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Sustainability and artificial

intelligence – an energy problem
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Technical – a practical approach
to predicting flow-induced sound
from duct termination grilles in
railway tunnel ventilation
systems

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Cover image: The design of the IOA coat of arms reflects the essence of the Institute and its membership, ensuring that each element of the design carried meaning. The grant of arms was the final step in completing the petition to His Majesty the King for the Institute's Royal Charter

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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 members

Spring has sprung and with it, a flurry of activity in the world of acoustics. It's been a busy few months for the Institute, filled with milestones, celebrations and few moments to reflect on how far we've come.

Let me share some highlights with you.

Progress on Chartered status

There are moments in life when you realise you're witnessing history – or at least something that will make for a good after dinner story later. One such moment occurred at the Mercure Hotel in Manchester in March. In a room filled with colleagues and a strong aroma of hotel coffee, I signed the petition for Chartered status. Russel Richardson and Chris Turner, two of the driving forces behind this ambitious endeavour stood by, with Chris serving as the official witness.

This wasn't just a ceremonial flourish; it was the culmination of years of effort to elevate our profession. With approval expected by late autumn and adoption likely in early 2026, Chartered status will mark a new chapter for the IOA, one that underscores our commitment to excellence and professionalism.

A week of research and collaboration

The week commencing 17 March 2025 was an extraordinary one for acoustics research in the UK. It began with the launch of Noise Network Plus in London and continued with celebrations for UKAN+ activities. The week was rounded off with a joint meeting between UKAN+ Physical Acoustics SIG and Early Career SIG, events that brought together some of the brightest minds in our field.

I had the opportunity to speak about pathways to Chartered Engineer status through the IOA. Mark Plumbley spoke eloquently about collaboration between UKAN+ SIGs and the IOA to drive forward the Noise Network Plus objectives. Trevor Cox captivated us with his vision for transformative initiatives like CDT Sound Futures and the LAURA project – both of which promise to position UK acoustics research as a global leader.

It was a week that reminded me why we love this field: the sheer breadth of ideas, the energy in the room, even when fuelled by too much caffeine, and the sense that we're all working toward something bigger than ourselves. My thanks go to the Research Coordination Committee for their work to help orchestrate these events.

The Art of Being a Consultant and an Acoustician

The following week, on 27 and 28 March, we gathered in Manchester for two back-to-back workshops:



The Art of Being a Consultant and The Art of Being an Acoustician. These events were aimed squarely at early career professionals, though I suspect even seasoned practitioners walked away with fresh inspiration.

During these sessions, I was able to speak about fostering collaboration between academia and industry. Consultancy, as various speakers pointed out, is not just about solving problems; it's about navigating human complexities – convincing people that they need your expertise while gently steering them away from their own misguided ideas. It's an art form, really, albeit one that often involves spreadsheets.

Special thanks are due to Professor Steve Dance, Zach Simcox and all the speakers who shared their wisdom with such generosity. Their advice ranged from technical tips to career strategies to life lessons – proof that acousticians are not just clever but also kind-hearted (most of the time).

Strategic initiatives

Sustainability remains at the forefront of our agenda. From integrating sustainability goals into educational programmes to supporting revisions of key reports like *Sound Economics*, we're committed to using our [PO6](#)

expertise for societal good. The Research Coordination Committee has also expanded its membership, welcoming leads from Noise Network Plus, CDT Sustainable Sound Futures, Leverhulme Trust Aural Diversity Hub, and UKAN SIGs – a move that promises richer collaboration across disciplines.

Our policy efforts are gaining traction as well. Whether through consultations or potential parliamentary engagement (including discussions around All Party Parliamentary Groups), we're ensuring that acoustics has a voice where it matters most.

Education and digital strategy

We've welcomed Mary-Jane Newton as Executive Director Education and Digital Strategy to spearhead innovative learning approaches that blend online and in-person delivery.

Acoustics 2025 – save the date!

Finally, I'm delighted to announce that *Acoustics 2025*, our 51st anniversary conference and exhibition, will take place on 20-21 October 2025 at the DoubleTree by

Hilton in Milton Keynes. I know that some wanted us to stage conference in Brighton, however with 15 lakes and 11 miles of canals, Milton Keynes has more bridges than Venice and more shoreline than Jersey.

Conclusion

As we look ahead, I encourage each of you to engage with Institute initiatives – whether by attending events, contributing your expertise, or simply staying curious about what's next. The IOA is more than an organisation; it's a community bound by shared passion and purpose.

Thank you for your continued support and for making acoustics not just a profession but a joy.



David Waddington, IOA President

A quieter future

'Noise Network Plus' is an Engineering and Physical Sciences Research Council (EPSRC) funded interdisciplinary network designed to address the grand challenges for noise pollution for the next 10-15 years.



Above: Some familiar faces at the launch of Noise Network Plus in London

Lunched at the Royal Academy of Engineering in March and led by Mark Plumbley and Abigail Bristow (University of Surrey), Charlotte Clark (City St George's, University of London), Simone Graetzer and Antonio Torija Martinez (University of Salford) and Alan Hunter (University of Bath), six transdisciplinary research projects based at UK institutions will each receive a share of a £10 million investment to help them address the challenges identified in the 2022 Tomorrow's Engineering Research Challenges (TERC) report (<https://www.ukri.org/publications/tomorrows-engineering-research-challenges/>)

Noise has a profound effect on human health and wellbeing, but reducing noise and its impacts is a complex, systemic and interconnected problem, requiring insights from many perspectives and creative ways of working.

As the House of Lords Science and Technology Committee reported in 2023, noise is a 'neglected pollutant'. It is also largely neglected across the UK engineering community. Outside of the IOA and the wider acoustical engineering community, noise is almost invisible in the work of professional engineering institutions. It is not included in teaching of sustainability in engineering degrees, so noise is often neglected until late in the engineering design process, resulting in products, systems and buildings that may create or transmit unnecessary noise.

To address this, the vision is to re-engineer the discipline of engineering so that noise is considered in all stages of the design process. Noise Network Plus is intended to be a catalyst to bring together diverse, dynamic teams from across disciplines, promote dialogue, co-design missions, form lasting and inclusive collaborations, and build unprecedented noise research capabilities.

By taking a 'systems thinking' approach to understand the complex systems that build noise into the world, Noise Network Plus will begin a long-lasting inter- and multi-disciplinary programme of research and engagement to reduce noise and its impact on people, the environment, and the economy: engineering a quieter future. ©

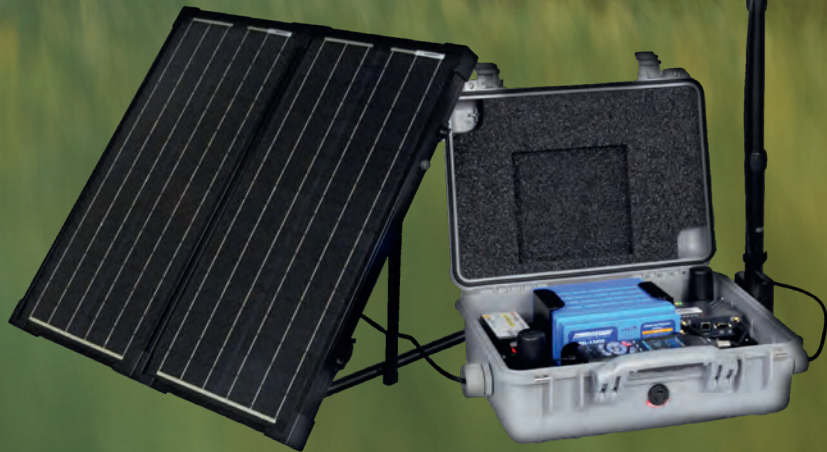
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Images within this border hold significance to the Institute, beginning with the wildlife:

	<p>The tawny owl (for England) The capercailli (for Scotland)</p>	<p>Representing the four home nations in which the Institute primarily operates.</p>
	<p>The lapwing (for Ireland) The red kite (for Wales)</p>	
	<p>Red rose of Lancashire</p>	<p>Representing Salford University, as a historic seat of learning and research for the acoustics industry.</p>
	<p>Dog rose of Hampshire</p>	<p>Representing Southampton University, a historic seat of learning and research for the acoustics industry.</p>
	<p>Common poppy</p>	<p>Representing Essex, the birth County of Lord Rayleigh, whose text <i>The Theory of Sound</i> (1877 and 1878) is recognised as one of the first books on acoustics to be published.</p>
	<p>Maiden pink</p>	<p>Representing Roxboroughshire, the birth county of Mary Somerville, whose text <i>On the Connexion of the Physical Sciences</i> (1834) has been lately recognised as one of the first texts explaining outdoor sound propagation, reflection and absorption.</p>

The armorial bearings have been granted to the Institute in perpetuity regardless of whether the petition for a Royal Charter is successful. However, they will be transferred to the Chartered body should the petition be successful.

The original grant of arms is on display in the Office in Milton Keynes, and a high-resolution photograph will be available for members to view at meetings and conferences.

Charter update

On Thursday, 27 March 2025, the IOA President, David Waddington, formally signed and sealed the official petition to His Majesty for the grant of a Royal Charter. The petition was hand delivered to the Privy Council Office on Wednesday, 2 April and is now under review by the Clerks to the Privy Council. 🌐



Engineering Division



The IOA Engineering Division will support you through the process to help you become one of more than 229,000 registrants that hold international professional recognition.

By Blane Judd BEng FCGI CEng FIET FCIBSE, Engineering Manager

We are already a quarter of the way through the year and working with applicants who are progressing with the drafting of their Professional Review Reports (PRR) continues. We hope to have some candidates for the next round of interviews which are in June.

Each Professional Engineering Institution (PEI) has its own way of applying the requirements for PRRs. It is therefore important to use the guidance material we send you and the example PRR so that we limit the amount of redrafting of your submission. Please don't fall into the trap of using another PEI's guidance to apply to us at the IOA. Just lately we have had some submissions that have not followed the example and so needed extra time to complete their application. We will look at submissions and send them to volunteers to review, but only once we think they are close to being the final draft. If you are asked to re-work your submission it is because we only want to put applicants forward who stand a good chance of being successful. We do not want to waste your time or that of the volunteers which is why we go through this process.

Follow the guidance to the letter

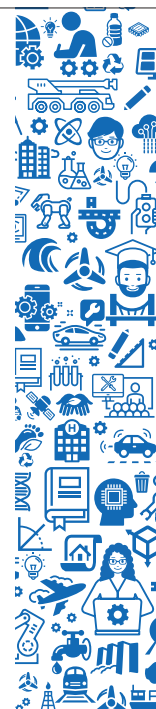
As it says in the guidance, think if you have selected a particular software to conduct modelling, for example, why you chose it, what the shortfalls are, what results you were expecting and how you validated the outputs. These are all part of the A and B competencies and will save you having to do several rewrites. It



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

Fourth edition

Published August 2020



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

is important that you present this in the best way possible as there are not that many acoustics academic programmes that are recognised by the Engineering Council. As a result we use this evidence as part of the evaluation of Masters level learning.

Because the IOA does not have any accredited training programmes, all applicants must submit an Initial Professional Development (IPD) report. This is a narrative that explains how you have developed from a qualified acoustician into a practicing engineer. We send an example of this report with all applications, so check out the contents and add your own personal information.

Emma Lilliman has worked hard to make sure everyone gets the

interview dates that suit them. Since we have a limited resource, we try to respond as quickly as possible, but high numbers of candidates all looking for feedback at the same time can cause a backlog, especially during holiday periods.

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).

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 June. If you are interested in taking the next step to becoming a professionally registered engineer, contact us on acousticsengineering@ioa.org.uk sending a copy of your CV and copies of certificates and transcripts of your qualifications. It is important that we have all of your further and higher education certificates, not just your highest attainment.

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 below).

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.

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 and experiential learning self-directed learning. In many instances, it is likely to be a combination of some or all these options. 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. [Watch at https://www.ioa.org.uk/video/recognising-your-professionalism-0](https://www.ioa.org.uk/video/recognising-your-professionalism-0)

IOA EVENTS FOR 2025

12th INTERNATIONAL CONFERENCE ON
AUDITORIUM ACOUSTICS 2025 (see advert below)
8-10 September 2025

The Bristol Beacon, Bristol

IOA ANNUAL CONFERENCE AND EXHIBITION
Acoustics 2025

19-21 October 2025

The DoubleTree by Hilton, Milton Keynes

REPRODUCED SOUND 2025:
PASSION, PROCESSING, AND PERCEPTION

Organised by the Electroacoustics Group

18-20 November 2025

Harrogate

Other event

54TH INTERNATIONAL CONGRESS AND EXPOSITION ON
NOISE CONTROL ENGINEERING (Inter-Noise 2025)

24-27 August 2025

São Paulo, Brazil

<https://tinyurl.com/54internoise>

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

12TH INTERNATIONAL CONFERENCE ON

AUDITORIUM ACOUSTICS 2025

8-10 September 2025

The Bristol Beacon, Bristol UK

Registration opening soon



SCAN ME

Following an outstanding Auditorium Acoustics conference in Athens in 2023, we now return to the UK for the first time since 2002 to host a conference at the restructured and refurbished concert hall in Bristol, newly named Bristol Beacon.

For further details please email: sheema.ali@ioa.org.uk or visit:
<https://www.ioa.org.uk/civicrm/event/info?reset=1&id=969>

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The Art of Being a Consultant 2025

The IOA Early Careers Group's annual conference brings together the UK's top acoustic consultancy experts to share their knowledge and experiences with emerging professionals in the field of acoustics.



Zach Simcox, ECG Chair

By Zach Simcox, ECG Chair

This year the conference was held at the Mercure Picadilly Hotel in Manchester city centre. Paired with 'The Art of Being an Acoustician', organised cooperatively with UKAN+, the first day's event focused on the acoustic consultancy industry.

The day was introduced by David Waddington, President of the IOA and Professor of Acoustics at the University of Salford, who gave an overview of the structure and work of the Institute of Acoustics. David Boaden broadly answered the overarching question, 'what is acoustic consultancy', while the following presenters filled in some of the specifics: Daniela Filipe taught the delegates the importance of negotiation of fees and contracts, Russel Richardson spoke on 'doing the job' and Mike Hewitt advised practices on working in multidisciplinary teams.



Sound advice

After lunch, Jo Lacy gave a thoughtful talk on equity, diversity, and inclusion in consultancy. Chris Turner spoke on the nuances of language when writing reports, and Fiona Rogerson presented on quality assurance and value in acoustic consultancy. The final session of the day was kicked off by Paul Shields, who laid out the importance of continued professional development (CPD). He also spoke about the requirements of the IOA regarding CPD for corporate and non-corporate members.

Delegates at the Art of Being a Consultant conference in Manchester

The final presentation of the day was an interactive talk given by Robert Adnitt on the ethics of consultancy, and the responsibilities and accountability of acoustic consultants. The day wrapped up with a lively discussion between delegates and experts on the themes of the day, and stories from both the new and well experienced acoustic consultants in the room.

Next year, The Art of Being a Consultant will be held in London. Consider registering if you are early in your consultancy journey!

[See page 16 for the report on the Art of Being an Acoustician event.](#) ©

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The Art of Being an Acoustician 2025

For the third year running the 'Art of Being an Acoustician' followed the 'Art of Being a Consultant'. Stephen Dance introduced the sponsor, the UK Acoustics Network once again. As usual, the day was split into three sessions covering senior acousticians, current acousticians and early career members.

By Professor Stephen Dance

Professor Dance gave the first presentation on his own career journey in computer science and mathematics as applied to acoustics problems. He then elaborated on various projects in areas such as electroacoustics, environment acoustics, material science and teaching. Stephen then handed over to David Waddington who gave a brief outline of research, enterprise and teaching activities at the University of Salford, including the investment into the new facilities as a part of Salford taking over airborne acoustics from the National Physical Laboratory. The final talk of the session was by the recently retired physicist, Keith Attenborough. He gave the long view of academia, focusing on his research areas starting in fibrous material before switching to porous material.

The second session of the morning started with the current generation of acousticians. First up was Jack Harvie-Clark who started out in fluid dynamics of turbo machinery before setting up his own consultancy focusing on environmental and building acoustics. Jack explained that his consultancy undertakes research in order to inform standards and guidance when necessary, for example, BB 93 and the newly proposed BS 8233. Jo Webb then outlined the course of her career, which followed the reverse path with consultancy followed by a PhD (funded by the Royal Horticultural Society). Her degree was in acoustical engineering from the University of Salford, which is where she is studying for her doctorate. Jo compared



Above: Some of the delegates and presenters at Art of Being an Acoustician 2025

research to consultancy with the key difference being the delivery time-frame. The final presentation of the morning was from Rupert Taylor, he took an apprenticeship-style route into acoustics, although he did win a Churchill scholarship, visiting the US. Rupert mentioned multiple projects around the world – but Paradise Island in Nassau looked like the winner! He was an early advocate of computer modelling and simulation, mentioning a ZX Spectrum to design a reflector for a round-house auditorium design.

Research

After lunch, Professor Dance introduced the afternoon session focusing on options to reintegrate research into the IOA saying that research funds (£240m per annum) and government support for research has never been higher, acoustics being funded by all research councils except astronomy. He then detailed the 34 Research Excellent Framework (www.ref.ac.uk) case studies to demonstrate the breath and geographical spread of research in the REF21 review.

Right: IOA President, David Waddington



Right: Recently retired physicist, Keith Attenborough





Above: Jack Harvie-Clark, whose presentation focused on environmental and building acoustics

The afternoon session was from the IOA ECG members starting with Zachary Simcox (IOA ECG Chair) giving a view of his doctoral research in explosions (Semtex) to temper steel (railway tracks). Lots of slow-motion videos were used to see shockwaves resulting in a high risk environment for the employees (noise at work). In addition, local residents (20km away) were annoyed by the blasting (four per hour). Zach was followed by Volkan Akun a post-doc on an InnovateUK project at the University of Salford. He covered his career path (Bilkent University, Turkey) in interior architecture followed by a PhD in soundscape. His research focused on the perception of sound



Above: Jo Webb, whose PhD was funded by the Royal Horticultural Society

produced by air source heat pumps and their assessment using the Energy House facility at Salford, stating that the conditioned air can be a random temperature which made using the scanning intensity probe (requires a steady hand) tricky at -5 degrees! The final talk was from Simone Graetzer whose career bounced from Australia and the USA, to the UK in speech and perception-based acoustics. Simone talked about the four post-doc positions she held and opportunities that arose that exactly matched her interest and skill set. She finished by introducing the new EPSRC funded (2025-2033) Centre for Doctoral Training at the University of Salford, Southampton,



Above: Rupert Taylor, who took an apprenticeship-style route into acoustics

Bristol and Sheffield, and the need for 70 PhD students. Steve added the need for 20 PhD students at Strathclyde (James Windhill) as well as 15 for the LAURA project both funded from this year by the Leverhulme Trust (Unilever).

Own up!

The event ended with discussions around, 'who broke what equipment and did they admit it?' Finally, thanks were given to IOA's Sheema Ali for her support, before the traditional adjournment to the bar for further discussions around all things acoustics. The one thing everyone had in common was the love of acoustics! 🎧

INSTITUTE AFFAIRS

Approved Membership Applications

The Membership Committee reviewed 80 application forms on 28 January 2025 at their Committee meeting held at IOA HQ in Milton Keynes. 26 corporate applications have recently been approved by the Council following the recommendations of the Membership Committee. The Committee saw 28 new candidates joining the IOA, the remaining applications came from members upgrading.

FIOA

Philip Hainsworth
Shiu-Keung Tang

Corporate members

John Cullen
Sarah Dennison
Jamie Easton
Ezekiel (Kiel) Edwards
David Fink
Rebecca Gabriel
James Gardner
James Hardacre
Miles Hodge
Thomas Jenkins
Iain Kelly
Gregor Massie
James Melville
Laura McNeill
Lukasz Milewski
Mollie Mitchell

Jameson Mweu (Musyoki)

Sam Peckham
Andrea Ricci
Nicklaus Tan
Charles Toher
Jack Tunstall
Matthew Vaughan
Allen Wiggill

Associate members

Najwa Adnan-Smith
Ehsan Ahmadi
Hari Baskar
Edward Beynon
Sophie Bryan
Paul Challender
Sarah Cook
Dave Cross
Alasdair Cruickshank
Paul Hawthorne
Martin Higgins

Elliot Knight

Yong Lee Low
Ian Macfarlane
Jacob Mathew
David McCann
Stephen McDonagh
Jayan Mistry
Daniel Moiseiwitsch
Jillian Monkhouse
Robert Nelms
Thomas Potter
Dorothy Poulter
Dylan Reay-Bennett
Nattapatr Senavattanagul
William Shuttleworth
Mohammad Zaid Siddiqui
Torrans Swallow
Faith Victoria van Jaarsveld
Pedro Vazquez
Robert Watson
Chris Whitelock

Kyle Wilson

Jonathan Wood
Ignas Zubriakovas

Research member

Helen Whitehead

Technician members

Abodunrin Aliu
Tomasz Stec

Affiliate members

Luke Comer
Samuel Coulbrook
Mohamed Hamza
Charlotte Pollock
James Robbins
Herbie Robson
Katerina Sandamas
Ethan Sweet
Wang Ki Yuen

Institute of Acoustics competitions for young people aged 7-25

The IOA has run two competitions each year since 2021: one for primary school-aged children and one for secondary school-aged children. This is a great way to encourage children to think about sound and the soundscapes around them.

