

# EXPOSURE

The official magazine of

**BOHS** The Chartered Society for  
Worker Health Protection  
Issue 4 2017

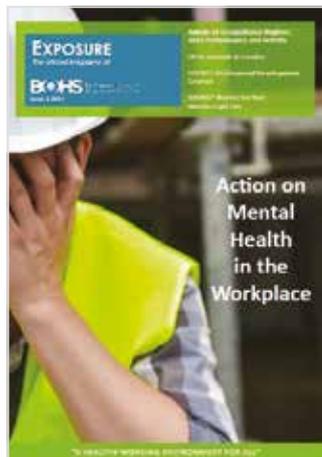
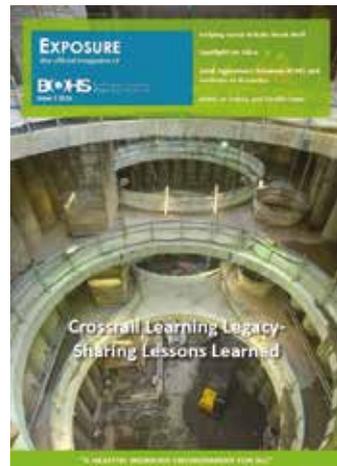
**Breathe Freely in Manufacturing:  
New Roadshows**

**Biological Monitoring to Support  
Legionella Risk Management: the  
Current and Emerging Methods**

**The Revised European Standard  
EN 689: Testing Compliance with  
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### Cover Story:

New BOHS course for the  
construction industry  
**Read more on page 14**

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### Dear Readers,

In this issue, you'll be able to read an interesting mix of topics ranging from legionella risk management (p12), skin and chemicals (p6) to testing compliance with exposure limits (p16). We also have our usual columns and we chat with our new Head of Communications and Marketing in Meet the Member (p30)!

It's going to be a very busy and exciting time in the coming months with events creeping up on us! Keep these dates for your diary: our *Breathe Freely* roadshows (p8 & 15), our FAAM launch (p11), IPXII (p25), plus, our asbestos roadshows (p11). Phew!

It is with sadness that we bid fond farewells to the following members of staff: Sukhraj Poonia who assisted with our FAAM project, San Dosanjh who was our Membership Officer and, plus, our Head of Qualifications, Paul Johnson who have all moved onto greener pastures. From all of us at BOHS, we wish them all the best for the future.

### The Exposure Team:

**Caroline Smith, Claire Creed,  
Evi Karmou and Michelle Chan**



Read the latest from our scientific journal, *Annals of Work Exposures and Health* at:  
[academic.oup.com/annweh/issue](http://academic.oup.com/annweh/issue)

### Let's keep in touch!

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## From the President | Karen Bufton



It's now been two months since my last update and a lot has happened over that period. The most significant for me was that Steve Perkins, our Chief Executive Officer (CEO) of eight years, has decided to step down and pursue a new career running his own business consultancy venture.

Steve was the Society's first ever CEO and initiated the transformation of BOHS to a much larger, learned, and impactful society. During this time, BOHS has experienced significant growth in membership, business performance, external profile and influence, as well as achieving our Royal Charter and Chartered Status for professional occupational hygienists.

I was sad to hear about Steve stepping down - as I know many of you were - but I also recognise this is the start of a new exciting chapter for Steve, as well as for BOHS.

As part of his external consultancy venture, Steve will continue to support BOHS in a part-time capacity as Head of External Affairs. Moving forward, he will represent BOHS at industry events and conferences, grow the relationships we have with external stakeholders, and provide handover to the new CEO. BOHS has already embarked on the recruitment of a new CEO and a working group has been established to manage

the process. If all goes to plan, we hope to have a new CEO in place by the end of the year.

During this process, I would like to thank the BOHS Senior Management Team including Shani Jackson, Paul Johnson, Evi Karmou (who has just joined us as Head of Communications and Marketing), Sue King and all the office staff for their support to the BOHS Society during the recent weeks of organisational change. They are continuing to focus on supporting the delivery of the BOHS strategy and in particular, the implementation of the Faculty of Asbestos Assessment and Management (FAAM), the *Breathe Freely* Campaigns and the roll out of the new Certificate in Controlling Health Risks in Construction course.

I will keep you up to date on the CEO recruitment progress in future editions of *Exposure* magazine and Steve also plans to share the activities associated with external affairs in an article in the next edition.

In other news, following our Council meeting in May, we held a development day in which we introduced a new 'board' appraisal process. One of the outcomes is that each Council member will now have two or three written objectives including at least one that supports the BOHS Strategy. Individual Council members' performance will be reviewed annually and the overall board performance will be assessed by Council. These activities have been done informally in the past, but this allows for a more robust process and a mechanism for continuous improvement.

In the same week, I attended the successful launch of the new *Breathe Freely* campaign for manufacturing and chaired the presentations from Dame Judith Hackitt DBE, Chair of EEF (Engineering Employers Federation), Martin Temple OBE, Chair of the HSE (Health and safety Executive), and Dr David Fishwick, Chief Medical Officer at the HSE. The event was held at EEF London Headquarters and was attended by 70 member companies and

supporters with the aim of raising awareness of the respiratory health hazards, initially starting with welding fumes.

For me, one of the perks of being President of BOHS is being able to attend the conferences organised by sister institutes in America and Australia, such as the American Industrial Hygiene Association (AIHA) and the Australian Institute of Occupational Hygienists (AIOH).

I was lucky enough to attend the American Industrial Hygiene Conference & Exposition (AIHce) that took place in Seattle in June. The conference was much larger than I had imagined with around 4,000 attendees, an exhibition hall with hundreds of exhibitors, and several simultaneous presentation sessions occurring over three days. One of the most interesting presentations was on occupational hygiene ethics and working with different cultures around the world. It highlighted the different expectations cultures can have regarding gender, ethnicity, health and the value of life and money. The other presentation I enjoyed was from Dr John J. Medina, a developmental molecular biologist with an interest in brain development. He explored what cognitive neuroscience can tell us about the brain and what makes a great leader. Apparently two contradictory skills, an intense focus on results coupled with strong social skills can transform a competent executive into a trailblazing leader.

I also attended the BOHS/AIHA/AIOH trilateral meeting in Seattle, which is normally held before the start of each of the conferences and provides an opportunity for each of the organisations to share our endeavours. It was interesting to note that all three are working on increasing the awareness of occupational hygiene externally and increasing membership.

I look forward to another couple of busy months and will update you in the next edition of *Exposure* magazine.



Our brand new campaign aims to make improvements in respiratory health protection for workers in the manufacturing industry, focusing in particular on the key area of welding

➔ **NEW** ◀

# Breathe Freely in Manufacturing

2017 Breakfast Roadshows

19 September, Glasgow

19 October, Birmingham

2 November, Middlesbrough

**REGISTER NOW**

Click on the New Roadshows section of [www.breathefreely.org.uk/breathefreelymanufacturing.html](http://www.breathefreely.org.uk/breathefreelymanufacturing.html)

*Join us and be part of the solution*

PARTNERS



The manufacturers' organisation



## Skin and Chemicals - an Absorbing Issue: What You Need to Know About Chemical Uptake Through the Skin and How to Prevent it | Kate Jones, BOHS Member



### CIA/BOHS Event 26 October 2017

Back in 2015, we surveyed the BOHS membership about their experiences and knowledge around skin issues. Most hygienists reported some dealings with assessing dermal exposures for chemicals with around two-fifths doing so quite frequently. In that survey, 90% of respondents said that they wanted to “know more about assessing the risks from dermal exposure to chemicals”. Since then, BOHS ran a successful

conference in Manchester (Occupational and Environmental Exposure of Skin to Chemicals, <http://oeesc2016.org/>). If you were not able to make that conference, presentations are available on the website. You also now have the opportunity to attend a focused one-day event on the topic. BOHS is jointly organising a meeting with the Chemical Industries Association (CIA) looking at skin absorption of chemicals, assessment methods and practical control measures. Content includes perspectives from the UK regulator as well as aspects from the European REACH regulations. The meeting will cover some helpful tools (modelling, biological monitoring) that can be used to assess skin exposures in the workplace and evaluate the efficacy of control measures. The role of hand-to-mouth contact, resulting in ingestion exposure will also be included. There will be a number of practical case-studies that show how skin exposure to

chemicals can be effectively controlled using concepts such as safe working distance, worker behaviour and appropriate PPE.

So, if you are one of those respondents who felt they needed to “know more about assessing the risks from dermal exposure to chemicals”, this is your chance to get some continuing professional development on the topic.

The event is taking place at the Hilton Hotel in Leeds on Thursday 26 October 2017. To book your place, please visit the CIA event page ([www.cia.org.uk/Training-and-events/Training-courses/Event-Details/eventDateId/105](http://www.cia.org.uk/Training-and-events/Training-courses/Event-Details/eventDateId/105)).

Registration fee is £150 + VAT for BOHS members. There is also the possibility to exhibit at the event. If this is relevant to your business, please email [events@cia.org.uk](mailto:events@cia.org.uk).



**Park** currently has a requirement for qualified or part-qualified occupational hygienists to work on our acclaimed construction and major infrastructure projects across the UK. A competitive salary and benefits package will be negotiated commensurate with your skills and experience. Knowledge of construction and civil engineering is desired but not essential.

In addition, we are seeking enthusiastic candidates with an interest in occupational hygiene to join our development programme. Suitable for graduates with a science background or those who wish to retrain in a new field.

**For more information and an informal chat, please contact:  
Linda Williams on 01296 310454**

**Or send your full CV detailing qualifications to [linda.williams@parkhs.co.uk](mailto:linda.williams@parkhs.co.uk)**

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**BOHS**

## Upcoming FREE Regional Meetings

**22 Sept: Northern Ireland**

Queen's University, Belfast

**Occupational Noise Measurement and  
Assessment**

**27 Sept: London, South & South East**

Society of Chemical Industry, London

**Repetitive Upper Limb Tasks Workshop Disorders**

**10 Oct: Northern Ireland**

Queen's University, Belfast

**Developing a Healthy Skin**

**24 Oct: Midlands**

Hilton Hall Hotel, Wolverhampton

**Specialist Sampling—Face Level and Metal Working Fluid (MWF)**

**5 Dec: Northern Ireland**

Queen's University, Belfast

**Confined Space and Gas Detection**

## Why not sponsor a regional meeting?

BOHS regional meetings provide a cost-effective sponsorship opportunity for companies, with benefits such as:

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- Contact with key decision-makers**
- Networking opportunities**

If you would like to sponsor a BOHS regional meeting, please email [membership@bohs.org](mailto:membership@bohs.org) with details of your company and the regional meeting you are interested in

## Breathe Freely in Manufacturing: New Campaign Update



A major new phase of the highly successful *Breathe Freely* campaign officially launched in London on 25 May 2017, at EEF's headquarters. The event was attended by around 70 partners and supporters of the campaign, and focused on further raising awareness of respiratory health hazards, which cause around 90% of the estimated 13,000 deaths in Britain each year from work-related diseases across all sectors.

