ACOUSTICS

BULLETIN



in this issue...

Raising the bar in assessing railway noise and vibration for new line-side housing



plus... IOA launches new sustainability award

Some thoughts on entertainment noise

We thought you should hear about our Noise insulation and Vibration damping solutions



REV/C

Acoustic Membranes

Dense and flexible polymeric noise insulation barrier products used within floor, wall, and roof constructions

•Single and Multi-ply membranes available.

DEDP/N°

Anti-Drumming Material

High performance resonant damping treatments

- for example on Metal Roof Systems.
- •As referenced in DfES produced BB93
- "Acoustic Design for Schools"
- Available as Self-Adhesive sheets or Spray & Trowel applied compounds.



Durbar Mill Hereford Road Blackburn BB1 3JU. Tel: 01254 583825 Fax: 01254 681708 Email: sales@wsbl.co.uk Website: www.wsbl.co.uk



Contacts

Publisher

Juliet Loiselle

Contributions, letters and information on new products to:

Nicky Rogers

Email: nickyr@warnersgroup.co.uk

Tel: 01778 391128

Advertising:

Dennis Baylis MIOA

Email: dennis.baylis@ioa.org.uk

Tel: 00 33 (0)5 62 70 99 25

Published and produced by:

The Institute of Acoustics Silbury Court, 406 Silbury Boulevard,

Milton Keynes,

Buckinghamshire MK9 2AF

Tel: 0300 999 9675

Edited, designed and printed by:

Warners Group Publications

The Maltings West Street



Bourne

Lincs

PE10 9PH

Views expressed in Acoustics Bulletin are not necessarily the official view of the Institute, nor do individual contributions reflect the opinions of the Editor. While every care has been taken in the preparation of this journal, the publishers cannot be held responsible for the accuracy of the information herein, or any consequence arising from them.

Multiple copying of the contents or parts thereof without permission is in breach of copyright.

Permission is usually given upon written application to the Institute to copy illustrations or short extracts from the text or individual contributions, provided that the sources (and where appropriate the copyright) are acknowledged.

The Institute of Acoustics does not necessarily endorse the products or the claims made by the advertisers in the Acoustics Bulletin or on literature inserted therein.

All rights reserved: ISSN 0308-437X

Annual Subscription (6 issues) £132.00 Single copy £22.00

@2018 The Institute of Acoustics

ACOUSTICS Volume 43 No 6 November/December 2018 BULLETIN

Institute affairs

- President's letter
- 6 **Engineering Division**
- IOA conference 8 programme
- 10 Branch news
- 12 IOA sustainability award

Instrumentation Corner

- Some thoughts on entertainment noise
- 18 IOA moves to Milton Keynes
- 2018 Inter-Professional 20 Networking event
- 22 IOA AGM report
- 62 Institute diary

General news

- 28 World industry news
- 54 Product news

Technical contributions

Assessing railway noise and vibration for new line-side housing

Industry updates

- Looking back at the life of 19th-century Irish physicist, John Tyndall
- John Connell Innovation 48 Award winner communicates proposed changes to landscape around Stonehenge with sophisticated audio simulations
- 52 PDA Ltd celebrates 30 years of business ANC campaign puts acoustics on the career radar MZA Acoustics ends first year on a high Cirrus Research now a **UKAS-accredited laboratory** for calibration services Cole Jarman's 25 years

Regulars

Committee meetings and 62 Institute Council

of trading

The Institute of Acoustics in 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, govern mental 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



WE MAPPED THE SOUNDS OF CHILE

With a population of around 17 million and roughly one-third of that living in Chilean capital of Santiago, traffic noise mapping wouldn't seem top of the urban research agenda.

Not so, last year a report stated that new car sales were up a staggering 27.3% in the country as the economy continues to improve. Santiago is also one of General Motors' manufacturing bases in South America. That's why Prof. Jorge Arenas undertook a two-year noise mapping study using equipment from Cirrus Research.

SEE THE RESULTS: more.cirrusresearch.co.uk/chile

Optimus sound level meters

The Latest Generation of Sound Level Meters for Environmental Noise Monitoring

#WEKNOWNOISE

Discuss your project with our noise expertsBook a free consultation **+44 (0) 1723 891 655**For our full range visit **cirrusresearch.co.uk**









Dear Members

To begin at the beginning: the new IOA office was opened on 26th September 2018 by the Mayor of Milton Keynes, Martin Petchey, who cut the tape and joined members of Council for lunch. One picks up snippets over such events, such as that there are plans to expand Milton Keynes from a population of 250,000 to 300,000 and to open a university in the city, in addition to the Open University. Martin Petchey was clearly impressed with our set-up and the opening was reported in the local paper, the MK Citizen. (See more on page 18).

Chairing the Council for the first time again reminded me of the depth and breadth of Institute activities and the possibilities for development and change. To help achieve these ends, we have appointed a marketing officer, Alex Shaida, who will be looking at our website, no doubt, with the aim of making it more informative and attractive, particularly to the younger members and visitors to the site. Perhaps there is a perception that the IOA is an old persons' game, so we would like to receive the views and input from this sector of our membership. Emma Shanks, who I

would definitely describe as 'young' although she might describe herself as 'youngish', demonstrated video logs, or vlogs, as a possible way of introducing the officers of the Institute to members. The vlogs would comprise short presentations (one to two minutes) about who officers, staff and committee chairs are, and what we do.

Auditorium Acoustics 2018

It was a great pleasure to attend Auditorium Acoustics 2018, held in Hamburg from 4th – 6th October, at the Elbphilharmonie, one of the most impressive and expensive performance spaces in Europe. This flagship international conference series takes place every three years and it attracts the great and good in research and design practice from all over the world, under the co-chairship of Raf Orlowski and Mike Barron. My research area is in another field; the prediction and control of noise and vibration, but it was good to listen to high-quality presentations dealing with auditorium design, numerical modelling and simulation and on auralisation. The discussions which followed, were informed and sometimes excited and robust. Long may this continue.



During the conference dinner, it was my pleasant duty to present the award to Jeremy Newton for services to the Institute. Jeremy is an exemplar of the level and quality of input by our volunteers to the IOA, in his case, as member, secretary then chair of the meetings committee over a period of nearly 25 years. This was while he was fully involved at Arup in auditorium design and later in auralisation for major infrastructure projects, such as HS2.

Finally, and of interest to me, is the number of job opportunities and interesting career prospects in acoustics consultancy, research and manufacture, and the shortage of applicants with the required skills. It would be interesting to know how many undergraduate and postgraduate students are registering for studies in acoustics and audio courses throughout the UK, and how many of them are aware of the IOA free student membership scheme and the long-term benefits of being a member.



Dany Cibbs Brasidant IO

Barry Gibbs, President IOA

Engineering Division

By Blane Judd, Engineering Manager



The Engineering Division has been working with the members who wish to join the growing number of engineers professionally registered with the Engineering Council.

he move of our HQ from St Albans to Milton Keynes went well, but did cause a small hiatus in our activities. Many of the records we held have been archived into electronic format to help facilitate storage in the new offices. Please bear with us if we ask for information you have provided before, as we can sometimes find it difficult to locate older data. We are still working to support those who started the process and for a number of reasons did not pursue it at the time. It is important, therefore, to keep copies of transcripts and certificates that you may have provided a while ago safe in case we need to ask for them again.

Emma Lilliman, who joined us when we moved to Milton Keynes, is becoming used to the processes here at the IOA and is doing a great job supporting candidates through their applications for registration. We are a small, dedicated team providing the necessary levels of support to assist members like you through the process.

We had two successful candidates in the last round of interviews and their profiles appear on page 7. Congratulations to them both. Our next round of interviews will be in the early part of next year and we already have some candidates working towards that session. We hold a number of interview events through the year, depending on the number of candidates we have coming forward for registration. We can offer face-to-face interviews or by video link. If you are interested in taking the next step to becoming a professionally registered engineer, contact us on acousticsengineering@ioa.org.uk

The requirements for academic qualifications for CEng and IEng changed in 1999. Pre 1999 an Honours Degree at 2:2 or above was required for CEng or a Higher Diploma/Certificate for IEng. Post 1999 this changed and for CEng a Master's Degree was required or an Ordinary Degree for IEng.

Routes to registration

There are two routes:

- 1. Standard route if you have the appropriate EC-accredited qualification (also referred to as an exemplifying qualification) in acoustics; and
- 2. Individual route, which requires further preparatory work from you before submitting evidence of your competence. Remember that we are here to help you get through the process, and advice and support is offered to every candidate personally.

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

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

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

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



Engineering Council successful candidates



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

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

The IOA is pleased to announce that Michael Ashcroft and George Gibbs have attained the standard required for admission to the national register, Michael at Incorporated Engineer level and George at Chartered Engineer level.



Michael Ashcroft IEng

Michael Ashcroft IEng

Michael graduated from Southampton University in 2014 with a BSc (Hons) in Acoustics and Music then worked for WSP for four years in London, with a six month secondment to Sydney in 2016.

Reflecting on the qualification process, Michael said: "In consultancy, we talk a lot about what 'we' as a company have done, but as part of the process it was good to take ownership of the work I had done and the decisions I had made.

"The process has encouraged me to look more at why things are done a certain way, rather than just accepting them as the norm, or standard practice."



George Gibbs CEng

George Gibbs CEng

George graduated from the University of Nottingham in 2006 with a BEng (Hons) in Environmental Engineering, before working as a project engineer in the water industry and then at St. Helens Council as a Scientific Officer (Planning and Noise). After he completed his IOA Diploma in Acoustics and Noise Control at the University of Salford, he joined Entec (now Wood plc) in 2009 as an Acoustic Consultant in their Manchester office, where he worked for nine years until he left his role as Associate Director. After a career break, George has just joined Noise Consultants Ltd in their Warrington office.

He said: "I completed the MSc in Acoustics with Environmental Applications at the University of Salford in 2017, and soon after, started the 'standard route' CEng application process, with the assistance of Blane Judd and the IOA team, and my CEng mentor, Dr Gary Seiffert (Liverpool University, Acoustics Research Unit), who I would like to thank for his guidance.

"I found the process of having to demonstrate the appropriate competencies both challenging and rewarding and I enjoyed the opportunity to reflect on previous projects and my own strengths and weaknesses. The project examples I chose to highlight the various competencies included engineering aspects of noise and vibration quantification, management and mitigation associated with nuclear new build, airport expansion and wind farm developments."

CEng is internationally recognised, and I would strongly encourage fellow professionals working in the acoustics industry to get in contact with the IOA so you can start your own CEng journey. Becoming a Chartered Engineer has been a career goal of mine for a long time and is an achievement of which I am immensely proud.

Institute affairs

Forty-nine membership applications have recently been approved by the Council following the recommendations of the Membership Committee. Of the total, 26 were new or reinstated, the remainder upgrades. One new application was received to be a sponsor for the Institute, which was approved.

Fellow			MIOA		
Christos Karatsovis			Jalal Amine-Eddine	Christopher Banks	Scott Castle
			Susan Gallimore	Matthew Gray	Jake Howarth
AMIOA			Graham Jump	Graham Jump	Tamasine Leighton-Crawford
Valishnav Balaji	Richard Budesha	Benjaporn Cait Smith	Jamie Pearson	Jacob Perry	Gary Phillips
Lianda Chapman	Thomas Dimasi	Tobias Ecclestone	Daniel Shaftoe	Andy Sills	Mark Smith
Kyle Edwards	Richard Evans	Suzy Everett	Andrew Thomas	Aaron Tomlinson	DanielTurner
Samuel Forrest	Sam Geering	Robert Harris-Marshall	Bo Wang		
James Hipperson	Piotr Kowalczuk	Jonathan Maguire			
Reid Malster	Aled McDougall-Brown	Jonas Lopez Montoro	Affiliate		
James Norman	Callum Stewart	Toby Walton	Gus Egan	Naomi Fuller	Hannah Mills
Benjamin West	Dhruvit Zaveri		Kimberley Onjun	David Ridgely	James Shepherd
Tech IOA			Sponsor		
Mark Berry			Direct Acoustic Solutio	ns Limited	

Vacancy for a Young Persons representative on the membership committee

his position is exclusively available for someone in the early part of their career, ideally who is already a member of the Young Persons group.

Applicants are expected to attend four membership meetings and ideally, the two Continuing Professional Development (CPD) review meetings per year at IOA HQ in Milton Keynes.

The main activity of the committee is to look at all applications for membership, making recommendations to Council for the election of corporate members (FIOA and MIOA) and approving the election of non-corporate members (AMIOA, TechIOA, Affiliates and Students) and sponsor members.

Complaints under the Institute's Code of Conduct are investigated, and recommendations to Council are made if the complaint is upheld and penalties against the member concerned may be appropriate.

The committee oversees matters concerning CPD for individual members and in relation to any such scheme operated by employers.

If you are interested in this post, please submit your application to **Emma.Lilliman@ioa.org.uk**

Conference Programme

8 November

Organised by Noise and Vibration Engineering Group Sustainable Engineering Design Southampton

27-29 November

Organised by the Electroacoustics Group
Reproduced Sound 2017 – Putting Sound in its Place
Bristol

16 January 2019
The new WHO Noise Guidelines for Europe

London

12 February 2019

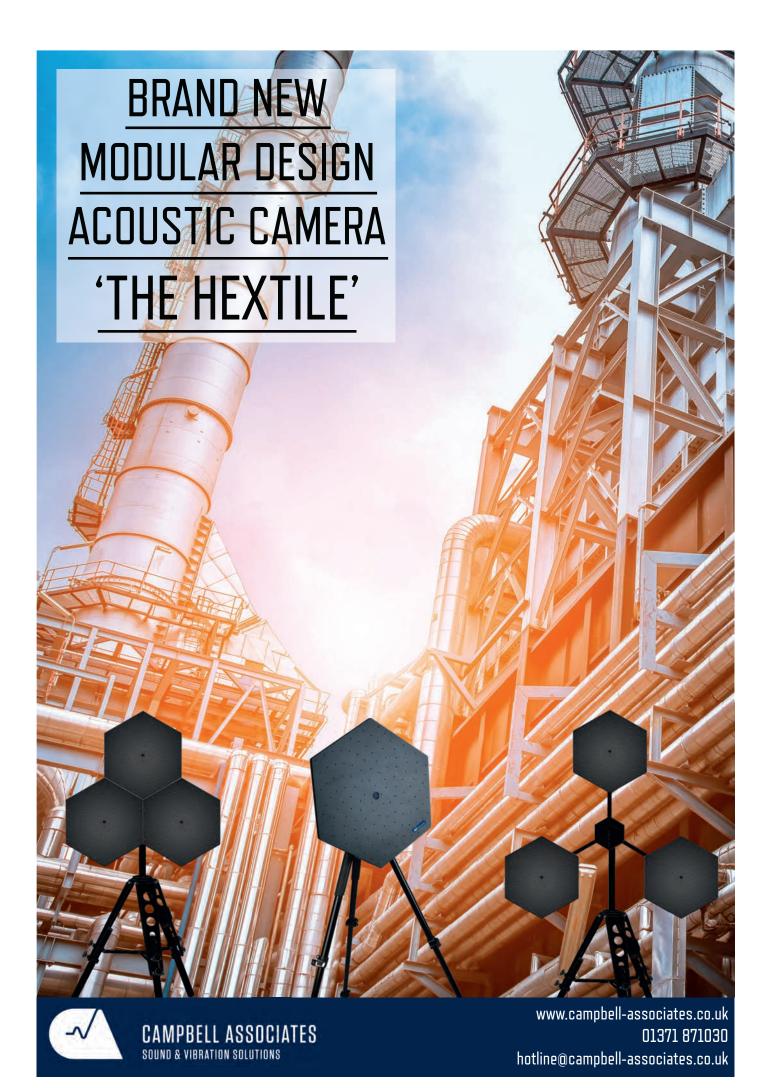
The Art of Being a Consultant Salford

17-18 April 2019

Organised by the Underwater Acoustics Group Sixth International Conference on Bioacoustics Loughborough

> 13-14 May 2019 ACOUSTICS 2019 Milton Keynes

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



Southern Branch

By James Jiang

In June 2018, the Southern Branch invited Mr Gwyn Griffiths MBE BA MSc to give a presentation of 'Underwater Robots and their Acoustic Payloads – New Insights and New Opportunities' during the local branch meeting at the Pod, Solent University. Drawing on the pioneering work in research and academic establishments and companies in the south of England, this talk summarised the different types of sonars used on underwater vehicles, how they have contributed new insights on fisheries' acoustics, zooplankton distribution and behaviour, the physics of the upper ocean, the statistics and characteristics of sea ice and floating ice shelves, as well as enabling high resolution mapping of the seabed and even the near vertical walls of undersea canyons. The event was very successful and has generated much interest from both IOA members and the public.