The Institute has successfully run both primary and secondary school competitions in previous years, attracting strong interest from pupils, and we plan to continue these initiatives in 2025 and beyond. The IOA encourages members to spread the word by letting their children, friends and local schools etc. know about this year's competitions.

This year's competition for older children and young people (aged 14 -25) has a noticeably different feel and the IOA is thrilled to invite as many as possible to enter. The competition has been revised to make it more accessible to both UK and international pupils. We've also expanded the age range by introducing two distinct categories.

These changes are designed to encourage greater diversity and inclusivity, inviting more young people to engage with the Institute and help promote awareness of the importance of sound in our everyday lives. We look forward to receiving a wide variety of creative submissions and sharing some of the highlights with our members and the wider public.

UK primary schools' competition: What sounds do you like? What sounds don't you like?

Children are asked to produce a hand-made drawing, picture, patchwork, collage or similar to illustrate some of the sounds they like to hear and some of the sounds (noise) they don't like to hear.

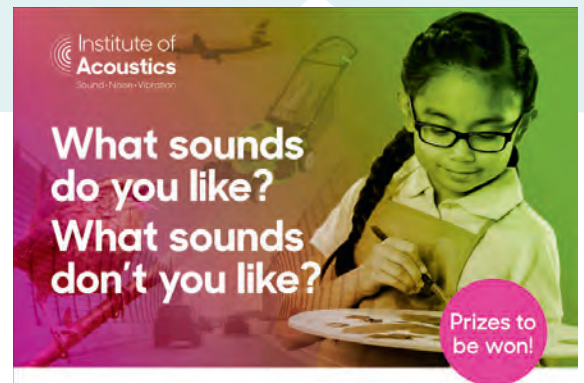
The format of this competition is similar to that in previous years, except that there are now two age categories: Category 1 is for children aged seven to nine and Category 2 is for children aged 10 or 11.

The winning entrant(s) will each receive a prize of £25 plus a prize of £500 for their school or education group. The winning school or education group will also receive an engraved crystal trophy. For each age category, the winner plus one friend or winning group, one teacher and one parent/guardian per child will also be invited to visit their nearest science centre. In addition, the winning school or education group will be given the opportunity for a STEM Ambassador who is a member of the IOA to visit them to present the award and speak a little about what it is like to work in acoustics.

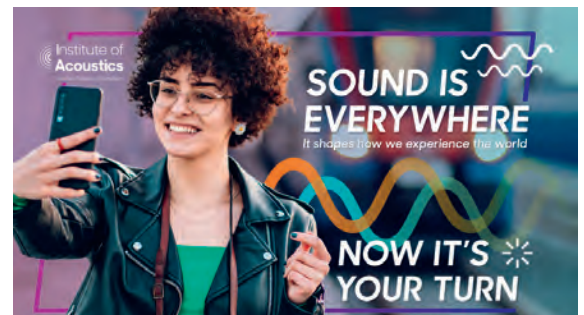
IOA 2025 young persons' competition: Sound unleashed: discover, create, inspire!

This year's competition for older children has had a revamp! The IOA is seeking fresh, creative presentations that inspire and educate others on the importance of sound.

Below: UK primary schools' competition



Below: IOA 2025 young persons' competition





The competition is to make a short, engaging video (up to five minutes) showing why sound is so important in our everyday lives and how it impacts people in meaningful ways. Entries can be submitted as part of an educational body (school, college, university) or directly.

Video presentations can include audio recordings, graphics, drawings, text and video clips.

There are four categories for participants based on age and location:

Ages 13–16
UK-based

Ages 13–16
International

Ages 17–25
UK-based

Ages 17–25
International

The winning entrant(s) in each category will each receive a £100 gift voucher. UK winners will receive an invitation to present their work at the Houses of Parliament during the Noise Abatement Society (NAS) annual awards ceremony, with reasonable travel and subsistence expenses. ©

Deadline for entries for both competitions is 31st July 2025.

More information can be found on the IOA website at <https://www.ioa.org.uk/news/what-sounds-do-you-what-sounds-don%E2%80%99t-you-uk-primary-schools-competition> and <https://www.ioa.org.uk/news/sound-unleashed-discover-create-inspire-ioa-2025-young-persons-competition>

Above: A glorious entry for the primary schools' competition

Conference & Awards 2025

Wednesday 25th June 2025
Crowne Plaza, Birmingham
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This year's conference will cover:

- Health effects of noise
- Emerging technologies
- Applications of bespoke assessment methods

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

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ACOUSTIC AWARDS 2025

The Awards look for projects which demonstrate delivery of value and quality for the client, go beyond current good practice, justify how any problems were overcome and show creativity and innovation.

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

ANC | ACOUSTICS & NOISE CONSULTANTS

Visit to Heathfield Academy for British Science Week!

British Science Week endeavors to raise awareness and create interest in science, technology, engineering and maths. It took place between 7-16 March this year with the theme of 'change and adapt', which plays a big part in the scientific world. Reena Mahtani threw herself into it and this is her report.

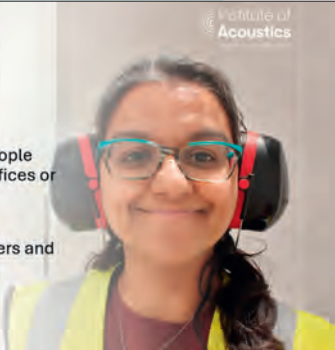
By Reena Mahtani FIOA

Reena's Career in Acoustics

I am an Acoustic engineer.

I work on designing buildings where people live, study or work, such as schools, offices or apartments.

I measure noise using sound level meters and then use a computer for calculations.



Vicky's Career in Acoustics

I work at AtkinsRéalis

- Finding out how noisy a new road or construction site could be, in people's homes
- In an office or at home
- Doing maths, talking to people and writing reports



Project Reverb started with the vision of getting as many acousticians as possible into schools during British Science Week 2025.

Volunteers working on the project, like me, were split into different teams to develop resources and promote them, so everyone in the industry would feel empowered to go into their local schools and share everything they know about acoustics.

As part of this, I signed up to become a STEM ambassador in 2024. The training is quite basic – it is mostly related to what being a STEM ambassador means and safeguarding. Once this is complete, the next step is to go through the paperwork for the DBS. In my case, I am an occasional helper at my local Beaver and Cubs group and as I had already undergone DBS checks through the Scouts, I just

Above: Reena's introduction to the pupils at Heathfield Academy

Above right: Vicky's career résumé for her school visits

had to do an ID check to confirm the details in my certificate were correct and valid. And that was it! I was ready to go.

Heathfield Academy

STEM Learning, the organisation behind STEM ambassadors, also host additional training sessions so you can pick and choose whatever you think you will need to know. I have completed a few sessions to help me prepare for my objective, which was a visit to Heathfield Academy in South Croydon as part of British Science Week 2025. This school was highly commended in the IOA primary schools' competition in 2024 with a piece of art created by a team of four children, one representative from each of the Key Stage 2 years, including my eldest son (proud mum moment). The artwork included contributions from each child

explaining their favourite sounds, from drums to churches and nature. The piece brings together the different sonic experiences of the children and reflected the diversity of the school.

Vicky Wills and I visited the school on a sunny Wednesday in March to talk about acoustics and do some experiments with Years 4, 5 and 6. We ran a one-hour session with each of the years, with 60 children per session, and even though it was a bit repetitive to cover the same content three times, we were amazed by how different each of the groups were and the questions they asked.

We talked about what we do in our daily lives, our jobs, how different spaces sound and why, how sound travels around and how noise can be mitigated. This is when we whipped out our music boxes and did our first experiment



Above: Confusaphones demo at a previous STEM event

on ground-borne noise. The confusaphones also made an appearance with one of the groups, who were super organised and managed to finish all our activities very quickly. They were incredible.

Have a sticker

And of course, each child got a sticker to take home! Did you know stickers help promote science? People will ask how they got the sticker, and children (hopefully excitedly) will explain what they did to get it and what they learnt. It is an easy win, and who doesn't like a sticker?

It was a really fun day, although tiring! If you are on the fence about doing it, please be aware there's a plethora of resources



Above: Heathfield Academy pupils with their experiments

available and some of the Project Reverb materials are now also on the Members' section of the IOA website (<https://tinyurl.com/ioaprojectreverb>) so everyone can make use of them. Even the design for the stickers has been uploaded so everyone can print their own. And if you have any comments or need support, we are always happy to help.

Project Reverb will be continuing for another year where we plan to build upon the resources that we have and reach more volunteers. The only caveat is that, after the experience, random children will wave hello at you when they see you or ask if you remember them! ☺

Below: Vicky and Reena presenting at Heathfield Academy



British Science Week 2026 will take place between 13 and 22 March.
www.britishsienceweek.org

Sustainability and artificial intelligence – an energy problem or big data opportunity?



As part of the sustainability series of articles in Acoustics Bulletin, it seems time to discuss AI, which is gathering pace in its influence in the work acousticians do.

By Peter Rogers in discussion with Dr Andrew Mitchell (Lecturer in Artificial Intelligence and Machine Learning for Sustainable Construction at the Bartlett School of Sustainable Construction) at University College London

Our digital energy footprint is a difficult thing to trace and measure. It considers the total energy consumption of any machine being used and the energy consumed while running software. It also includes any energy that has been expended in the development of the tool being utilised. Therefore, every email, text, message or call has associated upstream emissions which contribute to the overall Scope 1 and Scope 2 emissions carbon footprint of a business or organisation. Quantifying that meaningfully becomes a challenge for accurate and responsible sustainability practices and these all must be considered. This is why I asked a well-respected acoustician, who now lectures in AI, with his area of work otherwise being in soundscapes.

Following the IOA and UKAN+ meetings held over the past year or so, I've had a growing concern about the associated energy use. I felt that exploring this topic through the lens of sustainability in a conversational style may be helpful to members. In this article we unpack this particular 'can of digital worms'.

- Questions I have included:
- should the providers in the supply chain bear the responsibility of addressing the the emissions generated by their services (such as Microsoft, Apple, Google, Meta etc); or
 - should emissions related to AI use remain a relevant concern for the acoustician, to consider in order to take responsibility for digital footprints when robustly considering baseline emissions?

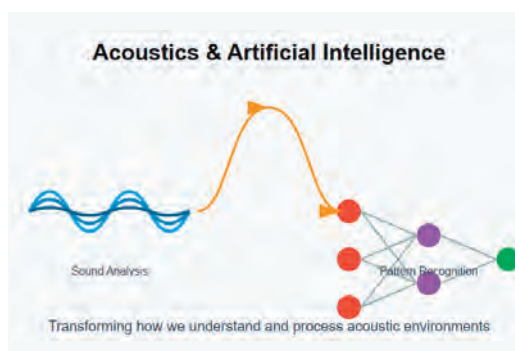
Artificial Intelligence is a potential game-changer, from big data



Above: Dr Andrew Mitchell



Above: ChatGPT-4o-generated



Above: Claude AI-generated



Above: Gemini generated

processing to image creation. This article is dedicated to exploring the use and efficacy of AI in acoustics as a credible part of the industry tool kit, which can also be a part of delivering sustainable outcomes. This is a question I will return to once hearing from Dr Mitchell.

I began by asking three generative AI tools (Gemini, Claude, ChatGPT) the same (very polite for some reason) question: *Please generate an image I can use in an article about acoustics and AI and also tell me what energy it took to create it in GHG equivalents*". The three responses are shown at the bottom of page 22.

The responses on energy used in their generation were reported as varying from 'negligible' from Gemini, to 'far less than 0.001 kg CO₂e' by Claude, and '~0.024 kg CO₂e (or 24 grams CO₂e)' by ChatGPT-3, with a comparison to driving 150m in a petrol car. So, the best guess would be that the above images could be equivalent emissions of a ½ km drive in a petrol car. That's worth thinking about

given the scale of the use now taking place across our industry.

I asked Dr Mitchell to set out how the energy use for different generative AI models varies, and which are the most energy intensive in his specific fields of acoustics?

AI and energy consumption, Dr Mitchell's response:

AI is quickly infiltrating our daily professional lives, whether through large language models (LLMs) like ChatGPT that summarise documents, or through text-to-image models that help to add colour to our presentations. Concerns have been raised about the energy requirements of these generative AI models and whether they have a place alongside sustainability initiatives. Articles including those in the BBC¹, MIT Technology Review², and Nature³ have all pointed to the complicated issue of AI energy consumption, and how energy demands will only grow as generative AI becomes more commonplace.

In acoustics, my work is dedicated to developing tools for

advancing soundscape engineering – the application of soundscape principles to acoustics engineering practice. Towards this, I develop models which can describe urban soundscapes and predict people's perception and emotional response to sounds. We've used classic machine learning and statistical techniques (which typically have minimal computational and energy costs) such as clustering analysis, random forest models and multi-level regression, as well as more complex and modern AI models.

We're also working on generative AI models which allow users to feed in an image or video of a location and generate audio of the soundscape it represents. This works in a similar way to image generation models like Stable Diffusion, which transform a text prompt to produce an image. [P24](#)

References

- 1 <https://www.bbc.co.uk/news/articles/c20g3dr4n4no#>
- 2 <https://www.technologyreview.com/2024/05/23/1092771/>
- 3 <https://www.nature.com/articles/d41586-024-00478-x>



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Jack Richardson, Hilson Moran Partnership Ltd

* Not accredited by UKAS

When researchers talk about AI models in acoustics, they could be talking about generative AI (like the examples above), but more likely they are talking about much smaller and more specialised models. These might range from machine learning models for data analysis – often effectively no different or more power-intensive than a linear regression – to BirdNet, a neural network for AI-powered bird sound recognition that can run on smartphones. AI is a very broad umbrella term and most of its applications within acoustics will have very little energy use or carbon emissions implications beyond any other computer models.

Generative AI

When referring to AI in construction or acoustics, criticism is often directed towards general purpose 'AI tools' (like ChatGPT) rather than industry-specific AI models. The growing size of these generative AI tools since their breakthrough in 2021, is measured using parameters or storage space. When released in 2021 ChatGPT's most powerful model, GPT-3, was made up of 175 billion parameters (requiring 350GB of storage). For reference, GPT-2 comprised 'only' 1.5 billion parameters. The largest LLM available now, GPT-4o, has additional functions such as image, video and audio generation, leading to a total of 1.5 trillion parameters. This means that the amount of computing power needed to train and run these models has vastly increased. They also take vastly more computing power than essentially any other type of AI model.

Data centres

Data centres (which are not just for AI but also power the internet and streaming services) are the lifeblood of these generative AI models and require massive amounts of power. Often this power requirement is clearly nationally significant, with data centres forecasted to account for more than 20% of Ireland's total energy consumption for example⁴.

The energy and carbon emission impacts of AI data centres are also quite complex to determine,

especially if not paired with low-emission energy sources. An in-depth study from Hugging Face estimated that training a customer LLM known as BLOOM produced 25 metric tonnes of CO₂e – roughly equivalent to 30 flights between London and New York⁵. However, the true figure is minimised as it was trained on a French supercomputer, powered primarily with nuclear energy. Training models on data centres in countries with more carbon-intensive power systems results in significantly increased emissions, by a factor of three to 20 times, depending on factors such as the model itself, the computing hardware and energy sources. As an example it goes on to say that ChatGPT-3 is estimated to have used 500 metric tonnes CO₂e during training.

There's an important distinction to make between training and use, which is especially relevant for this conversation about sustainability concerns of companies using these models as consumers.

Energy costs

Training is the single most computationally and energy intensive part of producing these models, but it is effectively 'one-and-done'; all of us using ChatGPT are now benefiting from that same training effort. On the other hand, each use of a model incurs its own new energy cost. Every time we send a query to a model in the cloud, a data centre is consuming energy to run it through the trained model. For 1,000 queries, this is estimated to range from about 7 Wh for text summarisation, to 288 Wh for text generation, to 519 Wh for image generation⁴. For an individual user, this may not be a concerning amount in itself – based on these numbers, relatively heavy use (like mine) could amount to the equivalent of running a laptop for about 20-30 hours – but regular use across a whole company or industry or sustained use for things like AI agents certainly adds up.

Ultimately, the energy system and carbon impacts of these AI tools are complex and difficult to determine. They depend on the specific model and its size, the

energy source for the data centres, the balance between training and usage, the task being performed and the pattern of use.

What I'd most like to see is industries examining what it is they want these AI tools to achieve and, where possible, developing or identifying smaller, more targeted models for their specific needs. In many cases this can have other benefits, such as better task-specific performance or the ability to run smaller models locally (on your own computer or company server) which potentially reduce costs as well as ensuring data privacy (an extremely important topic for industrial AI use which we haven't touched on).

That is one for another time I think Dr Mitchell, but something for all to think about what they would consider to be 'targeted use' of AI in acoustics.

Conclusions

The main point I took after speaking to Dr Mitchell when thinking about AI in acoustics is yes, 'generative AI' tools are massively energy intensive and are likely to become even more so in the future, unless optimised for the task they are targeted to do. At first, it may seem that the impact is relatively small, but the scale of use makes it worth quantifying when taking a deep dive into the carbon equivalent costs of your own digital footprint.

It strikes me that an estimated twice the energy use for image creation verses text generation is something to pay particular attention to while fossil fuels are in the energy mix for data centres, also to challenge why this is needed or justified.

We must be careful not ignore the true impacts or tar all forms of artificial intelligence with the same oily brush, but ChatGPT and other large language models (LLM) are currently generally there for convenience and time-saving rather than substantial technical analysis, but that is likely to change it seems, and embracing that change by at least attempting to quantify the carbon footprint seems to be the responsible step. Industry-specific models, such as the ones that Mitchell himself uses, are not

References

- 4 [https://www.nature.com/articles/d41586-025-00616-z#ref-CR2\[5\]](https://www.nature.com/articles/d41586-025-00616-z#ref-CR2[5]) <https://www.technologyreview.com/2022/11/14/1063192/>
 5 <https://chatgpt.com/>

comparable in scale or energy consumption to the massive data centres that power LLMs, and direct energy use of computers is covered by scope 1 and 2 footprinting, but it may be a sensible approach to make a science-based estimate of your digital footprint as scope 3 impact and report that to add pressure on tech companies to clean up the energy that they use to run their data centres as part of their supply chain responsibilities.

Mitchell says (as Casey Crownhart states in her article for the MIT Technology Review⁵), “rising electricity demand from AI is in some ways no different to rising demand from EVs, heat pumps or factory growth. It’s how we meet that demand that matters.” He concludes: “If we can move to generate energy from exclusively renewable sources, then the energy

consumption of LLMs would not add to our digital energy footprint”.

We are clearly not there yet, but I’ll be adding an estimate for our digital footprint to our scope 3 carbon footprint reporting for sure.

Digital tools should serve people

When it comes to the usage of small-scale, industry-specific AI models, consumption need not provide a barrier to their use and development in acoustics. As LLMs continue to expand we must though be conscious of their impact and ask ourselves whether their benefits outweigh the significant challenges that they pose to sustainable developments within acoustics and across broader society. If the growth of AI leads to a fossil fuel boom, then these concerns will only continue to plague this

exciting and dynamic development, whereas a renewable energy-driven infrastructure will offer a friction-free route ahead.

We leave the last word to AI (represented here by OpenAI’s ChatGPT-4o as the winner of the detail given in its answer on energy related to the image created). I uploaded the article and asked it for a conclusion and after some coaxing to be frank it came up with this:

*“The future of acoustics delivering sustainable outcomes won’t be shaped by Big Tech’s trillion-parameter models, but by professionals who demand that digital tools serve people **and** the planet. If tech giants won’t clean up their energy act, maybe it’s time your industry started asking louder questions”* OpenAI’s ChatGPT-4o[5]. Well said! 🗨️

Dr. Andrew Mitchell is a lecturer in artificial intelligence and machine learning for sustainable construction at University College London. His work ranges from the development and training of machine learning models for analysing urban soundscapes to the application of AI in the construction industry such as its use in digital twins and construction management.

Peter Rogers is the co-chair of the Sustainable Advisory Group for the IOA and Managing Director of Sustainable Acoustics Ltd (a carbon neutral company).



EDI discussions lead to a plan of action



Results of a survey completed by members of the IOA, UKAN+, CIBSE and IOP helped to steer discussions at a recent EDI Day with the theme ‘integrating equity, diversity and inclusion into acoustics, physics and building services’.

By IOA EDI Working Group members, Angela Lamacraft of Sustainable Acoustics Ltd and Simone Graetzer of the Acoustics Research Centre, University of Salford

On 20 March, members of the IOA Equity, Diversity and Inclusion (EDI) Working Group, the Noise Network Plus, UK Acoustics Network Plus (UKAN+), the Association of Noise Consultants (ANC), the Chartered Institute of Building Services Engineers (CIBSE), the Institute of Physics (IOP), the EDI Hub+, EqualEngineers, Constructing Rainbows, Defra, the Environment Agency, AECOM, AtkinsRéalis and others came together for an EDI Day at the Institute of Physics (IOP) offices in London. The main aims of the day were to understand the current EDI challenges and explore best practice and potential actions.

In the morning, those attending heard examples of the

Above: Some of the team that joined the IOA and the UK Acoustics Network Plus for a day discussing how to improve equity, diversity and inclusion in acoustics, building services engineering and physics

discrimination experienced in acoustics, physics and building services engineering and reviewed findings from the EDI survey conducted in February and March of this year. Some experiences shared during the drop-in sessions and via the survey were extremely concerning: they very much reminded those of us at the EDI Day why we need to help our industries avoid such harmful practices in the future.