The new campaign, *Breathe Freely in Manufacturing* – which is being run in partnership with EEF the manufacturers' organisation, HSE, TWI, TUC, JCB, Toyota and BAE Systems – will operate concurrently with the original *Breathe Freely* initiative for the construction industry.

### Why *Breathe Freely in Manufacturing*?

Whereas the initial phase of the campaign – which launched in April 2015 - focused on the construction sector, this second part centres on the manufacturing sector specifically to prevent occupational lung disease

amongst welders. The campaign is urging the industry to get on board with robust controls to protect the respiratory health of their welders.

In the manufacturing sector specifically, it is estimated that annually, around 4,000 workers suffer from breathing and lung problems they believed were caused or made worse by their work.

### Why welding?

In the manufacturing sector, welders have been identified as a group at particular risk of serious lung conditions from inhaling hazardous fumes, gases and dusts. As a result, this new phase of the *Breathe Freely* initiative will focus primarily on improving respiratory health protection for welders.

Welding is one of the most common activities carried out in the UK. It is estimated that there are approximately 190,000 workers in the UK who weld. Of these, around 73,000 are categorised as professional, skilled welders. Additionally, there are also around

117,000 unskilled or semi-skilled welders who carry out welding as part of their job.

Welding is one of the top ten causes of work-related cancer, estimated at causing around 150 deaths a year in the UK.

In the manufacturing sector, it is estimated that annually, around 4,000 workers suffer from breathing and lung problems they believed were caused or made worse by their work

In addition, welding is associated with numerous other serious health conditions, such as asthma, COPD (chronic obstructive pulmonary disease), metal fume fever and effects on the nervous system as well as short-term irritation of the throat and lungs, and reduced lung function.

Each year, it is estimated that breathing metal fume at work leads to 40 to 50

welders being hospitalised with pneumonia, with the disease killing about two welders annually.

**Comments from the launch event**

Launching the campaign, Karen Bufton, President of BOHS, said, “The good news is there’s a solution – all of these cases of ill health caused by welding are, in fact, preventable. Welders can be protected from the hazardous fumes and gases by recognising the hazards, evaluating the risks and controlling exposures. This is, quite simply, good occupational hygiene practice.

She continued, “Unfortunately, we know that workers are still being exposed to high levels of welding fumes and gases because in some workplaces, either there are no controls in place, inappropriate controls are being used, or the controls provided are not being used properly. Our new initiative aims to ensure we’re getting this right. We are urging employers to make use of our *Breathe Freely* resources to check that

the right controls are in place and are being used properly, with a solid plan in place to ensure continuous improvements in practice.”

Welding is associated with numerous serious health conditions, including: asthma, COPD, metal fume fever, effects on the nervous system, and reduced lung function

“Tackling ill health is a key responsibility of business,” said Dame Judith Hackitt DBE, Chair of EEF, “but we will only achieve success if everyone recognises that it is an integral part of success. We know that keeping people fit and in work as well as accommodating an increasingly ageing workforce can hold the key to productivity gains in our sector with the health of employees a major factor in an organisation’s competitiveness. Good health is good business.

“Whilst we have achieved significant progress, there is still much more that can be done to manage occupational health risks, and initiatives such as this can only ensure such an important business task receives more attention.”

Speaking at the launch, HSE Chair Martin Temple OBE told delegates: “It is great to see the range of organisations here acting together to improve health and safety; in particular, BOHS for setting up the *Breathe Freely* initiative and EEF for its support in instigating this second phase covering welding.

“This is a significant workplace activity where we can and must make a real difference to workers’ health. Businesses no longer allow staff to be in clouds of cigarette smoke so welding fumes should be considered with as much concern. Unfortunately, workers in some businesses are still being exposed to high concentrations of fumes and gases. Make sure you're getting this right.”



Look out for further news on this campaign throughout the year. Why not get involved in the campaign? You can become involved in a variety of ways, to help BOHS raise awareness of occupational lung disease that this initiative is addressing.

As awareness grows, we receive more requests for speakers, collateral and more so we value your support to resource these requests

**To register your interest in becoming involved, please email [evi.karmou@bohs.org](mailto:evi.karmou@bohs.org) (Evi Karmou, Head of Communications and Marketing)**

**FREE Breathe Freely Resources**

- Welder task sheets showing the controls that need to be in place to protect welders
- A welding fume slide pack and information sheet for HS&E Managers to use when communicating with employees
- Guidance materials on topics such as LEV, RPE and the hierarchy of control. Over time, a bank of good practice case studies highlighting the benefits of having the right controls in place will also be made available
- External links, including the BOHS *Directory of Occupational Hygiene Services* at [www.bohs.org/consultant](http://www.bohs.org/consultant) – the definitive list of UK companies able to provide qualified and experienced occupational hygienists, and specialist occupational hygiene support services.

# ANNALS OF WORK EXPOSURES AND HEALTH

## ***Annals of Work Exposures and Health***

is BOHS' scientific journal and is dedicated to presenting advances in exposure science supporting the recognition, quantification, and control of exposures at work, and epidemiological studies on their effects on human health and well-being

Check out the latest issue at  
[academic.oup.com/annweh/issue](http://academic.oup.com/annweh/issue)

### **Features:**

An archive dating back to 1958!  
Virtual issues on topics including asbestos,  
exposure modelling and respiratory diseases  
Editor's Choices  
...and more!

# >>Asbestos Roadshows

BOHS has taken steps to enhance the level of competency and expertise of asbestos professionals by launching a new Faculty of Asbestos Assessment and Management (FAAM)

The official launch of FAAM will take place at an evening reception at the prestigious Conrad Hotel in Westminster on the 11th October

A person wearing a white protective suit, a respirator mask, and red gloves is working on a ceiling. The ceiling has some damage and is made of metal panels. The person is looking up and to the right.

BOHS are holding a series of roadshow events in October and November to reflect a number of changes and developments in the industry.

These events are key for anyone who wants to find out about the latest developments in the asbestos profession.

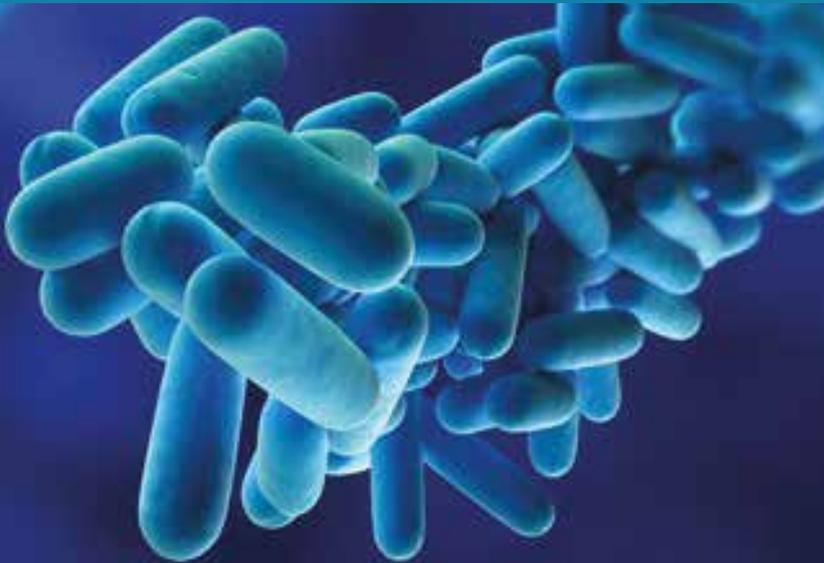
They will take place on:

**11 October: London**  
**18 October: Glasgow**  
**31 October: Cardiff**  
**6 November: Manchester**

Member rate at each event: £130 + VAT  
Non-member rate at each event: £170 + VAT

More info can be found at:  
[www.bohs.org/conferences-events](http://www.bohs.org/conferences-events)

## Biological Monitoring to Support Legionella Risk Management: the Current and Emerging Methods | Adrian Parris, BOHS Chartered Member



### Part One: current status, and issues with conventional methods

I would say one of the most *enjoyable* aspects of being an occupational hygienist is the broad spectrum of disciplines it covers, and also because it is a profession that never stands still - it still requires dedication to learning. In my opinion, it is these aspects that make an occupational hygienist ideally placed to provide a high quality level of advice when it comes to legionella risk management. With the support of BOHS, who provide both professional development through their Certificate of Competence in Legionella, in addition to a range of training tools through the proficiency modules (P900, 901, 903 and 904 covering management and control of a range of susceptible systems), we are ideally placed to make a difference. I recently visited one of BOHS' training providers, and it was reassuring to see a shift from classroom teaching to a more practical and hands-on approach and in this case, by using a mock-up of a water system which will help embed the learning.

Knowledge of legionella bacteria, and how it presents a risk, is constantly improving. A recent study has identified how it manages to evade the human defences by generating a molecule called

RavZ, which interrupts the process of autophagy and prevents the body's defence mechanism from happening.

In another study by Public Health England, the potential for a high prevalence of legionella bacteria within our homes has been highlighted, and was featured in the national press such as on the Daily Mail through an article called "Deadly legionnaires bug lurking in 1.5million British homes".

Although the above article has been written to ensure maximum impact, the supporting research paper on Research Gate called "Occurrence of legionella in UK household showers" contains some interesting and useful information. For instance, it suggests that mains-fed electric showers, which are generally classed as the lowest risk of shower systems, may present a higher risk than initially thought.

Another focus of this study was the use of rapid legionella tests to support these investigations. There is still a degree of confusion within the industry sector regarding sampling and analysis of legionella bacteria, and the use of emerging rapid tests. In the first part of this two-part article, I'll provide an oversight of the current status and issues with conventional methods. In part two,

I will concentrate on those emerging as the preferred rapid tests, the issues that surround them, and how they can be used with other microbiological tests to understand the microbiology of a system.

Legionella Culture Method to ISO 11731:1998 has long been classed - and still is - the 'gold standard' method when identifying the presence of legionella bacteria in a system. Surprisingly, the analysis has a low recovery rate, having at best a 30% accuracy for clean water, and as low as 5% for heavily fouled water. In addition, there is a wide range of other sources of error that can occur through the process of collecting the sample for analysis, which may mean the result is not representative of the system's condition.