Gwyn Griffiths MBE BA MSc at the Pod, Solent University

Central Branch

By Adam Baker

In September, Central Branch members enjoyed a presentation on the forensic analysis of speech and sound by Dr Jessica Wormald, who works as a forensic consultant at J P French Associates & the University of York. Jessica spoke about the work that forensic analysts undertake and started by giving a summary of the main sources of audio recordings used by forensic analysts (often to assist the court and legal system), which include telephone calls to the emergency services, mobile telephone recordings and recordings made using covert devices.

Jessica went on to discuss the process of speaker comparison, explaining that the phonetic similarities and differences are analysed through auditory and acoustic examinations, and demonstrated the principles of speaker comparison with the aid of audio recordings. She explained how the forensic analysis of speech and sound has developed in the past 30 years, not least, the approach taken to reporting evidence on criminal cases and the assessment scales used by practitioners in this field.

Jessica summarised authenticity analysis techniques, including the use of electric network frequency (ENF) information, which can be used by forensic analysts to interrogate a recording to determine the time a recording was made and whether there is evidence of the recording being edited.

This was a well-attended and interesting presentation and Central Branch members were very grateful to Jessica.

The next Central Branch meeting will take place on Thursday 22nd November. The presentation 'Noise control in consumer products' will be by Nathan Thomas of Dyson. Key to a noise and vibration engineer's role in product development is providing technical support to product design teams, this commonly involves simulation, measurement and analysis, understanding acoustic performance, and device noise control solutions. We look forwarding to seeing you at the BRE innovation park near Watford and for more details please visit the 'Latest Events' section of the website.

Midlands Branch

By Fiona Devine

In July, Jon Tofts and Tony Clayton of the Environment Agency (EA) came to the WSP Birmingham office to give a talk on 'How the Environment Agency regulates noise pollution.' Tony opened by explaining what the small team of three officers do. He then handed over to Jon, who introduced us to the standard noise conditions set in environmental permits. Jon then explained how the EA investigates noise complaints using a Common Incident Classification Scheme (CICS), which categorises the impact from

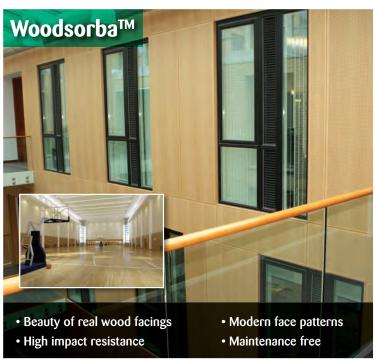
noise ranging from Category 1 – 'Serious effect on human senses' to Category 4 – 'No impact'. This was supported by examples of each category.

Finally, we were treated to an additional presentation by Tony on 'How well is uncertainty dealt with in acoustics reports submitted to the EA...or rather not'. Though numbers were down from previous events, the talks provoked lively discussion. Thank you Jon and Tony for giving the presentation and to WSP for hosting the event.

Acoustic Panels

Soundsorba manufacture and supply a wide range of acoustic panels for reducing sound in buildings.

www.soundsorba.com









Soundsorba's highly skilled and experienced acoustic engineers will be pleased to help with any application of our acoustic products for your project.

Please contact us by calling **01494 536888** or emailing **info@soundsorba.com** for any questions you may have.



TEL: +44 (0)1494 536888 **FAX:** +44 (0)1494 536818 **EMAIL:** info@soundsorba.com **SOUNDSORBA LIMITED**, 27-29 DESBOROUGH STREET, HIGH WYCOMBE, BUCKS HP11 2LZ, UK

IOA launches new sustainability award



Peter Rogers FIOA, Past Chair of the Sustainable Design Task Force for the IOA, launches this new award, which recognises the work acousticians do in delivering sustainability.

n 2013, the IOA set up a Sustainable Design Task Force (SDTF) with the aim of supporting the Institute and its members in strengthening their contribution to sustainable design.

The SDTF set out a number of recommendations in its final report to the IOA Council in 2017. One of these recommendations was to recognise the contributions and achievements of members with an award to celebrate their contributions toward building a sustainable future, and to develop a pool of case studies that others can learn from and be inspired by.

I'm delighted to be able to say that IOA Council has now approved the terms of the award, which will be available from 2019 onwards.

Criteria

The award is open to individuals, or teams, who are able to demonstrate and provide evidence of one or more of the following:

- An exemplar contribution towards the delivery of sustainability, for today and for future generations.
- Demonstration of value in all three key areas (societal, economic and environmental).
- Can clearly demonstrate a significant contribution

 through education, design, construction practices
 or guidance that promotes the implementation of sustainability through acoustics.

Applicants are invited to highlight particularly valuable and/or pioneering aspects of their submission in key current priority areas of sustainability such as climate change, clean energy, eco-responsible materials, planning more sustainable communities and use of soundscaping.

Recognition

The award will be given on a rolling basis to those who reach the bar (and not as an annual award), as this will enable winners of each year's cohort to have a recognised period as honoured members. Award winners will be presented with a certificate and a year-stamped, bespoke logo with a unique ID, which can be used by the individuals and companies to which they belong (for one year from the date of the award). After this time, the award lapses and they must stop using it. A form of approved legacy wording can then be used thereafter.

The unique logo is currently being designed and will be linked visually with the IOA's branding. Winners will be requested to refine their submission into a case study, which will be published on the IOA website, and the winners' work will be available to view for a full year from the date of the award. The logo will link directly to their work, so it can be used on websites and email signature strips. Award winners will also be given honorary membership of an 'alumni' from which the judges for future awards will be drawn and a pool of expertise will be built.

It is an exciting way to be recognised for the work acousticians do in delivering sustainability, and it is hoped the award will help to communicate the good work that is being done by our members more widely.

The judging panel has already been formed, and we await entries on a rolling basis to pick out the best and brightest examples.

How to enter

To enter, send up to a 1,000 word synopsis of your work, plus pictures and figures, setting about how you believe it satisfies the above criteria, and how it delivers sustainability through the application of acoustics to ioa@ioa.org.uk.

Where a team is involved, you can still enter, provided it contains at least one member of the Institute who has made a substantial contribution to the work done. Other team members can also be acknowledged in the case study, but only IOA members will be able to benefit from the use of the logo for the year.

So the gauntlet has been thrown down, and we wait to see who is doing what.

Peter Rogers FIOA

Past Chair Sustainable Design Task Force for the IOA Ordinary member of Council and Managing Director of Sustainable Acoustics Ltd.



Total cloud based monitoring solutions



Noise. Dust. Vibration

- Cloud based data analysis and display
- Class 1 noise measurement
- Tri-axial vibration measurement
- Dust including PM10, PM2.5, PM 1 & TSP
- PPV peak particle velocity
- VDV vibration dose value
- FFT dominant frequency calculation
- Advanced triggers and alarms

SvanNET is the latest web portal that supports multipoint connection for all Svantek monitoring stations for noise, vibration and dust. The web user interface is easy to use and intuitive to operate and allows maximum flexibility for on-line and off-line reporting.

Svantek monitoring stations are designed and built to work in the rigours of a construction site. They use military standard connectors and have communication options to fit with the most remote site.

For further information and a demonstration call us now 01234 639551 or email us sales@svantek.co.uk

A nice evening out... some thoughts on entertainment noise

By Tony Higgins MIOA, Director at Enviroconsult and Rebecca Knox GradIOSH

any consider that at the end of a hard-working week, the reward is an evening out with friends. A few drinks and a club to finish. Our 'reward' may be putting our health at risk. Research carried out by students from the University of Wolverhampton has provided some interesting evidence to quantify what we already know. An evening out is bad for our health! I refer not to the alcohol (we are regularly advised by Public Health England that we should not binge drink and that we should stick to fewer than 14 units a week to avoid the chronic effects of alcohol in later life). I refer instead to damage to our hearing. Unlike alcohol, noise already has a framework for legal exposure levels to protect employees' health from unwanted noise in the workplace. These well-established limits offer an opportunity for evaluating noise exposure for recreational activities that generate noise and a way of assessing the unintended impact of noise, particularly on patrons of entertainment venues.

Legislation

Occupational exposure to noise is regulated under the Control of Noise at Work Regulations 2005. This sets limits on noise exposure designed to protect health and prevent hearing damage. The limits are stated in Regulation 4 and set exposure action levels (EAL) based on daily or sometimes

2005 No.1643

HEALTH AND SAFETY

The Control of Noise at Work Regulations 2005

Made 19th June 2005

Laid before Fartiament 28th June 2005

Coming 1000 force - 6th April 2008

ARRANGEMENT OF REGULATIONS

Citation and commencement:
Interpretation:
ARRANGEMENT OF REGULATIONS

Citation and commencement:
Exposure limit values and action values.
Assessment of the risk to health and safety created by exposure to noise at the workplace.
Elimination or control of exposure to noise at the workplace.
Elimination or control of exposure to noise at the workplace.
Health surveillance.
Mentherance and use of equipment:
Health surveillance.
Lecengino exchilectes from hearing pratection.
Exemption exchilectes from hearing pratection.
Exemption exchilectes for oversegency services.
Exemption exchilectes for oversegency services.
Exemption exchilectes for correspency services.
Exemption exchilectes for the prevency services.
Exemption exchilectes for the propose of giving the propose of giving feet without mostleadines to proposals submitted to him by the Health and Safety of Work etc. Act 1974(a) cthe 1974 Act" and of all other powers enabling him in that behalf, for he purpose of giving effect without mostleadiness to proposals submitted to him by the Health and Safety Commission under section [1(2)(d) of the 1974 Act after the carrying out by the safe formission of constitutions in accordance with section 50(3) of that Act, hereby makes the following Regulations:
Citation and commencement

1. These Regulations may be excited as the Control of Noise at Work Regulations 2005 and shall come into force on this April 2006, except that—

14 1974 Act and of the force of the proposed giving the safety of the proposed giving the control of the proposed giving effect without mostleadiness to proposed submitted to him by the Health and Safety Commission of constitutions an accordance with section 50

weekly exposure to noise. The lower EAL, is broadly a trigger for investigation and risk assessment, the upper EAL requires action to be taken to reduce noise to a level that is as low as reasonably practicable. The levels stipulated in Regulation 4 are shown in the table below (echoed in the World Health Organisation Guidelines₃ (issued in 2015):

Exposure Limit/Action Value	Lep,d limit	LCpeak Limit
Lower Action Value	80	135
Upper Action Value	85	137
Exposure Limit Value	87	140

(HM Government, 2005)

The legislation only expressly applies to employees exposed to noise or to others at work (e.g. contractors) who may be affected by the acoustic climate. Strangely, it does not apply directly to other persons at the same site who are exposed to the same acoustic environment, as they are not at work. However, the levels noted for occupational exposure are directly applicable health-related standards and must surely be considered reasonable for evaluation of the effects of noise on all people exposed.

With the exception of the general requirement under s.3 Health and Safety at Work etc. Act 1974, there is no specific legislative control to protect the public from the effects of site-generated noise to which they intentionally expose themselves. Arguably for entertainment venues, the Licensing Act 2003 provisions could be used to limit noise exposure on the grounds of public safety. I am not aware that this has been attempted yet, and it would be a brave Licensing Authority that would be the first! It is therefore a matter of individual choice of the people attending these music venues to take actions to protect themselves, although to exercise a true choice, individuals will need to be informed.

It has been identified through research that many patrons of pubs and clubs do not properly understand the hazard and therefore are not taking precautions to prevent risks to their hearing. Sadhra et al (2002)₁ reported 69% of participants within the study did not perceive noise within bars as a risk to their hearing. Beach, Gilliver and Williams (2013)₂ stated that those who attended one site of high noise exposure were likely to further attend others. Most did so without concerns over the potential health implications for their hearing or perhaps recognising that any additional exposure to noise would have a cumulative impact with any occupational noise already experienced. The concept of 'noise dose' appears not to be understood.

Noise dose

Compliance with occupational noise standards is often expressed as a noise exposure dose (a percentage of the maximum noise exposure over eight hours)

(ref: http://www.hse.gov.uk/noise/calculator.htm), or as a exposure level vs time, to help provide context in understanding the extent of adverse impacts in the workplace. An example of exposure levels vs time and conversion of noise levels to noise dose is included in the tables below:

Average noise level	Time taken to receive a dose equivalent to the upper exposure action value (85 dB)
85 dB	8 hours
95 dB	45 minutes
100 dB	15 minutes
105 dB	5 minutes
110 dB	Under 2 minutes
115 dB	Under 30 seconds

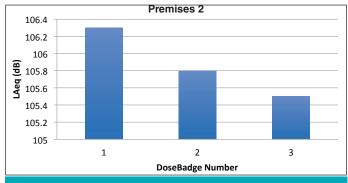
Daily noise dose %	Lep,d dB(A) (8hour)
70	83.5
80	84.0
90	84.5
100	85.0
200	88.0
400	91.0
600	92.8
800	94.0
1,000	95.0
1,500	96.8
2,000	98.0
4,000	101.0
6,000	102.8
8,000	104.0
10,000	105.0

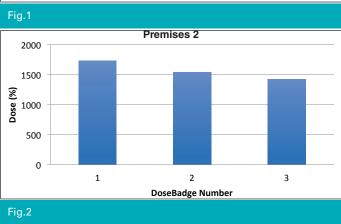
Research conducted by a student at Wolverhampton University clearly shows that exposure to noise for patrons of entertainment venues can be extremely high.

Wolverhampton data

A number of different types of venues were studied; ranging from pubs with incidental music, to bistro bars with live bands and full blown night clubs. Personal dose meters were worn for the periods of exposure and the results captured in real time. The example in Figures 1 and 2 on page 16 show the exposure of three individuals in a night club over the course of an hour carrying out a mixture of activities, dancing, drinking, or visits to the quiet room area, but all the venues (without exception) evidenced significant exceedances of the WHO guideline values.







The results show significant exceedances of the recommended WHO guidelines for the patrons of the club. Note that this data is for one hour of exposure, where many patrons would likely be present for several hours (increasing the dose). Based on the data collected, the noise dose is at least 14 times the recommended level, and clearly likely to cause significant hearing damage if repeated regularly. Put another way, the music noise in this particular nightclub could be safely observed for no more than five minutes without causing potential harm.

Worryingly, this data isn't an isolated case. It is entirely consistent with other surveys and the HSE's own data presented for noise from entertainment venues. Many young people will be exposed regularly to very significant levels of occupational noise, and then routinely expose themselves to even greater levels of entertainment noise without realisation of the harm being caused, and of course, this ignores the use of personal audio devices and intra ear amplification.

The cumulative impact is projected to have significant effects on health and wellbeing in later years.

Health effects

The health effects of exposure to excess music and entertainment noise are well understood. Anyone who has been to a concert will recognise effects like temporary threshold shift, or tinnitus, which will normally affect some, if not most, attendees for a short period following a concert or entertainment event. The WHO report endorses the outcome of the National Institutes of Health Consensus Development Conference Statement (1990), and advises that the magnitude of temporary threshold shift and tinnitus can be a good indicator of early development of irreversible hearing loss.

The Department of Health report, 'Action Plan on Hearing Loss', suggests:

"3.3 In older age, hearing loss becomes a major challenge and people with hearing loss can find it difficult to follow speech without hearing aids and are at greater risk of social isolation and reduced mental well-being. Social isolation has an effect on health and in

older people there is a strong correlation between hearing loss and cognitive decline, mental illness and dementia."

The growing body of evidence on health effects from entertainment noise surely calls for a more robust approach to noise exposure and protection of public health in a more holistic manner.

Conclusion

We started this article by discussing a simple evening out. Review of the research and comparison of the ongoing acoustic impacts with relevant standards clearly shows potentially serious concerns, with national implications for resourcing our health needs into the future. There seems no good reason why occupation health-related standards should not also apply as noise dose exposure standards more generally.

The Department of Health document acknowledges that prevention is one of the key actions to be taken, and correctly identifies some of the key issues that need addressing (occupational noise, environmental noise, entertainment noise and personal devices etc.). It further demonstrates objectives to be pursued in addressing the needs, but regrettably fails to ask the key questions about HOW we should integrate these noise exposure categories into a broader health model.

It appears to me that, to put controls in place is both possible and advisable, but the issue of noise impacts on health need to be more robustly researched as a whole, and those at risk from significant exposure to noise should be made aware of the likely impacts on their health. We already control noise at work and environmental noise, as well as noise from some machinery (though we could usefully control maximum noise dose from personal devices), and we could issue additional guidance to limit noise from entertainment, or require venues to publicise health data and/or offer hearing protection.

For the time being it is left to local authority EHOs and acoustic consultants to do what they can to limit exposure to noise in the workplace, entertainment venues and the environment as a whole, not only to protect the public but also the businesses at risk from claims for hearing loss or damage, and more importantly, those entertainment venues we all enjoy, who might face claims from staff and patrons alike for deliberately exposing us to very high levels of noise. To quote section 3 of the Health and Safety at Work etc. Act 1974:

"It shall be the duty of every employer to conduct his undertaking in such a way as to ensure, so far as is reasonably practicable, that persons not in his employment who may be affected thereby are not thereby exposed to risks to their health or safety."

