www.hazardex-event.co.uk

hazardex 2021 incorporating PPTeX

6th & 7th Oct • Harrogate • Yorkshire • UK

PROTECTING PLANT, PROCESS & PERSONNEL

EXHIBITION VISITOR

VISIT THE EXHIBITION AT HAZARDEX 2021 AND BENEFIT FROM ACCESS TO THE LATEST PRODUCTS WHEN YOU PRE-REGISTER

OPENING TIMES

Wednesday 6th October 2021
09:00 - 18:00

Thursday 7th October 2021
09:00 - 15:30

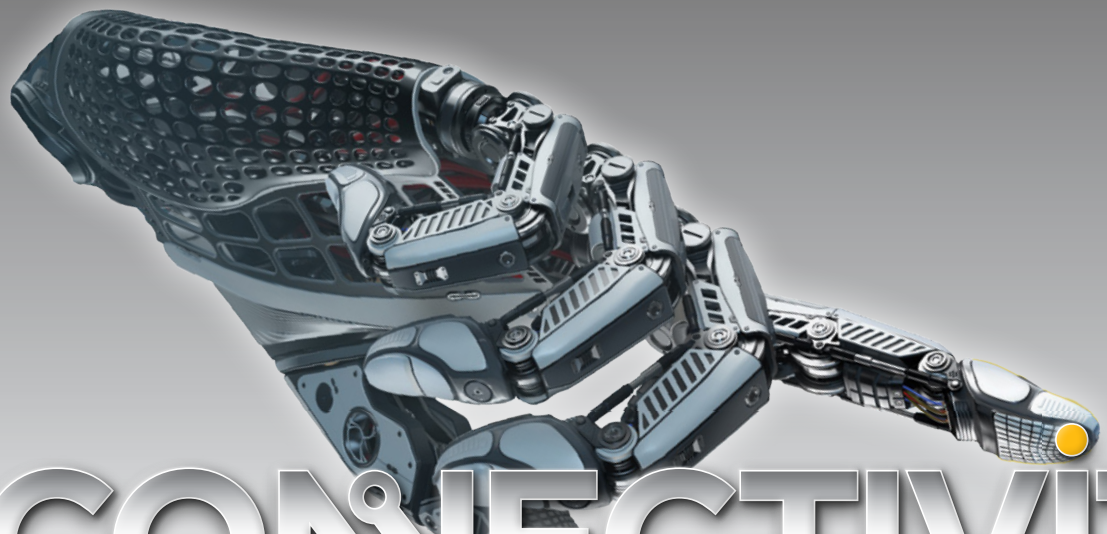
IN ASSOCIATION WITH:

Chemical Business Association
Cogent skills for science industries
CompEx Part of the JTL Group
Connectivity
HSE Health & Safety Executive
IECEx
InstMC
IChemE Safety Centre
nepic
TSA
UKPIA United Kingdom Petroleum Industry Association

HARROGATE, YORKSHIRE, UK

www.hazardex-event.co.uk

06|10|21
07|10|21



CONNECTIVITY

Understanding the Fourth Industrial Revolution

Everything you need to know about how to get the best out of Industry 4.0 and the Industrial Internet of Things

Visit the website and subscribe to our newsletter

Website: http://www.connectivity4ir.co.uk/
Twitter: @connectivity4IR

CONNECTIVITY

hazardex 2021 incorporating PPTex

6th & 7th Oct • Harrogate • Yorkshire • UK

Hazardex Conference & Exhibition 2021

The essential business forum for everyone involved in the safe and efficient operation of hazardous area plant and equipment

Editorial Notes

These notes contain details of the papers presented at the Hazardex 2021 Conference, held at the Majestic Hotel, Harrogate, UK on October 6 & 7, 2021.

Each author has supplied the organisers with a biographical profile and a summary of the paper.

The views expressed in these papers are those of the authors and do not necessarily represent the views of either IML Group plc or any of the Event Sponsors. Copyright for each paper is retained by the author and IML Group, and any reproduction is prohibited without their prior written consent.

These notes also contain essential background information on the accompanying exhibition, including a floorplan for the event and exhibitor details.

The Hazardex 2021 event also features conference papers and exhibition stands dedicated to Personnel Protective Technologies (PPTex) – equipment incorporating electronic and technological systems that the user can wear, hold, or use to minimise hazards at work.

Please take some time during the event to visit exhibitors.