Improving the membership experience

During the second session, the various organisations shared their

Codes of Conduct, EDI policies and EDI training practices so that we could learn from each other and discuss what works and what needs improvement.

The final session of the day focused on tangible actions that the IOA can take to improve the experience of our members. These will be reviewed and a plan of action for implementation will be developed.

Thank you again to everyone who responded to our EDI survey and attended the morning drop-in sessions; your insights have been hugely valuable in guiding our conversation. ☺

If anyone is interested in joining our multi-organisation EDI ‘workshop’ group and/or being invited to future events, please send an email to Simone at s.n.graetzer@salford.ac.uk

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Bioinspired multifunctional lightweight engineering solutions for noise control applications

Mostafa Ranjbar explains how learning from the naturally architectural cellular structures of woodpeckers' beaks, dragonfly wings, bones and trees help to develop lightweight materials for noise and vibration mitigation applications in aerospace and automotive applications.

By Mostafa Ranjbar, Lecturer in Mechanical Engineering, Faculty of Engineering and Natural Sciences, Cranfield University

The geometry of cellular structures can be engineered to provide extraordinary mechanical properties and multifunctional features in materials, which can filter and reduce the harmful travelling mechanical/acoustic waves over wide frequency ranges.

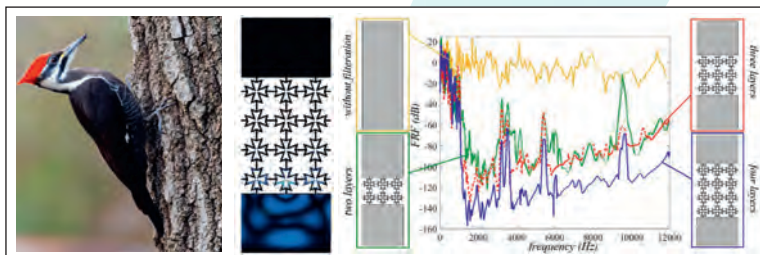
The cellular structures of the woodpecker beak, dragonfly wings, bones and trees have common lightweight characteristics with significant tuneable mechanical properties and by learning from these natural structures, we could develop practical solutions for noise and vibration mitigation applications. The internal geometry of the cellular structures can be designed to provide a tuned mechanical stiffness distribution and mitigate the travelling vibration and acoustic waves while their total mass and original materials remain unchanged. Furthermore, fast 3D printing of such structures provides an extra advantage.

Back to nature

In one of our projects at Cranfield University, we developed lightweight sandwich panels with architecturally designed cellular cores, which helps to emit less noise from trains, aircraft and cars into the surrounding medium.

The lightweight cellular structure of a woodpecker's beak is naturally designed to filter the imposed impact waves generated while the bird is drilling into trees by preventing the harmful vibration transmission into its brain. We used this mechanism to develop lightweight vibration dampers.

Below: Bioinspired phononic vibration dampers

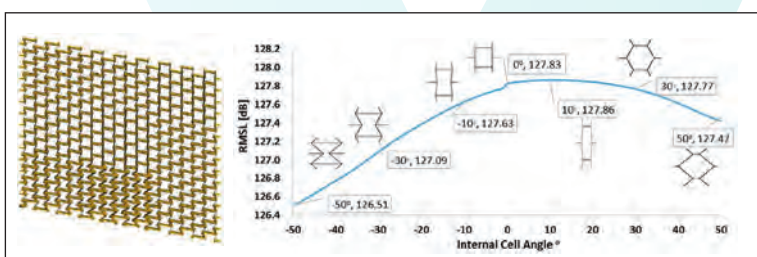


In another work, we learned from the structure of the dragonfly wing to develop multifunctional lightweight cellular structures, which could manipulate the emitted noise while enhancing the flyability and energy consumption features of aircraft wings.

Below: Bioinspired lightweight structure for multifunctional noise control applications



Right: Adjusting the internal geometry of a honeycomb cell can reduce its noise radiation

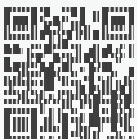




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BS 8233 proposals: what do people really think now?

Jack Harvie-Clark and Ben Fenech have been researching the industry’s perception of the proposed updates to BS 8233.

By Jack Harvie-Clark



The proposals to revise the residential design aspects of BS 8233 were first presented in the UK at the IOA conference in September 2025. Follow up events included an IOA webinar at the end of September which reached the IOA Zoom account limit of 500 participants.

Following the feedback from this and other events, Jack Harvie-Clark and Ben Fenech have developed and communicated further information about the proposals, which they have shared at subsequent events. The purpose of these questionnaires was to understand the perception of those people who have sought an opportunity to understand the proposals in greater detail, and ask any questions they liked about them. They have already used early responses to update and refine the information that they are communicating about the proposals, to address the concerns of the acoustics community.

The IOA is currently conducting its own survey of members’ views, and has links to many sources of information about the proposals at <https://www.ioa.org.uk/bs-8233-resources>

In this article they share the feedback that they have received from people who have attended one of the webinars or in-person events between January and March 2025 including the IOA Scottish

Branch webinar *Deeper Dive*, the IOA workshop *Deeper Dive* in Manchester, the Sussex Pollution Working Group webinar, the NE England Environmental Health group webinar and the West Midlands Environmental Protection Group.

Questionnaires

The questions were made available to participants in two parts, to enable a few questions to be asked following relevant presentations and Q&A sessions. The first part asked questions around noise and health, with three questions, and the second part about façade sound insulation or internal levels, with six questions. The questionnaire comprised multiple choice questions (MCQs), with an opportunity for free narrative comment after each question. The

response to each MCQ is presented first in this report, followed by a thematic analysis of the narrative comments. As no questions were compulsory, there are slightly different numbers of responses to each question. Participants gave their permission for their responses to be used in this way and no personally identifiable information was requested from participants.

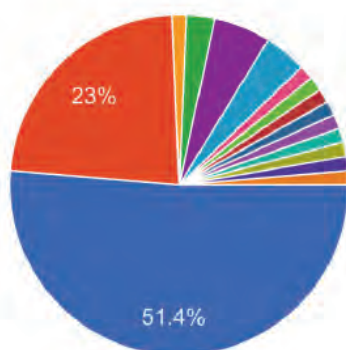
Part 1: noise and health

The breakdown of respondents is shown below. Most respondents who are not ‘acoustic consultant, private sector’ are in the public sector, identifying with a wider variety of roles than private sector consultants. These questions have a good balance between respondents from the private and public sectors.

N.B. The feedback reported in this article represents the opinions of participants at events and respondents to the questionnaire, not those of the author nor of the IOA.

My main job is:

74 responses



- Acoustic consultant, private sector
- Acoustic practitioner, public sector
- Planning consultant (non-acoustic), pri...
- Planning practitioner (non-acoustic), p...
- Environmental Health Officer
- EHO
- EPO
- EHO regional coordinator

Question 1: The current state of knowledge on noise and health warrants more emphasis on sound levels outside people’s home

From the 71 responses there was support for this statement, with the majority (59%) of respondents agreeing or strongly agreeing, 10% disagreeing and 31% remaining neutral. The minimal disagreement suggests broad acceptance that external noise levels deserve greater emphasis based on current evidence, though the substantial number of neutral responses could indicate some reservation or uncertainty amongst respondents. Of the seven respondents who disagreed, five identified as private sector consultants and two as public sector practitioners.

Themes in comments to question 1

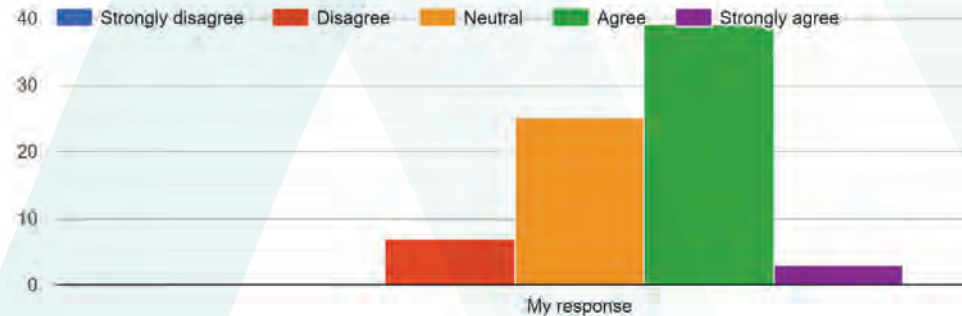
The comments revealed a central tension between the emphasis on external versus internal noise levels. While some respondents supported the need to consider external noise and its impact, others argued for the continued priority of internal criteria due to practical application and enforcement reasons. Contextual factors such as regional variations, policy balance, development constraints and the importance of personal control over one’s environment were also highlighted. Several respondents acknowledged the need for more research on internal noise levels and advocated for a person-centered approach that prioritises health and wellbeing.

Question 2: Our standards and guidelines should take account of how different sources of transportation sound affect people’s health to different extents

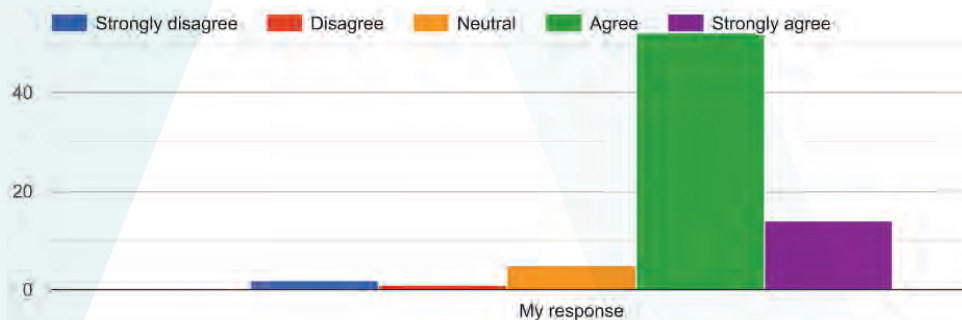
This question received the strongest agreement of the first three questions, with 89% of the 71 respondents (63 people) agreeing or strongly agreeing, 4% (three people) registered disagreement or strong disagreement, and 7% (five people) remaining neutral. This overwhelming support suggests strong consensus that different transportation noise sources should be treated differently in standards and guidelines, reflecting their varying health impacts.

Themes in comments to question 2

The comments revealed strong support for source-specific approaches to noise assessment, acknowledging that different noise sources have varying impacts.



Above: Responses to question one



However, concerns were raised about implementation complexity and the need for practical assessment methods. Respondents emphasised the importance of considering cumulative impacts from multiple sources and combined health effects. Additionally, there was a call to broaden the scope of noise considerations beyond transportation sources, including neighbour noise and other types of sounds, while also addressing potential socioeconomic inequalities.

about implementation rather than disagreement with the concept itself.

Question 3: Sound exposure categories set out useful markers for navigating the impact of noise in residential planning

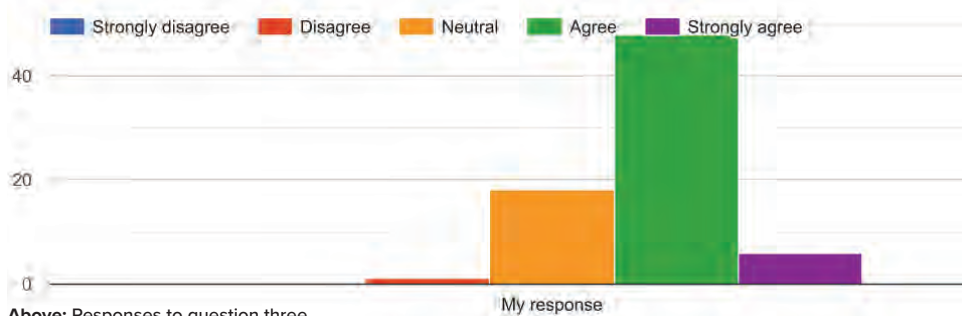
70 people responded to this question, again showing significant support, with 75% (51 people) agreeing or strongly agreeing, 1% (one person) disagreeing, and 24% (17 people) remaining neutral. The very minimal disagreement paired with substantial agreement indicates support for sound exposure categories as valuable planning tools. The moderate number of neutral responses could reflect caution

Themes in comments to question 3

While generally supporting the use of sound exposure categories, the comments revealed concerns about their practical application and interpretation, especially by local authorities. Respondents emphasised the need for clear guidance and standardisation to prevent misuse. Questions were raised about the relationship between planning and development decisions and the SECs, as well as the importance of considering contextual factors such as inter-departmental collaboration, source diversity and the potential for overspecification. Some respondents also suggested refining the conceptual clarity of the categories.

Across the first three questions, the pattern showed consensus on the need to emphasise external noise levels, differentiate between transportation sources and support to utilise sound exposure categories as planning tools, though with varying degrees of enthusiasm and some uncertainty remaining.

P32



Above: Responses to question three

Part 2: façade sound insulation

A smaller number of people submitted responses to this second questionnaire, with 60% of respondents identifying as being acoustic consultants in the private sector and most of the others associated with public sector roles.

Question 4: Specifying façade sound insulation according to the health effects of noise (i.e. having different internal level targets for different sound sources) seems appropriate

The responses generally showed support for aligning façade sound insulation with the health burden rather than absolute decibel level, with 69% (40 out of 58 responses) agreeing or strongly agreeing. Only 7% (four people) disagreed with the proposal to specify façade sound insulation according to health effects of noise, with 24% (14 people) remaining neutral.

Themes in comments to question 4

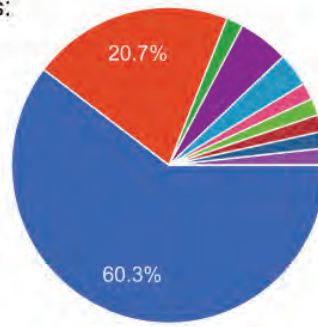
Health burden equivalence emerged as a predominant theme, with respondents suggesting that designing to achieve the same health burden across different noise sources is more appropriate than targeting identical internal noise levels regardless of source. Implementation concerns were frequently mentioned, particularly regarding how this approach would be integrated into planning guidance and assessed for compliance by local authorities. Evidence base questions appeared in several comments, with some respondents querying the strength of evidence linking external noise levels to health impacts and calling for more robust data. Simplicity versus accuracy trade-offs were noted, with some respondents suggesting that treating all transport sources identically would be simpler to implement, even if less scientifically accurate. Other noise sources were consistently mentioned, with respondents highlighting that transportation noise is not the only consideration and guidance for industrial, music, sports and other sources would also be needed.

Question 5: There should be options for the designer to:

- Determine façade sound insulation by SEC
- Design to internal levels if they prefer
- Design to internal levels ONLY

My main job is:

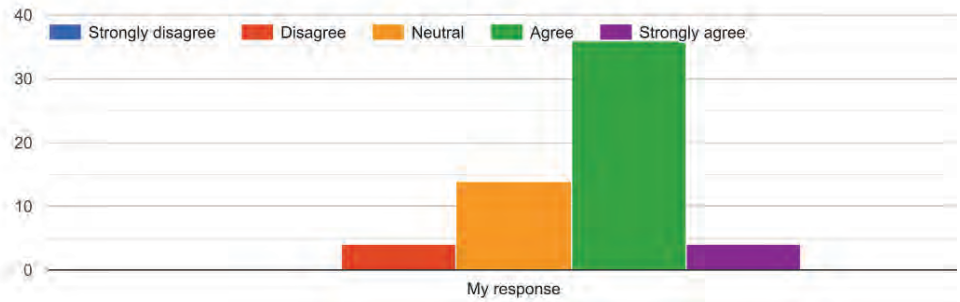
58 responses



- Acoustic consultant, private sector
- Acoustic practitioner, public sector
- Planning consultant (non-acoustic), pri...
- Planning practitioner (non-acoustic), p...
- Environmental Health Officer
- EHO
- LA LGO
- EH Regional Coordinator - former IOA...

1/2

Below: Responses to question four



Respondents showed clearest support for determining façade sound insulation by SEC with the option to design to internal levels, while there was less support for designing to internal levels only. 69% of respondents (39 people) agreed or strongly agreed with the first statement, while only 7% (four people) either disagreed or strongly disagreed. Given the option to design to internal levels, 72% (41 people) agreed or strongly agreed, while 6% (three people) either disagreed or strongly disagreed. There was general opposition to the option to design to internal levels only, with 29% (15 people) either disagreeing or strongly disagreeing, and only 17% (nine people) agreeing or strongly agreeing.

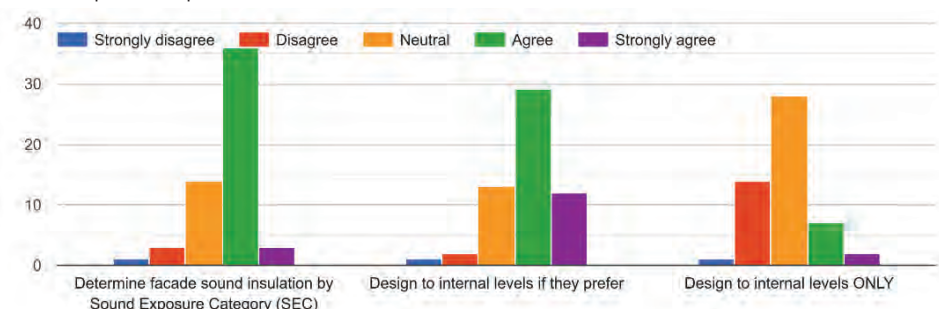
Themes in comments to question 5

Flexibility in design approach was strongly endorsed in the comments,

with respondents favouring multiple options for designers to choose the most appropriate method for each situation. Internal noise considerations beyond transportation sources emerged repeatedly, with several respondents noting that very low internal noise levels might make other noise sources (such as neighbour noise or internal building services) more noticeable or problematic. Comments mentioned the usefulness of internal noise levels for designing planning conditions and providing a clearer basis for compliance checks. There were specific mentions of accounting for uncertainty in laboratory versus real-world façade performance. Respondents also highlighted the importance of frequency assessment, the risk of over-specification, and the value of professional judgment, as well as potential issues with façade sound level measurements

P34

Below: Responses to question five





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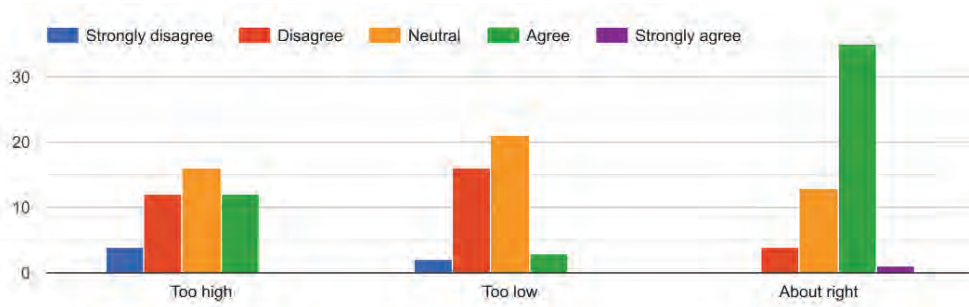
Question 6: A benchmark of 35 dB L_{den} internally for road traffic noise is:

- Too high
- Too low
- About right

The benchmark of 35 dB L_{den} internally for road traffic noise saw the strongest support for this being ‘about right’, though a notable minority considered it either too high or too low, with more people considering it to be too high than too low. 68% of respondents (36 out of 53 people) agreed or strongly agreed with the level being ‘about right’, with only 8% (four people) disagreeing with this option. 43% (18 people) disagreed or strongly disagreed that it is too low, with only 7% (three people) agreeing that it is too low. 36% (16 people) disagreed or strongly disagreed that it is too high, against 27% (12 people) who agreed it is too high.

Themes in comments to question 6

Measurement indicator preferences were evident in several comments, with some respondents expressing a preference for maintaining the well-understood $L_{Aeq,16hr}$ metric rather than adopting L_{den} . Evidence basis questions appeared in comments requesting clarification on the research supporting the 35 dB benchmark. Day-night relationship concerns were raised about how L_{den} incorporates day, evening and night periods. Practical implementation challenges were mentioned regarding certain development types, with respondents



Above: Responses to question six

noting that equivalent night-time levels of approximately 25 dB might be difficult to achieve in some scenarios. Several respondents indicated they needed more time to evaluate the proposed standard in its entirety before forming a definitive opinion on this specific benchmark.

Question 7. The proposed minimum facade sound insulation of 30 dB $D_{nt,A,1r}$ is:

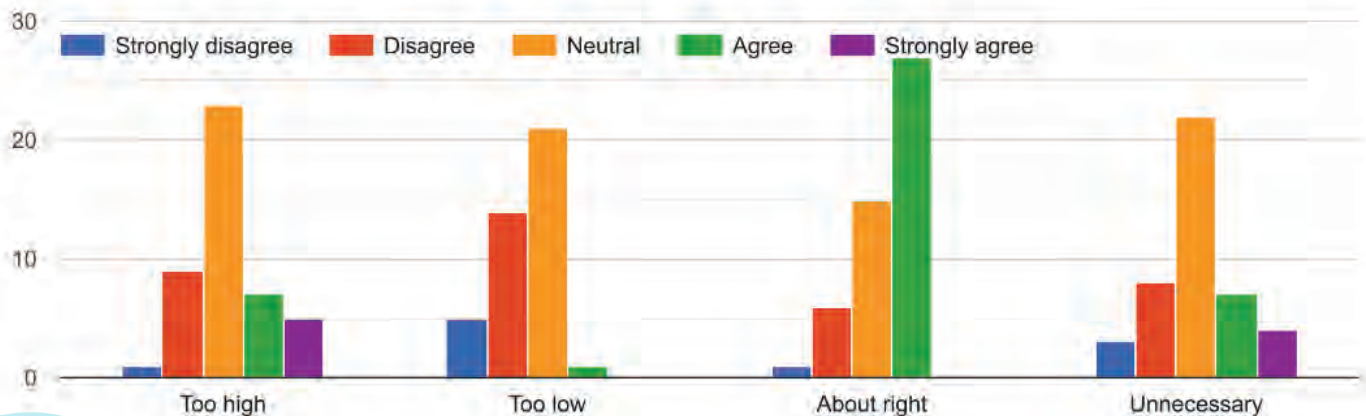
- Too high
- Too low
- About right
- Unnecessary

The minimum facade sound insulation of 30 dB $D_{nt,A,1r}$ showed the most divided opinions, with ‘about right’ receiving the most support with 55% (27 of the 49 respondents) agreeing, 14% (seven people) disagreeing or strongly disagreeing, and 31% remaining neutral.