Footnotes:

- [1] Sadhra, S., Jackson, C., Ryder, T. and Brown, M. (2002) Noise exposure and hearing loss among student employees working in university entertainment venues. Annuals of Occupational Health, 46(5), pp. 455-463
- [2] Beach, E., Gilliver, M. and Williams, W. (2013) Leisure noise exposure: Participation trends, symptoms of hearing damage and perception of risk. International Journal of Audiology, 52(1), pp. s20-s25.
- [3] Hearing loss due to recreational exposure to loud sounds (2015) World Health Organisation
- National Institutes of Health Consensus Development Conference Statement January 22-24, 1990 Noise induced Hearing loss [online] [accessed 09.10.18] https://consensus.nih. gov/1990/1990NoiseHearingLoss076html.htm
- [5] Action Plan on Hearing Loss (2015) Department of Health



Advertising feature

Noise mitigation against HS2 enabling works at 30 Euston Square

30 Euston Square is a stunning Grade II* Listed building dating back to 1906. Maintaining the legacy of the healthrelated professionals who have occupied the building since it was constructed; it was acquired by the Royal College of General Practitioners (RGCP) in 2010, who took up the task of refurbishing and upgrading its spaces.

Selectaglaze has a longstanding relationship with RGCP and has carried out a number of installations to different areas of the building over the years.

The relationship began in 2010, when the new owners decided it was necessary to undertake works to reduce noise ingress on



the façade overlooking the Euston Road, notably, the State Room on the top floor. To make it more attractive for the users of the space, it was decided to treat the windows and rooflights with secondary glazing.

Again, on the same facade, on a few of the lower floors there are study rooms where GP members can stay when they are on College business. Secondary

glazing has been installed to prevent noise from passing traffic. A mixture of units were installed, including vertical and horizontal sliding units and side hung casements.

In 2012/2013, Selectaglaze returned to install secondary glazing to other areas of the building, which were either used for RGCP staff or as tenanted office areas. These were overlooking Euston Square and a few of the study bedrooms towards the rear of the building.

The local area has changed dramatically in recent years, with Euston Station set to become the end point of the new HS2 high speed rail link.

In 2016, Selectaglaze was approached to install secondary glazing to areas of the RGCP building on Stephenson Way and Euston Street to help combat any noise from the building work. Working to an architect's specification, the design was finalised and after Listed planning consent was granted, installation began. All units specified grant access to the primary windows, to enable the maintenance and cleaning.

Established in 1966 and granted a Royal Warrant in 2004, Selectaglaze is the leading specialist in the design, manufacture and installation of secondary glazing.

For further information, please contact Selectaglaze on

Tel: 01727 837271

Email: enquiries@selectaglaze.co.uk

www.selectaglaze.co.uk

We reach over 3,000 specialist individual acousticians, their companies and their clients each month.



We reach over 3,000 specialist individual acousticians, their companies and their clients each month.

The Institute enables you to advertise through:

- The Acoustics Bulletin
- The website
- Directory of acoustic service providers

Publications are circulated to ALL members of the Institute of Acoustics – one of the largest national acoustical societies in the world - and to libraries and educational institutions throughout the UK.

If your company is looking to sell products or services to our members, or if you need to recruit specialist staff, or require more information on advertising opportunities or samples of our publications please contact:

Dennis Baylis MIOA, Advertising Manager, Peypouquet,, 32320 Montesquiou, France Tel: +00 33 (0)5 62 70 99 25 Email: dennis.baylis@ioa.org.uk



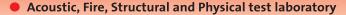
Shaping a better future, together.

We are seeking an experienced acoustics engineer to join SNC-Lavalin Atkins who is keen to work on technically challenging projects.

To apply please send your CV to emma.rees@snclavalin.com or call 01332 223050



(f)(y)(in) snclavalin.com | atkinsglobal.com



Site acoustic pre-completion testing
 Notified body



Fire Acoustics Structures

T: 0115 945 1564

www.btconline.co.uk btc.testing@saint-gobain.com



IOA opens new head office in Milton Keynes

There is a well-known saying by Alexander Graham Bell that when one door closes, another one opens. And on Wednesday 26th September, the Institute of Acoustics officially opened the doors to its new, purpose-built offices in Milton Keynes.



he Mayor of Milton Keynes, Martin Petchey, officially welcomed the Institute to the town by opening its new head office in Silbury Court. Despite having given up our beloved home of many years in St Albans, and said goodbye to some of our close work colleagues because of the move, there's a palpable sense of excitement and adventure ahead of us as we transfer from one fond home to another. Just a five minutes' walk from the town centre and no more than 15 minutes on foot (even if you're not a brisk walker) from Milton Keynes' main railway station, the office is custom-built with a state-of-the-art training room that provides classroom style work desks for up to 29 students.

How the move was planned

The Institute's office relocation was necessary as the lease for the St Albans office was going to expire towards the end of 2018. The building that housed the office had been sold and its new owner's intention was to convert it into flats.

The search for the new office began last autumn and the Institute's initial objective was to stay in St Albans. Potential locations close to St Albans were also being considered, such



as Hemel Hempstead, Watford and Harpenden, but the search had to be widened to include Milton Keynes, after initial searches resulted in limited office options.

Shortlisting possibilities

We eventually drew up a shortlist of potential office locations that included St Albans, Harpenden and Milton Keynes. To assess which office presented the right choice for the future home of the Institute, a balanced scorecard was developed and this was applied to each potential location. It factored in a number of important criteria such as likely impact on staff, accessibility, and the requirement for the right kind/style of office space to include a larger boardroom/classroom section for the Institute's growing training needs. Due diligence on financials were based on a pre-defined budget and the initial, one-off financial implications of a move.

Future-proofing the Institute was also going to be a key consideration. Moving away from St Albans presented a major challenge, as it meant some of the Institute's staff would be unable to work in the new location. However, it was important to think further ahead, and evaluate the need to upgrade the IT systems, allowing staff to make good use of the digital information that new IT systems offer. Access to future skills and expertise for the Institute was another major consideration, as the choice of location could make a significant impact on recruiting the right calibre of staff as the Institute develops.

A major deterrent to remaining in St Albans was that office rents have more than doubled over the past few years. This had been caused in large part by significant ongoing housing shortages in and around London, which was fuelling a steady rise in the conversion of offices into houses in order to keep up with the burgeoning demand. Consequently, the resulting lack of office space drove up rents and it became evident that office rents were probably going to continue spiralling upwards in the next few years in St Albans.



We now have two self-contained, acoustically insulated work pods for members to use

The answer becomes clearer

Milton Keynes soon started to appear favourably as the Institute's new location due to the town's rapid commercial expansion and corresponding growth in housing stock already planned to meet the demands for a growing, professional workforce. We concluded that even though office rents were likely to rise in the coming 10 years in Milton Keynes, it would be at a slower pace than we were witnessing in St Albans.

The Silbury Court location began to stand out above the other options as the Institute's preferred choice. Our 10 year evaluation indicated that Silbury Court could potentially save us a substantial sum of money in rent, and would also provide superior communications with broader technological facilities, especially when compared to the Institute's previous base and other locations we were considering.

Focal point for the future

Allan Chesney, Institute of Acoustics CEO, firmly believes that the office move presents a huge opportunity. He said: "Our office move was more than just about moving us from A to B. As an Institute, we're constantly evolving, changing and expanding to meet our members' varied and growing needs, and we've been working very hard to update our internal systems to fully modernise the services that we provide.



Library/snack area situated immediately outside the training room



(LR) Barry Gibbs, IOA President and Martin Petchey, Mayor of Milton Keynes at the official opening of the new office in September

"By being up-to-date with the latest technologies and making our service offering more attractive and beneficial to not only our primary UK membership base, but also internationally, it will help us to move ourselves forward during a time of widespread digital opportunity. Our new office space will be more closely aligned toward achieving our future aims and objectives."

The office includes two self-contained, acoustically insulated work pods for our members to use and a new training room, which also serves as a boardroom for council and member meetings. The training room is available for private hire when not being used for the Institute's training requirements or members' meetings. Institute members are encouraged to come and visit us at their convenience during regular office hours.

New team members

Complementing the office move, the Institute now has some new staff members:

Edith Borowicz, responsible for education and the new Moodle learning platform, which will be developed and enhanced over the next 18 months

Email: edith.borowicz@ioa.org.uk

Emma Lilliman, responsible for membership and engineering and office administration

Email: emma.lilliman@ioa.org.uk

Alex Shaida, responsible for marketing and general communications

Email: alex.shaida@ioa.org.uk

We're currently looking for a part-time administrator to support general administration for four hours a day on Tuesdays, Wednesdays and Thursdays.

Visitors

We look forward to seeing you soon at our new home at Silbury Court, 406 Silbury Boulevard, Milton Keynes MK9 2AF

Tel: 0300 999 9675

2018 Inter-Professional Networking event

By Angela Lamacraft, ACCON UK, former Chair of the Young Members' Group reports on the recent Inter-Professional Networking event.

he fourth Inter-Professional Networking event was held on 14th August 2018 in London. Nine professional bodies took part this year:

- The Institute of Acoustics;
- The Institute of Mechanical Engineers (IMechE);
- The Institute of Structural Engineers (IStructE);
- The Landscape Institute (LI);
- The Chartered Institution of Building Services Engineers (CIBSE);
- The Royal Town Planning Institute (RTPI);
- The Institute of Fire Engineers (IFE);
- The Chartered Institute of Ecology and Environmental Management (CIEEM); and
- The Institute of Environmental Management and Assessment (IEMA).

The evening followed the usual format of an introductory speech followed by refreshments and informal networking that has proved so successful in previous years. As with previous years, the ice-breaker activity was networking bingo: participants were required to search the room for people matching various descriptions (e.g. a mechanical engineer, someone who has worked on a project in Asia, someone who speaks a foreign language etc). A range of effort was put into the activity, with some people's competitive streak appearing and others preferring to focus on more traditional networking.

Workshops

This year's event also saw the introduction of pre-bookable CV workshops. Three well-attended parallel sessions of peer-reviewing were held in side rooms off the main event.

The aim of the event is to allow young members of different disciplines to come together to learn about each other's work and perhaps make some important connections. We believe this helps young professionals to feel more confident when discussing a variety of technical matters within project teams, and may even encourage creative and sustainable design. The event was held at a new venue this year – and the Patch Bar St Pauls in London worked brilliantly!

A video of the event is available at:

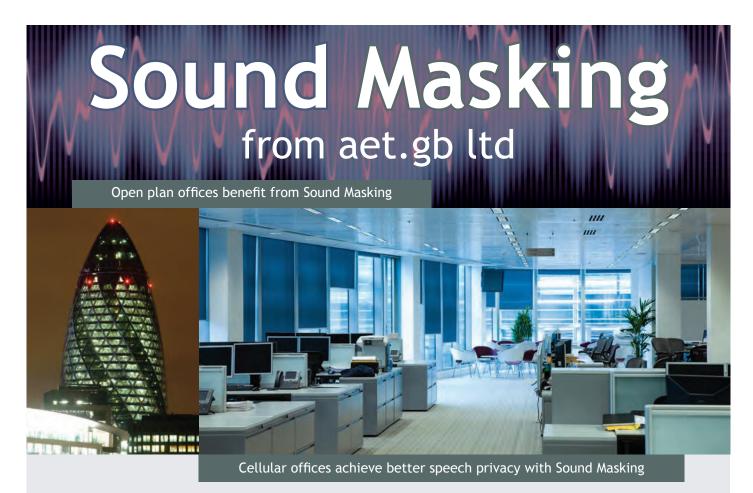
https://we.tl1GH6ZeWOtp courtesy of Curtis Gregory at Debussy Designs (@Curtis_Debussy).

This event will happen at roughly the same time next year and we hope it will be even bigger. Keep an eye open for advertisements nearer the time!

Many thanks go to Adam Mayall (IMechE), Manolis Papadantonakis (IStructE), Tristram Bushby (LI), Lucy Barton and Lubaina Mirza (RTPI), Alex Logan (CIBSE), Sunny Pawar (IEMA), Ashley Theakstone (IFE) and Rosie Whicheloe (CIEEM) for helping with the organisation and promotion and on the night.



Delegates at the 2018 Inter-Professional Networking event (Image courtesy of Ashley Theakstone)



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

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

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

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

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

- · Vodafone World HQ
- Procter & Gamble
- Swiss Re
- Mobil Exxon HQ
- Elizabeth Arden
- Barclays Bank
- Freshfields
- KPMG
- PWC
- BP





Sound Masking is now available with a host of extras including:

- PA, either all call or zone by zone call
- Dual level options for audio visual room etc
- Automatic ramping to conserve energy and produce profiled masking
- Fault reporting
- Automated amplifier changeover

www.aet.co.uk

AET.GB Ltd., 82, Basepoint, Andersons Road, Southampton, Hampshire SO14 5FE Tel: 0044 (0)8453 700 400 sales@aet.co.uk



AGM report

The Institute of Acoustics AGM was held during the 'Acoustics of Places of Entertainment and Sports Venues' one-day meeting at the Lowry in Salford, on 13th September 2018.

uring the AGM, the Presidency was handed over from Jo Webb to Barry Gibbs. William Egan retired as Past President and was given an Honorary Fellowship. Stephen Turner became President Elect. Jim Glasgow retired as Vice President Engineering and James Hill took up the role.

The election for Ordinary Members was held and Peter Rogers, Vicky Stewart and Martin Lester were all re-elected.

Honorary FIOA Citation for Mr William Egan

William was President of the Institute from 2014 to 2016. He has a science background, and studied business and finance before working for a series of high-tech companies where he gained knowledge in technical purchasing and sales, and business development. He became a business consultant, and worked as a general manager with a firm specialising in automation and control before moving into the world of acoustics with sound and vibration measurement specialist, Brüel & Kjaer. He moved from being UK Managing Director to Northern Europe Managing Director and finally, to Global Services and Solutions Director.

Jo Webb hands over Presidency of the IOA to Barry Gibbs

Working at Brüel and Kjaer (B&K) led to William joining the Institute and the Measurement and Instrumentation Group committee. He was also actively involved with the Midlands Branch, encouraging B&K to actively support regional meetings. At this time, he also contributed to Council as the Sponsor Member's Representative. At the end of 2013, he moved his 'day job' again – to underwater acoustic solutions specialist, Teledyne RESON, as Vice President – Global Sales.

William has combined the demanding global role of his day job with being President Elect, President and now Immediate Past President of the IOA. His business acumen and wide-ranging experience have been invaluable to the Institute, and it is for his contribution to the running of the Institute at the highest level that this nomination is provided.

During William's term as President Elect on Executive, he actively supported the President, providing formal and informal advice on finance and management procedures.

As President of the Institute, William worked closely with the Chief Executive to initiate and guide a review of the Institute's education provision. The IOA relies on revenue generated by education and William sought to protect this income for the future by commissioning an external review to gauge members' needs. This ultimately led to the commissioning of an IT system upgrade to provide improved automation in system management, and the provision of a learning platform.

Between 2014 and 2016, the Institute received unprecedented negative attention from a political lobby group who opposed the continuing construction of on-shore wind farms, in part because of our progress in providing guidance to improve



William Egan receiving his Honorary Fellowship from Jo Webb



01db.com





Institute Affairs

the technical consistency of noise assessments. The lobby group undertook a campaign against the Institute and certain of its members. Throughout the campaign, William demonstrated steady and considered leadership. He provided significant guidance and support to members negatively affected by the group's actions, thus securing a longer-term outcome where the reputation of the Institute was not damaged.

Now that he is Immediate Past-President, he remains an active member of Executive. During 2017-18 he has freely provided support and advice to the Institute in the decisions regarding the future location of our head office. He has leant on his experience of commercial property, people management and the impact of moving businesses and modernisation to provide invaluable input in what has been a difficult decision-making process. We are delighted to present him with an Honorary Fellowship.

'Acoustics of Places of Entertainment and Sports Venues' meeting report

By Alex Krasnic, Principal Acoustic Consultant at Vanguardia Around two years ago, the Building Acoustics Group (BAG) and the Environmental Noise Group (ENG) mooted the possibility of this one-day meeting, then inspired by a London Branch meeting presented by David Leversedge, of Aria Acoustics, entitled 'Sound management at large music festivals in the UK'. Before then, an IOA Working Group began revising the current Good Practice Guide (GPG) on the Control of Noise from Pubs and Clubs [1]. Fast forward to 2018 and two members of the Working Group; Alex Krasnic (Vanguardia) and Dani Fumicelli (Temple Group) set out to organise this meeting.