We hope you enjoy Hazardex 2021!
...the Hazardex team

Russell Goater
Publisher & Event Director
russell.goater@imlgroup.co.uk

Alistair Hookway
Editor & Event Content Manager
alistair.hookway@imlgroup.co.uk

Hazardex Events
IML Group
Blair House
High Street
Tonbridge
Kent TN9 1BQ
United Kingdom

Tel: +44 (0) 1732 359990
Email: events@imlgroup.co.uk
Web: www.hazardex-event.co.uk

hazardex 2021 incorporating PPTeX

6th & 7th Oct • Harrogate • Yorkshire • UK

Welcome to Hazardex 2021!

To make your participation at Hazardex as easy as possible, we have compiled the following information which covers basic hotel, venue and event details. For any further information, speak to the organisers at the Conference Reception Desk. Please enjoy the exhibition and we wish you a successful and useful conference.

Event Venue: Majestic Hotel, Ripon Road, Harrogate, HG1 2HU, United Kingdom
Hotel reception Tel: +44 (0) 1423 700300

Exhibition and Conference The Exhibition will be taking place in the hotel's **Carriage Suite**.
Conference Venues: Stream 1 will be taking place in the **Ballroom** and Conference Stream 2 will be in the **Reading Room**.

Gala Awards Dinner: The dress code for the Gala Dinner is business suit or relaxed formal (ties optional). The drinks reception will be held in the **Regency Suite** from 18:30. Dinner will commence at 19:30 in the **Ballroom** (Conference Stream 1 room).

Products & Services: Please take time to view the Exhibition during your lunch and refreshment breaks. The companies represented are all leading suppliers of equipment and services for hazardous areas and should be able to assist you with any query you may have. Exhibitor contact details can be found at the back of this Conference Pack.

Check-In: You will be able to check into your room any time from **15:00** on the day of arrival. A swipe of your credit card will be taken upon checking-in, so that any extras can be charged to your room and settled upon departure.

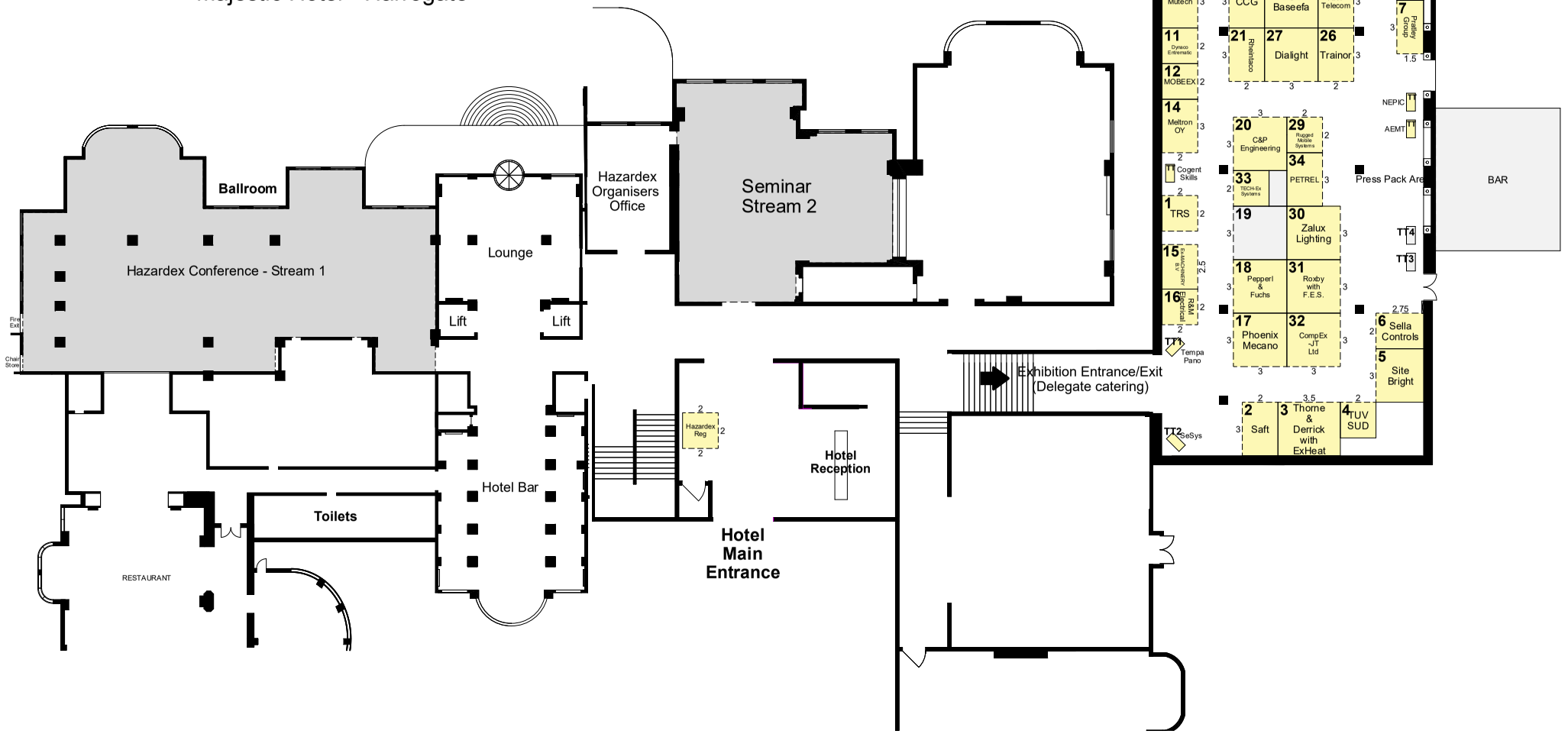
Check-Out: All guests must vacate their hotel rooms during the morning of October 7 (or day of departure) by **11:00**. Any extra costs must be settled with your hotel upon departure. Please leave sufficient time to check out as it may be very busy and could reduce your time in conference.

