwood, Large & Stigwood, (available at www.masenv.co.uk) provides a powerful argument for adopting BS4142.

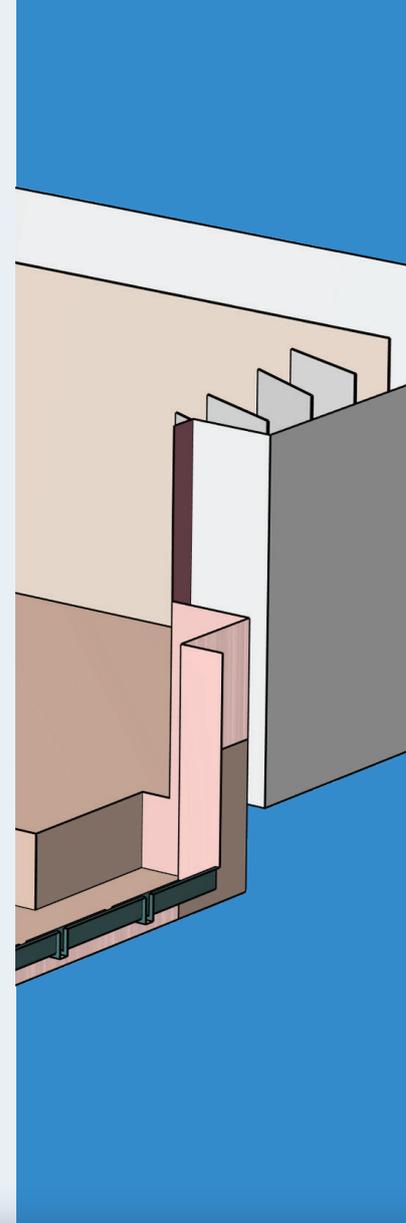
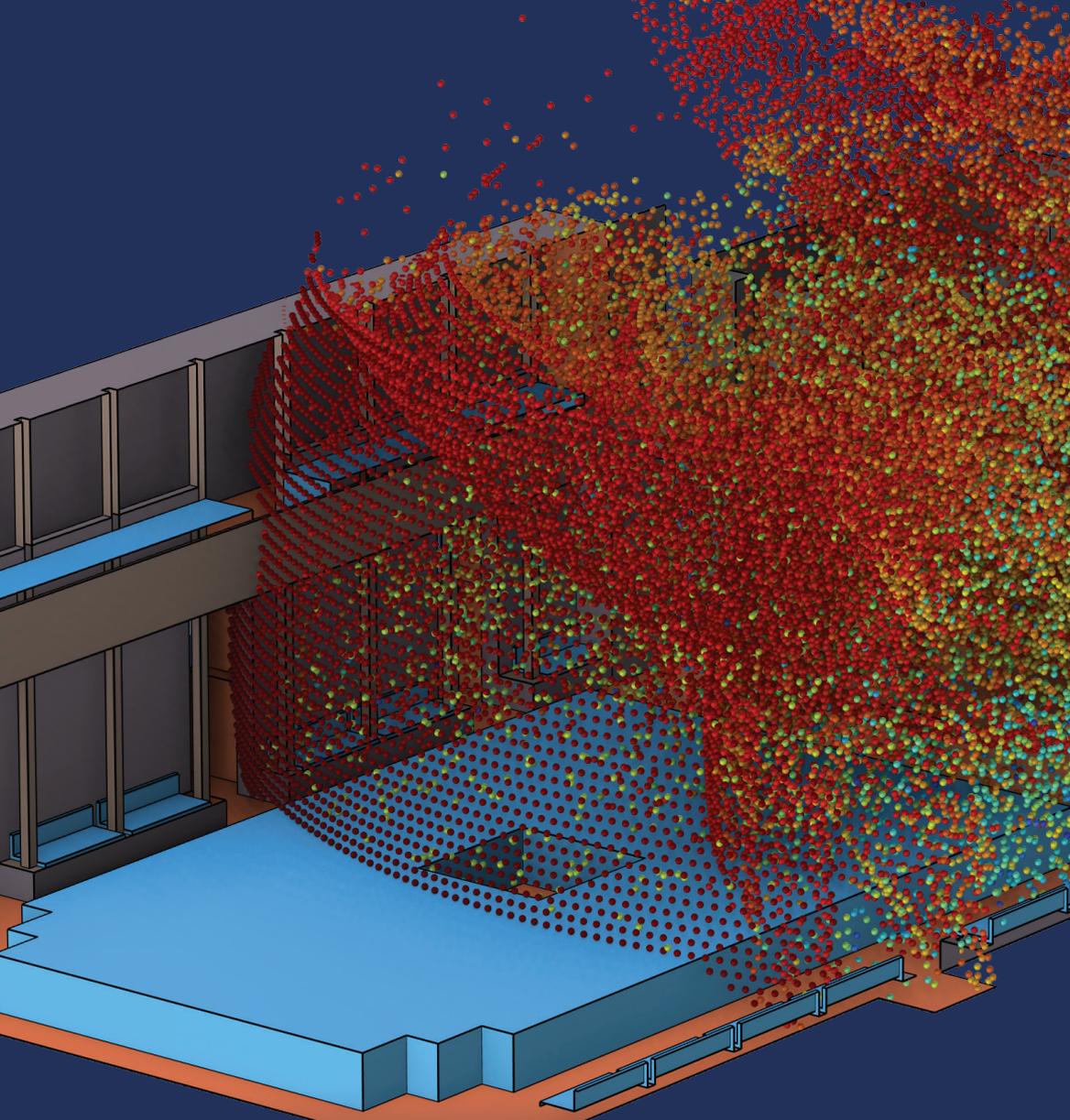
BS4142 has since been updated during 2019 and the INWG report *INWG Analysis of WSP report* and Briefing Paper *Onshore wind turbine noise guidance* include a detailed argument for the use of BS4142 with comparisons of BS4142:2014+A1:2019 versus ETSU-R-97. Government MID guidance issued by the Environment Agency during March 2023 further strengthens the argument for the use of BS4142.