Fifty delegates attended seven presentations, including a short Q&A style session at the end of each one. Putting the first session into context, Dani explained that the eventual aim of the IOA would be to embark on a formal, membership-led consultation process, focusing on the current draft GPG, and that the one-day meeting would provide a forum for delegates to engage on a pre-consultation basis.

Dani summarised the work already carried out by the Working Group (in collaboration with Chris Hurst of Three Spires Acoustics and Jim Griffiths of Vanguardia, alongside a small group of stakeholder consultees). With more than 15 years since its original publication, Dani described the changes to the regulatory landscape between then and now, and how these changes would be reflected in the draft GPG, noting that the GPG would not intend to be a definitive statement of best practice, and that compliance with legal duties and licensing requirements would still be incumbent on those responsible for managing noise from places of entertainment.

Risk-based assessment

Dani described the rationale behind the draft GPG, introducing the concept of a risk-based assessment and proposals for an entertainment noise framework, leading to further draft advice centred on a risk rating tool and an associated qualitative assessment scale. These would form the basis of a relative approach to entertainment noise control, the aim of which would be to provide the practitioner with the necessary tools to both risk rate entertainment-led operations and recommend an appropriate set of noise limits, based on the difference between the With Entertainment Noise (EN)

and the Without Entertainment Noise (WEN) levels. This would include a recommendation for adopting C-weighted metrics as a more practical tool than use of octave-band based metrics, where low-frequency content could be deemed materially consequential. Such a method could then be adopted to inform the licensing process, with the aim of recommending appropriate conditions.

Alex then picked up where Dani left off by discussing some of the proposed content, again noting the various stakeholders who, it was envisaged, would likely adopt the revised guidance. Topics relating to noise management plans (NMPs), premises and music-based noise control techniques, including effective mitigation considerations (such as the deployment of different types of electronic limiter devices), communication with Local Authority representatives, the wider community and public relation matters were also discussed. To follow up, the discussion passed to the floor, where delegates discussed the merits of a wider IOA consultation and proposals to circulate a questionnaire intended to form the basis of a membership-led consultation.

Agent of Change principle

The second session focused on the recently introduced Agent of Change (AoC) principle, which has been avidly discussed by acoustics practitioners since its inception in Paragraph 182 of the revised National Planning Policy Framework (NPPF) [2]. Dani stated that what constitutes 'reasonable use' of one's property depends on the character of the locality and that it is no defence that a complainant 'came to the nuisance' and, while the introduction of AoC in the planning domain might appear to have lent a helping hand to operators of entertainment-led premises, it should be noted that for developers proposing to site new, noise-sensitive developments close to existing noise-generating business, and aspiring operators proposing to site new, noise-generating premises close to existing noise-sensitive properties, then the principles which underpin AoC should be applied in equal measure.

Dani then sought to scrutinise the wording of Paragraph 182, by drawing attention to a number of key descriptors of the AoC principle. By citing relevant case law, Dani showed that while the concept of AoC is nothing new, nuisance cannot be defined by specific thresholds that apply under all circumstances and that each case must be judged on its merits.

Ultimately, developers still have a responsibility to understand the relevant planning issues but consultants may still be liable to mis-apply or mis-interpret the guidelines, despite an overriding desire from operators to seek absolute guarantees that no complaint will be levelled at their business, given that current policy offers no defence in the matter. In conclusion, Dani expressed concern that new housing could be disproportionately hindered, should the emphasis be placed on the AoC principle by seeking to avoid complaint, as opposed to the management of risk of unreasonable restrictions imposed on the noise generator.

SWG3 case study

The third session was presented by Lindsay McKintyre of KSG Acoustics, who provided an insightful case study regarding the conversion of an historical Customs & Excise Bonded Warehouse into a multi-arts and music venue (SWG3) in Glasgow. Lindsay explained that the siting of the venue

SoundPLAN Noise 8.0 - NEW!

The only system of its type incorporating the most advanced indoor noise calculation method in addition to it's wide range of transportation and industrial modules, together with an improved, user-friendly interface

SoundPLAN Essential 4.1 - NEW!

The upgraded version of our entry-level software package making this the perfect choice for infrequent users or more advanced users that don't require the unrivalled flexibility and full power of its sister package

"SoundPLAN's world-renowned noise software just got even better..."



Institute Affairs

was initially problematic (acoustically), given its proximity to the University of Glasgow's Maclay Halls of Residence and that careful thought into the acoustic redesign of the building would be needed from the outset.

Delegates learned that previous objections has been levelled at the former Galvanisers Yard and Shed due to the existing noise profile consisting of a two hour, late evening/ early morning ingress of patrons, extensive music breakout to the neighbouring Eastvale Place, congregations of patrons outdoors until 03.00 hrs, coupled with a lack of effective security and patron egress strategy. Lindsay described how effective acoustic solutions were proposed, focusing on producing a working noise management plan, introducing an effective line of communication with the neighbouring Halls of Residence, the use of 10Eazy to control music noise levels, improved co-ordination of security responsiveness to movements of patrons and introducing a pop-up taxi rank to divert patrons away from the venue efficiently, amongst other soft measures. In particular, Lindsay focused on an holistic approach to the Galvanisers Shed, by way of effective architectural acoustic improvements.

Through considered acoustic modelling, KSG could demonstrate to all parties that due attention had been paid to achieve compliance with all off-site music noise conditions. Lindsay concluded that whilst the Finnieston district had come alive and that GCC remained supportive of the venue, the growth of the area would now bring its own set of (planning) challenges in light of the Agent of Change principle, which is now in the process of being adopted by GCC's licensing directorate.

Sports venues

The fourth session of the day was presented by Vanguardia Director and London Branch Chair, Jim Griffiths. Pitching a lively discussion centred on the acoustic design of sports venues, Jim took a few cues from the Midlands Branch Meeting of last December by re-visiting the concept of the 'atmosphere wheel'. This was conceived as a design tool aimed at illustrating the various elements which influence the acoustic design (and eventual operation) of any sports-led venue. Jim described how current standards that influence venue design do not necessarily lend themselves to effecting the often demanding outcomes of operators and owners of such venues. This is particularly true when an ever greater need exists to balance the client's aspirations for concert-level sound quality versus sporting atmosphere, and where these requirements are largely affected by either short or long reverberation times, as well as PA speech intelligibility performance.

By early design involvement with the architect and careful siting of acoustic absorption solutions, an optimal balance against all these acoustic requirements can be achieved. Citing Vanguardia's input in the new Tottenham Hotspur Stadium project, Jim explained that by balancing the influence of all of the polycarbonate and steel elements of the roof constructions and perforated steel absorbers, the desired acoustic response within the stadium bowl could be achieved.

A brief comparison of the various categories of sound systems commonly found in sports venues followed, with those enjoying the highest sound quality characterised by the arrangement of 'banana-shaped' line arrays on the high-level gantries.

Jim described the geometrical differences between large-scale venues and comparatively smaller buildings, such as traditional concert halls, and the significant acoustic differences expected in each. Using the Wembley Stadium example, Jim was able to demonstrate how, by aligning the sound system design with that of the bowl acoustics, the desired atmosphere can be generated when fans are inside the stadium but also as they are led into the stadium from the concourse areas as the atmosphere builds up the expectation.

Finishing off his presentation, Jim presented a novel, web-based, visual representation of changing sound levels in different parts of a stadium bowl during the entirety of a football match, which fascinated the delegates.

Acoustic design of multi-function arenas

Simon Jackson of Arup Acoustics, presented a session focusing on the acoustic design of multi-function arenas, citing examples from Manchester Arena, Barclays Center (Brooklyn), the First Direct Arena (Leeds) and the Royal Arena (Copenhagen). Simon explained that while the audience/performer relationship is much more complex (as the spaces are enclosed) than with sports venues, careful consideration needs to be given to the interplay between reverberance, early and late reflections (especially at low frequencies), compliance with environmental noise criteria (due to venue breakout) and the specification of sound systems, particularly where installed PA/VA systems are required to integrate with touring systems brought in by artists.

Accordingly, design briefs usually require consultants to be conscious of the multi-use functionality of such spaces, partly due to economic necessity and recognising that the acoustic design must achieve a diverse range of applications. This often ends up being a compromise between sports and entertainment uses, which provides reasonable flexibility at least costs, whereas variable acoustic systems provide enhanced optimisation but at increased cost.

Following these design principles, Simon cited the example of Manchester Arena, which was required to meet many of the multi-functional requirements whilst at the same time, complying with onerous environmental protection criteria.

Concluding with examples from the First Direct Arena (Leeds), Simon showed how good acoustic design, when integrated with other building services systems such as fire detection, lighting and thermal control, can still achieve high levels of sound insulation by adopting steel beams supported on resilient bearings and a concrete roof slab, in a bid to meet off-site environmental protection criteria at the nearest, noise-sensitive receivers.

Entertainment venue close to houses

Simon Fairclough's session focused on a Bureau Veritas (BV) project, which addressed the acoustic shortcomings of an entertainment-led venue in Merseyside, located within a development area that had a planning application submitted for circa 100 houses. The venue had been plagued with acoustical problems for some time and significant acoustic remediation would be required in order for the venue to continue operating as a function room for local events. Following an extensive background noise survey conducted of the surrounding environs, coupled with measurements of operational sound levels taken during a typical weekend,

Simon explained that in light of the new dwellings being proposed, the EHO had refused the application on noise grounds alone, despite the developer's offer of substantive mitigation in a bid to achieve the EHO's criterion of NR20 when measured inside bedrooms.

However, with the EHO's insistence on achievement of the internal noise levels with windows open, it quickly became apparent that all noise mitigation would need to be centred on the source of noise alone. Simon went on to describe the poor (acoustical) condition of the venue, which posed numerous challenges to the BV team.

After benchmark sound insulation testing coupled with acoustic modelling of the building fabric, an enhanced building envelope solution and dedicated PA system design was presented to the developer.

Noise compliance monitoring at outdoor events

The closing presentation was by Jonty Stewart of Wight Noise, who spoke about his experience of noise compliance monitoring: what to do before, during and after outdoor festivals. Jonty highlighted some of the pre-planning activities such as agreement of the orientation of music stages with the event organisers, modelling of the sound systems likely to be deployed and determining/agreeing off-site noise limits with the Local Environmental Health Directorate, along with identification of any other relevant licensing restrictions.

He reminded delegates to be mindful of influencing factors such as population densities and dispersion within the local area, local topography, number of noise sources, prevailing atmospheric conditions, locations of both on-site and off-site noise-sensitive receivers and existence of any acoustic barriers.

Jonty ended his presentation with an amusing take on a novel noise control solution at a recent outdoor event, involving parking a long wheel-base Hi-Top Sprinter van full of clothing merchandise directly in front of a particularly problematic dance music tent, with some degree of sound attenuation resulting!

As the meeting drew to a close, delegates continued to discuss the abundance of information taken away from the day's proceedings, continuing over drinks at the Lowry's bar, including potential timescales for the Institute's consultation to members on the Draft GPG, forthcoming.

All in all, it was a superb day and thanks go to all the organisers involved from the IOA and the Lowry. Perhaps a sequel to this one-day meeting may follow in due course.

References:

- [1] Good Practice Guide on the Control of Noise from Pubs and Clubs. Institute of Acoustics, March 2003
- [2] National Planning Policy Framework. Ministry of Housing, Communities and Local Government, July 2018

NoiseMap five: Mapping the way to a quieter future... ... for high-speed rail

- Coverage of huge schemes
- Converts between Internet databases and Local databases
- Multi-processor calculation
- Easy access tools
- Up to 500 categories and combinations
- TNPM calculation

For details see our website: www.noisemap.com email: rogertompsett@noisemap.com tel: +44 20 3355 9734













New WHO noise guidelines for Europe released

he new WHO Environmental Noise Guidelines for the European Region were launched in October at a special event held in Basel. The long-awaited document, which makes some strong policy recommendations, updates the previous WHO guidance and contains the latest evidence regarding the adverse impacts that exposure to noise can cause to health and wellbeing.

One of the main differences to the previous guidelines is that the impact of road, rail and air transport noise are treated separately. In addition, there are new sections on noise from wind turbines and leisure activities.

The WHO notes that the new guidelines now show stronger evidence of cardiovascular and metabolic effects of environmental noise. In addition, the document includes relationships between noise exposure and the risk to health.

The guidelines are the result of several years of work spent systematically reviewing evidence from around the world about the impacts of noise. Professor Stephen Stansfeld, who chaired the Guidelines Development Group, said: "These guidelines have been developed based on the growing body of evidence in the field of environmental noise research. They aim to support public health policy that will protect communities from the

adverse effects of noise, as well as stimulate further research into the health effects of different types of noise."

The publication of the guidelines stimulated some media interest and the Institute was asked to provide some initial comment, some of which was published.

The guidelines run to around 180 pages, including annexes and references, so they will take a bit of digesting. The Institute recognises the importance of this document and is planning to hold a one-day meeting on the guidelines in early January 2019, probably at a venue in London, where one of the key speakers will be Professor Stansfeld.

In addition, we will look at the guidelines more closely in the next issue of the Acoustics Bulletin.

For more information see:

http://www.euro.who.int/en/publications/abstracts/environmental-noise-guidelines-for-the-european-region-2018 http://www.euro.who.int/en/health-topics/environment-and-health/noise/publications/2018/environmental-noise-guidelines-for-the-european-region-executive-summary-2018 https://www.mdpi.com/journal/ijerph/special_issues/WHO_reviews

ISO 19488:2018 – Acoustic classification of dwellings

In this edition of Acoustics Bulletin you should have been reading about ISO 19488:2018 – Acoustic classification of dwellings, but that article has been withdrawn. Phil Dunbavin, Chairman of the BSI EH/1 Committee and author of the article explains.

The draft standard was issued to the international community as a Final Draft International Standard (FDIS) for comments and voting. An FDIS is issued with the instruction that only editorial or typographical errors are to be considered as all the technical issues should have been dealt with earlier in the drafting process.

In this instance though, the FDIS was voted on and unexpectedly disapproved. I cannot ever recall an FDIS not becoming an ISO in the many years that I have been involved in international standardisation. This is such an unusual event that I consulted the ISO Secretariat to find out what would happen next with this draft standard. The answer was that the parent committee, ISO/TC43/SC2, would make that decision at the ISO meetings in Japan during the week beginning 15th November 2018.

I will be reporting on the outcome of that meeting in the next edition of Acoustics Bulletin.

Sound-sensing protein found

cientists in the US have identified key proteins in inner-ear hair cells that produce an electrical response to sound.

While the idea of hair cell mechanosensory transduction was first proposed in the 1980s, the identity of the proteins that convert sound into electrical signals that the brain can interpret had remained elusive. Now, a team of researchers led by Harvard Medical School's David Corey and Jeffrey Holt, says it has conclusive evidence that protein TMC1 forms the basis of hearing in vertebrates.

They showed that TMC1 and closely related TMC2 proteins, form sound-activated pores through which positively charged

ions flow into inner-ear hair cells. This establishes an electrical signal that is relayed to the brain via the eighth cranial nerve. To understand how the protein works, the research team first deduced its structure, and then investigated the roles of individual parts of the molecule.

Corey's team are now working on gene therapy strategies to treat specific mutations in the TMC1 protein. However, he also notes that now TMC1's function has been identified, there is still much to learn about the way it works within a cell and how it interacts with the other proteins it connects to.







SQuadriga III

The future of mobile measurement systems

With the familiar small form factor, the latest generation of SQuadriga offers an unprecedented scope of functionality, usability, and versatility – without losing any of its proven features.

www.head-acoustics.com

ANC to explore the balance between noise and natural ventilation at CIBSE event

he Association of Noise Consultants (ANC) will be setting out some key issues surrounding natural ventilation and noise at CIBSE's Build2Perform event.

Jack Harvie-Clark, Immediate Past Chair of ANC, a specialist in the management of noise, ventilation and overheating, will outline some of the acoustic challenges that emerge between external noise and natural ventilation in mitigating overheating.

His talk is part of Build2Perform's 'Acoustic issues in relation to natural ventilation' session, which takes place on day one of the two-day event, being held at Olympia London on 27th and 28th November.

The session is being held in Theatre D, from 12 noon until 1pm. More details at https://www.build2perform.co.uk



Jack Harvie-Clark of the Association of Noise Consultants

Can acoustic sensors diagnose machine health?

he rise of new digital industrial technology, known as Industry 4.0, is a transformation that makes it possible to gather and analyse data across machines, enabling faster, more flexible and efficient processes to produce higher-quality goods at reduced cost.

Small defects can manifest huge breakdowns in factory machines while inflating energy consumption and tightening margins. Acoustic sensors can monitor machine health before such problems get out of hand.

With the advent of Industry 4.0, manufacturers are using various types of sensors to collect information on asset health. Those metrics inform predictive analytics processes, such as work order generation and potential asset downtime.