If we consider sampling covered under BS 7592:2008, it is important prior to commencing sampling to devise a plan detailing what samples are to be taken, when, where, and how they should be collected, transported and stored. Errors can occur if bottles are not sterile and/or a neutralising agent is not added, such as sodium thiosulphate to mop up any residual oxidising biocide. Samples that are overfilled, which I've observed in the past, will wash out the neutraliser. Disposable gloves should be worn to prevent sample contamination, and care should be taken in handling the lid. Once a designated sampling point has been identified, decide what you want to sample, bearing in mind the outlet could be contaminated with legionella bacteria. If you are interested in sampling the system water, it should be sterilised beforehand. If you are interested in clarifying if the outlet is a source of bacteria, then a pre-flush sample should be taken before it is sterilised, and then a post-flush sample taken. The stability of the sample cannot be guaranteed if the lab analysis is not started within 24 hours of collection. The current standard requires that during storage and transport, samples are protected from heat and sunlight, and kept at ambient temperature. Storing in ambient conditions is based on some historic

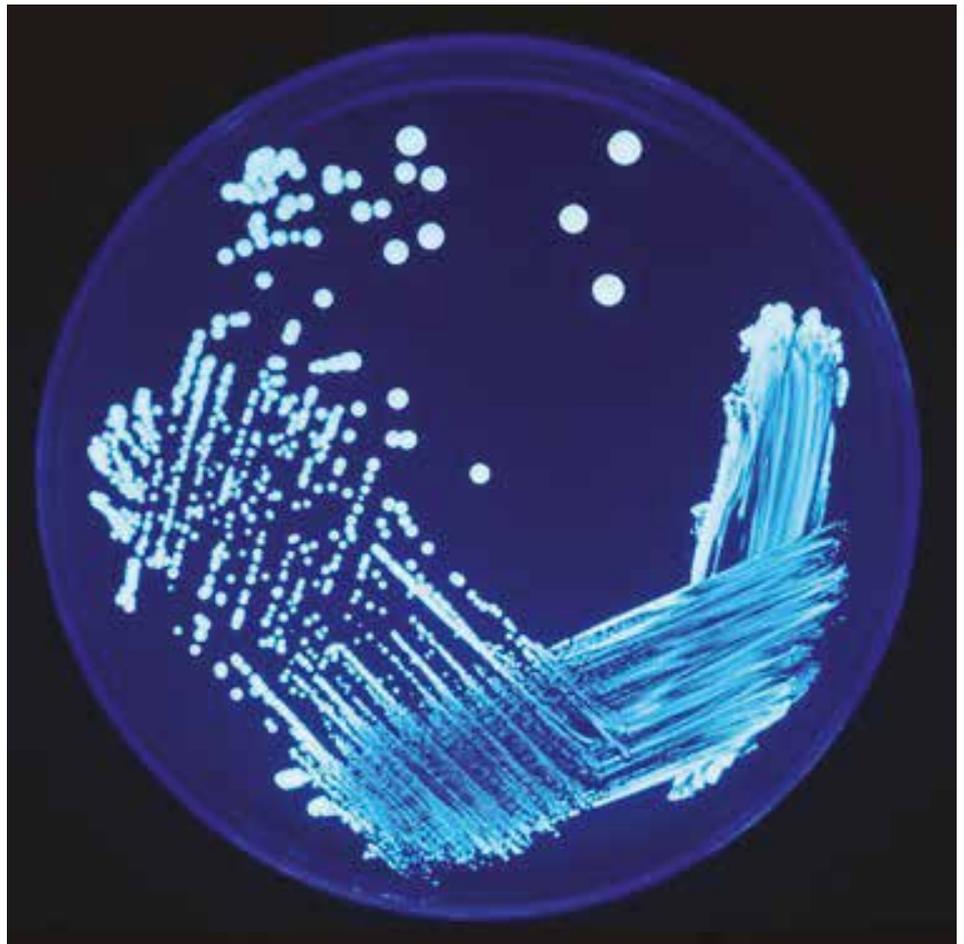
research, and guidance may change in the future to align with handling general waterborne bacterial samples, which requires samples to be refrigerated.

Then there is the analysis. The objective is to grow living organisms: you would, therefore expect this could well be problematic, so much so that you cannot guarantee that when a sample returns a negative result, it means there is no legionella present. Issues can occur when you have viable, but non-culturable, bacteria: not all legionella bacteria will grow on the plate, and others won't grow within the 10-day window of the test. Two standard media, GVCP and BCYE, are used. The lab normally has a preference, but they do perform differently, with GVCP having the better recovery rate, and BCYE being prone to overgrowth of legionella bacteria. Both of these have been used for some time: there are more recently developed media, which have greater recovery rates, but haven't been adopted in the standard method.

We know that legionella likes to live in a community, within a biofilm, which provides protection and the food source required to survive. To enable biofilm to establish, ideally the water velocity should be low, which is why management of dead legs and dead ends are important. Hence there may be high bacterial loading in the sample, which could out-compete the legionella bacteria on the plate, or hide the legionella bacteria from being detected. In addition, they can also grow within a host bacteria, such as amoebae, which could lead to a disproportionately high count, or not show up at all when being cultured.

The detection limit for the analysis has long been 100 CFU/L, but with the push for lower detection limits, mainly from the health care sector, it is likely that not all the sample provided will be used. However, we know legionella lives in a biofilm, so what if the part of the sample taken doesn't contain the biofilm? The results will be significantly underestimated. If a low detection limit is not important to you, ensure you request the lab to analyse the entire sample.

Thus, it can be seen why the industry



sector is confused, and if you throw in the results from an inter-lab proficiency scheme, which suggests wide ranging results from participating laboratories (for instance, one sample result ranged between <1 to 187, 000 CFU/L), this really throws a question mark over the value of legionella monitoring by the culture method. Currently, it is the only method which defines action levels within HSE Guidance. It really emphasises the importance of having a well designed system, and a robust written scheme of control to remove the reliance on legionella monitoring. It is recognised that systems may return positive results: remember that legionella is a naturally occurring bacteria, so considering the results along with other system performance measures, as well as looking at trends rather than isolated positives may give a better indication of whether there is a real issue.

It is important to eliminate as much potential for error as possible. If you deploy a water treatment service partner in your business, then ask to see their legionella sampling plan and procedures; and take some time to observe their

practices. Satisfy yourself you are getting the standard which you would expect from a professionally accredited company.

However, in spite of the potential problems, all is not lost. There are changes afoot: a revision of ISO 11731 is currently in the pipeline. Professional bodies in the UK were not keen on the new revised standard but were in the minority, and it is expected to be implemented this year. Information on the planned updates, along with the application of other microbiological tests, including the front runners in rapid testing, PCR and Legipid<sup>®</sup>, will be the focus of part 2 of this article, to appear in issue 5 of *Exposure* magazine.

Knowledge of the risks presented by legionella bacteria is constantly improving

There is still confusion within the industry regarding sampling and analysis of legionella bacteria, and the use of emerging rapid tests

## New BOHS Course for the Construction Industry

The **Certificate in Controlling Health Risks in Construction (CCHRC)** course was launched in July. This is a new and unique course for BOHS, and was created due to widespread demand from the construction industry, where there was felt to be a lack of user-friendly training about health risks specific to that sector.

The profile of health risks in the construction industry has been raised significantly during the last couple of years, by initiatives such as BOHS' *Breathe Freely* campaign, and the work of the Health in Construction Leadership Group (HCLG). Many readers of *Exposure* will be familiar with the worrying statistics from the construction sector:

- Construction workers are 100 times more likely to die as a result of ill health caused by work, than from an accident
- There are around 5,500 new occupational cancer cases in construction each year
- Each year, there are around 76,000 cases of work-related ill health

### What is the course?

The aim of the course is that students will develop their knowledge of health by learning how to recognise and control the most common health risks found on construction sites. They will also understand where to find further information and advice, if required.

CCHRC has been specifically designed to provide training for construction site supervisors, so they can better recognise and control the health risks specific to their workplace, by:

- Identifying the most commonly present health hazards found on construction sites, such as noise and dust
- Understanding the principles of risk control
- Identifying the measures needed to control common health risks from construction activities

Another advantage of the course is that it takes place on one day\* – an important benefit for businesses that,



typically, are under increasing pressure to consider resource and cost implications. Furthermore, companies have the opportunity to become a BOHS Approved Training Provider and can then deliver the course to their own staff – a further benefit that can deliver ongoing cost savings.

### Why this course?

'Health' can feel like an overwhelming subject for Health and Safety Managers and other professionals responsible for this area. Therefore, this course has been developed due to widespread demand and will focus on occupational hygiene. It has been developed in collaboration with construction industry leaders, extensively researched in partnership with industry experts, and trialled with industry personnel.

This course is the only one of its type, and the high profile of the project has created significant demand – resulting in a waiting list of prospective candidates.

\*Prior to the course, candidates will complete a two-hour online distance learning module to consolidate their learning before attending the course.

It has been developed in collaboration with construction industry leaders, extensively researched in partnership with industry experts, and trialled with industry personnel.

**CCHR|C**  
Certificate in  
Controlling Health Risks  
Construction

**hc**  
health in  
CONSTRUCTION  
leadership group

Construction workers are 100 times more likely to die as a result of ill health caused by work, than from an accident

## Breathe Freely in Construction Roadshow



On 13 July, BOHS launched the first of its four *Breathe Freely in Construction* roadshows of 2017, held at Edgbaston Cricket Ground in Birmingham. It was a great opportunity for attendees to review the campaign to date as well as to discuss critical issues in the construction industry and actions taken.

We welcomed Jennie Armstrong, Head of Occupational Health and Wellbeing at Tideway, and Chair of the *Breathe Freely* Steering Group as well as other guests including:

- Tim Shambrook from the Health Risk Management Unit at the HSE who discussed the view from the regulator on how to raise the bar in construction
- Vern Harrington from RVT Group, sponsor of this series of roadshows, shared case studies focusing on examples of effective control made possible by temporary solutions
- Mike Slater from Diamond Environmental and the Past-President of BOHS presented managing workplace health risks in construction, focusing on the role of occupational hygiene and the impact of the *Breathe Freely* campaign on raising awareness and inspiring change

Over 40 attendees took part in interactive discussions focusing on key and emerging issues in health, improvements that participant companies have made to health as well as new developments on the *Breathe Freely* campaign resources.

The remaining roadshows will take place on:

21 September at SS Great Britain, Bristol

27 October at Surgeon's Hall, Edinburgh

15 November at London (venue to be confirmed)

Sign up now at and be part of the solution:

[www.breathefreely.org.uk/breathe-freely-in-construction-roadshow-2017.html](http://www.breathefreely.org.uk/breathe-freely-in-construction-roadshow-2017.html)

This series of roadshows is sponsored by



## The Revised European Standard EN 689: Testing Compliance with Exposure Limits | Trevor Ogden, BOHS Member and Former Chief Editor of the *Annals*



Photo of the Working Group. *Standing left to right:* Florence Saillet, Jose Luiz Sanz Romeras, Gautier Mater, Theo Scheffers, Roger Grosjean, Maria Ilaria Barra, Christian Schumacher, Ralph Hebisch, Raymond Vincent and Jan Twisk. *Seated left to right:* Wouter Fransman, Hans Thore Smedbold, Trevor Ogden and Dr Rojo Aparicio. *Absent:* Martine Chouvet, Bruno Janis, Gebhard Von Kries and Robert Piringer.