The INWG believes there is no technical reason why BS4142 should not be used. Its use would protect the health and wellbeing of local populations bringing onshore wind in line with similar noise polluting industries in rural areas.

(You can access the referenced INWG documents at www.inwg.org.uk)

Richard Cox, INWG

All letters to the editor are very welcome and should be emailed to nickyr@warnersgroup.co.uk



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Sound Insulation Testing & Measurement Association gains UKAS Accreditation to ISO 17024:2012

SITMA, the Sound Insulation Testing & Measurement Association has gained accreditation to BS EN ISO/IEC 17024:2012 for certifying testers as competent to test in accordance with BS EN ISO 140-4:1998 and BS EN ISO 140-7:1998 for Building Regulations pre-completion testing requirements in all four home nations.

By Barry Cope, Group Managing Director of the BCTA Group, which encompasses SITMA

SITMA, at the time of receiving its accreditation, has 117 certified testers, covering the nation from northern Scotland to Cornwall. These testers, despite some negativities levelled at SITMA, always operated to standards akin to those with UKAS BS EN ISO/IEC 17025:2017.

Not the 'easy option'

SITMA members always had to comply with much higher calibration and checking requirements than people expect to be able to join the certification scheme and has struggled to shake off the notion that it is the easy route to compliance, but it is far from it. SITMA members are required to demonstrate eight separate calibrations and checks before their application will even be considered.

These checks include UKAS Level Calibration of:

- sound level meters;
- filters;
- reverberation time;
- calibrator; and
- tapping machine.

Along with checks of:

- one-off checks for tapping machines;
- speaker stability; and
- speaker directivity index.



Theory exam

SITMA members are also subject to a tough 56-question theory exam, which currently has less than a 35% pass rate for those who do not opt for additional training. The pass rate with additional training is around 75%.