Taxis: These can be ordered from the Main Reception of the hotel.

hazardex 2021 incorporating PPTeX

6th & 7th Oct • Harrogate • Yorkshire • UK

Majestic Hotel - Harrogate



Stand #	Exhibitor	Stand #	Exhibitor	Stand #	Exhibitor	Stand #	Exhibitor
TT1	Tempa Pano	4	TUV SD	14	Meltron	25	ANT Telecom
TT2	SeSys	5	Site Bright	15	Ex-Machinery	26	Trainor
TT	Cogent Skills	6	Sella Controls	16	R&M Electrical	27	Dialight
TT	AEMT	7	Pratley Electrical	17	Phoenix Mecano	29	Rugged Mobile Solutions
TT	NEPIC	8	Link Instruments	18	Pepperl+Fuchs	30	Zalux Lighting
1	Total Rental Solutions	9	Exloc	20	C&P Engineering	31	Roxby with F.E.S
2	Saft	10	Mutech	21	Rheintacho	32	CompEx Certification Ltd
3	Thorne & Derrick	11	Dynaco	22	CCG	33	Tech-Ex Systems
3	EXHEAT	12	Mobexx	23	SGS Baseefa	34	Petrel

hazardex 2021 incorporating PPTeX
6th & 7th Oct • Harrogate • Yorkshire • UK

HAZARDEX 2021 – PROTECTING PLANT, PROCESS & PERSONNEL

Running order subject to change
Check www.hazardex-event.co.uk for the latest updates

HAZARDEX CONFERENCE 2021 – DAY 1

Stream 1 – Chair: Dr Zsuzsanna Gyenes, Deputy to the Director – IChemE Safety Centre
Main conference room (Yellow badge holders only)

08:00 – 09:20: Registration & Refreshments

Day 1, Morning – Keynotes

09:20 – 09:30: Chair's introduction

09:30 – 10:10: **Simon Wood, Environment, Health & Safety Specialist – UK Petroleum Industry Association (UKPIA)**
An enabling regulatory framework to deliver Net Zero
10:10 – 10:50: **Tim Doggett, CEO & Douglas Leech, Technical Director – Chemical Business Association (CBA)**
Chemical safety, storage, regulations, and warehousing

10:50 – 11:30: Refreshments, Networking, & Exhibition Viewing

11:30 – 12:10: **Dil Wetherill, Managing Director – Method Functional Safety**
What's coming in IEC 61511 Edition 3
12:10 – 12:50: **Colin Cameron, Managing Director – Mutech Limited**
New edition of IEC 60079-11 Intrinsically Safe Equipment Standard

12:50 – 13:55: Lunch, networking & exhibition viewing

Day 1, Afternoon

14:00 – 14:40: **Mark Walker, Vice President – DEKRA UK**
Creating a culture of care
14:40 – 15:20: **Prof. Dr. Thorsten Arnhold, VP Technology – R. STAHL**
Explosion protection of hydrogen installations