More details of the working group can be found on page 20.

**A revision of European Standard EN 689, on testing compliance with exposure limits for airborne substances, has been agreed by a Working Group of the European Standards Organisation, CEN. In the next few months the revision will be voted on by the national standards organisations, such as BSI, but seems certain to be approved. I represented Britain on the CEN working group, nominated by BOHS. The Standard is long – about 50 pages in the draft - but in this article I have tried to pick out and sum up some of its highlights.**

### Why do we need a Standard on exposure limits?

COSHH Reg 7 requires adequate control of substances hazardous to health. This means that the principles of good practice are applied, and any approved workplace exposure limit is not exceeded. These twin requirements reflect the duties in the EU Chemical Agents and Carcinogens Directives (98/24/EC and 2004/37/EC), although the directives call the limits Occupational Exposure Limit Values (OELVs) or simply Limit Values.

Other EU countries therefore have similar requirements to those in COSHH.

Any exposure management plan will concentrate first on good practice. The COSHH ACoP emphasises this, and is obviously right, because measurement takes time and there is no point in undertaking it if there are controls that need to be applied anyway. But what should be done about the second requirement – compliance with the OELVs? The employer must ensure that a limit is not exceeded (ACoP para 126 and 128), and in para 106 the health and safety professional is advised to check this. And now we hit a problem. How can the professional do this?

It is a problem because of the variability of exposure. Exposure depends on many interacting variables – work methods, work rate, closeness to sources, background concentrations, local and general ventilation – so that occasional chance relatively high exposures are very hard to avoid. In statistical terms, the exposure distribution is highly skewed (Fig. 1). This means that getting one measurement result below the limit tells

us very little, and two or three are hardly any better unless they are very low indeed. The first few measurements may be well within the OELV, but the next one may be in the tail of the distribution, above the OELV, but still a representative measure of exposure. This will be a breach of the law, and this measurement may be the one made by an enforcing authority.

Guidance to professionals on this problem usually recognises that even in a well-controlled environment there is never 100% certainty that all exposures will be below the OELV. However, if an employer has a measurement programme which demonstrates a less than 5% chance of any exposure exceeding the OELV, then that is often reckoned to be good enough in practice, provided, of course, that the principles of good practice are also being applied.

Various pieces of guidance have appeared over the last 40 years which advise the professional how many measurements to make, and how far below the limit they must be, to ensure

that this 95% criterion is met. An important example, *Testing compliance with OELs for airborne substances*, was produced in 2011 by a joint working party of BOHS and the Dutch Occupational Hygiene Society, NVvA. It can be downloaded from the BOHS website – go to “Find expertise” and then “Guidance for occupational hygienists”. The trouble with past guidance is that getting statistical confidence of meeting the 95% criterion requires far more measurements than most employers would be prepared to stomach. There is a trade-off between confidence in a compliance decision and the cost and time of making more measurements.

**The new Standard – a better way through?**

This year brings a better solution to this problem – a revision of European Standard EN 689. The Standard dates back to 1995, but the new version concentrates on the problem of measuring compliance rather than the wider problems of managing exposure. The revised Standard assumes that the “principles of good practice” are already being applied, and that the employer now wishes to implement the second step, testing to see if the OELV is

complied with. It takes advantage of recently-published French research, which has demonstrated how to do this with an acceptable level of confidence from fewer measurements than was ever thought possible before.

Any employer may decide that they want a compliance test, but the Standard must be implemented by an “appraiser”, defined as a “person who is sufficiently trained and experienced in occupational hygiene principles, working and measurement techniques, to conduct the part of the assessment he or she is performing according to the state of the art”. Professional competence is therefore essential to conduct the tests properly. The appraiser conducts an initial review and may decide not to measure, either because non-compliance is so likely that more controls are required first, or because exposures cannot conceivably reach the OELV and measurement is unnecessary.

But assuming that measurement goes ahead, the numerical core of the revised standard may be summed up as follows. Personal exposures are measured on a sample of workers in a Similarly Exposed Group (SEG). The SEG is a familiar concept in this field, and is a group of

workers having “the same general exposure profile” to the substance concerned “because of the similarity and frequency of the tasks performed, the materials and processes with which they work, and the similarity of the way in which they perform their tasks”, to quote the definition in the Standard. Three, four, or five exposure measurements may be taken from the SEG as a **Preliminary Test**: if all are low compared with the OELV then it may be concluded that the OELV is complied with. “Low” is specified as follows:

Three measurements: All exposures must be < 0.1 x OELV

Four measurements: All exposures must be < 0.15 x OELV

Five measurements: All exposures must be < 0.2 x OELV.

If any measurements are made at this or any other stage which exceed the OELV, the conclusion must be that the exposures of the SEG do not comply with the OELV – this is an inevitable conclusion because of the legal requirement that the OELV must not be exceeded.

If the exposures taken so far do not comply with the above requirements, then more exposures must be measured in the SEG,

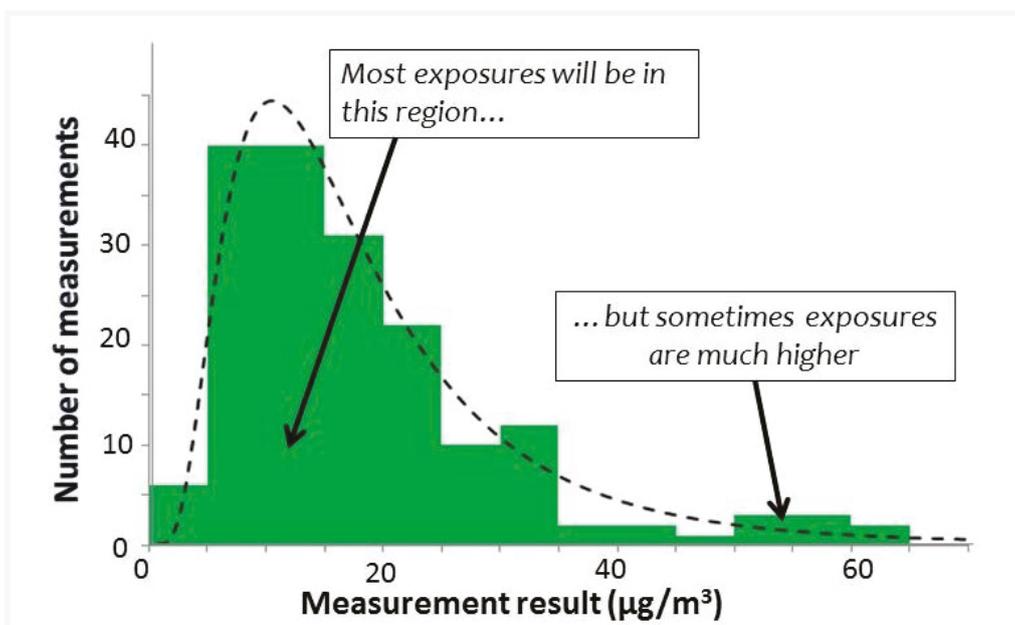


Fig. 1. A typical exposure distribution: 177 personal exposures to lead, by Cope et al (1979), taken from Rappaport and Kupper (2008). The dotted curve is the lognormal distribution which best fits the data

## The Revised European Standard EN 689: Testing Compliance with Exposure Limits | continued

and a Statistical Test applied. The text of the standard specifies the performance required of the test, and an informative annex gives an example of a test which meets the specification. Calculations are performed on the results and the answer is compared with the value in a table, depending on the number of exposures measured.

The appraiser does not have to understand the technicalities to apply the test, but the annex tells the appraiser how to calculate, for log-normally distributed exposures, the ratio of the OELV to the geometric mean of the exposures in geometric standard deviation units; or, for the unusual case of normally-distributed exposures, the difference between the OELV and the arithmetic mean in standard deviation units. The answer to the calculation is compared with values in a table, which tell the appraiser whether the SEG complies or not. More technical details and background of the Preliminary and Statistical Tests are given in the Appendix below.

In many cases, of course, there is simultaneous exposure to more than one substance, and Article 4(4) of the Chemical Agents Directive says that the risk must be assessed of the substances in combination. The Standard includes an advisory (ie guidance only) annex on this, which includes two possible uses of an index  $I$ , which is the sum of the exposure  $E$  to each substance divided by its OELV.

$$I = E_1/(OELV)_1 + E_2/(OELV)_2 + E_3/(OELV)_3 + \dots$$

The value of the index calculated from this formula is then treated as the exposure, and the overall OELV is treated as 1.0, in applying the Preliminary and Statistical Tests summarised above. One of the approaches specified in the annex applies the formula to substances present “with similar effects or acting on the same target organ”, and this has long been used in Britain and is described in para 91 of HSE guidance EH40/2005. However, the second use of the index is to apply it to all substances present. This

is of course a stricter test, stricter than in HSE guidance. Two other possible approaches are mentioned: using more advanced toxico-kinetic models, and “less conservative approaches”, which will include treating all the substances independently. The Standard says that the appraiser should choose between all of these options, but if all the substances are treated independently, the appraiser should justify this.

Tom Geens and colleagues developed an Excel tool, BWStat, which greatly simplified the task of making the calculations in the BOHS/NVvA guidance (Ingle, 2015), and made application of the guidance much more practicable. Tom is interested in developing BWStat to use with the new EN 689, and would welcome comments to Tom Geens at [tom.geens@provikmo.be](mailto:tom.geens@provikmo.be). BWStat itself can be downloaded from the following link: [www.bsob.be/?q=en/node/67](http://www.bsob.be/?q=en/node/67).

### Other major points in the Standard

I have concentrated in this article on the numerical test of compliance, which is the heart of the Standard, and its most innovative part. There is however a lot more material. An important part is validation of the SEGs. OELVs apply to individual workers. Using SEGs is an inevitable shortcut, but the appraiser must try to ensure that the exposure measurements are representative of all the members. This requires care in setting up the SEGs, in choosing workers for measurement, monitoring the operation by remaining on site (or arranging for this to be done by another trained and experienced person), and recording relevant information. There is another advisory annex on examining the statistical distribution of results within the SEG to see if they are as expected, or whether one or more of the measured workers has exceptional exposure and ought to be in a separate SEG. This

Jose, Roger, and Hans Thore in discussion during a coffee break



examination can only be applied if there are at least 6 measurements. (The BOHS/NVvA guidance, referred to above, included a statistical test of individual compliance, but this required more complicated specification of who was sampled; also the test has been criticised for its imprecision, and hopes that it would be used and validated after publication of the guidance have not been fulfilled. I wrote about this in an earlier Exposure article [Ogden, 2014]. The Standard therefore uses a more pragmatic approach, as described.)