Some of the most prominent sensors measure temperature, voltage, vibration, electricity, and humidity but can acoustic sensors diagnose machine heath effectively?

We often diagnose problems in machines dependent on whether we can hear a noise or not. However, sound outside the human hearing range also yields valuable insights into machine health. Many machine breakdowns can be detected acoustically and in combination with predictive algorithms, non-invasive acoustic sensors can detect faint noises long before the machine fails.

Another method for detecting sounds in real time is by acoustic cameras that pick up sonic waves and visualise them thermographically.

This acoustic information can be collected by placing multiple sensors at target points in machines and connecting them to a wireless device, which directly transmits and uploads the data to a cloud server where it can be analysed. Combined with an asset management system and predictive analytics, this can provide detailed insights into key asset efficiency parameters.

According to some research, up to 40% of factory energy costs could be caused by air leaks. When a motor starts degrading, the overall efficiency of the machine reduces. To make up for the reduced efficiency the motor consumes more energy. This leads to additional electricity consumption and higher electricity bills in a cycle the end of which is no better machine failure and two higher-than-necessary bills (repair and

Using acoustic sensors to discover mechanical defects allows manufacturers to fix the machines before such destructive cycles begin, reducing downtime and extending the lifetime of the machine.



Dishoom gets the acoustic treatment

Set in Kensington's beautiful Grade II listed Barkers Building, Dishoom was designed by interior architects Macaulay Sinclair's with the aim of transporting dinersback in time to Jazz Age Bombay.

This design incorporated stone floors, marble stairs & polished plaster walls; all finishes that on their own, would turn the space into a sonic battleground.

Macaulay Sinclair specified Oscar Acoustics' trowelled SonaSpray fcx finish onto plasterboard at 12mm thick for the ceilings; enough to take the edge off the noise & make speech clearer but not enough to kill the atmosphere.

Unlike the majority of acoustic finishes, it is possible to adjust the SonaSpray range's depth so as to fine tune the acoustics to suit every project & brief.





in You Tube 🔰 f 🔿

Subscribe to our social media channels to view our Ellie Explains series where 3yr old Ellie explains acoustics



Raising the bar in assessing railway noise and vibration for new line-side housing

This article provides a summary of a research study commissioned by the Rail Safety and Standards Board (RSSB). The study, entitled 'Assessing how the rail industry can improve and influence the management of noise during line-side residential development processes' (Project T1125) was completed in 2017-18 and published in August 2018. (https://www.sparkrail.org/Lists/Records/DispForm.aspx?ID=25817)

s part of its sustainable development programme, RSSB commissioned a research project to investigate how the rail industry can influence line-side housing developments and the town and country planning process in order to reduce railway noise and vibration effects on future residents.

With the increasing evidence around the effects of long-term environmental noise on human health, and a demand for land for housing development, there are growing numbers of new housing developments proposed close to existing railways. Both train operators and the infrastructure owner, Network Rail, are experiencing all-time highs of complaints from line-side residents due to noise.

In September 2016, Network Rail announced plans to 'unlock land for 12,000 new homes by 2020'. A research need was identified by the cross-industry Noise Policy Working Group, hosted by RSSB, to better understand the increasing risk of nuisance (noise and vibration) from the operational railway.

Introduction

As set out in RSSB's sustainable development principles, the rail industry is committed to proactively managing emissions such as noise, assessing and minimising their impacts through established management systems, and ensuring appropriate mitigation is built into all new railway investments, where required.

Though thought to be less likely to cause nuisance than transport modes such as road and aviation, noise and vibration from railway operations can be a significant factor affecting the enjoyment of people's homes adjacent to railway lines. The rail industry (both Network Rail and the train operating companies) is the primary recipient of complaints from line-side residents relating to noise and vibration from rail-related sources.

This project aimed to consider how potential noise and vibration impacts are assessed and addressed in new residential developments through the planning system, and how the railway industry can contribute to this process.

There was concern in the rail industry that developers may not fully consider the full range of rail-related noise and vibration impacts on future line-side neighbours.

Key potential sources of noise and vibration from railway operations that tend to lead to complaints include:

- operational rail traffic;
- train horns;
- idling engines (including in sidings and at signals);
- public address systems at stations;
- activities associated with infrastructure maintenance at night;
- activities at rolling-stock maintenance and stabling depots.

A significant amount of guidance on noise mitigation and how noise should be considered through the planning process exists, for example, the National Planning Policy Framework and associated Planning Practice Guidance on Noise. The project investigated how this guidance is implemented in relation to new residential developments adjacent to existing railway lines. The review identified recommendations as to how the rail industry might better engage with the planning process so that noise and vibration impacts on new developments are appropriately considered and mitigated.

Aims

The project has provided:

- an assessment of whether the planning process and design of line-side development sites result in appropriate levels of noise and vibration mitigation;
- identification of lessons learned from the historic management of the line-side development planning process;
- identification of effective means to safeguard residents of future line-side developments against noise and vibration disturbance generated by active railway operations;
- a practicable process for the rail industry to engage in and to influence how noise and vibration impacts are considered and managed during the development process; and
- recommendations as to how to implement and communicate this process.

Research approach

To achieve the project aims, the focus of the research has been the detailed review of the Town and Country planning process at 20 line-side development sites including a desktop review of the Planning Portal and interviews with stakeholders.

The 20 housing development proposals ranged in scale from a small, four new home site, to a more than 2,000 home development. They were geographically spread across three rail routes in England including in rural, urban and suburban settings, and are temporally diverse going back to 2002, where the development has been built and has residents in occupation, through to proposals that are not yet consented and still going through the planning process. Seven of the case study sites were known to have generated rail noise-associated complaints to either Network Rail or a train operator.

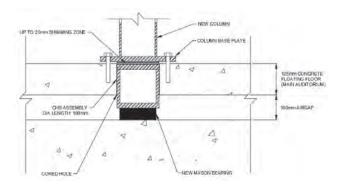
For each of these case studies, the Planning Portal was accessed to establish information about the proposal, the noise assessment carried out, and any consultation. To supplement this, questionnaires were used for the line-side residents and



Royal Opera House Case Study

After an initial floating floor installation in 1997, Mason UK joined up again with the Royal Opera House to assist in the design and supply of acoustic isolation solutions. The "Open-Up" project undertook a substantial refurbishment which included the Piaza and Linbury Theatre which went under a major redesign with a brand new seating structure being constructed on top of the existing Mason Floating Floor.

Royal Opera House Piaza entrance



▲ Sectional view of the new bearing assembly through the existing floating floor

In addition to the main auditorium, a new waterproofed floating floor was required in the lift pit. The floor was designed and supplied by Mason UK along with a bespoke column baseplate design which enabled the existing lift columns to be preloaded onto the floor. The bearings were selected to satisfy the 12Hz acoustic requirement as well as the high loading and emergency conditions that are common with lift design.

The Royal Opera House project is typical of how Mason UK are able to not only provide high quality acoustic solutions, but also able to assist in the design and installation of complex, bespoke arrangements.



The main scope of the Mason UK works was to investigate the existing 20 year old Mason floating floor bearings and assess whether the new loadings from the steel structure were still suitable. On review, additional bearings were required to satisfy the additional new loads despite the existing bearings being in good condition. Redundant jacks were disengaged and holes were cored through the floating slab at new column locations for bearings and steel extension sleeves to be inserted; the structural steels where then constructed upon the sleeves.



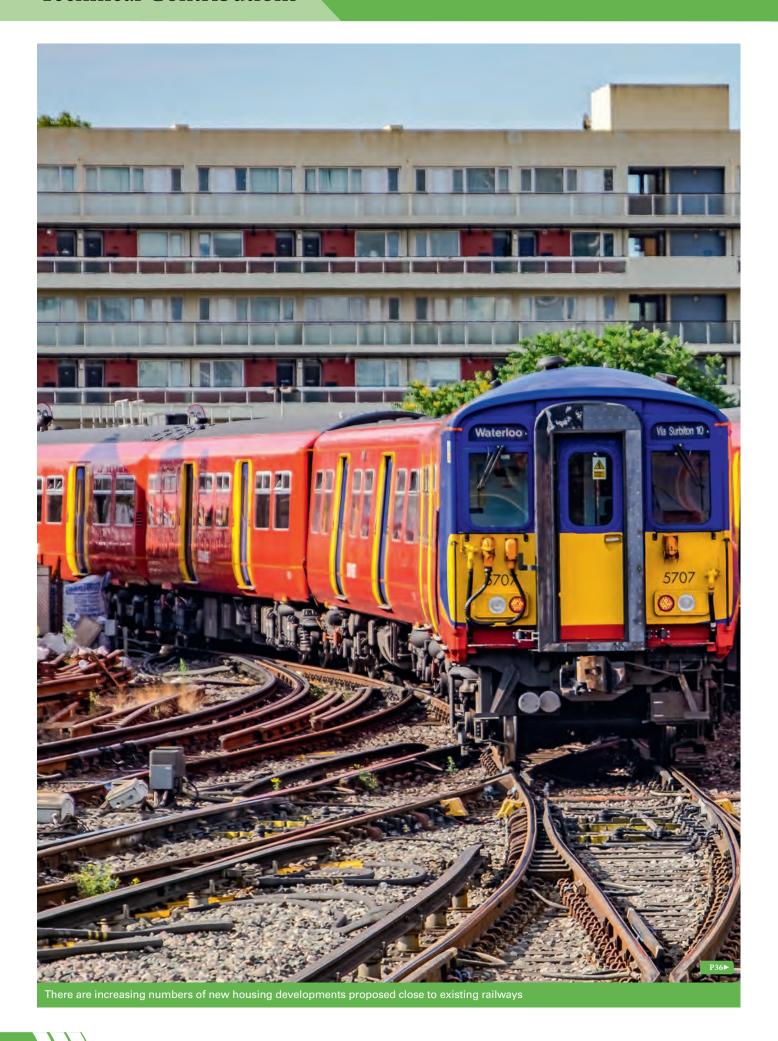
ABOUT MASON

A world leader in noise & vibration control products for over fifty years setting the standard for consultants & architects. In addition to a complete range of mounts, our floating floors, walls & suspended ceilings provide total acoustic isolation.

TYPICAL APPLICATIONS:

- Music Rooms Night Clubs Plant Rooms Recording Studios Bowling Alleys Building Isolation
 - Cinemas Gymansia Microscopes M+E Isolation Suspended Ceilings Industrial

Technical Contributions







Technical Contributions

structured interviews were carried out with Local Planning Authority (LPA) case officers, environmental health officers (EHOs) and Network Rail town planning and property teams.

Network Rail consultation

It is implied that Clause 16 of the Town and Country Planning (Development Management Procedure) (England) Order 2015, requires that an LPA must notify rail infrastructure managers of planning applications if the site is within 10 metres of relevant railway land. Consequently, there is a mechanism whereby Network Rail have an opportunity to comment on the proposals if the development comes within 10 metres of the railway land. Local Authorities will also consult Network Rail outside of this distance should they believe there is an impact/issue that needs considering. From the perspective of the potential noise and vibration impact, this 10 metre threshold is low, as significant adverse impacts could occur at greater distances from the railway. Consultation on sites further from the rail is at the discretion of the LPA.

Evidence of a consultation response from Network Rail was found from 11 of the 20 schemes investigated. Of these 11, nine mentioned noise. The noise and vibration-related comments by Network Rail highlight the need for noise and vibration assessment and its consideration in design and siting of new homes. Some comments highlighted that there could be a lawful increase in rail traffic both during the day and night time, including the freight train operations. One response listed detail on operational elements of the railway that could cause noise or vibration effects. Despite this detail of response, no conditions were imposed upon the development concerning noise and vibration.

In none of the case studies were there any instances of pre-application consultation being carried out with Network Rail (or other rail industry stakeholders), including on the draft Local Plan or development of planning policy. Therefore, baseline surveys, assessment and development design had already been carried out and so there was little opportunity for Network Rail to influence the approach to the assessment or the design of the development.

Stakeholder relations

Relationships between planning and environmental health departments were found to exist for all LPAs interviewed, although at different levels of maturity. The LPA interviewees confirmed that they have processes to identify those applications where noise from sources such as railways may be an issue, and which prompts the need for input from the LPA's environmental health department. The LPA planning departments interviewed confirmed that their contact with the railway industry was generally restricted to Network Rail during statutory consultations on planning applications. To do this, the LPA consults with the Network Rail planning team by email or letter. The town planning technician undertakes a process of internal consultation and then provides a response on behalf of Network Rail.

Interviews held with EHOs suggested that communication between environmental health departments and the railway industry tend to be more common though these have been established through local authorities investigating railway noise complaints received from residents, rather than through the planning process.

Noise and vibration assessment reports

Noise and vibration assessment reports were found for around three quarters of the sites. The structure of the reports was broadly similar covering:

- relevant policy;
- a baseline survey;
- an assessment of the likely façade noise levels mainly based on the survey results;
- the determination of what building envelope sound insulation would be needed to achieve the relevant values in British Standard 8233, which deals with sound insulation and noise reduction for buildings; and
- in some cases, an acoustic barrier between the site and the boundary was recommended to achieve certain noise levels in the gardens of the proposed properties.

Vibration was addressed at just over a quarter of the sites. At one site, vibration was considered in the context of the potential for structure-borne re-radiated sound affecting the premises.





Penguin Recruitment Ltd is a multi-disciplined Engineering and Environmental Recruitment Consultancy established in 2004. We offer Nationwide and International Recruitment Services covering both the permanent and contract/temporary markets.

With extensive experience in the Acoustics and Air Quality Industry, we are proud to offer an energetic can-do approach to any recruitment requirements ensuring candidates and clients receive a friendly, professional and knowledgeable service at all times.



- Calibration and Testing
- Quality Assurance and Technical Management
- Audio Visual and Electro-Acoustics
- · Noise Control and Product Design
- Vibration and Stress Dynamics
- · Noise, Vibration and Harshness testing

For an informal chat please call Amir on 01792 365 007, or alternatively email amir.gharaati@penguinrecruitment.co.uk

www.penguinrecruitment.co.uk

Technical Contributions

For the sites where vibration was not mentioned, the distance between the building line and the railway was such that vibration would be unlikely to be an issue.

While reviewing these reports, observations of the following areas were made:

- duration of baseline noise survey;
- assumptions for future growth for rail traffic;
- overall noise exposure and assumptions around opening windows;
- maximum noise levels that might wake residents;
- other sources of railway noise; and
- · assessment criteria.

Duration of baseline noise survey

For several of the sites, the duration of the baseline survey was for 24 hours. For others, the survey duration was around five days, including the weekend period. At one of the sites, the EHO of the LPA commented that a 24-hour survey was insufficient, and a further week-long survey was subsequently undertaken.

While guidelines do not state a specific duration, rail operational noise is known to fluctuate over a week/weekend and day/night periods and therefore survey baseline durations should include a representative sample of existing rail noise, likely to be at least five to seven days.

Assumptions for future growth of rail traffic

There were virtually no assessments in the case studies reviewed that considered how the impact might change due to an increase in usage of the railway compared with the current situation. Only where there was a well-known and publicised rail enhancement project (East West Rail) were future growth of rail traffic assumptions made. As Network Rail point out in a number of their consultation responses, rail traffic may change without further consent, furthermore, Network Rail have an investment programme of enhancing and increasing rail capacity across the network and therefore intensification of use is likely in many locations. More frequent services can often lead to an increase in the average noise exposure levels. This was largely found not to be considered.



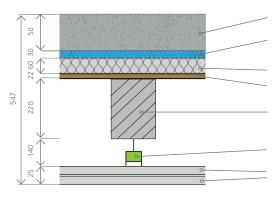
Network Rail have an investment programme of enhancing and increasing rail capacity across the network

Akustik+sylomer > ®

Manufacturing **solutions** for architectural acoustics and vibration problems since 1969.

Acoustic tests carried out in Ift Rosenheim laboratory prove excellent results of **akustik+sylomer**® acoustic hangers, **reaching 30db for impact noise and 82 db airborne noise** when used with recyclable construction materials.





Mortar (50 mm, 120Kg/m²)

Elastic thermal isolator (30 mm, 5,2Kg/m²)

Fibre cement (60mm, 89,3Kg/m²)

Chipboard (22mm, 13,3Kg/m²)

Timber joists (80mm, 220mm)

Akustik+Sylomer® 30 & profiles

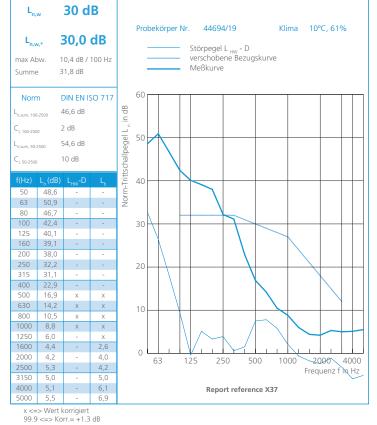
Plasterboards (25mm, 20,6Kg/m²)



SCAN FOR FULL REPORT

IMPACT NOISE

AIRBORNE NOISE





AMC-MECANOCAUCHO ENGINEERS BASED IN UK, PROVIDE INSTALLATION ADVICE AND ASSISTANCE TO UK AND IRELAND WORK SITES TO ASSURE CORRECT INSTALLATION.