Above: Barry Cope

Once the application is reviewed, an on-site witness audit is conducted before candidates are offered certification with SITMA.

The lodgement portal

The difficult entry requirements are not the only trick in the bag for SITMA. Its lodgement portal is its real piece de resistance and it has three main benefits to improve quality:

• Tester locations

The SITMA lodgement portal requires testers to add their locations before midnight of the night before the test, allowing SITMA to conduct auditing

completely unannounced. To its knowledge, it is the only UK Certification Scheme in construction that is able to work this way. Though SITMA does not normally conduct unannounced auditing, the ability for SITMA to audit this way keeps the scheme members straight and stops them taking risks that otherwise they may attempt to without the same level of oversight.

• Raw data

The SITMA lodgement portal takes raw data from the sound level meters and re-calculates the DnT and LnT itself, rather than relying on a tester's submission which could theoretically have errors in the calculation, or a different calculation methodology.

• Test reports

SITMA creates the test reports for the tester using the portal. Because the data is uploaded, the user is required to complete the plot numbers, room volumes, site address and select their equipment from the list. SITMA then compiles the report, making a task that would take an hour down to 120 seconds.

Mr Cope said: "To say SITMA is an easy option is just not true. With the equipment requirements, theory, and practical examinations it's proved the undoing of some very high-level consultants. We're really very proud of what we have achieved and have quietly, over the past five years, been improving and building on what we do to make the system as efficient, as smart, and as accurate as we can make it." 🌐

Post-nominals and when can they be used

Paul Shields BSc, MSc, FIOA, Chair of the IOA Membership Committee, advises on the correct way to use your post-nominals.

Post-nominals are also sometimes known as post-nominal initials, or post-nominal titles.

They are letters placed after a person’s name to show various achievements (e.g. accreditations, qualifications, and military decoration honours). They can be received from an award such as academic degrees (BS, MBA, PhD), professional licences (C Eng, M Eng TechCIOB, CEnv, etc.) or institutions, such as the IOA.

Benefits of using post-nominals?

Post-nominals represent an achievement, skill level, experience and sometimes an ongoing commitment to a way of working. They are a valuable signpost for the individual and those who choose to work with them.

Benefits of IOA post-nominals

- showcases your credentials and strengthens your reputation;
- demonstrates your commitment to professionalism, integrity and excellence;
- displays your skill and experience level;
- indicates your dedication to continuous professional development; and
- gives you recognition as a part of the acoustics community.

Using your post-nominal also positively impacts the IOA and the acoustics industry. Showing your IOA post-nominal increases our profile, it heightens recognition and the desirability of certifications and, as a result, raises standards across the industry.

How to use post-nominals

The IOA actively promotes using your post-nominals to showcase your achievements.

You can use your post-nominals on your email signature, business cards, letterhead, business/corporate websites, publications, your LinkedIn profile, event speaking profile, and on your CV.

The generally accepted order for post-nominals is as follows:

1. Civil honours (e.g. OBE)
2. Military honours
3. Appointments (e.g. MP)
4. Higher education awards (e.g. MEng, BSc)
5. Membership professional and/or academic bodies (FIOA, MIOA, AMIOA)

If you have several post-nominals, you can tailor the ones you include, only showing the two or three most relevant to your current role and industry.

Terms and conditions for IOAs post-nominal use

These are included in the Institute of Acoustics Bylaws¹ sections 4 and 10. Designations can only be used by active members. Members whose registration has lapsed or who have resigned their registration are not eligible to use the IOAs post-nominals. Post-nominals can only be used by certain classes of membership. See the table below.