If exposure is found to comply with the OELVs, it must of course be reviewed if there is a significant change of circumstances, and it is expedient to do so from time to time even if there is no visible change. The Standard recommends doing this annually. This does not necessarily involve measurement – the need for a measurement will be included in the assessment. But as a back-up, another advisory annex gives three examples of methods for calculating recommended intervals in which the reassessment ought to include new measurements to test compliance, depending on the level and distribution of the original set of measurement results.

### Will it affect British regulation and guidance?

As a general rule a national or European Standard is only good practice guidance, unless there is a regulation which cites it and says it must be used. For example, there is a Regulation which requires that 13 amp plugs in Britain must comply with the British Standard BS1363. Without such a regulation, BS1369 would have no legal force. The revised EN 689 will have no legal force in Britain.

It seems very unlikely that the HSE will want to endorse the Standard as a whole, but it is to be hoped that it will provide a benchmark of good practice for employers, in particular of the number and level of measurements required to establish with reasonable certainty that an OELV is complied with, and that HSE will take advantage of this. At the moment, the only specific HSE guidance to employers on this question seems to be COSHH Essentials General Guidance G409, *Exposure measurement:*

*Air sampling*, which says “If the results for a given task are below one third of the exposure limit, your controls are probably good enough”. The problem with this is that it does not say how many results should be used to draw this conclusion, and is insufficient as it stands. It would be better to use the specification in the Preliminary Test summarised above, or some other test derived from Grzebyk and Sandino’s (2005) work (see Appendix below).

Unfortunately, in the absence of clear guidance from HSE, many people will continue to want to make just one measurement to check that exposure is below the OELV, and consultants will continue to be pressured to work this way. The idea of taking even three measurements per SEG will be too much. Relying on one measurement is always going to be insecure, in case something unnoticed has gone wrong. Quite apart from that, by the standard of the Preliminary Test, a single result would have to <4% of the OELV to give good confidence that the OELV would not be exceeded if more measurements were made (Table VII of Grzebyk and Sandino, 2005).

...it is to be hoped that [the Standard] will provide a benchmark of good practice for employers...

It will remain the case that a single valid measurement above the OELV must be regarded as non-compliance with COSHH, but the Standard should provide employers and their representatives with an aid to managing exposure so that such a non-compliance is very unlikely.

### Further information

The text of the Standard will not be publicly available until it is finally approved, probably early next year. Meanwhile, you are welcome to address questions to me at [ogden@ogs.org.uk](mailto:ogden@ogs.org.uk).

Kelvin Williams has been giving some much appreciated presentations on statistics at BOHS regional meetings, with help from John Ingle, so if you want to understand more about this, come and hear Kelvin. He is booked for East

Midlands and Yorkshire (at HSL) on 10<sup>th</sup> October, and London, South and South-East on 8<sup>th</sup> November. Keep an eye on the regional meetings programme on the BOHS website under the event listings in the Conferences & Events section.

### Acknowledgements

It has been an honour to represent BOHS and Great Britain on the CEN working group, and I thank BOHS for the opportunity. The BOHS sampling strategy group has provided opinions and comments during the four years of the work, so special thanks to them. They are: (UK) Martin Axon, Adrian Hurst, John Ingle, Andrew Kennedy, Sarah Leeson, Martie van Tongeren; (USA) Martin Harper (with help from Emily Lee); (Belgium) Roger Grosjean, Tom Geens; (Netherlands) Theo Scheffers.

### Appendix: Statistical background to the tests

The variability of exposures can often be represented by a lognormal distribution – Fig 1 illustrates the variability of 177 measurements and a lognormal distribution fitted to the results. Any lognormal distribution is characterised by two variables: the geometric mean (GM) indicates roughly where the centre is, and the geometric standard deviation (GSD) measures the spread of the results about that centre. There are formulae given in the statistical test annex to the Standard which enable you to calculate these parameters for any set of results.

There are physical reasons why a lognormal distribution usually fits exposure data, but there are some circumstances in which a normal distribution gives a better fit, and occasionally others are found. An annex to the Standard gives advice on testing between lognormal and normal distributions, and the Preliminary and Statistical Tests can be used with a normal distribution, but for simplicity I will just discuss the case of the lognormal distribution.

Five percent of 177 is 8.85, so if the 177 measurements were arranged in ascending order the top 5% point (the 95<sup>th</sup> percentile) would be between the 168<sup>th</sup> and the 169<sup>th</sup> measurements – at about 50 µg/m<sup>3</sup> in the Fig 1 example. However, if only half a dozen measurements are available, this

## The Revised European Standard EN 689: Testing Compliance with Exposure Limits | continued

procedure clearly will not work. But you can assume that a lognormal distribution fits the results – you calculate the GM and GSD of your six results, and these are the parameters of your best-fit curve. You can then find where the 95<sup>th</sup> percentile of this best-fit curve would be from standard tables.

However, if you took another half dozen measurements, random variation means that they would not be exactly the same, and would give you a somewhat different estimate of the 95<sup>th</sup> percentile, and a third set would be different again: you are starting to get a distribution of estimates of the 95<sup>th</sup> percentile. There is in fact an upper confidence limit of your estimates – the value below which 95% of estimates of the 95<sup>th</sup> percentile are likely to lie. This is sometimes known as the Upper Tolerance Limit (UTL). From a single set of six measurements you can estimate not only the 95<sup>th</sup> percentile, but also the UTL, and if there are only a few measurements the UTL turns out to be many times the 95<sup>th</sup> percentile. What then should we compare the OELV with? Should it be with a single estimate of the 95<sup>th</sup> percentile, which will be very unreliable, or the UTL, which will be unrealistically high? The answer is, somewhere in between.

The French national research institute on occupational safety and health (INRS) researched this problem to investigate the best approach for comparing a small number of measurements with the OELV (INRS, 2008). If you had a very large number of measurements, then you could calculate the 95<sup>th</sup> percentile accurately, and know the true answer of whether this percentile was above or below the OELV. The INRS workers argued that if you make such a comparison based on a small number of measurements, then just because of random errors, sometimes you will conclude that 95<sup>th</sup> percentile is below the OELV when the true answer is above (false compliance) and sometimes you will conclude that 95<sup>th</sup> percentile is above when the true answer is below (false non-compliance). INRS found by computer simulations that if you make the comparison with a simple estimate

of the 95<sup>th</sup> percentile the number of false compliances exceeds the number of false non-compliances, and if you make the comparison with the UTL then the number of false non-compliances exceeds the number of false compliances. They concluded that the best balance occurs when we make the comparison with the upper 70% confidence limit of the estimates of the 95<sup>th</sup> percentile. This criterion was therefore used by the French regulation on compliance testing, by the BOHS/NVvA guidance referred to above, and now in the new Standard. A fuller summary in English of the INRS work is included in Ogden and Lavoué (2012).

The text of the Standard, which is what really counts, specifies the Statistical Test as: “The test shall measure, with at least 70% confidence, whether less than 5% of exposures in the SEG exceed the OELV”. The calculation method outlined above is in an annex which is only advisory, so other measurement protocols and calculation methods can be used if desired. This structure gives a method which can be applied now, but permits the development of other testing protocols which meet the criterion.

The Preliminary Test is based on earlier work at INRS, by Grzebyk and Sandino (2005). Amongst other things, they considered what would happen if you

took a small number of measurements and compared the maximum result of these with a fraction of the OELV. Can you set a fraction of the OELV which the maximum of a small number of results must not exceed for you to be sure that, say, the 95<sup>th</sup> percentile of a large number of measurements would not exceed the OELV itself? They investigated this by computer simulations for a range of GSDs, and the results are applied in the Preliminary Test to collecting 3, 4 or 5 measurements per SEG.

The first photo is of the Working Group taking a break from its 200 hours of discussions. Members are from various countries and are as follows:

**Austria:** Robert Piringier

**Belgium:** Roger Grosjean\*

**France:** Florence Sallet (French standards organisation, AFNOR, Secretary), Gautier Mater, Martine Chouvet and Raymond Vincent (Convenor)

**Germany:** Christian Schumacher, Gebhard Von Kries and Ralph Hebisch

**Italy:** Bruno Janis and Maria Ilaria Barra

**The Netherlands:** Theo Scheffers\* and Wouter Fransman

**Norway:** Hans Thore Smedbold\*

**Spain:** Jose Luiz Sanz Romeras and Dr Rojo Aparicio

**UK:** Trevor Ogden\*

**CEFIC liaison:** Jan Twisk\*

\*BOHS members (and Wouter is an Assistant Editor of *Annals of Work Exposures and Health*). Photo supplied by Instituto Nacional de Seguridad e Higiene en el Trabajo, Bilbao.



**HELP SHELL TO IMPLEMENT WORKER HEALTH PROTECTION**

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Shell are pleased to announce that we are seeking for an Occupational Hygienist to join our European Hygienist Team.

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## HSE News



### Engineering firm fined after exposing workers to hand-arm vibration syndrome (HAVS)

An engineering firm has been fined for failing to control the risk to employees using hand held power tools from hand-arm vibration syndrome (HAVS).

Manchester and Salford Magistrates heard how Newfield Fabrications Co Ltd (NFCL) failed to ensure the risks to its employees from exposure was adequately controlled. The company also failed to ensure its employees were given sufficient information, instruction and training on the effects of working with vibrating hand tools.

An investigation by the Health and Safety Executive (HSE) found that sometime towards the end of 2015, a welder who had been working at the company for a number of years had been given a job that involved a significant amount of grinding and polishing.

After a number of hours on the task, the

worker began to experience numbness and tingling. He asked to swap with another worker but was told to carry on. Whilst his symptoms continued he was told by his supervisor to carry on using vibrating tools.

A few weeks later, a 20 year old apprentice welder also began to suffer from vibration-related symptoms from using similar tools.

Newfield Fabrications Co Ltd of Sandbach, pleaded guilty to breaching Regulations 6(1) and 8(1) of the Control of Vibration at Work Regulations 2005. The company has been fined £120,000 and ordered to pay £7,241 costs.

### HSE releases annual workplace fatality figures

The Health and Safety Executive (HSE) has released its annual figures for work-related fatalities, as well as the number of people known to have died from the asbestos-related cancer, mesothelioma, in 2015.

The provisional annual data for work-related fatal accidents revealed that 137 workers were fatally injured between April 2016 and March 2017 (a rate of 0.43 per 100,000 workers), the second lowest year on record.

There has been a long-term downward trend in the number of fatal injuries to workers – they have halved over the last 20 years – although in recent years the trend shows signs of leveling.

HSE Chair Martin Temple said: “Every fatality is a tragic event that should not happen. While we are encouraged by this improvement on the previous year, we continue unwaveringly on our mission to prevent injury, death and ill health by protecting people and reducing risks.” The HSE Chair added: “We deal daily with the causes and consequences of work-related deaths, injuries and ill health. Today’s updated figures continue to inform our understanding of which areas we need to target. We concentrate our interventions where we know we can have the biggest impact. We hold dutyholders accountable for managing the risks they create in the workplace. This benefits workers, business performance, the economy and wider society alike.”