15:20 – 16:00: Refreshments, Networking, & Exhibition Viewing

16:00 – 16:40: **Neil Smith, Head of Workforce Development – Cogent Skills**
What is the 'golden thread' that links human factors, competence, and compliance problems and solutions?
16:40 – 17:20: **Andrew Vincent, Associate Partner – Instinctif Partners**
Crisis communications: from fire to front page

Stream 2 – Chair: Ron Bell OBE, Technical Consultant and Advisor – Engineering Safety Consultants
Seminar room (access open to all registered attendees)

08:00 – 11:20: Registration, Refreshments, & Exhibition Viewing

Day 1, Morning

11:20 – 11:30: Chair's introduction

11:30 – 12:10: **: Karl Metcalfe, Technical Advisor & Ex Trainer – Association of Electrical & Mechanical Trades (AEMT)**
Taking responsibility for repairs to Ex rated machinery
12:10 – 12:50: **Robert Magraw, Operations Manager – BakerRisk**
Design and operation of effective toxic shelters

12:50 – 13.55: Lunch, Networking & Exhibition Viewing

Day 1, Afternoon

14:00 – 14:40: **Glynn Warren, Product Specialist – Exloc Instruments**
What's involved in achieving UKCA 'Ex'
14:40 – 15:20: **Steve Pearson, Executive Chairman – Phusion IM**
Improving inspections with advanced use of hazardous area data and mobile devices

15:20 – 16:00: Refreshments, Networking, & Exhibition Viewing

16:00 – 16:40: **Rolf Kinck, Senior Instructor & Morten Aasen, Chief Commercial Manager – Trainor**
Digitalisation and the advantages of e-learning
16:40 – 17:20: **Steve Williams, Sales Director – Hazardous Lighting Solutions**
Intelligent lighting control for explosion proof areas

18:00: Exhibition closes

18:30: Drinks

19:30: Gala Dinner, Awards, and Entertainment

22:30: Drinks

hazardex 2021 incorporating PPTeX
6th & 7th Oct • Harrogate • Yorkshire • UK

HAZARDEX 2021 – PROTECTING PLANT, PROCESS & PERSONNEL

Running order subject to change
Check www.hazardex-event.co.uk for the latest updates

HAZARDEX CONFERENCE 2021 - DAY 2

Stream 1 – Chair: Ron Bell OBE, Technical Consultant and Advisor – Engineering Safety Consultants
Main conference room (Yellow badge holders only)

08:30 – 09:30: Registration & coffee

Day 2, Morning

09:30 – 09:40: Chair's introduction

09:40 – 10:20: **Peter Davidson, Executive Director – Tank Storage Association (TSA)**
Cyber security for senior managers

10:20 – 11:00: **Sarabjit Purewal, Principal Specialist Inspector – UK Health & Safety Executive (HSE)**
The use of artificial intelligence in safety related applications

11:00 – 11:30: Refreshments, Networking, & Exhibition Viewing

11:30 – 12:10: **Randall Williams, Project Engineer – Proeon Systems**
Ensuring compliance for fire & gas detection

12:10 – 12:50: **Paul McLaughlin, Consultancy Team Lead – Kiwa Gastec**
Application of DSEAR to manage the safe operation of hydrogen installations

12:50 – 14:00: Lunch, Networking, & Exhibition Viewing

Day 2, Afternoon

14:00 – 14:40: **James Steven, Development & Innovation Manager – DNV**
Ignition prevention is only for electrical equipment?

14:40 – 15:20: **Ewan Povall, Senior Consultant & Chris Heath, Graduate Consultant – RPS Group**
The importance of considering the role of the user in the assessment and design process

Stream 2 – Chair: Paul Hague, Head of Scheme Development – CompEx
Seminar room (access open to all registered attendees)

08:30 – 09:30: Registration & Refreshments

Day 2, Morning

09:30 – 09:40: Chair's introduction

09:40 – 10:20: **Andrew Derbyshire, Principal Safety Engineer & Chris Bell, Consultant, Asset & Management Systems – DNV**
Changing an unknown known into a known known in Functional Safety

10:20 – 11:00: **James Jordan, Technical Control & Safety System Lead – Arete Project Delivery**
Safe delivery of integrated control and safety systems