IOA Diploma in Acoustics and Noise Control

We regularly see members of the IOA who have successfully completed the diplomas using ‘PGDip’ as a post-nominal. Please note the Institute of Acoustics Diploma in Acoustics and Noise Control does not have any abbreviations or post-nominals. It is not a postgraduate diploma and does not qualify for any post-nominals. ©

TITLE	POST-NOMINAL
Honorary Fellow of the Institute of Acoustics	(Hon. F.I.O.A.) or (HonFIOA)
Fellow of the Institute of Acoustics	(F.I.O.A.) or (FIOA)
Member of the Institute of Acoustics	(M.I.O.A.) or (MIOA)
Associate Member of the Institute of Acoustics	(A.M.I.O.A.) or (AMIOA)
Technician Member of the Institute of Acoustics	(Tech.I.O.A.) or (TechIOA)
Affiliate of the Institute of Acoustics	No post-nominals
Student Member of the Institute of Acoustics	No post-nominals
<i>Please note that no other titles or abbreviations or post-nominals are permitted.</i>	

If you have any further queries concerning the use of post-nominals relating to the IOA then please contact us at membership@ioa.org.uk

Footnote

¹ <https://www.ioa.org.uk/laws>

North East & Yorkshire Branch

Legacies of sound: past, present and future of museums' soundscapes *By Rebecca Romeo Pitone*

To mark the 50th anniversary of the IOA, we are celebrating the intersection between acoustics, soundscapes and heritage. 'Legacies of sound: past, present and future of museum soundscapes' is a two-part event to reimagine the soundscape of museums.

There has been a growing interest in recent years in the aesthetic soundscapes of public architecture beyond questions of structural acoustics and environmental noise management. This has emerged from an increased awareness of the importance of sound (and sensory environments more generally) in the production of public space, and in generating affective connections between people and place. Increasingly urgent discussions around access and inclusivity are also taking place in parallel.

Museums have also become increasingly attentive to the role and potential of sound, both within curated exhibition spaces and in other public areas. Sound clearly has the capacity to shape spaces, to trigger different modes of spatial relations and to connect visitors to exhibitions in very emotive ways. At the same time, sound can create exclusions, for instance in relation to sensory overload or feelings of not 'belonging' in a space.

While museums are repositories of the past, their role in shaping society's understanding of history continues to evolve. Through a series of compelling talks by acousticians, museum practitioners, access and equity staff and advocates, the event will look at how we can re-shape the acoustic environment of museums to make them relevant for new generations of visitors.

Part 1 – An introduction to acoustics and soundscapes of museums, hosted by the IOA North East and Yorkshire Branch, sponsored by Apex Acoustics

26 June 2024, 2pm-6pm, the Great North Museum, Newcastle upon Tyne

After a brief introduction to the acoustical aspects of museums from a historical perspective, we will explore topics related to the soundscape of museums, looking at how the acoustics of the building and its artefacts affect different visitors' experiences.

Further information about Part 1 of the event will be available soon.

For any questions in the meantime please email: ioa-neyorks@apexacoustics.co.uk/

Part 2 – Acoustic and sound design for inclusion, wellbeing and community in museums, sponsored by Charcoalblue,

28 June 2024, 1pm-6pm, City, University of London

As part of the AHRC funded project 'Place-making through sound: designing for inclusivity and wellbeing' (2023-24), hosted by theatre and acoustics consultancy, Charcoalblue, this half-day workshop will explore current practice around sound as an agent of inclusion and wellbeing, addressing a range of issues including neuro-inclusion, cultural belonging, and soundscape approaches to space and exhibition design.

Register for this event here: <https://www.city.ac.uk/news-and-events/events/2024/june/sound-museums-designing-for-inclusion-wellbeing-and-community>

Or via the QR code



Further information about Part 2 of the event will be available soon. For any questions in the meantime please email: L.nooshin@city.ac.uk

In celebrating the past with a forward-looking approach to inclusive soundscape design, this two-part event aims to inspire and inform professionals working in the museum sector, fostering a deeper understanding of the role of sound in creating accessible, equitable, and engaging museum experiences.