Mesothelioma, one of the few work-related diseases where deaths can be counted directly, contracted through past exposure to asbestos killed 2,542 in Great Britain in 2015 compared to 2,519 in 2014. The current figures relating to asbestos-related cancer reflect widespread exposures before 1980. Annual deaths are therefore expected to start to reduce after this current decade.

A fuller assessment of work related ill-health and injuries, drawing on HSE’s full range of data sources, will be provided as part of the annual Health and Safety Statistics release on 1 November 2017.

The company also failed to ensure its employees were given sufficient information, instruction and training on the effects of working with vibrating hand tools

# New Research Shows How Diesel Fumes Damage Our Lungs



As occupational hygienists, you will be aware of concerns about harm to health from diesel engine exhaust emissions.

Now scientists have demonstrated a mechanism by which diesel exhaust particles directly affect the lungs to initiate symptoms associated with asthma.

In a study published in the *Journal of Allergy and Clinical Immunology*<sup>1</sup>, an Imperial College-led research team examined the effect of particles in diesel fumes on lung tissue.

These particles – also known as the soot content – can account for 60% to 80% of the exhaust fumes. The precise amount will depend on fuel and engine type.

The study found that while the core of the particles is composed of carbon, the surface has a layer of polycyclic aromatic hydrocarbons (PAHs). This layer is particularly hazardous.

Because the particles are so small, they trick the body into thinking they are non-hazardous molecules when entering the lungs. Once in the lungs, they trip nerve

receptors and cause them to misfire. In turn, this can cause asthma attacks, breathlessness and coughing. While it affects people with pre-existing respiratory conditions more, it still has an impact on anyone who breathes them in.

## 40,000 Deaths Per Year – More Must be Done

Even before this research, air pollution has been attributed to causing up to 40,000 deaths in the UK per year. Exposure to vehicle exhaust fumes is known to heighten the risk of cancer.

## Diesel Fumes in the Workplace

Many workplaces will be especially prone to the effects of diesel fumes. When diesel engines are running in buildings, the restricted space means limited dilution of the fumes can occur. Diesel engines will also be producing more harmful substances whilst they are running cold, as opposed to once they have had a chance to warm up on the road and this must be accounted for in the protective measures.

If proper local exhaust ventilation (LEV) is not in place, workers will be exposed to diesel fumes at much higher levels. This potentially puts lives at risk and opens up the risk of prosecution to employers from the Health and Safety Executive (HSE). So, any exposure must be reduced to a level that is ALARP (As Low As Reasonably Practicable).

## Workplaces at Heightened Risk from Diesel Fumes

The types of workplaces that may at extra risk from diesel fumes include:

- Garages and car dealerships
- MOT bays and car servicing workshops
- Railway engine sheds
- Airports
- Fire stations
- Military installations and repair shops

## How Can Workplaces be Protected from the Harmful Effects of Diesel Fumes?

It is the legal responsibility of the employer to mitigate the serious risks of diesel fumes. This obligation is governed by the Control of Substances Hazardous to Health Regulations 2002 (COSHH).

Under COSHH, the employer must undertake a risk assessment relating to the diesel fumes (and any other hazardous substances) and either prevent or adequately control the risk. If they cannot be eliminated, fumes should be captured at source using suitable LEV. This kind of solution could involve:

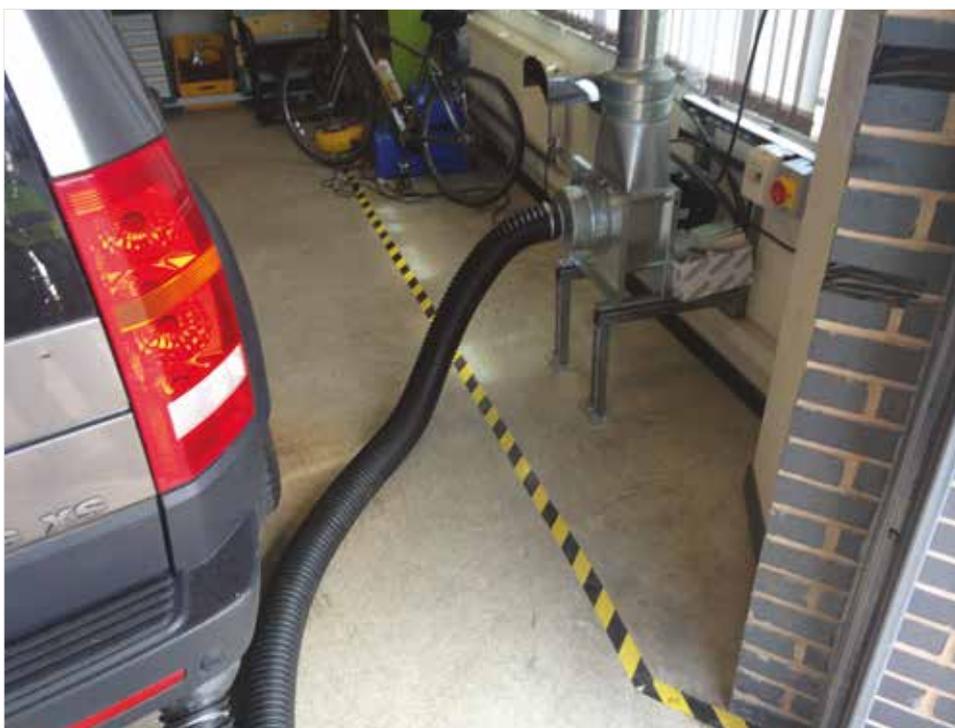
- Rail systems
- Exhaust hose reels
- Simple flexible hose systems

Other times, something unique to a premises may be required.

It is also important that once captured the emissions are discharged to a safe place where they do not re-enter the building or other neighbouring buildings. Typically, this is via a discharge stack terminating vertically at high velocity (>15m/sec) at least 3m above the building (anything within a 5m radius) so that it penetrates the building boundary layer.

#### Experts in Diesel Fume Extraction

People who work in an environment where they are exposed to diesel fumes face potential health risks if the fumes are not extracted properly. This new research only goes to demonstrate the dangers further.



Vent Tech are one of the UK's most respected LEV specialists, and are expert in designing and installing ventilation systems that remove harmful diesel fumes. If you would like to find out more about how we can help you or your clients, or to get a quote, call the team on 0117 971 2163.

Note: Adrian Sims (CEng. BSc. (Hons) CoC

(Control) MFOH(S) MILEVE MIPlantE.) is the Managing Director of Vent-Tech Ltd. Adrian also sits on the ILEVE steering committee as well as delivering BOHS LEV training.

<sup>1</sup> 'Mechanistic link between diesel exhaust particles and respiratory reflexes' by Robinson, R.K. et al is published in the Journal of Allergy and Clinical Immunology

## Save the Dates!

### BOHS Events

#### September 2017

- 19: Breathe Freely in Manufacturing Roadshow, Glasgow
- 21: Breathe Freely in Construction Roadshow, Bristol
- 22: Northern Ireland Regional Meeting, Belfast
- 25-27: IPXII, Glasgow
- 27: London, South & South East Regional Meeting, London

#### October

- 10: Northern Ireland Regional Meeting, Belfast
- 11: Asbestos Roadshow, London
- 11: FAAM Launch, London
- 18: Asbestos Roadshow, Glasgow
- 19: Breathe Freely in Manufacturing Roadshow, Birmingham
- 26: Joint CIA/BOHS event, Leeds
- 27: Breathe Freely in Construction Roadshow, Edinburgh
- 31: Asbestos Roadshow, Cardiff

#### November

- 2: Breathe Freely in Manufacturing Roadshow, Middlesbrough
- 6: Asbestos Roadshow, Manchester
- 15: Breathe Freely in Construction Roadshow, London

#### December

- 5: Northern Ireland Regional Meeting, Belfast

#### April 2018

- 16-19: OH2018, Stratford-upon-Avon

### Non-BOHS Events

#### September 2017

- 14: IOSH National Safety and Health Conference, Nottingham
- 21: Image of Construction, Birmingham

#### October

- 4: British Safety Council Annual Conference, London
- 10-11: Health & Safety North 2017, Manchester
- 19: Trent Occupational Medicine Annual Symposium, Nottingham

#### November

- 8: Asbestos: The Truth, Manchester
- 20-21: IOSH 2017, Birmingham
- 22: Workplace Healthy Lungs Summit, London

KEY BOHS DATES

<p>September</p> <p>Tuesday</p> <p><b>19</b></p> <p>2017</p>	<p>September</p> <p>Monday</p> <p><b>25</b></p> <p>2017</p>	<p>October</p> <p>Wednesday</p> <p><b>11</b></p> <p>2017</p>
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First Breathe Freely in Manufacturing Roadshow

IPXII

FAAM Launch

General Updates | Shani Jackson, General Manager (Interim)



decided to move on to new pastures and will be leaving BOHS in August; Paul has had a huge impact on the BOHS Qualifications business since his arrival in 2012 and will be sorely missed, not only for his expertise in education and qualification but also for his dry sense of humour and endless patience. The recruitment process to find a new member of the senior management team to lead this area of the organisation has started and we will keep you updated as this progresses.

**Delivering strategic projects and FAAM**

As I mentioned, the team at Head Office are focusing very much on the delivery of some key strategic projects this year, namely FAAM, CCHRC and *Breathe Freely*. Articles in this issue by Evi Karmou, Caroline Smith and Natalie Horton explain the progress of CCHRC and *Breathe Freely*, so I won't go into these too much, but I will take a moment to update you all on progress with FAAM.

The support from members at the AGM in April this year to amend the wording of our Charter and Bylaws to enable the development of specialist faculties, and in particular the agreement to commence with the establishment of FAAM has triggered a great deal of activity at Head Office. As well as being required to further seek formal approval from the Privy Council on the changes (which was gratefully received and signed at Buckingham Palace on 19th July!), the team have been beavering away working through the long list of actions on our project plan including planning our launch event, creating faculty documentation like the Handbook and CPD Guide, writing content for the website and designing process flows for the computer system. We're looking forward to welcoming media and VIPs to the FAAM launch event on Wednesday 11th October 2017 which will mark the day that FAAM opens its doors for membership applications. The introduction of FAAM is a significant milestone for BOHS as it marks the first big step towards the creation of an 'umbrella' model, which will enable BOHS to expand its reach in

worker health protection through specialist professions too.

**Asbestos roadshows**

To coincide with the launch, we're also planning a series of Asbestos Roadshows around the UK which will reflect a number of changes and developments in the industry. The Roadshows are key for anyone who wants to find out about BOHS' new Faculty of Asbestos Assessment and Management, along with the latest developments for the duty to manage, plus the HSE's Analyst programme. Bookings are now open on the BOHS website for these one day events, and as usual, BOHS members are eligible for the discounted rate.