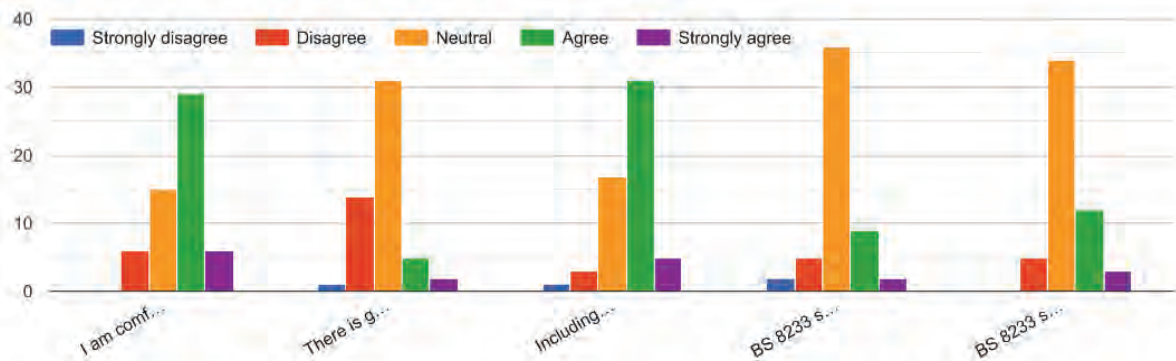
Themes in comments to question 7

Construction industry practicalities emerged as a significant theme, with comments highlighting

concerns about validation quality, particularly for change of use developments. Several respondents noted that window manufacturers typically use different metrics (R_{TRA} or $R_w + C_{tr}$ rather than $D_{nt,A,1r}$). Context-sensitive application was frequently mentioned, with respondents suggesting that minimum requirements should be determined case-by-case rather than universally applied. Some respondents expressed concern about enforcing high minimum values in quiet rural areas where very low internal ambient noise might be undesirable. Acoustic environment balance was highlighted by those who noted that ‘too quiet’ environments can be as disturbing as those that are too loud, with several respondents drawing on anecdotal experience with complainants to support this view. Over-specification risk was identified by respondents concerned about the economic impact of requiring higher performance windows than necessary, particularly in quiet locations with large glazing areas.



Above: Responses to question seven



Above: Responses to question eight (see full text of statements below)

Question 8: For noise from events (expressed in terms of L_{max}), to what extent do you agree/disagree with the following statements?

- I am comfortable specifying and/or complying with L_{max} criteria
- There is good quality evidence linking L_{max} criteria to long term health outcomes (please provide further details below)
- Including additional L_{max} criteria in BS 8233 will add value to residential acoustic design
- BS 8233 should include L_{max} criteria for all situations (please suggest suitable references below)
- BS 8233 should include L_{max} criteria only for specific situations (please suggest suitable references below)

The responses to this question revealed significant tensions in professional opinion about L_{max} criteria. Most notably, there was a stark contrast between respondents' comfort with using L_{max} criteria and their assessment of the supporting evidence. While 63% (35 out of 56) of respondents agreed or strongly agreed they were comfortable specifying/complying with L_{max} criteria, only 13% agreed or strongly agreed there is good quality evidence linking L_{max} to long-term health outcomes, with 28% disagreeing and 58% remaining neutral.

Despite this acknowledged evidence gap, 63% of respondents agreed or strongly agreed that including L_{max} criteria in BS 8233 would add value to residential acoustic design and only 7% disagreeing. This suggests practitioners consider L_{max} useful in practice regardless of health evidence limitations.

The responses were more divided on whether BS 8233 should include L_{max} criteria universally or only in specific situations. More respondents supported situation-specific criteria (28% agreeing/strongly agreeing) than universal application (21% agreeing/strongly agreeing), though neutral responses dominated both

questions, reflecting uncertainty in the community.

Themes in comments to question 8

Evidence versus practical utility was the dominant theme, with numerous comments acknowledging the lack of robust health evidence for L_{max} while simultaneously expressing reluctance to abandon a measure that practitioners believe to be valuable. The phrase 'lack of evidence of correlation isn't evidence of a lack of correlation' captures this sentiment. Specific application contexts were frequently identified where L_{max} was deemed particularly useful, including emergency service sirens, night-time economy noise and intermittent disturbing sources. Contextual information value was highlighted by several respondents who suggested that L_{max} provides important contextual understanding of noise environments that average measures might miss. Risk of unscrupulous practice was mentioned by those concerned that removing L_{max} entirely might enable developers or contractors to avoid addressing potentially harmful noise events. Emerging evidence was cited regarding certain impulsive sounds, suggesting the evidence base may be evolving on specific L_{max} applications.

Question 9: Guidance on sound insulation or limits for other (non-transportation) sources should be in:

- BS 8233, even if there is a lack of robust evidence
- Planning guidance outside BS 8233 (e.g. TAN/PAN, ProPG)

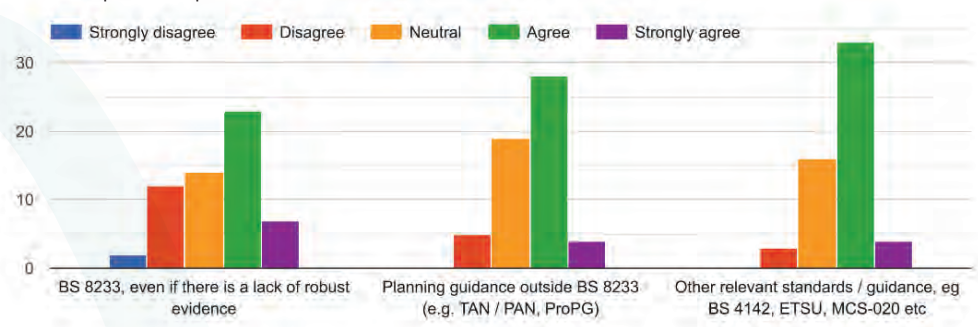
- Other relevant standards/guidance, e.g. BS 4142, ETSU, MCS-020 etc

The responses show clear preference for where guidance on non-transportation noise sources should be located. The strongest support was for including this guidance in 'Other relevant standards/guidance' (e.g. BS 4142, ETSU, MCS-020), where 66% (37 of 56 people) agreed or strongly agreed, closely followed by 'Planning guidance outside BS 8233' (e.g. TAN/PAN, ProPG), where 57% agreed or strongly agreed. There was less support for including such guidance in BS 8233 itself, with 52% in favour but with 24% disagreeing or strongly disagreeing. Fewer respondents expressed disagreement with the second two suggestions.

Themes in comments to question 9

Comprehensive approach advocates argued that since BS 8233 provides guidance on noise insulation generally, it isn't logical to limit its scope to only transportation noise. Several respondents expressed concern that an updated standard focusing exclusively on transportation noise might lead to other noise sources being overlooked by developers. Cross-referencing preferences were evident in comments suggesting BS 8233 should include details or references for all situations, with some respondents advocating for specific methods or appropriate cross-references to other standards for non-transportation sources. P36

Below: Responses to question nine



The agent of change principle was highlighted by respondents who noted that BS 4142 and similar standards should apply to designs of new developments, with responsibility for protecting inhabitants falling to whoever introduces the change (the ‘agent of change’). Practical guidance value was emphasised by respondents suggesting that any guidance, even with limited evidence, would be preferable to leaving practitioners without direction. Standards misapplication concerns were raised about how existing standards are sometimes applied to circumstances they weren’t designed for, such as using guidance intended for one context to assess another (e.g. using noise rating curves for internal levels of commercial noise).

Acknowledgements

I am grateful to all the people who expressed their opinions in the questionnaires and the BS 8233 committee for challenging questions and providing feedback throughout.

Conclusion

The feedback from these deeper-divide events demonstrates broad professional support for the fundamental principles underlying the proposed BS 8233 revisions. There is clear consensus that our standards should evolve to reflect current evidence on noise and health, particularly regarding external noise levels and source-specific impacts. The concept of SECs has been positively received as a tool to help navigate planning decisions.

However, the responses also highlight important implementation concerns that will need careful consideration as the standard develops. Practitioners value flexibility in approach, with strong support for maintaining multiple design options rather than prescribing a single methodology. The tension between evidence-based approaches and practical application is particularly evident in responses regarding L_{max} criteria, where respondents acknowledge the limited evidence base while still valuing these metrics in practice.

The feedback emphasises the importance of clear guidance, appropriate cross-referencing to other standards and consideration of the broader planning context in which BS 8233 will operate. Concerns about consistent interpretation by local authorities, potential socioeconomic implications and the relationship with housing delivery targets are recurring themes that will need addressing.

Overall, these responses provide valuable insights from practitioners who will be applying the standard daily. The high levels of engagement and thoughtful comments demonstrate the acoustics community’s commitment to developing robust, evidence-based, yet practical standards that genuinely protect health while enabling necessary residential development.

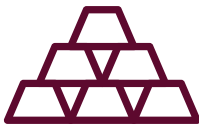
Summary headlines (TLDR)

- Strong support for evidence-based approach**
 Most respondents (59%) agree that current knowledge on noise and health warrants more emphasis on external sound levels, reflecting the latest WHO evidence base. Only a minority (10%) disagree, the remainder remaining neutral.
- Near-unanimous support for source-specific criteria**
 89% of respondents support accounting for how different transportation sources affect health to different extents, showing strong consensus for this shift in approach.
- Sound exposure categories well received**
 75% of respondents view sound exposure categories as useful markers for navigating noise impact in planning, though many comments express caution about implementation.
- Preference for option to design façade for internal sound levels**
 Most respondents favour having multiple design options (SEC-based and internal level-based) rather than restricting designers to one approach only.
- Internal level 35 dB L_{den} benchmark for road traffic noise broadly accepted**
 68% of respondents consider the proposed 35 dB L_{den} internally for road traffic to be ‘about right,’ though there are some concerns about practical implementation.
- Mixed views on minimum façade insulation**
 The proposed 30 dB $D_{nT,A,w}$ minimum requirement received the most divided response, with significant support but also concerns about over-specification in quiet areas.
- L_{max} invokes a professional dilemma**
 While 63% of respondents are comfortable using L_{max} criteria and believe they add value to residential design, only 13% think there is good quality evidence linking L_{max} to long-term health outcomes.
- Non-transportation noise guidance preferred elsewhere**
 Respondents favour including guidance on non-transportation noise in other standards or planning guidance rather than within BS 8233, though with appropriate cross-referencing.
- Implementation concerns throughout**
 Across all questions, respondents expressed concern about practical implementation, consistent application by local authorities, and balancing noise criteria with housing delivery needs. 🗣️

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Appointment of Executive Director for Education and Digital Strategy

The IOA is embarking on an important new chapter in the development of its education services to better serve its members and wider acoustics community.

By Alistair Somerville, Immediate Past President and Education Strategy Leader

In response to evolving professional needs and a changing global landscape, the Institute is committed to enhancing its infrastructure and educational offering to better serve its members and the wider acoustics community. A central goal is to significantly increase our international presence and to make high-quality acoustics education available to learners anywhere in the world.

To lead this transformation, the IOA has created a new role: Executive Director for Education and Digital Strategy.

Left: Mary-Jane Newton, IOA Executive Director for Education and Digital Strategy



This role is pivotal in delivering the Institute’s long-term educational goals by reimagining how courses and content is developed, structured and delivered, alongside ensuring a self-sustaining future income stream.

Welcome Mary-Jane Newton

I am pleased to announce that Mary-Jane Newton has recently been appointed to this position. Mary-Jane brings with her a wealth of experience in education, digital innovation and service development, having held senior roles with organisations such as Oxford University Press, Macmillan Education, Imagine Learning, and Nord Anglia Education. Her background combines expertise in education and professional development, technology-enhanced learning and global education markets.

With academic qualifications in communication studies, media, business and artificial intelligence, Mary-Jane is widely recognised as a thought leader in education and technology. She is a regular speaker at industry events and brings a forward-thinking, collaborative approach to innovation in education.

In her new role, Mary-Jane will lead the strategy for the Institute’s diploma and continuing professional development programmes. She will explore new models of delivery,

strengthen partnerships with academic institutions and industry and identify opportunities to expand the Institute’s educational footprint internationally.

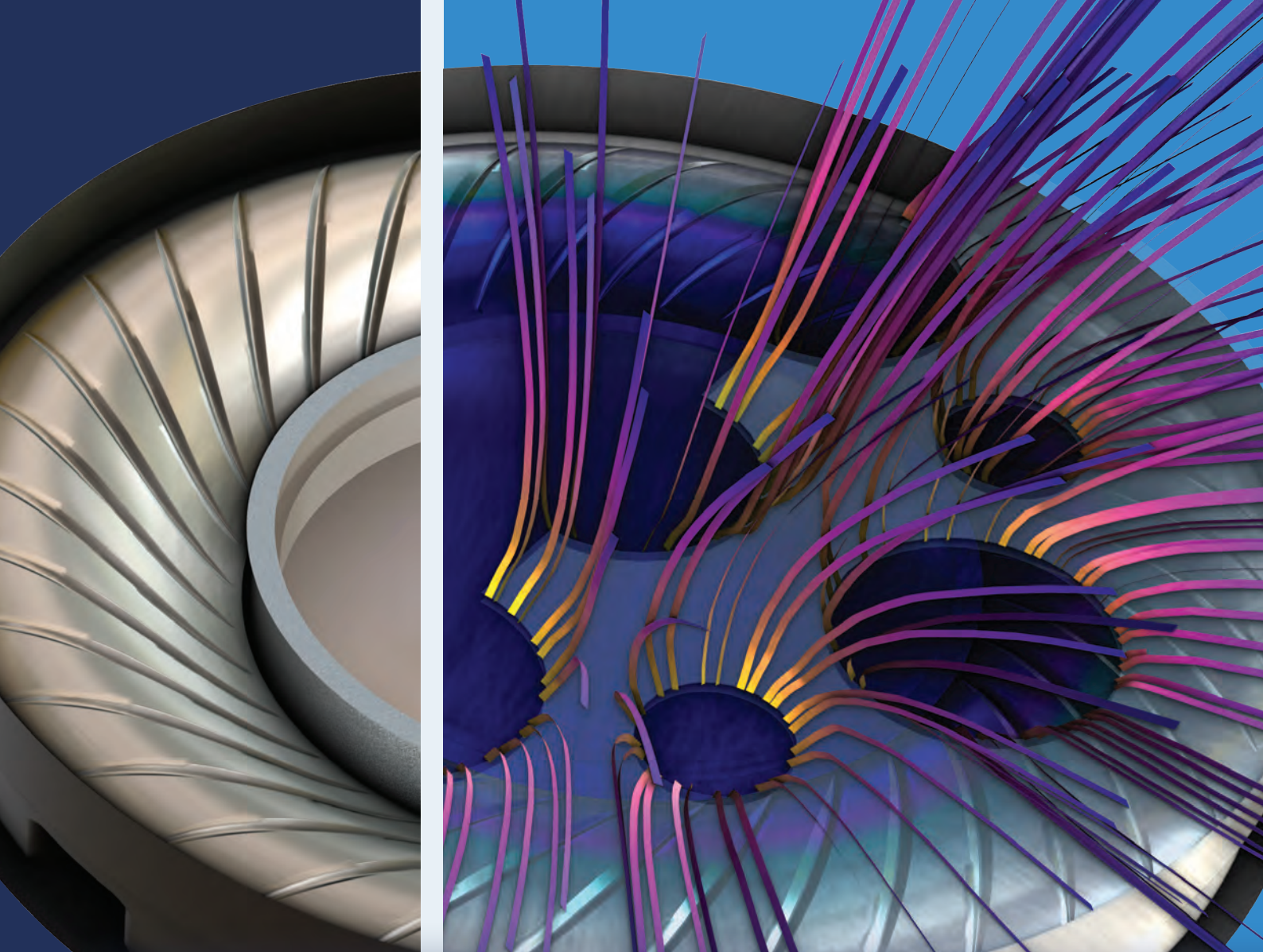
She will work closely with the marketing team, as well as the IOA’s extensive network of stakeholders to ensure our education strategy aligns to ongoing efforts in digital infrastructure and furthers our mission as a membership organisation.

Commenting on her appointment, Mary-Jane said: “The field of acoustics is endlessly fascinating and I am excited to join such a vibrant and committed professional community. I look forward to working collaboratively to deliver our ambitious education strategy and will ensure that it supports acousticians at every stage of their careers.”

Chris Barlow, Chair of the IOA Education Committee, added: “This appointment is a significant step forward in our strategic vision for education. We lead the way in delivering acoustics training in the UK and beyond and we are proud to continue to invest in the future of learning for our profession.”

This is a pivotal moment for the IOA. We are committed to educational excellence, innovation, and global engagement and the creation of this new role reflects this.

Please join me in welcoming Mary-Jane to the IOA. ☺



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The IOA Bursary Fund update

IOA Council allocated £10,000 to the Bursary Fund, which it aims to use in both improving IOA members' access to acoustics-related training and activities and also helping them to carry out acoustics-related STEM activities, where funding from other sources may be limited or unavailable.

By Reena Mahtani FIOA, Chair of the Bursary Fund

The winter round of the Bursary Fund closed for applications at the end of February with three applications received before the deadline. The first one asked for support with diploma fees, the second applicant asked for assistance travelling and attending The Art of Being a Consultant conference in Manchester. The third applicant requested funding to attend Euronoise and the associated summer school in Málaga.

The first two applications were accepted for funding. The third one, however, was rejected due to the applicant's field of work being related to the conference and the summer school proposed. We acknowledge this can sometimes be a grey area and even though a person's main role is not directly related to the proposed activity, there may be overlaps and we cannot provide funding in these cases.

Timely applications please

A fourth application was received on the very last day but sadly needed a bit more work. Feedback was given to the applicant, and we hope they resubmit during the spring round. Please bear in mind that I am always happy to do a first pass at applications before passing them to the review panel and, as part of that, I can ask for additional information or for clarifications to be included. This helps improve the quality of the applications and maximise the chances of obtaining funding, so please do not leave it for the last day if possible.

Spring round is still open

We have also received expressions of interests and emails asking questions about the process and



types of activities that can be funded, which is always positive! By the time this edition of Acoustics Bulletin reaches you, the spring round will still be open for applications until the end of May, so if you or someone you know could benefit from financial assistance from the Institute for training or STEM activities, please get in touch!

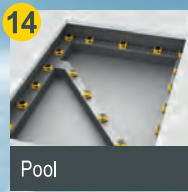
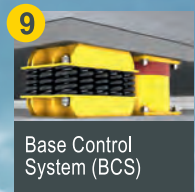
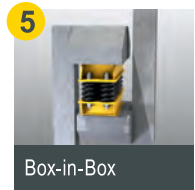
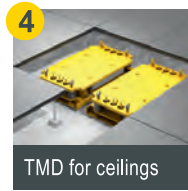
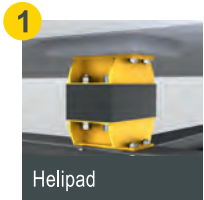
Good luck! ☺

IOA Bursary Fund applications can be submitted by members at any grade, either as individuals or as a consortium. The IOA Executive and Council recognise the ongoing impact of economic uncertainties on the acoustics community, so have decided that applications from members who have recently lost their job, or those who are struggling to find employment, will be prioritised. See the application form here: www.ioa.org.uk/can-we-help/bursary-fund-application-form

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Current parliamentary and policy news

Over the past weeks the IOA has continued to advocate for clear noise policy guidance to protect health in accordance with the Noise Policy Statement England, as Government reforms to strategic planning policy take shape.

Above: Acoustic alerts have been discussed as an important potential safety measure for e-scooters if their use in public places is to be made legal

Our Irish Branch broadly welcome redrafted guidance for environmental noise assessment and in Parliament, ministerial support is expressed for updating testing methodology for noise from outdoor equipment to protect access to EU markets.

England: proposed land use strategy needs clear noise policy

In responding to the Government consultation on a strategic national approach to land use in England, IOA emphasised the need for clear policy guidance to ensure environmental noise is properly assessed. With large scale noise developments proposed – including 1.5 million homes, energy and transport infrastructure, this would allow for properly planned mitigation to avoid significant effects and to minimise adverse effects of noise on health and quality of life, in accordance with the Noise Policy Statement for England. We also propose that measures must be taken to protect tranquil areas with high amenity value, so that the high-quality soundscapes they provide continue to deliver health benefits. Our response also highlights the role of environmental health practitioners in supporting local planning authorities who would need sufficient resourcing to enable them to provide necessary advice on noise that will prevent health impacts arising.