North West Branch

IOA 50th celebrations

By David Terry

The NW Branch committee is in the process of arranging an exciting electric go-kart racing experience for later this year, to celebrate the 50th anniversary of the IOA, and NW branch members should look out for further details shortly.

The NW Branch meeting on 25 April 2024 was hosted by Ecophon at their new offices at 'Material Source Studio' Manchester.

Scottish Branch

Passivhaus design principles

By Eleni Kontesidou



Above:
Image courtesy of Anne Budd, Chair of the IOA Scottish Branch

In February, the Scottish Branch welcomed Matt Bridgestock, architect and Passivhaus designer, at our hybrid branch meeting in Glasgow. Matt is a Managing Director at John Gilbert Architects as well as a founding director of Sussed, a sustainable design driven environmental consultancy.

As the Scottish Government strategy (including anticipated amendment in Scottish Building Regulations) and current best practice are moving the construction industry towards a Passivhaus standard building model, we at the Scottish Branch are keen to understand the potential

impact these changes might have on acoustic design and noise control.

Matt gave a very interesting and informative talk introducing the main Passivhaus principles of design and highlighted the challenges and benefits it presents for the construction industry. He also presented various relevant case studies and 'lessons learnt' from completed projects. In doing so, he particularly emphasised areas where acoustics were impacted, either positively or negatively, and discussed how we can all adapt to ensure high performance buildings, both from an energy/sustainability but also from an acoustics perspective.

Our sincere thanks go to RES (Renewable Energy Systems) and Peter Brooks for hosting our meeting in their offices at STV Pacific Quay and of course to Matt Bridgestock for such an illuminating talk and subsequent Q&A session. It was a very well-attended and lively meeting, for both in-person and online participants and we hope that future hybrid meetings will be equally successful.

If you are a member of the Scottish Branch but are not receiving the relevant notices and emails, please make sure to update your preferences in the 'My Details' section of your online IOA account by signing up to the Scottish Branch (under 'Other Details').

Acousticians needed for the assessment of pods

A new scheme for assessing the sound insulation performance for configurable pod meeting rooms has recently been launched. It is run by the FIS (a trade body representing the finishes and interiors sector) with the assessments undertaken by Sandy Brown and Cundall, and involvement from the University of Salford.

The purpose of the scheme is to assess larger configurable pods, which cannot currently be measured in accordance with ISO 23351-1. The scheme was presented at the IOA London Branch in February and a recording of this is available on the IOA website.

Now launched, the scheme is seeking an additional acoustics consultancy to be involved in the assessment process. This is a commercial opportunity for interested



parties and is proposed to help ensure a robust and rigorous approach to the scheme. Those interested should

contact Joe Cilia (joecilia@thefis.org) with an expression of interest, alongside details of relevant experience in the measurement and specification of pod acoustics. As a minimum, interested parties shall have full corporate membership of the Institute of Acoustics (MIOA or higher).

The deadline for applications is Friday 31 May 2024.

Southern Branch

HS2, managing the noise and vibration of Great Britain's new high-speed railway line, and Southern Branch AGM

By Reena Mahtani



Above: Oliver Bewes, Head of Noise Assessment at HS2 Ltd, presenting at a recent Southern Branch meeting

On 23 January 2024, Oliver Bewes, Head of Noise Assessment at HS2 Ltd, joined us at the KP Acoustics Labs, Southampton, where he presented on the management of noise on Great Britain's new high speed railway.

He gave an overview of the scope of the project and progress on more than 350 construction sites between London and Birmingham. HS2's key noise policies were discussed, which cover construction, operational airborne noise, groundborne noise, noise from stationary systems and operational noise and vibration monitoring.

Oliver explained the importance of these policies and gave insight into how the commitments made are apportioned across the many contractors designing and building the railway. During the construction phase, the project has made over 800 CoCP Section 61 applications since works started and we learnt that there have been relatively few appeals relating to these applications. Oliver believes that is a good indicator that the process is providing protection to people who live near construction sites whilst enabling works to proceed.