Offices in LEICESTER

Bipin J Mistry BSc 158 Kedleston Road Leicester, Leicestershire, LE5 5BL +44 (0) 7711 349 425 +44 (0) 1162 219 659 bjmistry@amc-ui.co.uk





Technical Contributions

Noise exposure and opening bedroom windows

The current policy on noise requires consideration to be given as to whether or not significant adverse impacts might occur on health and quality of life. In HS2 Phase One Information Paper, E20: 'Control of Airborne Noise from Altered Roads and the Operational Railway' (HS2 Ltd, 2017), the following thresholds for SOAEL (significant observed adverse effect level) were applied to operational noise from railways:

- LAeq,16h (free field) = 65 dB (0700 2300)
- LAeq.8h (free field) = 55 dB (2300 0700)

Research, such as that reported in World Health Organisation 2011 'Burden of disease from environmental noise', indicates that increased risks of effects such as cardiovascular disease start to become apparent at around 65 dB, LAeq,16h. The research is unclear regarding how the building envelope insulation might affect this outcome. Thus, as a precautionary approach, there is an argument for avoiding placing residential façades that include habitable rooms at or above this level of exposure.

At night, the advice from the World Health Organisation is clearer. In its Night Noise Guidelines for Europe it states that at exposures of above 55 dB, Lnight, "The situation is considered increasingly dangerous for public health." Therefore, there is a case for avoiding placing residential façades, which include bedrooms, at this exposure.

Some of the sites investigated had levels of more than 65 dB, LAeq,16h. Even more had night time levels above 55 dB, LAeq,8h.

For the most, levels recommended in BS 8233 could only be achieved with windows closed, in which case, it was advised that an alternative means of ventilation would be needed. As residents in practice do want to open their windows, particularly in the summer months, this assumption that windows are closed is not fully robust.

Maximum noise levels that might wake residents

In the sample of reports reviewed in this research, not every noise and vibration impact assessment considered the maximum noise levels from the train movements. It is recognised, especially for night, that maximum levels are as important in determining the extent of the impact as average (LAeq) values. The guidelines regarding the effect of the impact of maximum levels at night are not precise. There is a cautious approach, which suggests that avoiding any maximum level between around 42 dB - 45 dB (LAmax) inside bedrooms would avoid any adverse effect. As the level increases and as the number of times it occurs increases, the adverse effect increases. Research is emerging endeavouring to identify the risk of awakening due to the number and level of maximum noise from train movements. Using that assessment approach provides information on the probability of a noise-induced awakening occurring.

Other sources of railway noise

Three of the sites were located close to existing or proposed stations. Despite this, none of the acoustic reports considered the noise from station-specific sources such as public address system announcements in the assessment. Interestingly, the causes of complaints to either Network Rail or the train operators are most commonly not from passing train traffic but rather from noise sources such as the idling of trains in depots, in sidings or at signals, or from public address systems or the sounding of horns. This suggests a gap in the commonly-modelled and assessed noise sources from rail, and that noise assessments should consider rail noise in a broader sense.

P42 ►



Causes of complaints are most commonly from noise sources such as idling trains, public address systems or sounding of horns



One of the Smoothest Floor Finishes on the market

Regupur® is a brand new range of screeding products, offered as a complete system with the Regupol® range. With the benefit of a single manufacturer guarantee, the Regupur® range is designed to provide one of the smoothest floor finishes on the market.

- · Highest quality finish protects aesthetic design
- Robust base for LVTs, ceramic tiles and other final
- Available as water-based or latex self-levelling screed
- Single manufacturer guarantee when applied with a Regupol® underlay as a system

Also available to procure as a stand alone screed solution in isolation

CMSDANSKIN

Scotland: 01698 356000 Central & Southern: 01925 577711 info@cmsdanskin.co.uk

www.**cmsdanskin**.co.uk

Regupur

A Trademark of Regupol®



SALES • HIRE • CALIBRATION



UKAS accredited calibration facility, see UKAS website for scope of UKAS accredited calibrations offered:- anv.ms.ukas

One-Stop Shop for Acoustic & Vibration Calibration

- Sound Level Meters
- Acoustic Calibrators & Pistonphones
- Microphones*
- Octave/Third Octave Filters
- Accelerometers*
- Vibration Meters*
- Tapping Machines
- Reverberation



*not accredited by UKAS



- Fast Turnaround
- Competitively Priced
- Customer Service

"We are very pleased with the excellent service we received from ANV in recent months. Most notably, they provided an efficient and hassle free calibration service with which we couldn't have been more satisfied." - Jack Richardson Hilson Moran Partnership Ltd

Technical Contributions

Conclusion

The reviews undertaken in this project have identified that optimum outcomes for managing noise and vibration impacts at new line-side developments are not always achieved. Several ways to improve the assessment process have been identified through the study of the 20 sites.

Guidelines for noise assessments

Noise assessments should:

- consider the design and layout of the housing development to avoid or minimise effects from rail noise and vibration and where appropriate, design in mitigation structures such as earth bunds or acoustic fencing;
- include baseline noise monitoring surveys long enough to account for operational fluctuations;
- consider early engagement with the rail industry and include modelled assumptions on future rail growth based upon planned enhancements;
- consider all sources of railway noise and vibration, including public address systems, train horns and locations where engines might be idling;
- include an evaluation of maximum levels; and
- consider the most recent relevant research and evidence
 of effects of rail environmental noise and vibration, and
 demonstrate achievement of noise exposure levels taking
 a conservative approach including the consideration that
 residents may wish to have windows open.

Recommendations for consultation

- train and freight operators to contact LPAs and participate in the planning process by being added to consultation lists and making LPAs aware of what they would like to be consulted on, and to respond to consultation on planning applications;
- Network Rail to consider improvements to the standardised response including a guidance note on the areas identified in the noise assessment report review;

- LPAs should start discussions on noise and vibration from rail during the preparation of the planning process and site allocations. This would allow Network Rail, train and freight operators to comment on the suitability of a site for residential use. LPAs could either liaise directly with Network Rail or advise developers during the pre-application enquiry process. This would allow comments to be made and taken into consideration before the planning application is formally submitted; and
- LPAs should consider whether it is appropriate to consult with Network Rail on applications outside of the 10m threshold when it is possible that there could be significant noise and vibration issues.

About RSSB

Through research, analysis, and insight RSSB supports its members and stakeholders to deliver a safer, more efficient and sustainable rail system.

RSSB's vision is to be a centre of excellence, valued by its members and stakeholders as an essential contributor to their success. Its independent evidence-based approach is built on strong technical capability, and the enabling of collaborative industry engagement for the benefit of the whole rail system.

To find out more about the sustainable development principles go to https://www.rssb.co.uk/Pages/improving-industry-performance/rail-industry-sustainable-development-principles.aspx

RSSB hosts a rail industry Noise Policy Working Group. To find out more contact **sustainabledevelopment@RSSB.co.uk**

Author *LucieAnderton*, *Senior Sustainable Development Specialist at RSSB.*



All sources of railway noise and vibration should be considered

MATRON 4 TYPE 3668

NEW NOISE NUISANCE ASSESSMENT KIT

Efficiently investigate intermittent indoors noise problems with this upgraded system!

The MATRON 4 Type 3668 toolkit contains a logging Type 2250 Light sound level meter with Class 1 measurement and high-quality sound recording capabilities, plus a microphone extension cable and tripod for easy remote positioning of the microphone.

To see the system in action, contact us today for a demonstration:

Email: ukinfo@bksv.com

Email: +44 (0)1223 389 800



Bruel & Kjaer UKJarman Way · Royston · Herts · UK
Tel: +44 1223 389 800
ukinfo@bksv.com

www.bksv.com



BEYOND MEASURE

SOUND LEVEL METER TYPES 2250/2250L/2270

COMPLETE BS4142:2014 SUPPORT



10 ms logging for objective assessment of impulses in compliance with Annex E of BS 4142:2014

Support in Measurement Partner Suite:

- Dedicated BS 4142:2014 results table for calculation of rating level
- Dedicated markers for specific, residual and background noise
- Automatic identification of tones and impulses in time history
- Measurement uncertainty according to ISO 1996:2007

Bruel & Kjaer UK

Jarman Way · Royston · Herts · UK Tel: +44 1223 389 800 ukinfo@bksv.com

Brüel & Kjær 🖳



BEYOND MEASURE

www.bksv.com/measurementpartner

Science of John Tyndall

Inspired by Roland Jackson's new biography of the prominent 19th-century Irish physicist, John Tyndall, we look back at the life of the great scientist.

magine you're demonstrating a peculiarly low pitched sounding device to Queen Victoria, and she doesn't quite appreciate its annoying noise, but it's of scientific and practical importance. That's precisely what happened in 1876 to John Tyndall who, as well as continuing his scientific research, was a long-time scientific adviser on lighthouses to the Board of Trade at Trinity House.

The provision of effective warning signals to ships in fog had concerned him for many years and it had led him to undertake an extensive study of the acoustics of the atmosphere.

Tyndall was taken aback by the observation that sounds heard clearly in one place could suddenly become inaudible, even though visibility or wind seemed not to have changed. This led him to an incredibly powerful insight. He imagined that water vapour could form invisible in-homogeneous 'acoustic clouds' that scattered sound internally, preventing it from penetrating through (like a powdered crystal stops the transmission of light running through it). High pitched sounds were scattered more than those of a low pitch.

His solution was to use a sound of low pitch, but make it as loud as possible. Hence the dull foghorn sound that we are used to hearing is an offshoot from some of his scientific experiments. One newspaper referred to them as Tyndall's 'demoralised and brutalised sirens, those pretty foghorns that make one on land doubt whether hearing is a blessing, but at sea doubt whether there is a more useful faculty'.

When Tyndall demonstrated this innovation to Queen Victoria, it made quite an impact on her, although her diary indicated she may not have been entirely amused by the intentionally irritable outcome of his scientific work.

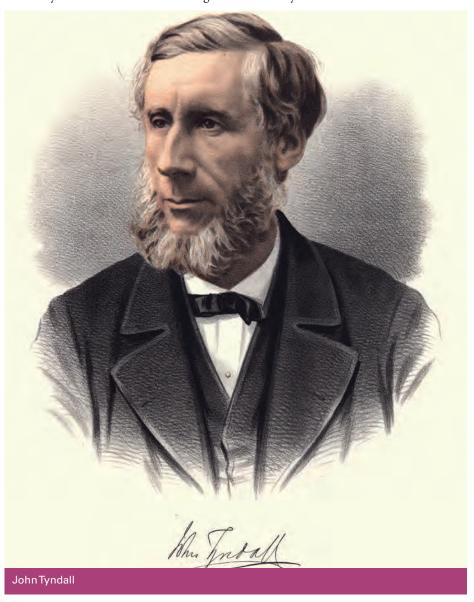
Brief biography

John Tyndall was born in Leighlinbridge, County Carlow, Ireland. His father worked as a local police constable, and was descended from Gloucestershire emigrants who settled in southeast Ireland around 1670. Tyndall had attended the local schools in County Carlow until his late teens, and was most likely an assistant teacher near the end of his time there. The subjects he learned at school included technical drawing and mathematics, with some applications of those subjects to land surveying.

In 1847, Tyndall opted to become a mathematics and surveying teacher at a boarding school in Hampshire, where he became good friends with Edward Frankland, who had previously worked as a chemical laboratory assistant for the British Geological

Survey. Frankland persuaded Tyndall to spend time in Germany to further his education in science.

From 1850 to 1856, Tyndall's early original work in physics focused around his experiments on magnetism and diamagnetic polarity, and his two most influential reports were co-authored with Knoblauch, who was a professor of his in Germany. Rising in prominence, Tyndall was elected a Fellow of the Royal Society in 1852, then in 1853, he attained the prestigious appointment of Professor of Natural Philosophy (Physics) at the Royal Institution in London.



* CARPENTER FIRESEAL[™] **ACOUSTIC FOAM**



PERFECTION

Tested by Exova Warringtonfire : Test Ref 367212 & 367213

Fireseal™ helping to reduce noise pollution with Class "0" acoustic foam tested at >90kg/m³ and supplied at >90kg/m³

ventilation lining sound absorption

acoustic enclosures

Carpenter's Fireseal™ is a highly modified flexible open cell polyurethane foam offering excellent sound absorption characteristics as well as acting as a damping medium due to its high mass and flexibility. Fireseal™ is tested and proven to be resistant to fungal and bacterial growth and is chemically inert. It will not dust or migrate even when subjected to very high air movement. Its flexibility and ease of handling makes it simple to apply to curved or complex surfaces and can be easily cut to the desired shape or size. Continual testing to some of the highest international fire standards, including BS476 parts 6 & 7 (Class "0"), EN13501-1 Euro Class B-S1,d0 and UL94V-O, makes Fireseal™ the safest solution.

For more information about this world class acoustic product please contact us on +44 (0) 1457 861141 Carpenter Limited, Dinting Lodge Industrial Estate, Glossop, Derbyshire SK 13 6LE, United Kingdom. www.carpenter.ltd.uk





Industry Update

About a decade later, Tyndall was appointed the successor to the positions held by Michael Faraday at the Royal Institution when Faraday retired.

Detailed studies in sound

By the late 1850s, Tyndall was studying the action of radiant energy on the constituents of air. In the late 1860s and early 1870s, he wrote an introductory book about sound propagation in air, which was also the time he became active in a large-scale British project to develop a better foghorn. Tyndall astutely established that sound is partially reflected (i.e. partially bounced back like an echo) at the location where an air mass of one temperature meets another air mass of a different temperature; and more generally, when a body of air contains two or more air masses of different densities or temperatures, the sound travels poorly because of reflections occurring at the interfaces between the air masses, and very poorly when many such interfaces are present.

The IOA's Tyndall Medal is awarded biannually to a UK acoustician, preferably under the age of 40, for their achievement and services in the field of acoustics. John Tyndall investigated the acoustic properties of the atmosphere and, though he was a distinguished experimental physicist, he is remembered primarily as one of the world's most brilliant scientific lecturers.

John Tyndall lectured on topics such as heat, light, magnetism and electricity. In his eight lectures entitled 'Sound,' first published in 1867, Tyndall explained numerous acoustic phenomena for a non-specialist audience. Emphasising the practical nature of scientific enquiry, he described experiments throughout

and included many illustrations of laboratory equipment.

The lectures discussed the general properties of sound, how it travels, how noise and music differ, how gas flames can produce musical notes, and much more.

Tyndall wrote this opening extract to his lecture:

In the following pages I have tried to render the science of Acoustics interesting to all intelligent persons, including those who do not possess any special scientific culture. The subject is treated experimentally throughout, and I have endeavored so to place each experiment before the reader, that he should realise it as an actual operation. My desire indeed has been to give distinct images of the various phenomena of acoustics, and to cause them to be seen mentally in their true relations.

Tyndall's three longest tutorials, Heat (1863), Sound (1867), and Light (1873), represented state-of-the-art experimental physics at the time. A large part of the contents was based on recent major innovations in the understanding of their respective subjects, and Tyndall was the first writer to present these findings to a wider audience. The books were devoted to laboratory science and they purposely sought to avoid excessive use of mathematics - despite the fact that mathematical modelling using infinitesimal calculus, especially differential equations, had been a component of the state-of-theart understanding of heat, light and sound at the time.

There's much more to Tyndall than his scientific research. According to the author, Roland Jackson, who recently wrote a detailed biography on him, entitled: 'The

Ascent of John Tyndall, he was a complex man, generous to his friends but combative in scientific disputes, with immense stamina but dogged throughout his life by insomnia and ill health, rigorous in his duties but also a romantic who loved poetry. Tyndall was "a tantalising mixture of the Liberal and the Conservative" as cited in the book.

When he was 55, John Tyndall married into the aristocracy, and unfortunately died due to a medical overdose accidentally administered by his wife. Tyndall took chloral* nightly to help him sleep, and magnesia in the morning. His wife, Louisa, accidentally administered a magnesia-sized dose of choral. Realising her mistake, she immediately told him: "Oh John, I've given you chloral." He calmly responded: "My poor darling, you have killed your John."

For those interested in learning more about the life of John Tyndall, the recently published (2018) book by Roland Jackson provides an in-depth account of his life and times. Jackson himself is a scientist, educator, and science communicator, who was Chief Executive of the British Association for the Advancement of Science (now the British Science Association), of which Tyndall was President in 1874, and Head of the Science Museum, London.