Read the full response here: <https://www.ioa.org.uk/publications/response-consultations>

Ireland: Response to noise guidance (NG4) consultation

In responding to a consultation on revised guidance for assessing environmental noise – the IOA Irish Branch commended the Environmental Protection Agency (EPA) for providing a comprehensive draft guidance document. The Branch emphasised the importance of the NG4 in maintaining environmental standards while supporting sustainable industrial development for EPA license holders. Comments include concerns raised about the appropriateness of smartphone apps as suggested for subjective assessment, stating these are not suitable for measuring or assessing environmental noise, as only competent persons should be completing noise impact and compliance assessments. The inclusion of increased competency requirements is welcomed as critical to producing high-quality assessments and reports that can be relied upon.

See all comments in the full response here: <https://www.ioa.org.uk/publications/response-consultations>

Minister supports updated regulation on testing methods for outdoor equipment noise

During the second reading of the Product Regulation and Metrology Bill, Jonathan Reynolds, Secretary of State for Business and Trade, acknowledged the need for regulation on equipment noise stating: “The Bill will ensure that the UK is better placed to address modern-day safety issues... It will enable us to reduce burdens

on business and keep up with technological developments, for example by updating the outdoor noise regulations in Great Britain. It will align testing methods across the UK, which was overwhelmingly supported in our recent call for evidence, and it will protect the public from noise pollution from products like lawn mowers and power generators.” The Bill is set to provide enabling powers allowing the Government to update outdoor equipment noise regulations in line with recent EU updates. In responding to a call for evidence in autumn 2024, IOA expressed the view that maintaining alignment with EU regulations is crucial for preserving EU market access and preventing migration of testing expertise, along with scope to enhance these requirements through adoption of additional measurement methods and standards.

Read the transcript of the debate here: <https://tinyurl.com/JRdebatetranscript>

Consultation: National Policy Statement for nuclear generation

A consultation has been undertaken on a new National Policy Statement for nuclear energy generation for England and Wales, as part of the ongoing review of planning policy. This follows a consultation last year on an approach to site assessment for nuclear energy. The draft consultation states “While significant noise, vibration, or air quality issues are unlikely during operation, construction-related transport may have local impacts.”

Noise is covered in detail in the Appraisal of Sustainability (<https://tinyurl.com/nuclearEN>). The consultation ran until 3 April 2025 (<https://tinyurl.com/draftEN7>)

Guidance on applications for linear infrastructure projects

Guidance has been published on preparing applications for linear nationally significant infrastructure projects. This advice, covering England and Wales, focuses on electric lines, gas transporter and other pipelines, the transfer of water resources and onshore transmission works included as associated development to offshore wind generating stations. Much of the advice is also applicable to roads and railways and the advice will be updated as different project types appear (<https://tinyurl.com/linearprojects>).

Call for evidence on impacts of airport expansion

The Environmental Audit Committee have issued a call for evidence on 'Airport expansion and climate and nature targets'. This aims to establish the targets which Ministers ought to ensure are met under its policy to support airport expansion. This includes examining to what extent the provisions of the current Airports National Policy Statement (ANPS) (which specifies the mitigation of adverse impacts on health and quality of life from noise) are supported by current evidence and projections on aviation growth. The enquiry accepted written evidence until 24 April 2025 and the IOA considered its response.

See the call for evidence here: <https://committees.parliament.uk/work/9061>

Gatwick airport expansion decision delayed

In February the Secretary of State for Transport, Heidi Alexander MP, announced she was "minded to approve" the operation of a second runway at Gatwick airport, however a final decision is being delayed to allow additional time to seek views from all parties on planning provisions. The Planning Inspectorate initially advised against approval, however measures to address noise and surface transport problems have been put forward to manage the

issues identified. The deadline for a final decision is 27 October 2025.

Read the Planning Inspectorate report here: <https://tinyurl.com/Gatwicknrunway> and the Government Statement here: <https://tinyurl.com/Gatwicktransportplanning>

Noise reduction targets for Europe recommended

A report by the European Court of Auditors has found that while European cities have cleaner air, they are still too noisy. The report states it proved difficult to assess progress made in reducing noise pollution – mainly due to gaps and delays in assessing and reporting on noise pollution by most EU member states. It also considers that the lack of EU noise reduction targets disincentivises member states to prioritise actions to reduce noise pollution effectively and, that the noise reporting thresholds only cover part of the EU population that may be exposed to harmful levels of noise. The audit was conducted as the European Commission is halfway through its 2030 zero-pollution targets. It recommends introducing EU noise-reduction targets and noise limits to the 2002 Environmental Noise Directive and aligning the noise exposure reporting thresholds as closely as possible with those recommended by the World Health Organization.

Read the full response here: <https://www.eca.europa.eu/en/publications/SR-2025-02>

Acoustic alerts for e-scooters

Acoustic alerts have been discussed as an important potential safety measure for e-scooters if their use in public places is to be made legal. The Department for Transport commissioned TRL and Warwick Manufacturing Group (WMG) at the University of Warwick. The research suggests that a standard universal alert sound could be used by all operators and manufacturers to avoid confusion and that it would be useful if distance and direction of travel could be easily detected from the sound. They also suggest that differentiating acoustic alerts so that e-scooters can be distinguished from e-bikes may be useful. In addition, it was

put forward that any artificially generated noise should be able to be switched off in some environments, e.g. if they are being used indoors.

Read the full report here: <https://tinyurl.com/e-scoots>

New Briefing Note: The health and social costs of road noise

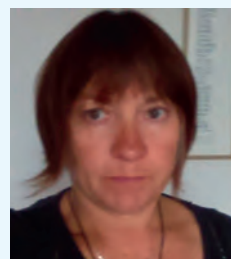
It has been estimated that the annual social cost of urban road noise in England ranges from £7 billion to £10 billion, similar to the cost of road accidents (£9 billion). Meanwhile the make up of the vehicle fleet is changing as combustion engines are replaced with electric vehicles. This new IOA briefing note sets out the sources of noise from roads and how it can be reduced. It explains that while EV motors are quieter than combustion engines, once vehicles are travelling at 50km/hr the contact between tyres and the road is the main source of noise we hear and the key to reducing road traffic noise.

Aimed at explaining this to the public and policy makers, it is available for download here: <https://tinyurl.com/bnroadnoise>

Wales: Consultation on permitted development for ASHPs

The Welsh Government is consulting on changes to permitted development rights including those for air source heat pumps (ASHPs). Views are sought on whether greater flexibility for the installation of ASHPs should be allowed, potentially introducing greater consistency with England. The consultation also covers electric vehicle charging points and pop up campsites. The IOA are convening a working group to consider a response.

The consultation is open until 1 July 2025 and you can see it here: <https://tinyurl.com/Walesdevrights> ©



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

Development of a practical approach to predicting flow-induced sound from duct termination grilles

Railway tunnel ventilation systems pose particular challenges for predictions of sound emissions, including the relatively high volumetric flow rates, and a lack of well-established models and empirical data. An investigation was undertaken in support of the acoustical design of tunnel ventilation systems on the UK HS2 project, in view of the project environmental commitments and noise constraints. This was aimed at identifying or developing practical prediction models for the flow-induced sound generated by duct termination grilles. Relevant literature was reviewed to identify existing prediction models and underlying theory. The information obtained from the review was used to develop practical models using available empirical data, including tests over a relatively wide range of flow velocities.

By Michael J B Lotinga (WSP) and Gennaro Sica (HS2 Ltd)

Ventilation systems serving railway tunnels provide vital air refreshment and temperature control during normal use, as well as fume or smoke extraction in emergency situations.

They differ from more typical building ventilation services insofar as they are scaled to accommodate very large volumes of air movement and may need to operate at considerably higher air flow velocities than might generally be encountered in other types of system.

Ducted ventilation system atmospheric terminations are often covered with a form of grille to prevent solid agents from entering the system, which could otherwise cause damage. To maintain the required system ventilation performance, protection provided

at atmospheric terminations must maintain an acceptable system pressure loss, which requires sufficient open area. Mesh grilles are one way to provide system protection while maintaining an acceptable pressure loss.

From the perspective of control of ventilation sound emissions, the termination device may present particular difficulties. This is because:

- 1 by obstructing the flow, ensuing turbulence inevitably causes sound to be generated; and
- 2 technical mitigation for atmospheric terminations can be challenging, due to the positioning at the end of the ducted system chain, which constrains downstream mitigation. Furthermore, termination grilles in many cases will not be optimised for controlling turbulent

sound emissions. Flow-generated sound caused by contractions or obstructions is characteristically dipolar or quadrupolar, with energy that scales exponentially with flow velocity [1]. Accordingly, the relatively high flow velocities associated with a tunnel ventilation system mean that atmospheric terminations could be key elements contributing to the total sound emission into the external environment. Reliable estimates of the flow-generated sound power of the termination are therefore important, since the emitted sound energy could impact on noise-sensitive locations.

Widely-used engineering codes of practice governing predictions of ducted ventilation plant sound sources include CIBSE Guide B4 [2], and the ASHRAE handbook [3], the

latter of which declines to offer a prediction method for flow-generated sound of termination devices. Guidance on flow-generated sound predictions within the CIBSE Guide B4 is contained in Appendix 4.A2, the two parts of which address ‘bends, takeoffs, transitions’ and ‘duct terminations’, respectively. The CIBSE guidance is focused primarily on indoor applications and ‘room diffuser’ type terminations; wider applicability to atmospheric

terminations comprising mesh grilles, especially large-scale systems operating at relatively high flow velocities, is uncertain. As part of the acoustic design development of the High Speed Two (HS2) tunnel ventilation systems, an evaluation was undertaken of available engineering methods, with the aim of identifying a suitable approach to assessing the system design against the relevant environmental commitments.

Approach

To support the investigation, archive empirical data were obtained for tests of mesh grille flow-generated sound at relatively high system velocities [4]. These test data were available for three grille designs, including two types of metal circular-strut mesh, and a plastic ‘eggcrate’ grid design (see Table 1 device references A, B and C — additional test data were subsequently incorporated, as discussed below¹).

Device ref	Grille description	Grille dimensions (rectangular duct), m	Grille strut type	Grille strut dimension* d, mm
A	Orthogonal metal mesh (25 mm square openings)	1.0 × 0.5	Round	2.5
B	Asymmetric metal mesh (non-uniform rhomboidal openings)	1.0 × 0.5	Round	2.5
C	Glass-reinforced plastic orthogonal ‘eggcrate’ grid (~50 mm square openings)	1.0 × 0.5	Flat (parallel to flow)	4.0
D	Machined slot-perforated metal plate (rectangular openings ~300 mm length, varying width)	1.1 × 1.1	Flat (perpendicular to flow)	5.0**
E	Orthogonal metal mesh (rectangular openings)	0.6 × 0.6	Round	3.0

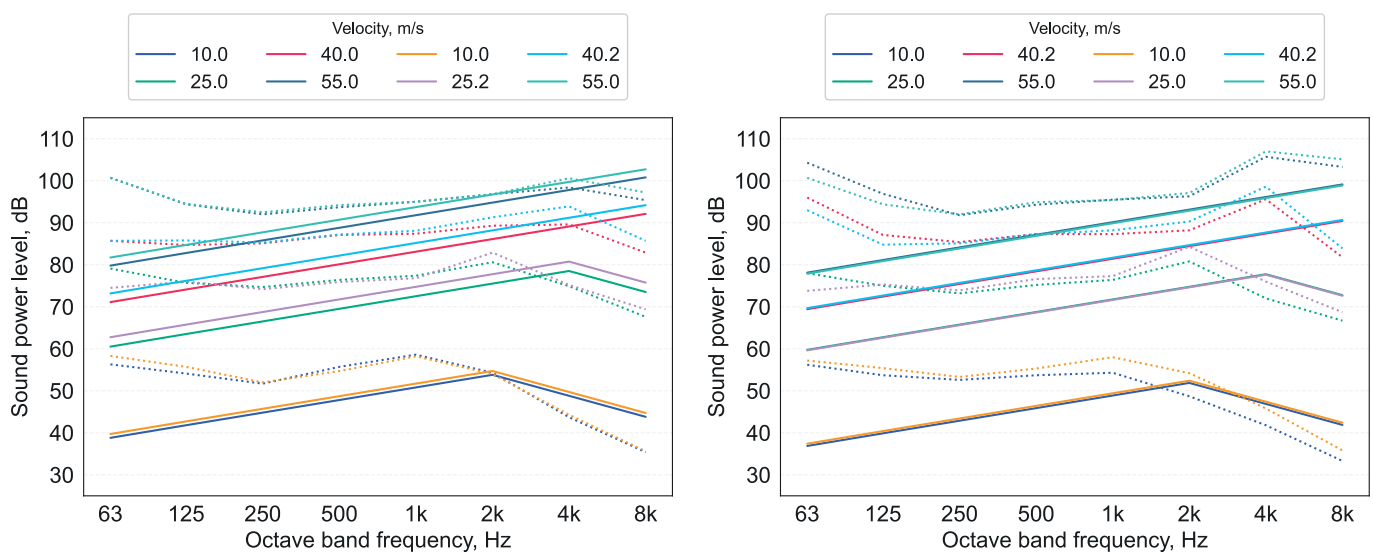
*Estimated based on available information and adjusted according to model peak frequency fit.

**Slot widths varied slightly, imposing a corresponding variation in the strut width. A single, representative, value had to be estimated for use in the prediction modelling.

Table 1: Grille test details¹

Initial predictions were made for the tested grilles using the CIBSE Guide B4 Appendix 4.A2 approach, which produced results that were not in close agreement with the test data (see Figure 1 for example). Consequently,

a further review and investigation were undertaken to interrogate the basis for the model and to identify potential alternative approaches, with a view to recommending a suitable model for making validated predictions. [P46](#)



Above: Figure 1: Predicted sound power level octave band spectra using CIBSE Guide B4 Appendix 4.A2.2 model for mesh grille device refs (left) A and (right) B (see Table 1); dotted lines: measurements; solid lines: predictions

1 Full test information, including acoustic and flow data, is available as supporting information within the full-length HS2 Learning Legacy article: <https://www.researchgate.net/publication/386104434> [36].

Review

The CIBSE Guide B4 clearly distinguishes between flow-impeding elements that reside ‘in-duct’ and those that form the duct termination [2]. For the latter, the estimation method presented in CIBSE Guide B4 Appendix 4.A2.2 was developed using a simplification of an approach based on empirical data for room diffuser elements, as derived from two given source references [5,6]. Consideration of the original publications indicates they are both rooted in the method outlined by Heller & Franken [7] which itself is based on the empirical approach set out in a doctoral thesis by Hubert [8]. Hubert undertook tests on a range of termination devices and elements, including integrated room diffusers, and more elemental gratings, perforated plates and mesh grilles, investigating the effects of the various components, forms and designs on flow-generated sound [8]. The approach presented by Heller & Franken [7] is based primarily on the measurements made by Hubert on room diffusers [8], which were generally observed to exhibit a broadband sound power spectrum characterised in a simplified way by a ‘haystack’ curve rising to a gentle peak at a frequency band determined by the flow velocity upstream of the diffuser. The overall sound power was found to be related to the product of the termination area S (i.e. the duct interior cross-sectional area), the 6th power of the upstream flow velocity U , and the 3rd power of the pressure loss coefficient ζ (defined below). The CIBSE Guide B4 method represents a further simplification of these observations.

The predictions made using the CIBSE Guide B4 approach for the tested mesh grilles can be seen to result in spectral peaks that rise in frequency with flow velocity (Figure 1). This is also evident in the test data, but with peaks occurring in lower frequency bands. A further distinction is that the measured low-frequency spectra do not exhibit the steady, uniform attenuation predicted at low frequencies by the model; the measured values show increases in energy in the lowest octave bands. Possible reasons for these discrepancies can be identified in available literature.

As recounted by Hubert [8], and discussed by Wood [9], flow obstructions can cause several types of periodic sound generation phenomena, including, ‘edge tones’, ‘jet tones’, and so-called ‘aeolian tones’. **Edge tones** are generated when flow encounters a sharp obstructive edge, splitting the flow and causing vortex generation that results in periodic pressure fluctuations. **Jet tones** are caused by contractions in the flow such as may occur with perforations and small flow outlets. **Aeolian tones** are similar to edge tones, but occur

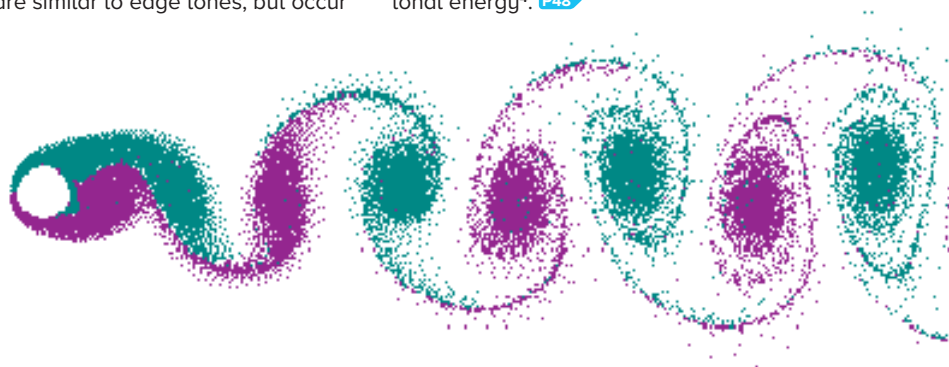
with a streamlined flow obstruction, such as a circular strut, which creates what is known as a ‘von Kármán vortex street’; a series of alternating vortices in the wake of the obstruction, again resulting in periodic sound generation (see Figure 2²).

Iudin³ [10] and Hubert [8] noted that the tone frequency f_{pk} of this phenomenon is determined using:

$$f_{pk} = \frac{StU}{d}$$

Above: Equation 1

Equation 1, St is the Strouhal number, a dimensionless quantity relating the upstream flow velocity U , the obstruction size d (the width of the obstruction perpendicular to the flow, i.e., the cylinder diameter) and the oscillation frequency. The Strouhal number for the aeolian tone generated by a cylindrical body has been estimated empirically as ~ 0.2 — this value is noted by Heller & Franken [7], who acknowledge that specific elements such as rods and perforations in terminations can generate tonal energy⁴. P48



Above: Figure 2: Diagram of periodic fluctuating wake in von Kármán vortex street phenomenon with cylindrical flow obstruction causing alternating vortices (©Cesareo de La Rosa Siqueira, Attribution, via Wikimedia Commons – used with permission)

2 A historical overview of developments concerning sound generation by cylinders in flow is provided by Blevins [41].
 3 The author E. I. Iudin has also authored English-language scientific publications on aeroacoustics (or Russian-language publications translated into English) as ‘E. J.Judin’ and ‘E. Y. Yudin’ (a reflection of the ambiguity of the Russian phoneme).
 4 For ‘wide grids or individual cylindrical rods’, Hubert infers a slightly larger value of ~ 0.21 from the reported test data [8].

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The spectral peak at $St \sim 0.2$ is also identified in the work of Gordon [11, 12] and Heller et al [13, 14] who undertook empirical testing of in-duct flow spoilers, and of whose work Hubert was also aware [8].

In discussing Strouhal's original work, Rayleigh [15] advises that the aeolian tone Strouhal number is related to the kinematic viscosity of air (appearing within the Reynolds number, Re), and, based on empirical investigations, can be estimated using:

$$St \approx 0.195 \left(1 - \frac{20.1}{Re}\right) \approx 0.195 - \frac{5.714631 \times 10^{-6} T^{3/2}}{(T + 110.4)\rho U d}$$

Above: Equation 2

Equation 2 depends on the absolute temperature T (in Kelvins) and density ρ of air, with which the kinematic viscosity of air is estimated using the so-called 'Sutherland formula' [16], with empirical constants taken from Hilsenrath et al [17].

Graham & Faulkner [18] proposed a model for grille flow-generated sound that attempted to generalise the information as presented by Heller & Franken [7], and incorporated the addition of terms for non-cylindrical struts. Examination of the Graham & Faulkner model [18] reveals that the terms for non-cylindrical struts were based on a simplification of the in-duct flow spoiler information in Heller & Franken [7], and disregarded the distinction made therein between the upstream flow velocity (U) and the constriction flow velocity U_c , which is defined as:

$$U_c = \frac{U(\zeta - 1)}{\sqrt{\zeta} - 1}$$

Above: Equation 3

The term ζ in Equation 3 is the pressure loss coefficient, which is related to the flow obstruction pressure drop ΔP by:

$$\zeta = \frac{2\Delta P}{\rho U^2}$$

Above: Equation 4

This work on Strouhal number-dependent aeolian tonal energy provides a possible explanation for the observed divergence between the test data and the predictions made using the CIBSE Guide B4 model, which assumes a spectral peak that is dependent only on the flow velocity and is not explicitly related to the dimensions of mesh grille elements.

A further interesting aspect of the information reported by Hubert is the tests investigating variation in the incident flow turbulence [8]. These indicated an effect on the low-frequency portion of the spectrum, which was accentuated with increasing turbulence. It can be expected that turbulence in the test systems would be likely to increase with increasing flow velocity, which may explain the increased low-frequency energy observed when compared with the CIBSE Guide B4 model predictions in Figure 1.