We then learnt about HS2's consenting process for operational noise mitigation and some of the research and development activities being undertaken to secure the performance of the mitigation, some of which we expect to see in more detail at the Southern Branch's half day event in May. The evening was rounded off with an informal tour of KP Acoustic's labs and a visit to their local pub for a social.

AGM

The Southern Branch's AGM took place during this event. David Yates read the annual report of the Branch, followed by the proposed changes to the committee membership.

- Sebastian Woodhams presented himself for re-election for another term while Jack Richardson formally resigned from the committee.
- Conor Tickner volunteered to become the new Early Careers Rep, replacing Taylor Cooper.
- In addition, we welcomed Teli Chinelis and Oliver Bewes as ordinary members and Sam Geering as a co-opted member.

Thanks to everyone that attended in person and online, and we hope to see you in our half day event on 14 May 2024, where we will explore the noise and vibration control measures of HS2 in more detail. This event will also be our celebration of the Institute's 50th anniversary, and there will be cake!

Register here <https://www.ioa.org.uk/civcrm/event/info?reset=1&id=884>

Dani Fiumicelli's presentation on the management of noise from outdoor events

By Taylor Cooper, Mott MacDonald

On Tuesday 26 March 2024 there were over 60 IOA Southern Branch members online to welcome Dani Fiumicelli who presented on the management of noise from outdoor events.

Over the past few decades so much of the music industry has changed. This is mostly because the way in which people consume music has changed – vinyl to CDs, to downloads, and now to streaming.

The current guidance document used in the UK for control of noise at outdoor events is the 'Noise Council Code of Practice on Environmental Noise Control at Concerts, 1995'. It gives guidance on the music noise level for different venues depending on how many concert days there are per calendar year.

It is also worth noting that in 2011 DEFRA, sponsored a research project (NANR292) to look at the attitudes of environmental noise from concerts in order to inform the review of the Code of Practice. One of the findings of NANR292 is that annoyance rates appear to be linked to the music noise level rather than venue and that the Code of Practice perhaps does not need to differentiate between different types of urban venues.

Dani went on to explain that the low frequency content of music is often a critical element of the sound because it drives 'the groove', or the urge to move/dance to the rhythm. Low frequency noise is of course notorious for noise complaints as it propagates more efficiently than mid to high frequencies.

Not even Beyonce is exempt from noise complaints. Dani shared an anecdote from a Beyonce concert where the speaker system was higher than the roof of the stadium so that it didn't block the big screens on stage.

Dani also explained that complaints are a poor indicator of overall noise disturbance since they are often linked to other non-acoustic factors as well, including perceptions of the concert goer behaviour, traffic management for the event, and lack of access to free or discounted tickets.

Finally, Dani made some potential key points for refreshing the Code of Practice based on his experience of outdoor music events such as more detail on low frequency guidance and (as mentioned above) aligning the guidance for all urban venues. 🎧

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IOA Environmental Sound and the Sound Noise & Health Groups spring meeting

By Adam Thomas (Arup)

In this article, Adam Thomas highlights key insights from a recent joint meeting hosted by the IOA Environmental Sound and the Sound Noise & Health Groups, where experts shared their perspectives on soundscape research, its definitions and practical applications.

Soundscape research has witnessed a remarkable surge in interest, with scholars and practitioners delving into various aspects of acoustic environments.

Francesco Aletta kicked off the meeting by providing an overview of the burgeoning field of soundscape research. As our understanding of soundscapes evolves, researchers are increasingly focusing on design and predictive modelling. These advancements promise to enhance outcomes within the frameworks we operate in. Francesco mentioned University College London's (UCL) work to create predictive modelling tools to empower designers. These tools aim to anticipate soundscape dynamics, enabling better decision-making during the design process.