Footnote

* Chloral, also known as trichloroacetaldehyde or trichloroacetanal, is the organic compound with the formula Cl₃CCHO. This aldehyde is a colourless oily liquid that is soluble in a wide range of solvents. It reacts with water to form chloral hydrate, a once widely used sedative and hypnotic substance (Wikipedia)

Sources

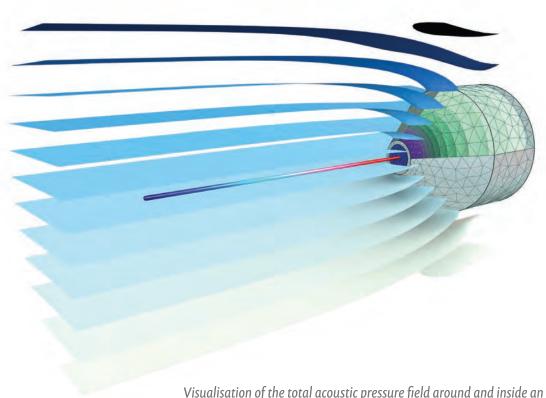
https://en.wikipedia.org/wiki/John_Tyndall "The Ascent of John Tyndall," biography by Roland Jackson

Sound: A Course of Eight Lectures Delivered at the Royal Institution of Great Britain, by John Tyndall https://play.google.com/store

You can read Tyndall's lectures for free by going to Google Books https://play.google.com/store. His lectures on Sound are entitled: Sound: A Course of Eight Lectures Delivered at the Royal Institution of Great Britain.



Hearing aids can't solve the cocktail party problem...yet.



Visualisation of the total acoustic pressure field around and inside an elastic probe tube extension attached to a microphone case.

Many people are able to naturally solve the cocktail party problem without thinking much about it. Hearing aids are not there yet. Understanding how the human brain processes sound in loud environments can lead to advancements in hearing aid designs.

The COMSOL Multiphysics® software is used for simulating designs, devices, and processes in all fields of engineering, manufacturing, and scientific research. See how you can apply it to hearing aid design.

comsol.blog/cocktail-party-problem



John Connell **Innovation Award**

IOA sponsored the Innovation Award in the Noise Abatement Society's John Connell Awards this year. This year's winner, AECOM, developed and used pioneering immersive sound demonstrations for the first time in a UK major road scheme statutory public consultation.



The John Connell Awards 2018 Innovation Award winner, AECOM

ECOM helped Highways England to communicate proposed changes to the landscape around Stonehenge and the A303 to its key stakeholders, by creating sophisticated audio simulations. Highways England proposed a tunnel to replace a road nearby to reduce traffic congestion, and AECOM simulated the changes in acoustics that would occur, which helped stakeholders to experience the changes in noise and visual impact of traffic for the World Heritage Site (WHS).

Russell Richardson, Honorary Secretary to the Institute of Acoustics, said: "Working on behalf of Highways England, this year's Innovation Award deservedly goes to AECOM for establishing a new standard of best practice via sound demonstration and visualisation technology on future road schemes. The simulation allows one to instantly experience and understand not just the addition of unwanted noise, but also the reduction and removal of such unwanted sounds. This provides various stakeholders an opportunity to appreciate the value in planned investments."

In second place, the highly commended award went to Temple Group & Flo with its Northern Line Extension Auralisation Animations and Community Engagement Programme.

The IOA was the proud sponsor of the John Connell Innovation Awards in 2018, and supported the previous year's award, which went to Brigade Electronics UK.

Innovation

The John Connell awards http://noiseabatementsociety.com/ john-connell-awards/john-connell-awards-2018/, now in their 17th year, are presented by the Noise Abatement Society who work closely with industry, government, local government, NGOs and members of the public to help find pragmatic solutions to every type of noise problem.

Gloria Elliott OBE, Chief Executive of the Noise Abatement Society, said: "Innovation is the bedrock of change and the winners of this year's John Connell Innovation Award, kindly sponsored by the Institute of Acoustics, have put good acoustic design and community engagement into practical application to achieve sustainable solutions."

Winning projects

Innovation Award winner

AECOM - 'Sound Demonstrations used at Statutory Public Consultation on major road scheme for the first time – A303 Stonehenge Amesbury to Berwick Down'

The planned upgrades to the A303 Stonehenge – Amesbury to Berwick Down Scheme – include junction improvements and a tunnel under Stonehenge that will reduce traffic congestion, noise and the visual impact of traffic from the World Heritage Site.

CESVA The professional choice. For a reason.

Since 1969 Cesva has been at the leading edge of noise measuring instruments, we make it easier than ever for you to make the right choice with our winning features and benefits.

SC420 Sound Meter

Providing unparalleled performance with intuitive control, now you can benefit from easy 'On & Play' technology that simply lets you get the job done quicker.



FP122 Sound Source

Which consists of the BP012 omni-directional loudspeaker and the AP602 amplifier for building acoustics measurements.



MI006 Tapping Machine

A standardised (ISO 10140-3 and ISO 140-7) Tapping Machine designed to generate normalised impact noise for laboratory and field measurements of impact sound insulation.



The above is a small sample of the many products we have available and remember, all come with our 12 month warranty and responsive Cesva@24, customer service for total peace of mind. Full range available from www.novaacoustics.co.uk



MAKE AN ENQUIRY

Call our dedicated sales line now on +44 (0)113 322 7977 or email us any time at info@novaacoustics.co.uk



Industry update



The John Connell Awards 2018 Innovation Award highly commended, Temple Group and FLO

Highways England wanted to clearly communicate the proposed changes to this iconic landscape and its soundscape for the community's benefit. Working together, Highways England and AECOM produced a pioneering and innovative solution that addressed a complex problem and set a new standard for itself and other governing highways infrastructure bodies for communicating road traffic noise impacts at consultation. The resulting sound demonstrations were used for the first time in a UK major road scheme statutory public consultation, making noise and visual impact intuitive to understand, accessible to a wider demographic while helping to allay fears, and communicate the facts about the scheme to stakeholders.

This new application of immersive technology was a successful innovation and collaborative effort across teams, and has helped to promote constructive discussion about noise with residents and other stakeholders.

Innovation Award highly commended

Temple Group & FLO – 'Northern Line Extension Auralisation Animations and Community Engagement Programme'

The construction of the Northern Line extension in central London has required major construction sites close to residential and commercial properties, often with works taking place during the evening, night and at weekends. The control

of noise and vibration during construction has been a major challenge faced while delivering the programme.

However, through proactive engagement with local stakeholders through Community Liaison Group meetings and drop in sessions demonstrating that their best interests were being considered, and by investing in complex auralisation animations, buy-in from residents was achieved for the use of acoustic sheds to mitigate some of the noisiest works. This meant that it was possible to avoid some cost to the public purse, there was less disruption to residents, arguably fewer effective mitigation options (e.g. insulation and secondary glazing) to potentially affected properties, or temporary re-housing of potentially affected residents.

John Connell Awards

The John Connell Awards were established by the Noise Abatement Society in 2001 to recognise local authorities, industry, individuals and organisations judged to have been outstanding in their efforts to both reduce the impact of noise nuisance and seek to pioneer practical and innovative solutions to noise pollution.





The Market Leading Acoustic Flooring Solution for Life

- Market Leading product with 25+ years history guaranteeing reliable and repeatable results
- For renovation and new build projects on joists and overlays
- Manufactured from recycled materials to assist with Sustainable Construction
- Document E Approved facilitating easy regulatory compliance



REDUC® Range

- Guarantees noise reduction with REDUC® improved acoustic performance
- Improves thermal qualities and vibration damping
- Minimal floor height increase
- Provided with full technical backup

Please contact us for free help and advice

T: 01536 270 450

E: info@acoustictechnologies.co.uk

PDA Ltd celebrates **30 years of business**

ince Philip Dunbavin Acoustics Ltd (PDA) was established in October 1988, Phil Dunbavin, Chairman and CEO, said: "It is fascinating to see the changes that have occurred in instrumentation and technology since then, as well as the raft of new standards and legislation.

"It is interesting to note some of the luminaries who have worked at PDA over the years; such as Professor David Waddington at Salford University and of course Jo Webb, the Immediate Past President of the IOA.

"The board of directors and I thank all the staff for their time



celebrates 30 years

and dedication in helping to see the company grow. They have been with us through thick and thin and along with several new members of the team, continue to see the company go from strength to strength."

ANC campaign puts acoustics on the career radar

he Association of Noise Consultants (ANC) has launched a new online initiative designed to attract more students into acoustics.

Featuring video interviews and case studies with students, graduates, professionals and academics in the industry, #ExploreAcoustics has been introduced to address the current shortage of graduates joining the sector.

The campaign forms a cornerstone of ANC's purpose to highlight the challenging, exciting and rewarding career opportunities available in acoustics and can be seen at www.association-ofnoise-consultants.co.uk/exploreacoustics



Cole Jarman's 25 vears of trading

OA sponsor organisation, Cole Jarman, celebrated 25 years of trading in September. The practice, originally titled Vernon Cole Associates, was established in 1993 by Vernon. It has been a long journey over the past 25 years to the current position where they now have 21 full time staff, and offices in Greater London, Manchester and Bristol.

Now established as a name associated with excellence in the world of acoustics, noise and vibration consultancy, and with wider backing as part of the RSK group, Cole Jarman is looking forward to the next 25 years bringing continued growth and success. They thank all



The Cole Jarman team, celebrating 25 years of trading

their clients and colleagues for their support over the past 25 years, as they say that it would not have been possible without them.

Cirrus Research now a UKAS-accredited laboratory for calibration services

oise monitoring instrument supplier and manufacturer, Cirrus Research, has just received UKAS accreditation for the calibration of sound level meters, acoustic calibrators and octave band filters. UKAS accredited calibration laboratory No. 10148, Cirrus Research, is

able to offer a calibration service that guarantees the accuracy and reliability of the instruments put through this process. Cirrus can calibrate its own products to UKAS standards and those from other manufacturers.

UKAS-accredited calibration is the highest standard of instrument verification available, and is recognised internationally as being one of the hallmarks of accuracy, precision and quality. Many organisations now insist that their instruments are UKAS calibrated.

Cirrus Research is now one of only five calibration laboratories accredited by UKAS to verify sound level meters and sound calibrators and the first UK lab to offer the calibration of acoustic calibrators to the 2017 standards.

www.cirrusresearch.com

MZA Acoustics ends first year on a high

ZA Acoustics Limited was set up a year ago by Martin Raisborough and Graham Hornby, two former directors at a global engineering practice. Between them, they have nearly 40 years of experience in the acoustic, noise and vibration industry and have played a key role in UK and international developments. Operating from offices in London and the north, their growth has been built on providing commercially-focused, technical excellence and building strong client relationships.

After a successful year of trading they are pleased to welcome two new recruits; Angela Hornby joins the team as Technical Director -

Environmental Acoustics, having previously worked for several international multi-disciplinary engineering/environmental consultancies as well as specialist acoustic practices. Robbie Christie joins as a Senior Acoustic Engineer and will be based in the company's northern region.



L to R) Angela Hornby, Technical Director, Robbie Christie, senior engineer, Graham Hornby, Director and Martin Raisborough, Director



Armstrong Ceilings to debut virtual reality education experience

rmstrong Ceilings is following up the launch of its new education brochure by exhibiting at two education shows this term, where they will debut a virtual reality ceiling installation.

On the Armstrong stands, users of the new VR experience will find themselves transported to a typical classroom setting that has not been acoustically treated. "Sitting" amongst the students, they will hear for themselves how typical classroom noise and clatter affects intelligibility and acoustic comfort.

The user will experience the acoustical transformation of the learning environment through the installation of a typical classroom ceiling system solution, using Ultima+ acoustic tiles Blind Boxes, Axiom transitions, and Prelude 24 TLS suspension system.

It makes it easy to see why 65% of teachers in a London South Bank



VISIT THE ARMSTRONG CEILING SOLUTIONS VIRTUAL REALITY EDUCATION EXPERIENCE:

Education Estates exhibition at Manchester Central from October 16th to 17th (stand G11)
 Education Buildings exhibition at Edinburgh International Conference Centre from November 21st to 22nd (stand B9)



University survey reported voice problems during their career – a point the VR experience also makes as well as the fact that up to 30% of what is said in classrooms is missed due to extraneous noise. The presentation also shows that a

high light-reflecting ceiling can also help with eye strain and fatigue.

More information is accessible via the Armstrong Ceilings website https://www.armstrongceilings.com/commercial/en-gb/.

Svantek's building acoustics app

ecognising the growing influence of acoustics on building design and the need to reduce the impact of noise from traffic, industry and neighbours on new housing developments and office units, Svantek has introduced a Building Acoustic (BA) Assistant App to support its Class 1 SVAN 977A or SVAN 979 sound level meters with built-in Bluetooth® interface.

The BA Assistant App's format allows users to go from room to room with the

sound insulation results available for sending to the customer immediately.

Developed for Android platforms, Svantek's app is easy to install and guides users through the sound insulation measurement procedure in accordance with ISO 16283. Sound insulation results are presented as a report compliant with the ISO requirements.

The sound insulation calculation is done automatically once the data files are assigned to rooms in BA Assistant App. The ISO 17 rating of sound insulation in buildings and of building elements is automatically calculated and included in the report templates.

A project containing measurements from the source and receiving rooms for different sound source positions is created during the monitoring period and the project is saved in the memory of the sound level meter along with the measurement files. The user interface allows results to be previewed in the form of time history plots as numerical values, and the size of the display of a mobile device makes it convenient to display spectrum views such as 1/3 octave analysis. Users can add images and voice comments to the measurement projects.

The App can be used with Svantek's SP 95 Impact Ball for sound insulation testing in lightweight structures. It is dropped vertically in a free fall from height of 100cm to the surface of the floor.

www.svantek.co.uk





Shape your design



Bring a monolithic aesthetic and great acoustics to ceilings and walls. New build or renovation, large or small, Rockfon® Mono® Acoustic is ideal for any retail, restaurant, work, leisure or living space.









Designed for modern life

Until now, there have been few acoustic, sound absorbing solutions that were easy to install and none which so successfully delivered the smooth, minimalist appeal of Rockfon Mono Acoustic.

This unique surface solution offers Class A acoustic performance with high sound absorption properties for both ceilings and walls.

www.rockfon.co.uk

Noise isolation in residential buildings

atest research carried out in IFT Rosenheim on ceilings with timber joists and acoustic ceiling systems, shows that very high noise reduction can be achieved by using Sylomer® Acoustic Hangers from AMC MECANOCAUCHO®.

The new recommendation number 103 of DEGA (2018) includes the higher quality class A* to designate the highest comfort level in noise reduction. The tests using the AMC Acoustic Super T-60 + Sylomer® 30 acoustic hangers reached an airborne noise reduction level of Rw=81 dB and an impact noise level of Ln,w=30 dB.

Because of this, both airborne noise reduction level and impact noise level allow the system to reach the highest quality class A*.

The use of a double ceiling suspended with AMC MECANOCAUCHO® Acoustic hangers provides the advantage of reaching high noise isolation values with the use of relatively low suspended mass. This creates new possibilities to fulfil the noise isolation

regulations, especially for old buildings and those with wooden ceilings.

The Sylomer® Acoustic hangers have another important advantage when low frequencies are considered. In the last DAGA Acoustic congress, which took place in Munich in 2018, one of the most important discussion points was that the regulation concerning the impact noise isolation (specially DIN 4109) is focused on frequencies above 100 Hz. However, frequencies below 100 Hz play an important role in impact noise isolation.

Concerning this point, during the International Noise and Acoustic Days in 2011, Prof. Andreas Rabold carried out a study that showed the importance of low frequencies to properly evaluate the impact noise transmission. This can be achieved by the use of a correction factor (Ln,w + CI,50-2500) that increases the range to include frequencies between 50 and 100 Hz.

Considering frequencies under 100 Hz, the AMC MECANOCAUCHO®



Acoustic Hangers show a very significant improvement in comparison with other tested systems, having a value of CI 50-2500 of only 10 dB.

www.akustik.com



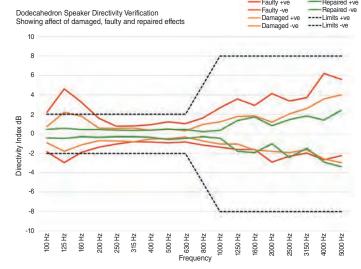
Dodecahedron speaker verification

eneration of sound fields for both sound transmission and reverberation time is an essential element of building acoustics. It is important that these fields are truly random in nature to ensure the validity and repeatability of the results, and to meet the requirements of BS EN ISO-16283-1 for transmission testing and BS EN ISO-3383-1 for reverberation time, several manufacturers are now offering dodecahedron speaker systems for use in these applications.