- 11 October, Holiday Inn London – Wembley
- 18 October, The Studio Glasgow
- 31 October, Mercure Cardiff Holland House Hotel
- 6 November, The Studio Manchester

**Head office round-up**

As well as the delivery of strategic projects and the focus on recruitment over the next few months, it's also the time of the year where the budget managers commence planning for 2018, which we aim to present at the Council meeting in November for approval. The team will become best friends with Microsoft Excel through this process, I'm sure! It's always an exciting time for me, as it involves setting our sights on the next set of goals for the Society and thinking through what and how can achieve them.

With the announcement in June that Steve Perkins was stepping down from his post as CEO, I was asked by our Council to take on some additional responsibilities to help bridge the gap in leadership whilst they embark on the process of recruiting a new CEO for the Society. I've accepted the challenge and am now working with all the teams at Head Office to ensure that we continue to focus on delivering the planned strategic projects for this year whilst also maintaining our usual business of qualifications, membership and conferences. Whilst at first the task seemed quite daunting, I'm relishing the chance to support BOHS' progress as we prepare for our new phase of leadership.

**The management team**

As well as the announcement by Steve earlier this year, there have also been some other changes to our management team. We warmly welcomed Evi Karmou as Head of Communications and Marketing during May this year. Evi has settled in very well to the organisation and has already got her teeth into the *Breathe Freely* campaign and the launch of the new Controlling Health Risks in Construction course, as well as working closely with Caroline and Michelle in the team to develop plans for the marketing of our core activities. We've also received the news that Paul Johnson has



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# IPXII

## Inhaled Particles XII

25 - 27 September **2017**  
Glasgow Marriott Hotel

### Bookings open

**Bookings are now open for Inhaled Particles XII (IPXII) the latest in a long line of highly successful and prestigious international conferences and meetings organised by the British Occupational Hygiene Society (BOHS). It is the oldest ongoing symposium series on the adverse health effects of inhaled particles.**

The first Inhaled Particles conference was held in Oxford in 1960 and over the next 50 or so years the meetings have been successful at attracting leaders and students in all of the scientific disciplines associated with particle-related disease.

### Delegate rates

Delegate Rates	Full Conference	Early Bird*
BOHS Member	<b>£450</b>	<b>£400</b>
Non-member	<b>£550</b>	<b>£500</b>
Speaker	<b>£350</b>	
BOHS Student Member	<b>£300</b>	

\*Early bird rates end on 31 July 2017

### Exhibitor packages

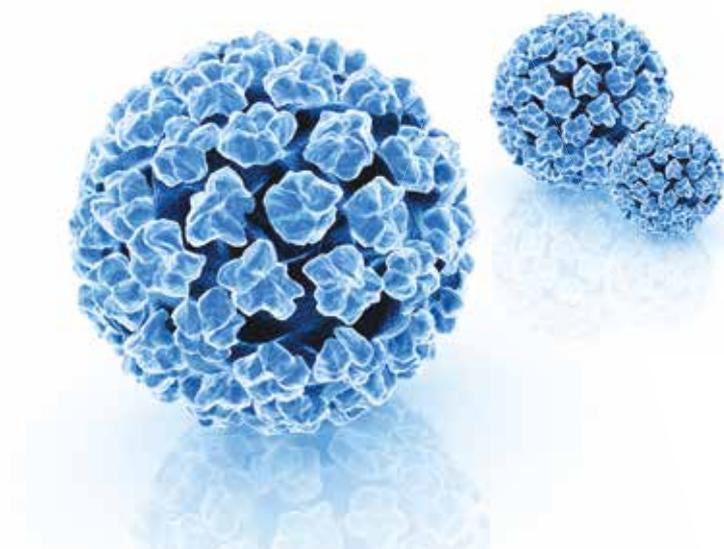
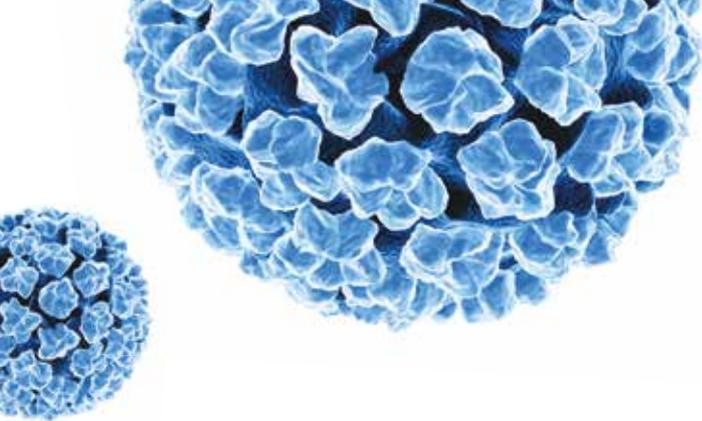
Stand package	£1,000
<ul style="list-style-type: none"> <li>• 3 x 2m shell space</li> <li>• One delegate place including entry to all conference sessions and daytime refreshments</li> <li>• Logo and company profile in the conference programme</li> <li>• Logo and link from the IPXII website to your own</li> <li>• Logo on holding slides throughout the conference</li> </ul>	

### Sponsorship opportunities

• Sponsorship of the conference dinner	<b>£2,000</b>
• Advert in the conference programme	<b>£500</b>
• A5 or A4 single sheet Insert into delegate bags	<b>£500</b>
• Branding of delegate bags	<b>SOLD</b>

All prices are subject to UK VAT currently at 20%.

**To view the preliminary programme, for more details about sponsoring and exhibiting or to book your place visit [www.inhaledparticles.org](http://www.inhaledparticles.org)**



## Qualifications Updates | Natalie Horton, Qualifications Project Manager



In the meantime we are continuing to branch out overseas, and as I write this we are preparing to launch another international asbestos proficiency qualification for asbestos fibre counting analysts. We've also received demand for international LEV qualifications, to help implement good working practice in countries which do not yet have legal requirements in place for maintaining and testing LEV systems. We are starting with developing an international version of the P601 qualification, which we aim to pilot later this year.

Another big opportunity for us at the moment is developing a series of 'asbestos in soils' qualifications. We're currently working on a P408 soil analysis qualification for asbestos analysts, which will be the first qualification of its kind available to the industry. It teaches students how to safely identify and quantify asbestos in soil using microscope analysis methods.

With the new Faculty for Asbestos Assessment and Management (FAAM) preparing for launch in October, and P408 due to follow shortly after, it's an exciting time for BOHS within the asbestos industry!

As a longer-term project, we are also identifying potential training gaps in order for us to develop occupational hygiene courses which meet the requirements of specific job roles. BOHS offers a number of technical qualifications for occupational hygienists, asbestos practitioners, LEV technicians and legionella consultants; however, these qualifications may not always be suitable for job roles which only require a small amount of occupational hygiene knowledge to do the day-to-day job. This could span from leisure centre managers who are responsible for managing legionella risk in their premises, to building managers who have a duty to manage asbestos. We are working closely with people who understand these roles to develop suitable courses and qualifications which meet these specific training needs.

Finally, I'll close this with a team update. We are sorry to say goodbye to our Head

of Qualifications Paul Johnson, who has managed the Qualifications Team for over five years. Under Paul's leadership, both the team and our qualifications portfolio has grown and expanded hugely, and he has helped to build strong working relationships with both training providers and industry professionals. Paul has also played a crucial role in a number of projects, including the development of international asbestos proficiency qualifications, the CCHRC course and major re-structuring of our Proficiency qualifications and written examinations.

Paul is leaving for pastures new within the qualifications industry (and will enjoy a much shorter commute to work!) We wish him all the best in his new role.

### Paul's words

It has been a tremendous pleasure and a hugely enjoyable challenge working for BOHS over the last five years. We have achieved so much together and I am confident that the future is very bright indeed. My successor will inherit a great team which simply gets on with doing its very best for the candidates and training providers every day.

I have worked with and met many terrific people but a special mention goes to those who have been with me every step of the way, providing exceptional support, advice and good humour. Thank you to John Lyons, Colette Willoughby, Ian Kellie, Dave Proctor and Shaster Arif. I couldn't have wished for better colleagues.



After a lot of eager anticipation, we are delighted to announce that the Certificate in Controlling Health Risks in Construction (CCHRC) course is now available for booking!

CCHRC is a unique one day course aimed at site supervisors and site managers, which focuses on the 'health' side of health and safety. It teaches how to identify the common health hazards on construction sites, what their ill health effects are, and how to control these hazards to a standard which protects worker health.

It's also a unique product development for BOHS in that it is the first course that we have designed as an 'off-the-shelf' product, where we also provide the training materials for tutors to deliver the course with. Construction companies have the choice of either sending their employees onto a pre-booked course with a BOHS approved training provider, or applying to become a training provider themselves and delivering the course to their own staff in-house.

Since its launch in July, CCHRC has generated a lot of interest within the construction industry, for training providers and candidates alike. We expect to see a lot of course dates coming up on our website over the next few weeks, so watch this space!

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## Communications and Marketing Updates | Evi Karmou, Head of Communications and Marketing



A big hello from me to all our *Exposure* readers who have been supporting BOHS all these years.

Most of you would not know me, as I recently took over the Marketing and Communications department from Sharon, who has now launched her own consulting business. I am very thankful Sharon decided to stay on board a bit longer to assist me during the transitional period.

I wish Sharon all the best with her new endeavour. She has done an exquisite job leading her team through a period of exciting changes and projects for BOHS. I am honoured and excited to be part of the team.

### Who am I do I hear you say?

I am a professional marketer with a weird sense of humour and a soft spot for charity organisations. Originally from Greece, I wanted to make a difference in the world, so I decided to leave home 11 years ago to do a Master's in Public Relations at Bournemouth University.

For over 9 years, I worked in various marketing roles in the hospitality industry in London. I absolutely adore

the hospitality industry and I gained very valuable experiences and knowledge which allowed me to grow personally and professionally. However, I've always had that nagging feeling I wasn't contributing to people's lives.

And then the position of Head of Communications and Marketing at BOHS came up and I applied immediately. When I entered the BOHS offices it felt like home. I was taken aback by the friendly, positive, professional attitude of my future colleagues. Needless to say when I got offered the job, I was jumping up and down with joy. And here I am!

### CCHRC

I am very excited to announce that the Certificate in Controlling Health Risks Construction has now launched and course dates are now live. The course has been specifically designed to provide training to anyone who has a functional responsibility for controlling health risks on a construction site, such as site supervisors and site managers, to ensure that relevant personnel are trained to better recognise and control workplace hazards and health risks.

This is a unique course to BOHS, tailored to the construction industry. Only one-

day, including two hours of online learning, it covers the important basics of control of health risks in the construction sector.

If you are working in construction, CCHRC is the go-to course for training in controlling health risks.