Martin McVay highlighted the new Environment (Air Quality and Soundscapes) (Wales) Act 2024 which brings soundscape into law in Wales. Alongside this legislation, a national soundscapes strategy (the Noise and Soundscape Plan for Wales 2023-2028) suggests a framework for assessing where soundscape considerations may add value and improve decision-making alongside more traditional noise assessments.

Peter Rogers shared his experiences applying soundscape practices to indoor environments. Specifically, he discussed a recent project example of a pilot study for assessing issues that affect officer wellbeing and quality of victim interaction, leading to designing improvements for a police station with an office like use component. The project involved engagement with users and analysing related acoustic metrics along with a blend of method A and B soundscape approaches as well as biometric indicators.

The combination of these three strands of evidence played a crucial role in achieving the realisation that the first workshop contained almost all of the answers discovered. Work is ongoing to design the interventions and achieve measurable outcomes.

Jack Harvie-Clark presented project examples, including an urban park, a residential scheme and a museum. By benchmarking against similar environments, Jack demonstrated how soundscape principles can inform design decisions.

During the panel discussion, several critical questions emerged:

- 1. Assessment to design:** How can we effectively transition from soundscape assessment to practical design solutions?
- 2. Context matters:** What non-acoustic factors should we consider when shaping soundscapes?
- 3. The next decade:** How will soundscape research impact outcomes in the coming years?

The meeting was attended by approximately 240 participants and emphasised the need for continued dialogue. As we strive to integrate soundscape principles into practice, the Acoustics 2024 conference promises to be a platform for further exploration.

Speakers:

Francesco Aletta, UCL,
Martin McVay, Welsh Government
Peter Rogers, Sustainable Acoustics
Jack Harvie-Clark, Apex Acoustics 

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Committee meetings 2024

DAY	DATE	TIME	MEETING
Wednesday	15 May	10.30	Research Co-ordination (London)
Thursday	16 May	All day	Engineering Interviews
Thursday	23 May	10.30	Executive
Thursday	30 May	10.30	Engineering Meeting
Wednesday	5 June	10.30	Council
Wednesday	19 June	10.30	CCENM Examiners
Wednesday	19 June	13.30	CCENM Committee
Tuesday	9 July	10.30	Diploma Tutors and Examiners
Tuesday	9 July	13.30	Education
Thursday	18 July	10.30	Meetings
Thursday	25 July	10.30	Membership
Thursday	15 August	11:00	Publications
Thursday	22 August	10.30	Executive
Wednesday	5 September	10.30	Council
Thursday	10 September	11.00	CPD
Thursday	10 October	11.00	Publications
Thursday	17 October	All day	Engineering Interviews
Thursday	24 October	10.30	Engineering
Tuesday	29 October	10.30	Research Co-ordination
Thursday	31 October	10.30	Meetings
Tuesday	5 November	10:30	CCWPNA Examiners

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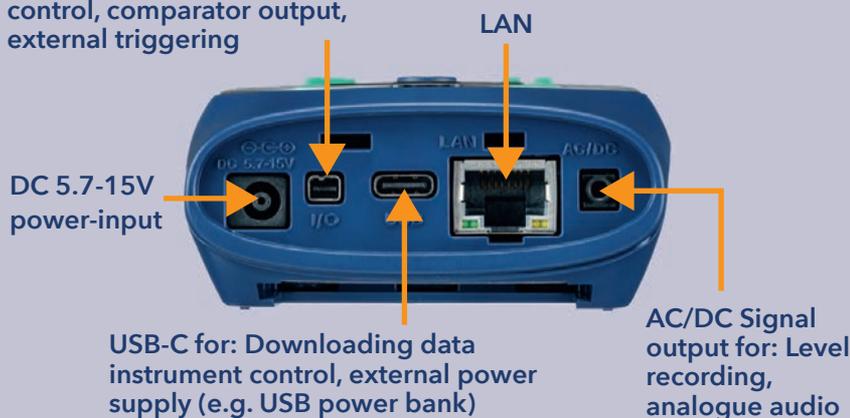


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