For sound transmission loss measurements, annex A of BS EN ISO-16283 requires each speaker system used to comply with a directivity specification. For reverberation measurements, including those made in support of transmission loss measurements, BS EN ISO 3388-1 has tighter tolerances on the omni-directionality of the speaker system for precision measurements. Both standards also require bi-annual verification of the speaker systems to confirm compliance with these standards. In both cases, this bi-annual verification comprises a full 360° polar measurement and the calculation of a 30° gliding arc response that is then compared with the 360° average polar response.

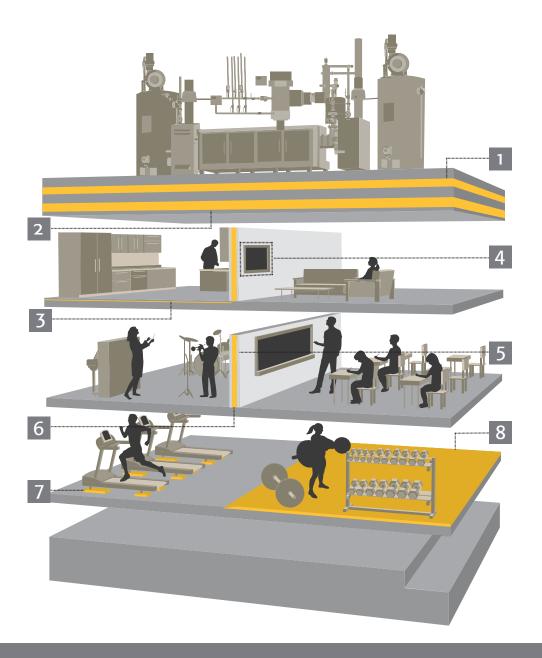
Campbell Associates calibration laboratory has developed a verification procedure to comply with these requirements; it mounts a dodecahedron speaker on a rotating spigot in an

anechoic chamber, which is then rotated through 360° past a measurement microphone. Measurements are made for each 1° rotation and the gliding arc calculated and compared with the specifications. The diagram below shows the effect of faulty speakers, i.e. no output, scraping coils or damaged cone, and finally the return to normal operation after repair.





It's not magic, it's engineering.®









BUILDING ACOUSTICS

Sound and Vibration Isolation

We are a team of experienced engineers focused on developing high-performing, cost effective acoustical products to ensure building standards for sound transmission are met

Innovative by design, simple to install, **GenieClip**[®] and **GenieMat**[®] are the trusted brands of architects, builders and acoustical consultants worldwide.

For more information on our company, products and expertise please call 01223 257770.

Learn more at www.pliteq.co.uk



The Lakes are alive with the sound of music!

akes Alive, a three-day musical and monumental art festival, broke new ground recently. Commissioned by the Lake District National Park, the festival offered an eclectic free programme of contemporary art and spectacular illusions with audience participation.

UK acoustic specialist, Chris Selkirk, from Sustainable Festivals, managed two of the main projects over the weekend.

Attempting to take acoustic measurements in such diverse settings was never going to be easy so Chris hired the Cirrus' Optimus Green Environmental Sound Level Meter, ideally suited for outdoor noise data capture.

His first project – Chorus – was a monumental installation of giant kinetic sculptures and a celestial choir of spinning sound machines. This was created by award-winning artist and British Composer of the Year, Ray Lee. This immersive work, which created a strange and beautiful world of sound and movement within the ancient walls of Kendal Castle, also created some acoustic headaches for Chris.

To give an idea of scale, Chorus comprised a large-scale soundscape installation of 14, 5m tall tripods with two mechanical arms atop. Each had two speakers emitting tones and sounds whilst spinning for a 360° acoustic effect. The piece was positioned at the highest point above the town, at Kendal Castle, to create an artistic vision dominating the landscape while accompanied by eerie orchestral sounds. And while this created a mesmerising optical illusion for visitors, it was also positioned within a residential area.

Chris explained: "The Chorus art piece was designed and positioned to be heard in both the near field and far field. Its purpose was to dominate the landscape and create an immersive large-scale piece of art with sound and light for a large audience.

"The location of the installation was on top of the largest hill in the town at Kendal Castle, surrounded by residential estates. For music-based events the design purpose would be to minimise off-site noise levels, whereas this piece was designed to be heard as far away as possible!

"The 28 speakers which were placed 5m above the ground, rotated at up to 100rpm, to make an amazing aural and visual



spectacle for the audience and strange unusual acoustics in the environment."

Chris' second project – Halo – was another interactive light and sound piece, this time situated in Fletcher Park, Kendall,



'Chorus' by British Composer of the Year, Ray Lee

where the audience became the composer as they moved through the installation, which was created by musician and inventor, Michael Davis. Triggered by movement, the visitors created ever-changing patterns of light and sound, so no two performances were quite the same.

"Both these art installations were within residential areas," said Chris. "It made for a very interesting but challenging weekend, but by measuring every parameter he needed simultaneously, the Optimus Green Environmental Sound Level Meter recorded everything in one measurement. Once Chris had decided on his optimum locations for data capture, all he needed to do was switch on, calibrate and start.

The NoiseTools software package that comes with every Optimus Green gave Chris a quick and simple way to download, analyse and report his noise measurements and the VoiceTag audio recordings, which can be played back for reference are automatically stored with the measurement data.



The Lakes Alive festival





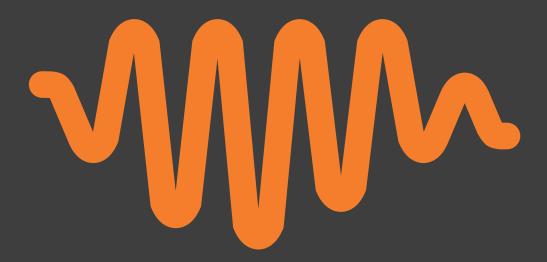
Since 2004, MSA has provided a bespoke recruitment service to clients and candidates working in Acoustics, Noise and Vibration. We are the UK's niche recruiter within this sector, and as a result we have developed a comprehensive understanding of the industry. We pride ourselves on specialist market knowledge and an honest approach - we are focused on getting the job done and providing best advice to clients and candidates alike.

With a distinguished track record of working with a number of leading Consultancies, Manufacturers, Resellers and Industrial clients – we recruit within the following divisions and skill sectors:

- Architectural / Building / Room Acoustics / Sound Testing
- Environmental / Construction Noise & Vibration Assessment
- Vibration Analysis / Industrial / Occupational Noise & Vibration
- Measurement & Instrumentation
- Electroacoustics / Audio Visual Design & Sales
- Underwater Acoustics / Sonar & Transducer Design
- Manufacturing / Noise Control & Attenuation
- Structural Dynamics & Integrity / Stress & Fatigue Analysis
- Automotive / NVH Testing & Analysis

For a confidential discussion call Jim on 0121 421 2975, or e-mail: j.mcnaughton@msacareers.co.uk

Our approach is highly consultative. Whether you are a candidate searching for a new role, or a hiring manager seeking to fill a vacant position - we truly listen to your requirements to ensure an accurate hire, both in terms of technical proficiency and personal team fit.



www.msacareers.co.uk/acoustics

Svantek's all in one noise monitoring station

vantek has launched its SV 200A, a Class 1 sound level meter integrated with wireless communication via 3G, LAN, Wireless LAN and Bluetooth*. It has four additional microphones located on the sides of the housing, which use the sound intensity technique to detect the direction of a dominant noise source in the vertical and horizontal axes. The Leq distribution in angle sectors is saved as the time-history and can be used for data filtering and reporting.

The SV 200A noise monitoring station can perform a real-time frequency analysis on 1/1 and 1/3 octave bands and save it as time history data. It can also record the audio signal for noise sources recognition and data recalculation.

The instrument's large wind screen reduces wind noise effects even at high wind speeds and the weatherproof housing protects against extreme weather conditions while fulfilling Class 1 accuracy.

The accurate GPS module provides information on location as well as measurement time synchronisation and an OLED display and push buttons enable the results preview and measurement parameters configuration.

The SV 200A has an internal Li-Ion battery and interface for direct solar panels connection. A waterproof mains adapter for charging the battery and powering the station is also included.



Live sound mixing within legal limits

t is important that the sound level generated by live events does not cause discomfort or damage to the audience's hearing, nor disturb the neighbours. The XL2 Sound Level Meter is a professional sound level measuring solution for such occasions.

The Projector PRO software presents all live measured levels in the venue itself on a connected computer or tablet. The software also advises front of house (FOH) how much headroom in sound level capacity is available for the near future in case the next song needs to

be loud. The XL2 records all the levels, required by law during a live sound event, in the audience area and the neighbourhood.

The Projector PRO software reads the measurement data from the connected XL2 Sound Level Meter and compares it to the allowed event limits. With the latest software extension, all parameters and limits can be saved in a profile on the computer. Before the event starts, the FOH technician simply selects the profile and the measurement starts automatically. Operation of the XL2

directly is no longer necessary; thus the meter can be stowed safely in the measuring case during the entire event.

The Projector PRO software includes the SPL Predictor, which shows the level history of the current measurement interval and can estimate how much time is left before the limit light illuminates. This provides a level of freedom in the mix, the audience is never exposed to any risk of hearing loss and this can be proved in the measurement report, which is available with a mouse-click immediately after the show.

A successful event must also comply with the permitted noise levels in the surrounding areas to satisfy the neighbours. The XL2 Sound Level Meter allows for easy live monitoring of the noise level in the neighborhood through a web browser to the NoiseScout platform. With a 3G connection to the measuring device, the level values are available live for monitoring directly at the mixing console. The meter is operated online via the web browser.



Cirrus Environmental technology takes off at Edinburgh Airport

irrus Environmental has teamed up with airport noise specialists, Casper, to launch a new stateof-the-art system which provides realtime information on flights and noise at Edinburgh Airport.

The project centres around Casper Noiselab, a new noise and track

monitoring system that increases the transparency around noise tracking analysis. It connects with the Cirrus fixed Galactus Integration Noise Monitor and its mobile sound level monitors to provide coverage across the local area.

The real time data is used and communicated to local communities via the Casper Noiselab System that improves the analysis and helps streamline the processing of complaints, allowing the airport to respond quickly to community concerns.

Craig Storey, Cirrus Environmental General Manager and Project Lead, said: "The Galactus is especially suited to aviation and aircraft noise, it can also be used in multiple use systems, such as monitoring noise and air quality at the same time."

Gordon Dewar, Chief Executive of Edinburgh Airport said: "We appreciate that aircraft noise can cause issues for our neighbours, we want communities to be informed and to better understand noise and through that will come greater trust and a better working relationship.

"This system will help us with that as it provides increased transparency around our operations, offering up-to-the-minute information on flights.'

www.cirrusresearch.com 🔼







Institute Sponsor Members

Council of the Institute of Acoustics is pleased to acknowledge the valuable support of these organisations

Founding Key Sponsors Brüel & Kjær



Key Sponsor



Acrefine Engineering Services Ltd Advanced Noise Solutions Ltd					
					AECOM
AMS Acoustics					
ANV Measurement Systems					
Apex Acoustics					
Armstrong World Industries Limited					
Arup Acoustics					
Bickerdike Allen Partners LLP					
Campbell Associates					
Christie & Grey Ltd					
Clement Acoustics					
CMS Danskin Acoustics					

Cole Jarman Ltd					
Echo Barrier Ltd					
Embelton UK					
EMTEC Products Ltd					
Farrat Isolevel Ltd					
Finch Consulting					
Gracey & Associates					
H&H Acoustic Technologies					
Hann Tucker Associates					
Hayes McKenzie Partnership					
Hilson Moran Partnership Ltd					
Isomass Ltd					
KP Acoustics Ltd					

	Sound Reduction Systems Ltd					
	Spectrum Acoustic Consultants Ltd					
	Wakefield Acoustics					
Waterman Energy Environment						
	And Design Ltd					
	WSBL Ltd					
	WZD					

Applications for Sponsor Membership of the Institute should be sent to the Milton Keynes office. Details of the benefits will be provided on request. Members are reminded that only Sponsor Members are entitled to use the IOA logo in their publications, whether paper or electronic (including web pages).

Committee meetings 2019

DAY	DATE	TIME	MEETING
Thursday	10 January	11.00	Meetings
Thursday	17 January	10.30	Membership
Thursday	7 February	11.00	Publications
Thursday	28 February	10.30	Diploma Tutors and Examiners
Thursday	28 February	1.30	Education
Tuesday	5 March	10.30	Diploma Examiners (London)
Wednesday	6 March	10.30	Medals & Awards
Wednesday	6 March	10.30	Executive
Wednesday	20 March	10.30	Council
Thursday	28 March	11.00	Meetings
Tuesday	9 April	10.30	CCWPNA Examiners
Tuesday	9 April	1.30	CCWPNA Committee
Thursday	25 April	10.30	Membership
Thursday	9 May	11.00	Publications
Thursday	16 May	10.30	CCHAV Examiners
Thursday	16 May	1.30	CCHAV Committee
Wednesday	22 May	10.30	Executive
Tuesday	23 May	10.30	Research Co-ordination (London)
Wednesday	12 June	10.30	Council
Tuesday	25 June	10.30	ASBA (Edinburgh)
Tuesday	2 July	10.30	CCENM Examiners
Tuesday	2 July	1.30	CCENM Committee
Tuesday	2 July	10.30	CCBAM
Wednesday	3 July	10.30	Distance Learning Tutors WG
Wednesday	3 July	1.30	Education
Thursday	4 July	11.30	Meetings
Thursday	1 August	10.30	Diploma Moderators Meeting
Thursday	8 August	10.30	Membership
Wednesday	11 September	10.30	Executive
Thursday	19 September	10.30	Engineering Division
Wednesday	25 September	10.30	Council
Thursday	10 October	10.30	Meetings
Thursday	17 October	11.00	Publications
Thursday	31 October	10.30	Membership
Tuesday	5 November	10.30	Research Co-ordination(London)
Tuesday	19 November	10.30	CCWPNA Examiners
Tuesday	19 November	1.30	CCWPNA Committee
Wednesday	20 November	10.30	Diploma Tutors and Examiners
Wednesday	20 November	1.30	Education
Thursday	21 November	10.30	CCENM Examiners
Thursday	21 November	1.30	CCENM Committee
Thursday	21 November	10.30	CCBAM Examiners
Tuesday	26 November	10.30	ASBA Examiners (Edinburgh)
Tuesday	26 November	1.30	ASBA Committee (Edinburgh)
Wednesday	27 November	10.30	Executive
Wednesday	11 December	10.30	Council

Refreshments will be served after or before all meetings. In order to facilitate the catering arrangements it would be

Institute Council

Honorary Officers

President

Prof B Gibbs FIOA Liverpool University **President Elect**

S Turner FIOA

ST Acoustics

Immediate Past President

L J Webb FIOA Wood Group

Hon Secretary

R Richardson MIOA,

RBA Acoustics

Hon Treasurer

D Wallis MIOA

Cirrus Research

Vice Presidents

J Hill MIOA AAF Ltd

Dr K R Holland

ISVR

G A Parry FIOA

ACCON UK

Ordinary Members

D Goodhand MIOA Goodhand Acoustics Dr P A Lepper MIOA Loughborough University Dr M R Lester HonFIOA Lester Acoustics LLP P Lowery MIOA \dot{AECOM} H Notley MIOA Defra P J Rogers FIOA Sustainable Acoustics E Shanks MIOA Health & Safety Laboratory V L Stewart MIOA Atkins Acoustics

> Blue Tree Acoustics **Chief Executive** Allan Chesney

R Watson MIOA



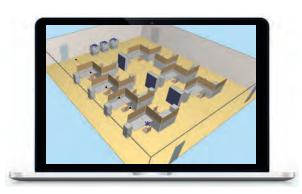




The leading software for environmental noise prediction.







CadnaA Autumn Training Sold Out.
Sign Up Today to Hear About Our
Spring 2019 Training Dates
hotline@campbell-associates.co.uk



SALES - HIRE - CALIBRATION

UKAS accredited calibration facility, see UKAS website for scope of UKAS accredited calibrations offered:- anv.ms/ukas



THE PROFESSIONAL'S CHOICE...FOR A COMPLETE **ENVIRONMENTAL MONITORING SOLUTION**

Noise, Vibration, Dust & Weather all on **One Website**





A COMPLETE, LIGHTWEIGHT AND PROFESSIONAL BUILDING **ACOUSTICS SOLUTION**



AVAILABLE FOR HIRE



SIG ACOUSTIC CAMERA

AT A PRICE THAT'S EASY TO JUSTIFY AND HARD TO RESIST!

- Small, light, portable and easy to use
- Powered from a standard USB socket (just plug into a laptop, no separate power supply required)
- Acoustic Camera, Spectrogram and FFT can be displayed simultaneously

 Images can be stored as mp4 files to share with
- team members/stakeholders

NL-52 the Heart of Rion's **RION Complete Solution for Measuring Environmental and Domestic Noise**

Full Support for BS 4142: 2014 Objective and Reference Methods