More information can be found on the BOHS website or simply email [qualifications@bohs.org](mailto:qualifications@bohs.org).

### *Breathe Freely*

I am very excited about the new phase of our *Breathe Freely* campaigns.

We have recently launched a new series of breakfast roadshows for the *Breathe Freely in Construction* campaign, sponsored by RVT Group. These roadshows are following a different format to the original ones and include an interactive section where best practice examples and case studies are being shared by the delegates.

This is a real chance to help shape the future of the campaign, but also share knowledge and experience with similar professionals.

In May 2017, the *Breathe Freely in Manufacturing* campaign officially launched at EEF London headquarters. This new initiative - run in partnership with EEF, HSE, TWI, TUC, JCB, Toyota and BAE Systems - focuses on preventing occupational lung disease in the manufacturing sector, and especially in welding. The event was attended by approximately 70 people, with the President of BOHS, Karen Bufton, introducing presentations from Dame Judith Hackitt (Chair of EEF), Martin Temple (Chair of HSE), Dr David Fishwick (HSL's Chief Medical Officer) and Mike Slater, Past-President of BOHS.

A series of breakfast roadshows are taking place this autumn throughout the UK, sponsored by EEF and SKC.

Do check [www.breathefreely.org.uk](http://www.breathefreely.org.uk) for more information on the campaigns, our new roadshows and how you can get involved.

# Simplify Your Sound and Noise Monitoring



The following article is an advertorial from Shawcity

We all understand the risks associated with sound and noise at work – permanent and disabling hearing damage caused by exposure over time or by sudden, extreme noises. Following HSE guidelines, a risk assessment is often required to identify what actions and planning may be required.

However, customer feedback indicates that assessors are often reluctant to use their existing monitoring equipment for a number of reasons. It may have been procured by another colleague and be unfamiliar technology or, perhaps surprisingly, it may actually be too complex for the job in hand.



NI-100 Noise Indicator

SV104 IS

EDGE 5

SD-200

SE-401-IS

SE-401

SVAN 971

Sound Pro

Some older instruments can offer too much functionality, over-complicating the task and making data harder to interpret. Advances in technology means there are now more options than ever and some of the newer, simplified technology is more than adequate for certain applications.

Shawcity offers a wide range of independently-sourced sound and noise monitors from simple decibel indicators right through to full octave band analysis instruments. Our team will talk through your requirements and help you identify the right tool for the job from a range of options. You can buy, hire or even 'try before you buy' to make sure the instrument is right for you.

We also offer trade-in deals against your old equipment and will even recycle it for you.

Contact the team on Tel: **01367 899565**  
or email: **solutions@shawcity.co.uk**  
for more information or to request a quote.

**Trade-in deals  
available**

## Meet the Member: Evi Karmou

### Current job title and organisation for which you work?

Head of Communications and Marketing, British Occupational Hygiene Society

### What A-levels and first degree did you take?

As I am originally from Greece, I went through the Greek educational system. I guess the equivalent of A-levels would be the exams Greek pupils sit in third year of lyceum. During the last two years of lyceum, Greek students select a 'direction' depending on the profession they want to follow. The three 'directions' are: theoretical – law, philosophy, literature, psychology studies; positive – chemistry, maths, medical studies; technological – accounting, marketing, business studies. I chose to follow the theoretical direction, which included ancient Greek, Latin, history and literature, as I wanted to study psychology. In case I didn't succeed, I added a choice course, which was economics.

Before submitting my university choices, I met a marketing lecturer and my world changed completely. I chose to study Marketing & Communications at Athens University of Economics and Business, the top university in marketing studies in Greece.

After obtaining my BSc in Marketing & Communications, I moved to the UK and obtained an MA in Public Relations Practice from Bournemouth University. I've been in the UK since 25 September 2006!

### What was the first job you got when you finished your full-time education?

My first job was Marketing Assistant at Unique Vacations Ltd; a hotel company that has luxurious all-inclusive resorts in the Caribbean. Since then I've worked in various marketing roles giving me good all-round marketing knowledge.

### When and why did you join BOHS?

Since I've started my career in marketing, I've always worked in hospitality-related roles. However, I've always had a soft spot for non-profit organisations; my MA thesis focused on the issue and lack of awareness of

domestic violence in Greece.

After years of working in hospitality, I felt I wasn't contributing much to society, at least not the way I wanted. When the position of Head of Communications and Marketing opened at BOHS, I immediately applied. Being part of the BOHS team gives me the unique chance to make a real difference in people's lives, by addressing issues that affect workers' health. This has been a dream job for me and I am very proud I have joined the team.

### Describe a typical day in your work

Let me just say that no day starts without coffee! I am Greek; I think that says it all...

There is no typical day at BOHS headquarters. My team is focusing on four main projects at the moment, including our *Breathe Freely* campaigns in manufacturing and construction, the launch of our brand new construction course, CCHRC, and the launch of FAAM.

It is great to be working together with all the teams in the office, including Qualifications, Events and Membership, to achieve BOHS' goals. Every team member is passionate about occupational hygiene with great care for their profession and that shows through the quality of their work.

### How did you get your current job?

At the end of 2016, I decided I needed a life change. After nine years of living in London, I found the life hectic, impersonal and exhausting. That's when I decided to move to the East Midlands. I had a soft spot for Nottingham, as my sister studied law there in 2003, and I had a few friends in the area. I was so happy when I saw the position being advertised. I didn't lose any time and applied immediately. A position in an organisation I admired and truly believed in, in my dream area; could it happen?

When I got *the* call from Sharon, I was in Greece visiting my family. I was, jumping up and down outside Vasilopoulos supermarket whilst my parents were looking at me with awe or embarrassment. Probably, the latter.

### What do you enjoy doing when you're not working?

Eating chocolate. Seriously, if I could eat chocolate all day without the fear of clogging my arteries or becoming obese, I would absolutely do it. I recently rediscovered yoga and some very intriguing crystal and reiki shops. Oh, and I just started ice-skating lessons. Despite the embarrassment of falling in front of primary school kids who are pros, I am determined to finish the course.

### Football or rugby (and which team)?

Ballet? Despite Greeks loving football, I do not follow neither football nor rugby.

### Where did you last go on holiday?

As my family lives in a seaside village in Southern Greece, I usually go there for holidays. Holidays in Greece usually include visiting doctors, dentists, endocrinologists, ophthalmologists, any doctor under the sun, grandparents, uncles and aunts, nephews and nieces, and if you have time, a bit of relaxing by the sea!

### Cat or dog?

My dream pet is a golden retriever.

### Favourite film?

Dirty Dancing! Oh, how I wish I had those moves. This year, it's been 30 years since the film was released.

### What was the last music album you bought?

I usually download songs, so I haven't bought a specific album in a long time. I do remember my first one - Celine Dion, *Falling Into You*. I was 13 years old; she's been my ever idol since.

### Favourite Book?

The LZR-1143 *Zombie Apocalypse Series*. I'm into zombie, post-apocalyptic genre. Gotcha!

### We're on social media!

**LinkedIn:** BOHS -  
The Chartered Society for  
Worker Health Protection  
**Twitter:** @BOHSworld  
**YouTube:** BOHS Video  
**Facebook:** BOHSWorld



## STRATFORD- UPON-AVON

The Premier Conference for  
Occupational Hygiene in the UK

16-19 April 2018  
Crowne Plaza  
Stratford-upon-Avon

We welcome papers on any aspect of occupational hygiene, worker health protection and occupational / environmental health but are especially keen to see papers covering topics in the following areas:

- **Occupational hygiene/health good practice**  
Practical workplace experiences  
Methods to assess and control risk
- **Physical agents**
- **Risk management strategies**
- **Human factors and behavioural science**
- **Controls**
- **Exposure science**
- **Future workplace hazards and emerging risks**
- **Chemical safety**  
Regulation & product stewardship  
Emergency/Incident management
- **Ergonomics and MSDs**
- **Legal compliance and best practice**  
(Regulations, ACOPs and standards)
- **EMF case studies**



### Types of submissions



#### Workshops

Designed to be interactive with a good degree of audience participation, workshops provide an ideal opportunity to discuss emerging hygiene issues and/or develop participants' skills. Those willing to initiate and facilitate a workshop are encouraged to submit an outline proposal via the abstracts submission process using the Workshop Submission Form. Usually 75-90 minutes.

**Submission deadline**  
13 October 2017



#### Practical Experiences in the Workplace/ Case Studies

Usually 10 minutes plus limited time for questions. Intended to be short, informal talks illustrating real world problems and how they were solved.

**Submission deadline**  
13 October 2017



#### Platform Technical Presentations

Professional practice or scientific research based presentations. Usually 15-20 minutes plus limited time for questions.

**Submission deadline**  
13 October 2017



#### Scientific Posters

Posters are especially suited to reporting small studies, preliminary findings or projects with large data sets that are difficult to display in oral presentations. Posters must be on display for the duration of the conference.

**Submission deadline**  
28 February 2018



#### IGNITE

Not for the faint hearted; IGNITE gives presenters the opportunity to deliver a 5 minute session on any suitable topic with a slide deck of 20 slides that auto advance every 15 seconds. The results are memorable.

**Submission deadline**  
28 February 2018

**Submit your abstract online at [www.oh-2018.com](http://www.oh-2018.com)**

**For further information visit [www.oh-2018.com](http://www.oh-2018.com) or email [conferences@bohs.org](mailto:conferences@bohs.org)**

### Speaker concessions

BOHS will continue to offer speakers and poster presenters one free day's attendance at the conference. If one or more of your submissions are successful, you will be entitled to the following:

**Free attendance on the day you are presenting\***

**OR**

**If you wish to attend the full conference we have a discounted rate specifically for speakers, bookable from August via the website.**

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Remember, all presenters are entitled to an extra two CPD points, in addition to those gained from attending the conference as a delegate.

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# OH2018

## STRATFORD- UPON-AVON

The Premier Conference for  
Occupational Hygiene in the UK

**16-19 April 2018**

**Crowne Plaza  
Stratford-upon-Avon**

### Welcome to OH2018

Occupational Hygiene 2018 is the leading international conference in the field of worker health protection in the UK, focussing on occupational hygiene and the prevention of occupational ill-health and disease.

Following on from the success of OH2017 which brought together a global audience of over 330 delegates, BOHS will once again be delivering an exciting programme which combines inspiring and thought-leading plenary sessions with scientific and technical sessions as well as a range of interactive workshops and case studies.

The conference will bring together researchers, practitioners, regulators and other experts from around the world to discuss the very latest in issues that affect health at work.

The location for this conference is Stratford-upon-Avon, a historic town in the heart of England, and the birthplace of William Shakespeare.

See overleaf for more details.

**Submit your abstract online at [www.oh-2018.com](http://www.oh-2018.com)**

**For further information visit [www.oh-2018.com](http://www.oh-2018.com) or email [conferences@bohs.org](mailto:conferences@bohs.org)**