Another branch of the literature on flow-generated sound from ducted system elements is found in the research underpinning the second part of the CIBSE Guide B4 Appendix 4.A2 (4.A2.1), which concerns in-duct elements including bends, branches and transitions [2]. For these elements, the CIBSE Guide B4 method has its basis in the analytical approach of Nelson & Morfey [19, 20] (which also adopted assumptions founded in the empirical work of Gordon [11, 12]

and Heller & Widnall [14]), developed from Nelson's doctoral thesis [21]. This approach was developed further by Oldham & Ukpoho [22] (also inspired by the work of Iudin [10]), and then subsequently by Waddington & Oldham [23, 24, 25, 26, 27] which resulted in formulae effecting an impressive 'collapse' of the sound power spectra from the various elements towards a single parametric relationship. These formulae were later simplified for adoption in the CIBSE Guide B4 Appendix 4.A2.1 [2]. A key aspect of this branch of the literature is its emphasis on the duct 'cut-on' frequency as a 'pivot point' in the spectral emissions of flow-generated sound from in-duct obstructions. In general, the duct cut-on frequency defines the spectral division between the frequency (or wavenumber) range in which transverse acoustic modes are able to propagate along the duct (above cut-on), and the converse range (below cut-on) in which only planar modes propagate. In these models, different formulae are used for the frequency bands falling above and below the cut-on frequency, to represent these differences in sound wave modal behaviour. The duct cut-on frequency f_{co} is defined for rectangular cross-section ducts as [28]:

$$f_{co} = \frac{c}{2l_y}$$

Above: Equation 5

where c is the sound speed in air, and l_y is the largest cross-sectional dimension. For circular cross-section ducts of diameter d , f_{co} is defined by [28]:

$$f_{co} = \frac{c\Psi_{1,1}}{\pi d}$$

Above: Equation 6

in which $\Psi_{1,1}$ is the 1st root of the derivative of the 1st-order cylindrical Bessel function of the first kind, J_1' (~ 1.84).

From the same essential theoretical basis as these models, Kårekull et al developed the 'momentum flux' model, while also extending the concept to termination devices [29, 30, 31], a development that links this branch of the research back to the purpose of the present study concerning atmospheric grille terminations. It is noteworthy, however, that the measurements of termination devices used by Kårekull [30] to validate the momentum flux model included only (interior) room diffuser elements, rather than (exterior) mesh grilles, the latter of which are of greater interest in the present study.

Initial prediction results

In view of the results for grille predictions made using the CIBSE model (see Figure 1), predictions were then made for the mesh grille test data using each of the approaches described by Heller & Franken [7] (based on Hubert [8]), NEBB⁵, [6], Kårekull et al [31], Bies et al⁶, [32] Sharland⁷ [33] and SRL⁸ [34] to understand if any of these engineering methods could produce a closer match to the test data than the CIBSE model predictions. When undertaking these predictions, additional archive data for grille terminations were also incorporated into the measurement dataset (device references D and E in Table 1) — these were available only for relatively low test flow velocities, but provide a broader set of data for prediction comparisons.

The results of the predictions⁹ are summarised as the root-mean-square error (RMSE) in the predicted sound power level spectra (L_w), and the overall A-weighted sound power levels ($L_{w,A}$) for all of the three tested mesh grilles in Figure 3. Indicative spectral comparisons with the test data are also shown in Figure 4 (for brevity, results in Figure 4 are shown for grille device ref A only).

Figure 3 indicates that prediction RMSEs tend to be larger for lower frequency bands, with broadband A-weighted RMSEs within the approximate range 5–12 dB. Interestingly, the CIBSE Guide B4 model is seen to yield somewhat lower errors than most of the other models in this group, although RMSE values exceed 5 dB and extend up ~ 20 dB at low frequencies. **P50**

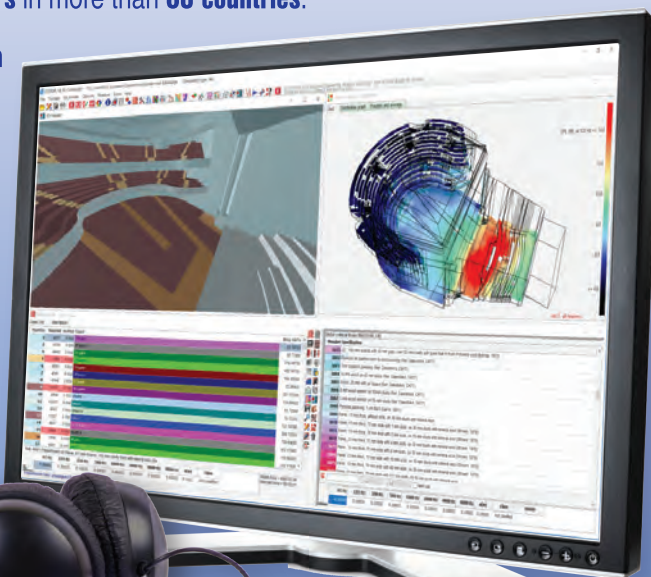
5 National Environmental Balancing Bureau, as cited in the CIBSE Guide B4 [2], and based on a simplification of Heller & Franken [7].
6 This is another version of the Hubert [8]-based approach, citing Baumann & Coney [39], which is a later edition of the same information presented by Heller & Franken [7].
7 This simplified model relies only on the flow velocity and duct dimensions, but was included as it is commonly referenced in engineering reports.
8 Sound Research Laboratories, which provides another simplified model and is also commonly referenced in engineering reports. This model is limited to overall sound power levels, so the spectral terms from Sharland [33] were applied, to aid comparison.
9 Prediction results presented have been made using values for the sound speed c calculated using the empirical approach of Wong & Embleton [40], assuming a relative humidity of 50%, dry air molar mass of $0.02895 \text{ kgmol}^{-1}$, and universal gas constant value of $8.3145 \text{ JK}^{-1}\text{mol}^{-1}$, with air density ρ calculated as $\rho = P_0 / (R_a T)$, where P_0 is static atmospheric pressure at ground level, assumed to take a value of 101325 Pa , and R_a is the specific gas constant for dry air, assumed to take a value of $287.058 \text{ Jkg}^{-1}\text{K}^{-1}$.

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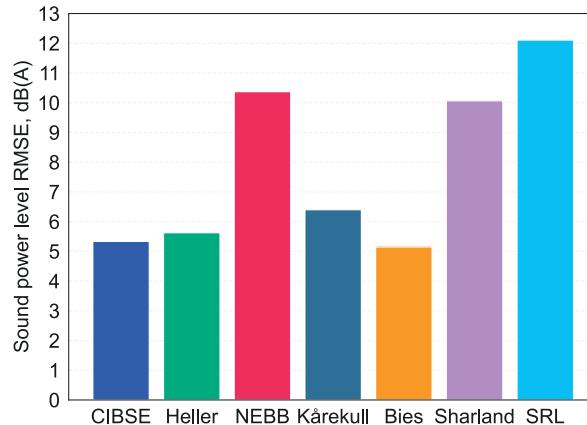
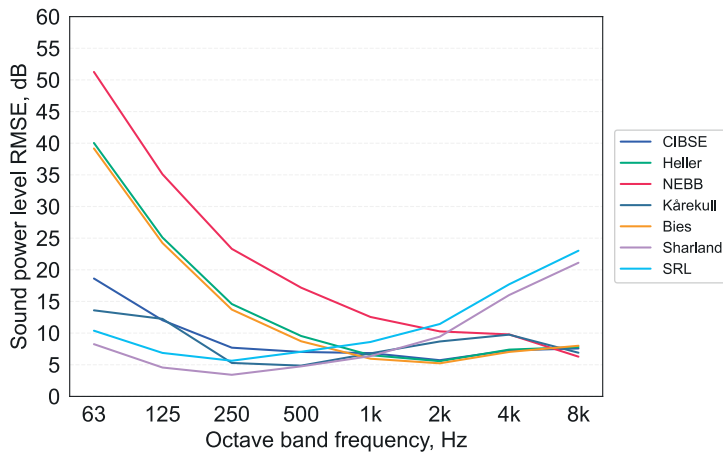
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Above: Figure 3: Root-mean-square error in predicted sound power levels for mesh grilles (device refs A, B and E — see Table 1)

Inspection of Figure 4 suggests that, while there is considerable inter-model variation, all the models tend towards underestimation of the measured L_w . However, a notable distinction can be seen at low frequencies, whereby the models based on the room diffuser data from Hubert [8] underestimate the low-frequency energy (<250 Hz) by a relatively large margin, while the Kårekull et al [31] model tends towards overestimation in these bands, exhibiting a rather different spectral trend that does not display an upper frequency peak. The Sharland model, on the other hand, provides closer

estimates at low frequencies, but again omits the upper frequency peak, and underestimates levels in the upper frequency range¹⁰. Another interesting aspect of the results shown in Figure 4 is that the NEBB [6] approach tends to yield lower estimates than the Heller & Franken [7] model on which it is based¹¹. This discrepancy seems to be due to differing spectral normalisation procedures, and therefore probably represents a misinterpretation by NEBB [6] of the original Heller & Franken [7] approach.

Since none of the reviewed models closely predicted the

measured data, new models for mesh grille flow-generated sound emissions have been formulated, derived by incorporating aspects of existing models together with the information gathered during the literature review, as described below.

Model development

First, the peak frequency f_{pk} is estimated using Equation 7 (making use of Equation 2 and Equation 3):

Below: Equation 7

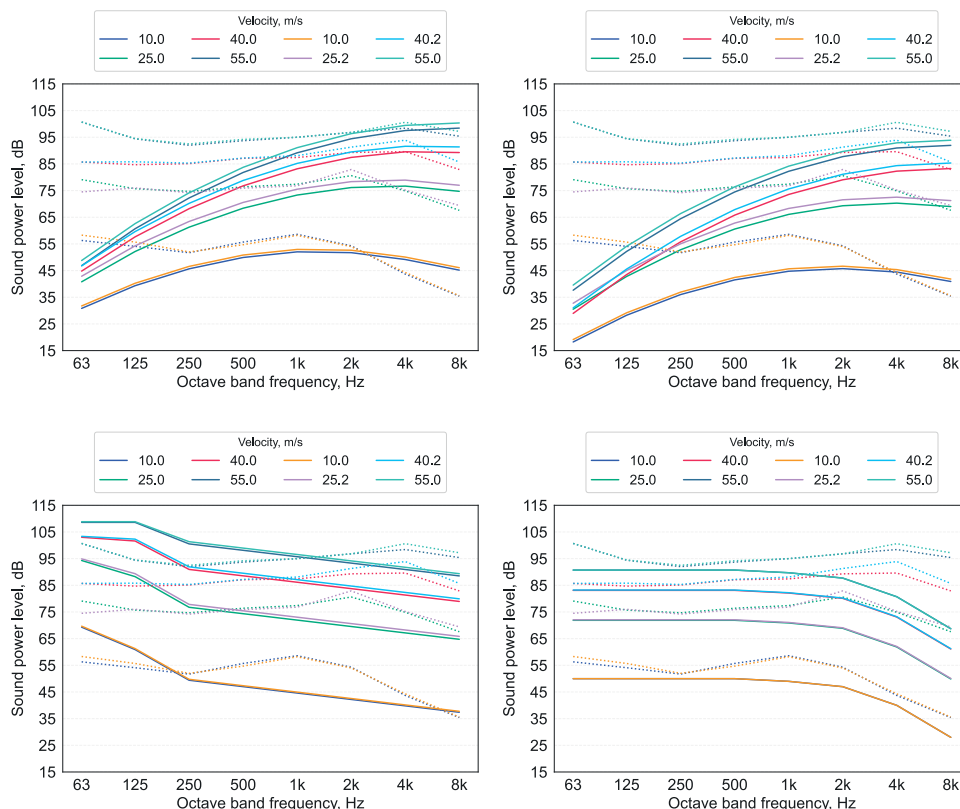
$$f_{pk} = \begin{cases} \frac{StU}{d}; St = 0.195 - \frac{5.714631 \times 10^{-6} T^{3/2}}{(T + 110.4)\rho U d} & \text{Circular rods or struts} \\ \frac{StU_c}{d}; St = 0.007372694 \Delta P^{0.39794} & \text{Non-circular rods or struts} \end{cases}$$

In Equation 7, the Strouhal number term in the bottom row has been derived by fitting a power curve to the values advised by Heller & Franken [7], based on the assumptions that the Strouhal number should approach zero as the pressure difference drops towards zero (i.e. no apparent obstruction), and will increase in a non-linear fashion with increasing pressure difference.

The octave band in which the peak frequency lies $f_{pk,oct(i)}$ is determined according to the definitions in BS EN IEC 61260 [35]. Similarly, the duct cut-on frequency is calculated according to Equation 5 or Equation 6 (as appropriate), and the octave band in which the cut-on frequency lies $f_{co,oct(j)}$ is determined. Other octave bands in the spectrum relative to the peak and cut-on bands are then denoted $f_{oct(i \pm m)}$ or $f_{oct(j-n)}$, respectively, where m and n are integers indicating each band's position relative to (i.e., m or n bands above or below) f_{pk} or f_{co} .

Left: Figure 4: Predicted sound power level octave band spectra for mesh grille device ref A, from various models: (top left) Heller & Franken [7]; (top right) NEBB [6]; (bottom left) Kårekull et al [31]; (bottom right) Sharland [33]; dotted lines: measurements; solid lines: predictions (see Table 1)

- 10 For brevity, the SRL grille ref A results are not shown in Figure 4 as these are simply an affine-transformed version of the Sharland results, shifted down the sound power axis and resulting in larger errors.
- 11 Again, for brevity, the Bies et al [32] model results are not shown in Figure 4, as this is a compact formulation of Heller & Franken [7], and so yields almost identical results.



The sound power spectrum L_w can then be estimated using:

$$L_w[f_{pk,oct(i)}] = 15 + 10 \log_{10}(S\Delta P^3)$$

$$L_w[f_{oct(i+m)}] = 15 + 10 \log_{10}(S\Delta P^3) - 5m$$

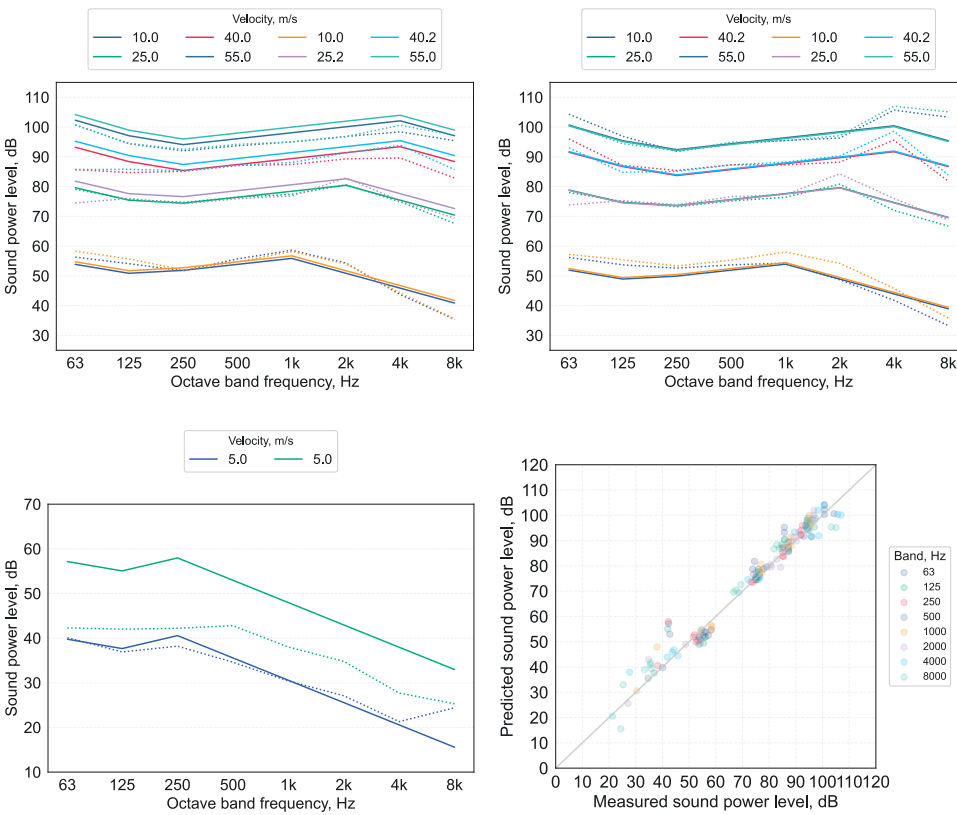
$$L_w[f_{oct(i-m)}] = 15 + 10 \log_{10}(S\Delta P^3) - 2m, \quad f_{oct(i-m)} > f_{co}$$

$$L_w[f_{oct(j-n)}] = 10 + 10 \log_{10}(S\Delta P^3) + n \log_{10} U^3, \quad f_{oct(i-m)} < f_{co}$$

Above: Equation 8

The results of predictions for the mesh grilles using Equation 8 are presented in Figure 5. The model predictions in Figure 5 exhibit a closer fit to the measurements, although the model consistently overestimates the sound power level for one of the grille E tests (Figure 5 bottom left). The corresponding test data indicate that, while both grille E tests were reportedly undertaken at the same flow velocity, each test was applied in opposite directions, one of which resulted in a much higher

Below: Figure 5: Predicted sound power level octave band spectra using Equation 8 for mesh grille device refs (top left) A, (top right) B, and (bottom left) E; dotted lines: measurements; solid lines: predictions; (bottom right) direct comparison of spectral sound power level with measurements (see Table 7)



pressure drop across the device [36]. The reason for this remains unclear, as such a large pressure discrepancy due to a reversal of flow direction was not observed in any of the other grilles for which archive test data were available.

A comparison of RMSE between the Equation 8 model predictions for the mesh grilles (refs A, B and E), and the non-mesh grilles (C, a plastic 'eggcrate' grid, and D, a machined slot-perforated metal plate) is shown in Figure 6 (below). This indicates that model errors tend to be larger for the non-mesh predictions than for the mesh grilles.

Right: Equation 9

$$L_w[f_{pk,oct(i)}] = 9 + 10 \log_{10}(SU^6) + 25 \log_{10} \zeta$$

$$L_w[f_{oct(i+m)}] = 7 + 10 \log_{10}(SU^6) + 25 \log_{10} \zeta - 4m$$

$$L_w[f_{oct(i-m)}] = 9 + 10 \log_{10}(SU^6) + 25 \log_{10} \zeta - 3m; \quad f_{oct(i-m)} > f_{co}$$

$$L_w[f_{oct(j-n)}] = 3 + 5 \log_{10}(S^2 U^{11} \zeta^5) + (n+1) \log_{10} U^4; \quad f_{oct(i-m)} < f_{co}$$

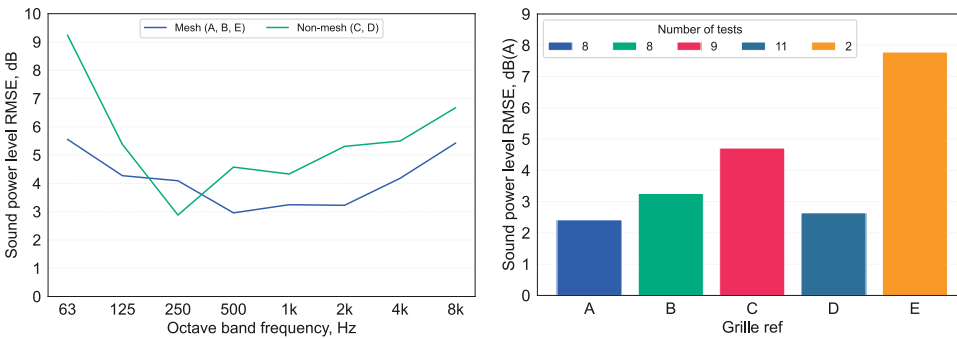
The RMSE in L_{wA} for each grille is also shown in Figure 6 (below), which illustrates that, although the error for one of the grille E tests is relatively large (see Figure 5 bottom left), the smaller number of tests on this device compared with the other grilles means this has a reduced importance when considered (aggregated) over the full dataset.

A similar, but marginally more complicated, model has been developed by replacing the ΔP parameter with separate terms for U and ζ , and allowing these to have varying exponents, as shown in Equation 9:

The results of predictions made using the model in Equation 9 are shown in Figure 7, which shows a good agreement with measurements in most cases — lesser agreement is evident for the plastic 'eggcrate' grid grille ref C and for one test of the mesh grille ref E.

As shown in Figure 8, the prediction models produce results in closer agreement with available archive test data than a range of existing engineering models identified in guidance and relevant literature. While the new models have been developed for mesh grille terminations, the improvement in general agreement also extends to the slot-perforated metal plate and plastic 'eggcrate' grid grille types included in the dataset, indicating the potential for wider applicability.

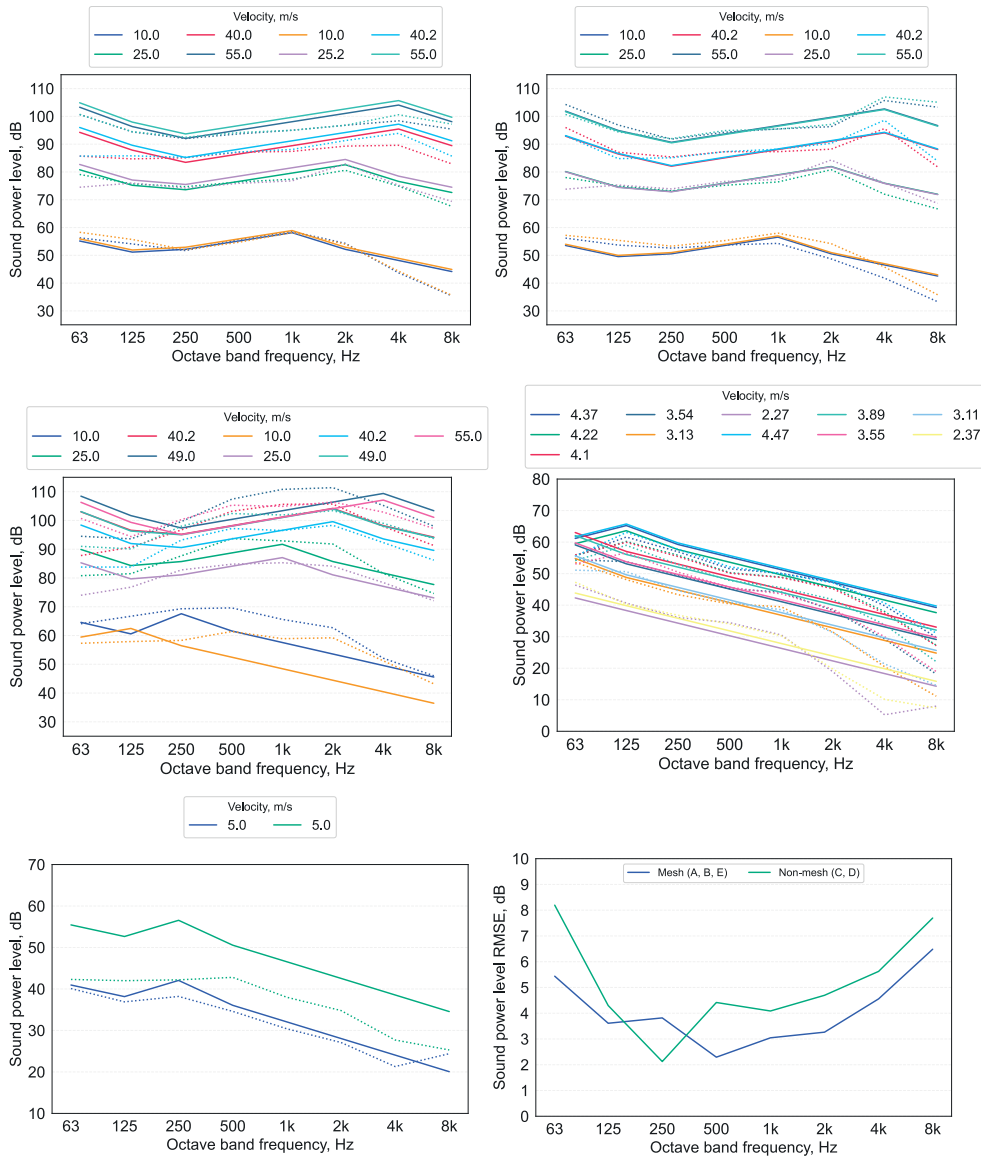
The resulting accuracy of sound power predictions made using the model defined in Equation 9 is summarised in Figure 9, which demonstrates the generally good agreement with the measured data over the spectral range considered.



Conclusions, limitations and outlook

Within the context of large-scale railway tunnel ventilation systems applications, system requirements may entail relatively high flow rates to be achieved, leading to increased

Left: Figure 6: Root-mean-square error in predicted sound power levels using Equation 8 (see Table 7)

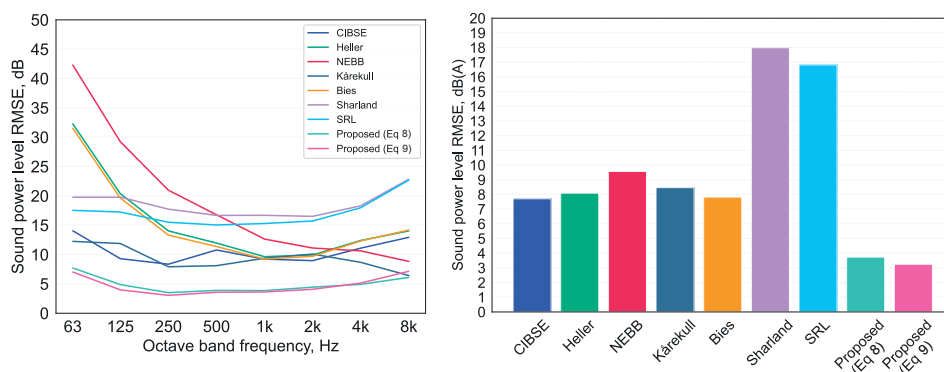


Left: Figure 7: Predicted sound power level octave band spectra using Equation 9 for all grille device refs (top left) A, (top right) B, (mid left) C, (mid right) D, (bottom right) E (see Table 1 in); dotted lines: measurements; solid lines: predictions; (bottom right) root-mean-square error in predicted sound power levels for mesh or non-mesh grilles

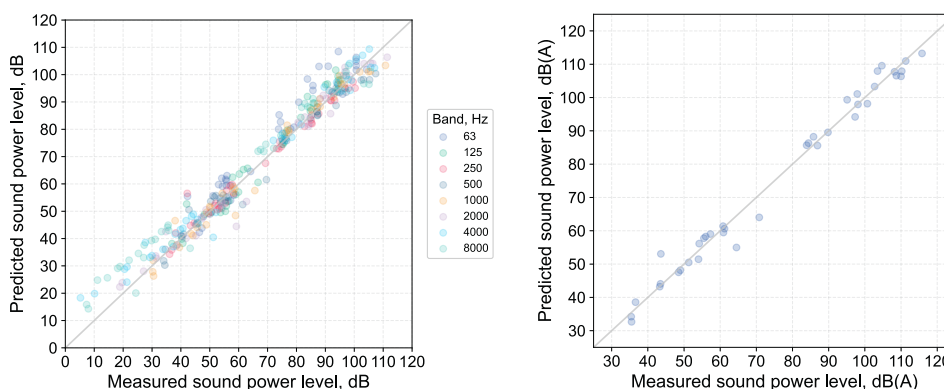
risks from flow-generated sound emissions. Suitable estimation methods are therefore important for evaluating the potential risk to achieving environmental design targets. The flow-generated sound emissions from duct system atmospheric termination grilles have been investigated, with the aim of identifying practical approaches to predicting sound generation.

Predictions using existing engineering methods identified in relevant guidance and literature with laboratory test input parameters were shown to underestimate measured levels in available archive test data. New models have therefore been developed, based on a combination of aeroacoustic considerations and empirical optimisation, predictions from which exhibit a closer agreement with the data. Of particular value for the application is that the proposed models show good agreement over a relatively wide range of flow velocities.

It must be acknowledged that a detailed physical analysis has not been undertaken to provide a rigorous basis for the predictive approach. One area in particular that should be highlighted is the low-frequency part of the spectrum. When developing prediction models with empirical data there is always a risk of overfitting to measured values, which can result in poorer prediction performance for input parameters that are not found in the dataset. The models developed exhibit reduced error in this region compared with existing engineering approaches, which is primarily explained by the assumption in the existing models of progressive attenuation for bands below the identified peak frequency; this contrasts with the elevating sound energy in the proposed models in certain low-frequency bands. Based on literature evidence, a plausible explanation for the higher low-frequency energy has been proposed as greater turbulence in the system at increasing flow velocities. The proposed



Above: Figure 8: Root-mean-square error in predicted sound power levels for all grilles (see Table 1)



Right: Figure 9: Direct comparison of sound power levels predicted using Equation 9 with measurements for all grilles (see Table 1); (left) octave band spectral levels; (right) overall A-weighted levels

models assume that these elevations in low-frequency energy occur below the duct cut-on frequency, and this seems to agree with some of the data, yet a physical reason for this frequency representing an inflection point has not been investigated. Testing the models with additional measurement data could be valuable for more extensive validation, and for investigating physical theories. It should also be remembered that the dataset comprises only a relatively small range of termination designs, and therefore the models may not necessarily be similarly accurate in making predictions for other grille designs and geometries. Further research could examine the applicability of the models developed to a wider range of grille designs, and consider further the potential influence of turbulence (or


other mechanisms) on the low-frequency spectral region.

This study of the flow-generated sound from termination devices represents investigations undertaken during the design development stages, and as such does not imply that such devices as outlined will necessarily be incorporated in the completed design of HS2. While the review of mesh grille sound has highlighted the potential contributions from tonal energy generated by the flow around grille struts, this does not necessarily mean that the sound emitted would contain prominent or even audible tones — determining the subjective audibility and prominence of tones within aerodynamic sound can be a complex process, and tonal energy can be masked by the contributions from broadband sound energy. Octave-band and third octave-band

engineering methods as discussed here do not provide sufficient spectral resolution to support robust analyses of tonal audibility or prominence. This is also a limitation of the measurement data used to develop the proposed models.

Acknowledgements

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(L-R) Professor Gary Heald receiving his tankard from Kevin Hamson last summer



Professor Gary Heald presentation

Kevin Hamson, Chair of the IOA Underwater Acoustics Group (UAG) and Andrew Holden, UAG Secretary presented Professor Gary Heald with a tankard as a token of thanks for his many years of support to the Group.

By Kevin Hamson

Gary began work on the UAG Committee in 1994 and since then has provided his time and energy in a succession of committee roles and organising IOA conferences.

During this time, Gary was awarded an honorary professorship at the Heriot Watt University School of Engineering and Physical Sciences.

Gary finally stepped down as Chair of the UAG in September 2023, but plans to present the tankard at the International Conference on Underwater Acoustics (ICUA) in Bath in June 2024 were thwarted by ill-health. Instead, Andrew and Kevin met with Gary in November, in Weymouth, where he lives and has worked for many years contributing to the world of underwater acoustics. 



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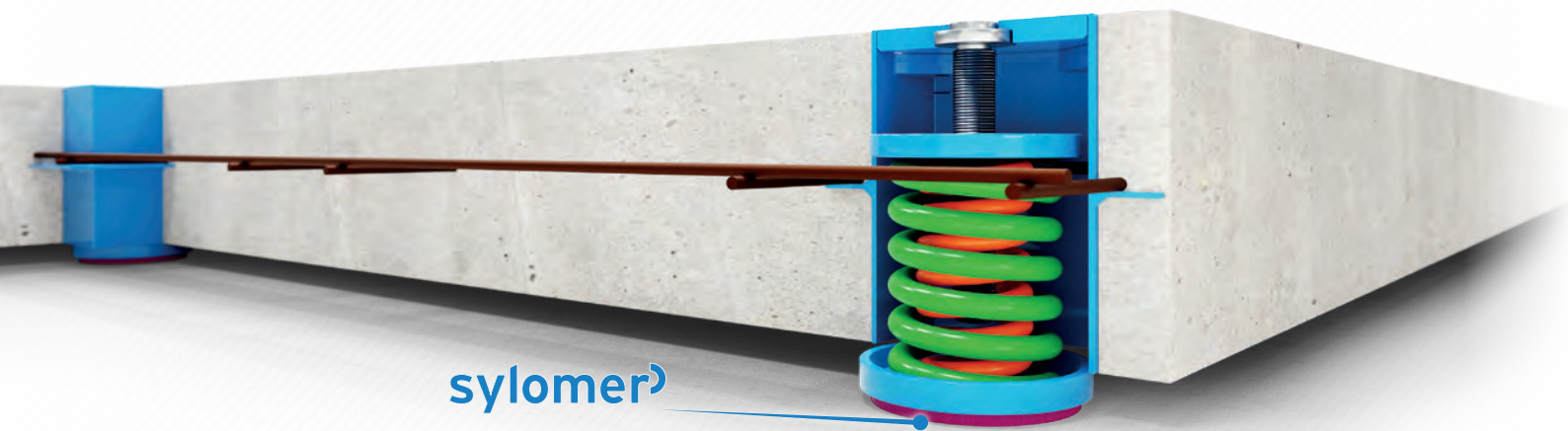
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SLAB LIFTING PROCESS



Angelo Farina, Professor of Environmental Technical Physics at the University of Parma

Angelo Farina, Professor of Environmental Technical Physics at the University of Parma, died in March 2025. In this obituary to him, we hear from three prominent industry figures who all credit Professor Farina for the direction their careers took.

By Ludovico Ausiello, Filippo Maria Fazi and Lamberto Tronchin

Training a generation of researchers

Ludo Ausiello, Senior Lecturer in electroacoustics and analogue electronics at University of Portsmouth, writes:

I first met Angelo Farina at the AES convention in Paris in 2006, where I presented two papers, one related to my PhD and the other expanding on my Masters' thesis, a naïve attempt to code colours with sounds. Angelo approached and said something along the line of: *"This idea of coding colours is cool, it would be useful in the automotive market, way more interesting than that 'high-quality audio coder' you discussed yesterday. That is for the past, now people only want MP3s."* Being a musician in disguise all my life, I found the remark both funny and deep.

Angelo entered my life in such affable way, that I ended up reading his articles and studying his work as a natural reflex. By then his list of publications was already long, although the paper I cherish the most *Advancements in impulse response measurements by sine sweeps* was still in the pipeline.

That was my very first encounter with one of the most important acousticians of all times, but it wasn't until mid-2009 that I found myself thinking of contacting him again. The opportunity came when a company wanted to explore some acoustic sensing to improve their algorithm to control a diesel engine. In just a few months Angelo had ironed out the perfect post doc position (which lasted three and half years), exploiting the intricacies of the Italian university bureaucracy and becoming my de-facto boss –



technically I was working within the company's premises, but I reported to him. He said to me: *"Don't let them exploit you. You're here to study this problem and to solve it. When you're done, don't let them trap you in doing something else, they're not paying you enough."* I did love his wit.

Angelo was always there whenever I needed a chat. He would sometimes walk into the workshop, switch on the lathe and show me how to approach a prototype. The first time I went to his office at the University of Parma, I noticed that the walls were quite bare apart from one beautiful picture of his family and only one plaque from Audio Precision. One wall was covered by a completely full bookshelf, but the place still felt frugal, almost stern. By that time, I deeply admired what he had published and I was starting

to grasp how powerful and versatile the sine-sweep measurement method was. In fact, I passed almost all my job interviews by discussing it or teaching it, and more importantly, I found myself being an advocate for this approach to measurements with all the students I have taught since.

Angelo called late one afternoon to say: *"We're going to measure La Scala theatre tonight and there is a seat in the van for you if you want it. It's going to be fun and we could do with some extra help."* An offer I couldn't refuse. I discovered that La Scala does not stop to let a few crazy acousticians measure the reverberation time after some refurbishments (and consequent protests by singers who swear the acoustics had changed!). By then Angelo was deeply in love with the Eigenmike and spatial audio, and I was there

moving crates, subwoofers and taking pictures. By the end of the night I heard Angelo say *“Ausiello, there is a Steinway model D on that stage, do you want to try it?”* He knew what it meant to me, and I still love the blurred picture he took with his phone of me playing La Scala.

Working with Angelo was at times incredible, because it felt as if he could see the sound, how it behaved, how the acoustics worked within and around it. One day we were trying to understand how to point MEMS in the engine compartment to maximise the signal to noise, and ‘voilà’, why not use acoustic holography to study how the noise was distributed within the compartment depending on frequency? Obviously, our probe didn’t have 60kHz of bandwidth, but we could explore and reflect with the data we gathered. For me it was almost magic, always done with special software developed personally by Angelo or by his other collaborators. The reality is that he trained a generation of researchers and I’m just one of them.

In May 2011 during my second year of post doc, my partner was travelling to meet me and she suffered a cardiac arrest on the train. The hours after that were hectic. Two days later I realised I hadn’t informed anyone at work, nor Angelo. Ashamed, I rang him and only managed to utter a sentence or two, in which the words ‘cardiac arrest’ might have been placed somewhere. Angelo stopped me gently and said *“I don’t need to hear from you until all is resolved. Stay with your partner as long as it’s necessary.”* This is deep trust for you.

The last time we met in person was in Southampton – his research on multidirectional impulse response and microphone arrays led him to lend a hand in investigation involving archeo-acoustics, exploring the sound of ancient caves and ancestral locations. On that occasion his wife, Grazia, was travelling with him, and we had a lovely lunch together and I was able to thank him for what he did. I asked him why his important work on the sine-sweep was published in a conference paper instead of a journal, he replied with a grin and his unique irony *“Once you publish in a journal your research is three years old. I didn’t want to wait all that time.”*

I wouldn’t be the person I am without Angelo.

One of a kind

Filippo Maria Fazi, Professor of Acoustics and Signal Processing at ISVR and Chief Scientist and Co-Founder of Audioscenic, writes:

Angelo Farina was one of the brightest and most prolific acousticians of our time. He made some fundamental scientific contributions in the fields of electroacoustics, architectural acoustics and 3D audio.

Those of us who had the pleasure and privilege of knowing him, or working with him will agree that Angelo was truly one of a kind. His charismatic personality, his enthusiasm and passion for the science of sound, along with his sharp and intuitive mind, made him unforgettable.

I owe so much to Angelo, both professionally and personally. I will be forever grateful for what he taught me, for his inspiration and for his friendship.

His work made a real difference and I think the world is a better place because of him. He leaves behind a lasting legacy and will be sorely missed by the acoustic and audio community.

A distinguished figure in acoustics

Lamberto Tronchin, Associate Professor in the Department of Architecture at University of Bologna writes: I first met Professor Angelo Farina when I was a student in my last year of my Master’s Degree in Building Engineering at the University of Bologna. He had just started giving lectures in the applied acoustics course, specifically, room acoustics. Until then, I didn’t know what my job would be after graduation, but since I was also completing my piano studies at the conservatory, I

figured out that I would become an acoustician, working on measuring and designing the acoustics of theatres, concert halls, churches and auditoriums.

Angelo had just started teaching and wasn’t well-known at that time. After this first lecture, I told him that I was a piano player and he immediately gave me a test on my ability to hear musical intervals. After some months, I decided to prepare my final dissertation in room acoustics and psychoacoustics and I measured IRs in seven theatres, comparing the acoustic parameters with subjective evaluation.

From that day, I remained in touch with Angelo as he became a distinguished figure in acoustics. We carried out research in room acoustics, musical acoustics, listening tests, spatial audio and auralisation and he had an answer for every one of my questions. I spent a lot of time with him at his laboratory, for more than 30 years often staying well in to the evening, when the University closed the doors.

In recognition of his significant scientific achievements, Angelo was awarded the prestigious Silver Medal by the Audio Engineering Society in 2024. His work has left an indelible mark on the acoustics community, influencing both academic research and practical applications. We mourn the loss of Professor Farina, whose absence will be deeply felt by all who had the privilege of knowing him. His passion for acoustics and his dedication to mentoring others have left a lasting legacy. He was not only a brilliant scientist but also a cherished friend and mentor. His contributions have shaped the field, and his memory will continue to inspire future generations. 🌟

The i3DA 2025 conference, which is taking place 10-12 September in Bologna, Italy, is dedicating a whole day to Angelo. The call for papers has been extended until 30 May 2025 and researchers who collaborated with Professor Farina or whose work was inspired by his contributions are invited to submit abstracts for these special sessions. This is an opportunity to share research to continue his legacy and engage with the community he helped build. <https://www.i3da2025.org/call-for-papers/> 🌟

www.i3da2025.org

Musical Acoustic Group

MAG meet at Royal Opera House

By Professor Stephen Dance, chair of the Musical Acoustics Group



Above: Professor Stephen Dance giving a talk on musicians' hearing (medical acoustics)

On 9 April 2025 the IOA Musical Acoustics Group (MAG) held a half-day meeting at the Royal Opera House (ROH). The afternoon meeting was free to attend (24 attendees) and was split into three sections: presentation, a backstage tour and further presentations.



Above: David Carugo presenting his research on spatial audio

Introductions were handled by Stephen Dance (London South Bank University), Chair of the Musical Acoustics Group who invited the attendees to experience the choral rehearsal room. Stephen gave a presentation on the redesign of the room and the improvements to the acoustics for the benefit of the 48 regular vocalists who rehearse in the space. This included the original space (1999), the redesigned space (2023) and the necessary adjustments to the acoustics of the final redesign (2024). As this was the space the presentations were taking place it was easy to hear the quality of the communication!

David Carugo (Oxford Brookes University) gave a presentation on spatial audio and musical instruments. He showed how there had been an increase in the number of microphones to record the directivity pattern from instruments 12 then 32 then 64 mics. He showed code and demonstrated how a virtual microphone could be created through a transform to reproduce the recording of a guitar at a different location, given enough actual microphones simultaneously recording the guitar under dry recording



Above: Antonella Bevilacqua presenting her work on Contarini's Villa (room acoustics)

studio conditions. David spoke on how this technique could be used for groupings of similar instruments.

During the coffee break Philippa and Alex (ROH health and safety team) kindly took two groups for a backstage tour around the opera house.

After the break Antonella Bevilacqua (University of Parma) gave a presentation entitled, *Architecture and music cross-correlation inside the guitar hall in Contarini's Villa, Italy*. This was an example of a missing link between ballrooms and theatres in terms of musical evenings. The vertically connected three storey space allowed the orchestra to play over the audience. The highest floor having a lightweight cane roof (sustainability in the 1600s) which could have acted as a resonator, Antonella having measured the vibration using a laser (non-disruptive testing).

The final presentation of the day was given by Stephen Dance and Ruben Vazquez Amos who introduced an update to the research with the Royal Academy of Music on the results from a pilot study of otoacoustic emission based hearing assessment of classical musicians.

Stephen and PhD student, Ruben Vazquez Amos, had tested 1,126 students using pure tone audiometry of which 995 students had also had distortion product OAEs taken using the hearing coach system. Stephen demonstrated that for 5% of the student population there was greater than 50% outer hair cell damage. He postulated that glue ear (common amongst toddlers) could be responsible through viral infection resulting in extensive cochlear damage.

The event finished with thanks to Sheema Ali, the organiser, and for those lucky enough – a performance of Bizet's Carmen!



Right: The audience at the Royal Opera House Choral Rehearsal Room (educational acoustics)

Noise and Vibration Engineering Group

By Matt Torjussen

On 10 December 2024, the IOA's Noise and Vibration Engineering Group hosted its 50th anniversary celebration with an online presentation by Dr James Woodcock, Senior Consultant in Acoustics at ARUP. The presentation, titled *Project CAELUS: Investigating the influence of operational factors, ambient soundscape, and context on the human response to drone sound*, explored the perception and annoyance factors associated with drone noise in the context of medical delivery networks.

Dr Woodcock, who specialises in environmental acoustics and perception of sound vibration, was joined by colleagues, David Hiller and Adam Thomas who supported the Q&A session. The talk highlighted work conducted as part of Project CAELUS, which aims to trial the UK's first medical distribution network using drones to enhance healthcare accessibility between urban and remote rural communities in Scotland.

Beginning with an overview of Project CAELUS and its consortium of 16 partners including AGS Airports, University of Strathclyde, Sky Ports, NATS and NHS Scotland, Dr Woodcock explained that noise had been identified as a significant barrier to the acceptance of drone networks. With conventional transportation noise typically assessed using exposure-response relationships developed over decades of field research, drone noise presents unique challenges due to its distinctive sound signature characterised by prominent, steady tonal components and sound energy concentrated in upper frequency ranges.

The research methodology combined field measurements, analysis-synthesis techniques and an online listening experiment. Field trials were conducted at Wescott Innovation Centre to characterise the noise profile of an electric vertical take-off and landing drone during overflights and take-off/landing operations.

These measurements informed the development of drone noise auralisations at varying altitudes and distances, which were then mixed with different ambient soundscape recordings (rural, village, and urban environments) and enhanced with visualisations.

The online listening experiment, completed by more than 700 participants, investigated how drone-listener distance, ambient soundscape type and contextual information influenced annoyance responses. Results revealed three key findings:

- annoyance decreased as distance between drone and listener increased;
- annoyance was significantly higher in rural settings compared to village and urban environments and, most notably;
- there was a significant reduction in annoyance when participants were informed about the medical delivery purpose of the drones.

Qualitative data indicated that participants most commonly described the drone sound as "loud", "harsh" and "buzzing", with contextual analysis showing that emergency, medical and search and rescue uses were considered the most acceptable applications for drones, while commercial delivery, surveillance and recreational uses were deemed least acceptable.

During the Q&A session, attendees raised questions about future research directions, the impact of background soundscapes on perception, night-time operations and the psychological impacts of drone noise. The presenters acknowledged the embryonic nature of this research field compared to conventional aviation noise studies, highlighting opportunities for further investigation into variables such as time of day effects and perceptual differences based on individuals' living environments.📍

Central Branch

By IOA Central Branch Secretary, Matt Torjussen

The Central Branch held two informative meetings during February and March 2025, both hosted at Silbury Court, Milton Keynes, and available via Zoom for remote attendees.

Intelligent listening: Ally Cares and the evolution of acoustic monitoring

The first of the Central Branch's spring meetings took place on Tuesday 11 February, featuring Thomas Tredinnick, CEO and Co-Founder of Ally Cares. The event explored how acoustic monitoring is being used to transform care provision in residential homes.

Thomas explained that Ally Cares is an evidence-based AI resident monitoring system, currently supporting over 6,000 residents across the UK. With a background in aerospace engineering, Thomas was inspired to create Ally after witnessing the challenges care home staff face in providing appropriate care to residents when alone in their rooms.

The presentation highlighted that residents in care homes spend 50-80% of their day in their bedrooms, during which time they are largely unobserved. Traditional systems rely on call buttons that residents often don't use (due to independence or not wanting to burden staff), or pressure-sensitive mats that only detect falls. Regular in-person checks by staff can be intrusive and frequently disturb residents' sleep.

Ally Cares' solution combines PIR sensors with two microphones installed in each resident's room. The system monitors both motion and sound, using AI to establish a baseline for each resident's normal activity patterns. When changes occur – such as calls for help, signs of distress, or unusual movements, staff receive notifications via an app, along with audio files that provide context to help them assess the situation.

Thomas shared impressive research findings from their work with NHS Trusts and ICBS. Care homes using Ally have seen a 63% reduction in falls, 56% fewer hospital visits, 50% improvement in residents' sleep quality, and 30% more staff time available for direct care.

One particularly interesting aspect Thomas highlighted was the system's ability to detect early signs of health issues. For example, increased coughing can indicate developing chest infections, while changes in toileting patterns or increased agitation might signal urinary tract infections; both of which can lead to serious complications if left untreated.

The system also helps care homes identify 'flashpoints' when multiple residents need assistance simultaneously. This allows for more strategic staff allocation, leading to better care outcomes and reduced pressure on staff.

Thomas emphasised that the technology is designed to complement rather than replace human care. The goal is to enhance residents' privacy and independence while ensuring they receive prompt attention when needed. The systems also provide valuable insights for staff shift changes, helping day teams understand how residents slept and adjust daily care accordingly.

The presentation concluded with analysis of data from a 62-bed care home in Herefordshire, where implementing Ally Cares resulted in 34% more sleep for residents, 61% fewer regular checks, and approximately six hours each day of staff time redirected to more personalised care.

Predicting change – the new BS ISO 9613-2: 2024

The second spring meeting was held on Tuesday 25 March, featuring Andy Pagett, Associate Director at AECOM, who delved into the recent changes to ISO 9613-2, the standard widely used for environmental noise prediction.

Andy, who has 18 years of experience as an acoustic consultant with particular focus on environmental noise modelling, explained that the previous version of the standard dated back to 1996 and had now been completely superseded by the 2024 version. Unlike its predecessor, the new version has been adopted as a British Standard (BS ISO 9613-2:2024).

The presentation focused on the key modifications to the standard and how these changes affect noise prediction results. Andy emphasised that in some cases, calculations using the new standard can yield results up to 11 dB higher than the previous version – a significant difference that could have major implications for noise assessments and planning decisions.

The most significant changes relate to ground and barrier effects. Andy walked through detailed mathematical explanations of how these changes work, illustrating the practical implications through modelled examples.

For ground effects, the new standard introduces a correction term (KGeo) that better accounts for the transition between hemispherical and spherical radiation patterns when sources are elevated relative to the propagation distance.

This can result in calculations that are up to 3 dB lower in certain circumstances.

However, the most substantial changes relate to barrier attenuation. The new standard incorporates strategies from ISO 17534-3 to improve how screening is calculated in 3D models. Two particularly important changes involve the modified treatment of barriers on reflecting ground, where the previous standard would subtract negative ground attenuation (i.e. reflections) when calculating barrier effects, potentially creating an artificial reduction that doesn't occur in reality. Additionally, there are improved barrier attenuation calculations for low barriers at long distances. The previous standard would maintain a 5 dB reduction for barriers that just break the line of sight, even at distances of several kilometres. The new standard corrects this with more realistic attenuation that decreases with distance.

Using practical examples, Andy demonstrated how these changes can result in predictions that result in higher levels than before. In a real-world scenario involving multiple receptors around an industrial site, some locations saw increases of over 10 dB simply by switching to the new standard.

Andy also briefly covered the four new annexes in the standard, which include improved methods for calculating attenuation through foliage, directivity corrections for chimney stacks, methods for incorporating local wind statistics when calculating long-term average noise levels, and guidance specific to predicting wind turbine noise.

The presentation concluded with a discussion of the practical implications for acoustic consultants. With this change, previously compliant assessments might now show exceedances when recalculated under the new standard. This could create challenges for projects already in planning stages or for comparing new assessments against historical ones.

Both meetings were well attended, with lively Q&A sessions and networking opportunities afterwards. The Central Branch committee would like to thank both speakers for their informative presentations, and Silbury Court for hosting the events.

Whilst Central Branch meetings are hybrid events, we encourage all members to attend in-person meetings whenever possible. These meetings offer a unique opportunity to learn from and network with peers. Both events were recorded and are now hosted on the IOA's website within the members' area. If you missed these informative talks, make sure you check them out online. Details of future meetings will be available on the IOA website.

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Eastern Branch

By Josie Nixon and Sam Ward

On the 27 February 2025, we held our AGM. Jody Blacklock has remained Chair of the Eastern Branch committee, Josie Nixon as the Secretary and Sam Ward as the Early Careers Group Representative. Continuing committee members are John Campbell, Michael Cheong and Mat Tuora. We also welcomed Sam Riley as a member of the Eastern Region Committee.

As part of the AGM we also went through the results of the questionnaire that was sent out towards the end of last year. Thank you to everyone who responded, it was greatly appreciated. We will take on board the comments and will look to move some of the Eastern Branch meetings in terms of days and locations to allow for more in-person attendance if members would like to. We shall also try to hold more meetings as hybrid events to enable people to join remotely.

Recent meetings

Soundwalk results

On 27 February, Sam Ward and Mat Tuora delivered a presentation summarising the results of a soundwalk carried out last September.

Members of the Eastern Branch undertook a soundwalk around the Anglia Ruskin University (ARU) Campus, Chelmsford. Participants visited five locations and were asked to give their thoughts on the character and qualities of each one. Feedback was collected and the procedure was based on the methodology outlined in the BS ISO 12913 Series.

The purpose of the soundwalk was to compare the responses returned by acoustic consultants, specifically in assessing the surrounding environment, perceived quality of a location and appropriateness of noise sources in the environment.

There was overall agreement on participants' impressions at most locations. We also found that average sound level did not predict people's perceived value of the area. Neither did we find a link between the character of an area and people's overall impressions.

The presentation was well attended and sparked some great discussion at the end on how soundwalks can be more widely adopted to support traditional assessments.

All the fun at the fair

On 27 March, Mark Scaife from Cahill Designs gave a fantastic talk on assessing noise from theme parks for planning applications. He talked about the problems of predicting noise from rollercoasters and rides at theme parks when they have not yet been constructed and the different processes that can be used. Mark also discussed different measuring methods of rides and the methodology they have honed over years of direct experience.

He also discussed measurements and prediction monitoring for special event evenings such as fright nights and concerts and did a fantastic job at answering questions from the audience and keeping everyone engaged.

This was our busiest event at the Eastern Branch for a while and it was so encouraging to see so many members attending from all over East Anglia.

We hope to move some of the future Branch meetings across the region to assist in allowing more members to attend.

Thank you to our recent presenters for your talks and we look forward to many more enjoyable and educational sessions again this year.

Future events

We have scheduled in a talk from HSE in September and from a local authority environmental health officer later this year, so keep your eyes peeled for more information on these events and for other topics.

If you would like to present or if you have a topic suggestion please get in touch. We are also open to suggestions for venues across the region, so please contact us if you have any suggestions or are able to host a Branch meeting. Please contact either Jody Blacklock or Joise Nixon at jody.blacklock@createce.co.uk or Josie.Nixon@HA-Environmental.co.uk

Make sure you have registered with the Eastern Branch to find out about all upcoming events or keep an eye on the IOA event website page.

Irish Branch

By Diarmuid Keaney

The Committee of the Irish Branch has formally submitted its response to the Environmental Protection Agency (EPA) of Ireland regarding the revised Guidance Note for Noise (NG4) as part of the ongoing public consultation process.

The EPA's NG4 document provides crucial guidance on assessing, managing, and controlling environmental noise emissions associated with licensed and permitted facilities. As a leading professional body for acoustics in Ireland, the IOA's Irish Branch has actively ensured that the revised guidelines reflect best practices in noise assessment and control.

The Committee's submission includes key recommendations to enhance the clarity, effectiveness and practical application of the NG4 guidance. Among the key points addressed in the submission are:

- **Technical improvements:** Suggestions for refining measurement methodologies to align with international best practices and recent advancements in acoustic assessment.
- **Consistency and clarity:** Recommendations to improve the consistency of noise criteria and reporting requirements across various sectors and regulatory bodies.
- **Environmental and community considerations:** Emphasis on balancing industrial and infrastructural development with environmental protection and community wellbeing.
- **Implementation and compliance:** Proposals to support more effective enforcement and compliance mechanisms, ensuring that noise limits are met relatively and practically.

Commenting on the submission, Diarmuid Keaney, Chair of the IOA Irish Branch said: "The revised NG4 guidance plays a critical role in safeguarding environmental standards while supporting sustainable development. Our submission reflects the expertise of Ireland's leading acoustics professionals, aiming to contribute positively to refining noise assessment practices and regulatory approaches."

The Committee of the Irish Branch of the IOA remains committed to collaborating with the EPA and other stakeholders to ensure that noise regulations continue to meet the highest professional and scientific standards.

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London Branch

By Jack Tunstall



Above: IOA London Branch Committee farewell drinks (L-R) Tony Garton, Jack Tunstall, Roslyn Andrews (Chair), Vicky Wills, Shaliny Denardi Vattathara, John Sails and Ben Southgate (Secretary)

Once again, the London Branch has had a busy few months, hosting some excellent talks on a variety of topics. We've also been busy organising our one-day event.

Evening meetings

In February, Ed Clarke gave an illuminating talk on motorsport noise assessment, drawing on his vast experience advising racing circuits and presenting expert testimony. He explored the complexities of measurement, the importance of maintaining independence and pitfalls to avoid when balancing the interests of operators, regulators and local communities.

In March, Trium led a session on the role of acousticians in producing noise and vibration chapters for environmental statements. Philip and Henry discussed EIA regulations, guiding frameworks such as the IEMA/IOA noise impact assessment guidelines and the anticipated move towards environmental outcomes reports (EOR). They also shared experiences from major developments to illustrate best practice in achieving proportionate, effective impact assessments.

The April meeting introduced members to the emerging sport of padel tennis. The presentation compared its noise profile to that of tennis, exploring existing assessment methodologies (both UK and international) and highlighting how differing standards can yield significant variations in

measured impact. Environmental health responses were also discussed, offering insights into the practical considerations of assessing and managing noise from this rapidly growing sport.

If you were unable to attend the meetings, you can catch up on the excellent presentations on the IOA website.

Upcoming events

Our next major event will be a one-day conference dedicated to the noise implications of air source heat pumps (ASHPs). As the shift away from fossil fuels gathers pace, ASHPs are set to become the default domestic heating solution, raising questions about potential noise impacts on neighbours and building occupants. Places for the event will be limited, so be sure to sign up quickly if you wish to attend. If you haven't already, make sure you're registered with the London Branch to stay informed about upcoming events.

Committee changes

With a bittersweet feeling, we say goodbye to Vicky Wills as a committee member. Following the April meeting, we raised our glasses in true London Branch fashion to thank Vicky for all the support and energy she has provided over the years. We wish her all the best in her northern adventures to come, she will be greatly missed!



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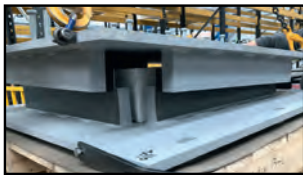
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Scottish Branch

By Anne Budd and Eleni Kontesidou

On 9 January 2025 Scottish Branch hosted a webinar on the proposed updates to BS 8233, to inform the upcoming consultation responses from members. Chaired by Anne Budd, presentations were made on the proposed changes by David Hiller, Chair of BS 8233 drafting committee, Dr Benjamin Fenech, Noise lead at UKH and Jack Harvie-Clark, Founding Director at Apex Acoustics. The meeting attracted over 80 attendees and there was plenty of useful engagement from members on the various topics including the proposed move away from WHO 1999 expert opinion to WHO 2018 evidence based guidelines, introduction of sound exposure categories, a more holistic approach to internal environmental quality, discussions of L_{Amax} and what we do and don't know, non-transportation noise sources and Scottish planning guidance. We thank the three presenters for taking the time to share their thoughts, insight and reasonings with the Branch.

Later in February we had the pleasure of welcoming Dr Shenzhi Su at the RMP offices in Edinburgh for a well-attended hybrid meeting. Dr Su presented her work

on iFieldnotes, a field note-taking and management app, which she developed utilising OpenAI APIs (or Application Programming Interfaces). During her talk, she explained how the lack of specialised, engineering-oriented fieldwork note-taking apps and the rising popularity of GenAI inspired her to start exploring the capabilities of GenAI for app development. Dr Su then demonstrated various AI-powered as well as non-AI functions within the app. Non-AI functions included convenient shortcuts such as inserting current date and time, weather conditions and air quality, location, media files (e.g. voice notes, photos etc.) and other capabilities.

Using OpenAI, the app also provides two types of AI functions; Custom GPTs and 'Ask AI' custom menus. These AI-powered functions provide additional capabilities such as proofreading and editing, template generator, performing calculations, translating text and audio into different languages, extracting information from images and countless others.

Dr Su concluded her presentation with her thoughts on identifying opportunities

for using GenAI in acoustic consultancy work and with a discussion on the main criticisms regarding the use of AI including data privacy concerns and its environmental impact, among others. The app is currently available for Android OS and the team are looking for partners to provide case studies and valuable feedback on the app's functionality.

Sincere thanks to Dr Shenzhi Su for the great presentation and to Emily Tilbury, our Social Convener, for organising the event.

Our next hybrid meeting, which was also our Annual General Meeting (AGM), took place on Wednesday 23 April at the RES offices in Glasgow with a presentation by Adam Fox on *Controlling Noise and Vibration in existing buildings*. A full update will be published in the next issue of Acoustics Bulletin.

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').



Scottish Branch meeting

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Southern Branch

By David Yates MIOA

The Southern Branch welcomed Mark Standen, Director of Energy and Sustainability at Syntegra Consulting on Friday 28 March for an overview of the assessment of overheating and the synergies of the discipline with acoustics. Mark discussed the process of carrying out overheating assessments, the requirements that needed to be achieved and the balancing of the risks of

overheating with energy efficiency requirements. He noted that they needed to consider the potentially contradictory requirements of the Building Regulations Approved Document (AD)F (ventilation), ADL (energy efficiency) and ADO (overheating). Coupled with acoustic requirements, providing the best solution for new developments can be a careful balancing act.

With approximately 50 members in attendance it was clear that acoustics practitioners had a keen interest in understanding the overheating assessment procedure and how acoustics can work best in synergy with the assessment as part of the wider design team. @



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COMMITTEE MEETINGS 2025

DAY	DATE	TIME	MEETING
Tuesday	13 May	11.00	CPD Committee
Wednesday	14 May	10.30	Research Co-ordination
Thursday	22 May	10.30	Executive
Tuesday	3 June	All Day	Engineering Interviews
Thursday	5 June	10.30	Council
Thursday	12 June	10.30	Engineering Meeting
Tuesday	17 June	10.30	ASBA (Edinburgh)
Tuesday	8 July	10.30	Distance Learning Tutors WG
Tuesday	8 July	13.30	Education
Wednesday	9 July	09.30	CCBAM
Wednesday	9 July	10.30	CCENM Examiners
Wednesday	9 July	13.30	CCENM Committee
Tuesday	15 July	10.30	Membership
Thursday	17 July	10.30	Meetings
Thursday	7 August	10.30	Diploma Moderators Meeting
Thursday	14 August	11:00	Publications
Thursday	21 August	10.30	Executive
Thursday	4 September	10.30	Council
Tuesday	7 October	All Day	Engineering Interviews
Thursday	9 October	11.00	Publications
Thursday	16 October	10.30	Engineering Meeting
Thursday	23 October	10.30	Membership
Tuesday	28 October	10.30	Research Co-ordination
Thursday	30 October	10.30	Meetings
Tuesday	4 November	10.30	CCWPNA Examiners
Tuesday	4 November	13.30	CCWPNA Committee
Wednesday	5 November	09.30	CCBAM Examiners
Wednesday	5 November	10.30	CCENM Examiners
Wednesday	5 November	13.30	CCENM Committee
Thursday	6 November	10.30	Diploma Tutors & Examiners
Thursday	6 November	13.30	Education
Tuesday	18 November	10.30	ASBA Examiners (Edinburgh)

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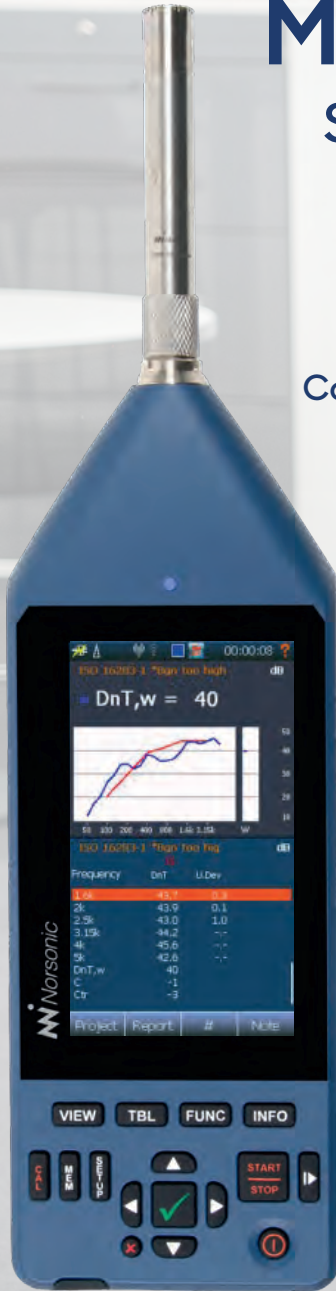
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