11:00 – 11:30: Refreshments, Networking, & Exhibition Viewing

11:30 – 12:10: **Dr. Alexander Zalogin, General Director – Russian Certification Centre of Ex and Mine Equipment (NANIO CCVE)**
Explosion hazard occurrence on the surface of thermocatalytic sensing elements

12:10 – 12:50: **James Park, Process Safety Consultant – RAS Ltd**
Flange guards - their use and applicability in managing hazardous area zoning

12:50 – 14:00: Lunch, Networking, & Exhibition Viewing

Day 2, Afternoon

14:00 – 14:40: **Kevin Boyd, Director – 2Value Solutions**
Proactive risk management using IIoT and wearables

14:40 – 15:20: **Bassey Okon Bassey, PhD Researcher – Cranfield University**
Operations-maintenance synergy at petroleum process facilities

15:30: Exhibition closes

hazardex 2021 incorporating PPTeX
6th & 7th Oct • Harrogate • Yorkshire • UK

The 2021 Hazardex Awards for Excellence

A total of 20 nominees have been shortlisted across four categories for the 2021 Hazardex Awards, designed to recognise excellence in the hazardous area sector. As always, this year's winners will be announced during a Gala Dinner at the end of the event's first day on October 6 at the Majestic Hotel, Harrogate.

The Hazardex awards programme has long been a benchmark for those supplying products, services and systems within hazardous areas. The awards offer Hazardex readers the ability to play their part in raising awareness and standards across the sector by nominating a company, product or service, entering their vote, and encouraging colleagues to do likewise.

The Awards will be presented following the informal, very well attended Gala Dinner where delegates, speakers, and exhibitors network over a three-course meal and drinks. The annual Hazardex International Conference and Exhibition is widely recognised as the most important global event specific to hazardous area operations across all major industries. Together with the Conference and Exhibition, the Gala Dinner and Awards for Excellence aim to strengthen and expand the community that looks to the Hazardex website and journal for industry intelligence and information.

This year, 20 companies have been nominated across four categories with an additional category, the Delegates' Award, being voted on by delegates and attendees at the Hazardex 2021 Conference and Exhibition, to identify which of the nominated entries provides the overall best hazardous area sector product, system or service.

The nominees for the 2021 Hazardex Awards for Excellence are:

Category 1: Technical Innovation – An innovative product or system for use in hazardous area environments.

a. Beamex	b. Blayds Group	c. Hazardous Lighting Solutions	d. ION Science	e. PULS Power
Product: MC6-Ex Calibrator	Product: T-Sure label	Product: I-PYROS Luminaire	Product: Cub 11.7 eV Personal VOC Gas Monitor	Product: DIN-Rail power supply model CP20.245-R2

Category 2: PPTex Innovation – The best innovation in Personnel Protection Technologies (PPT) equipment incorporating electronic and technological systems that the user can wear, hold or use to improve safety within the process and high hazard industries.

a. Extronics	b. i.safe Mobile	c. Mobexx	d. Salunda	e. SeSys
Product: iTAG X30 (RTLS safety tag)	Product: IS-TH1 (Android-based handheld barcode scanner)	Product: XCZ1-iPhone	Product: Crew Hawk	Product: Hazardous area Ex-rated cameras

Category 3: Best Customer Service – A company or corporate division that has provided excellent customer service in the sector over the last two years.

a. Dron & Dickson	b. Exloc Instruments	c. Mutech	d. Thorne & Derrick	e. Yokogawa RAP

Category 4: Contribution to Safety – A product, system or service which has made a significant contribution to safety in hazardous area environments.

a. ANT Telecom	b. Bosch Rexroth	c. Dynaco	d. Hawke International	e. Sella Controls
Product: Lone worker devices	Product: SVA R2 (Compact Subsea Electric Actuator)	Product: ATEX high speed roll up door	Product: Rapid Connection Gland (RCG)	Service: Functional Safety Management

Further details about each category and nominee can be found on the Hazardex Event website: **www.hazardex-event.co.uk**

Hazardex 2021 Chair Profiles

Conference Chair – Stream 1, Day 1

Dr Zsuzsanna Gyenes, Deputy to the Director – IChemE Safety Centre

Dr Zsuzsanna Gyenes *is the Deputy to the Director of the IChemE Safety Centre with experience in training CEO's of high hazard industrial sites on Process Safety Leadership and Culture, implementing tools and overseeing Process Safety Management systems for various industrial sites, reviewing safety reports, advising on risk reduction and performing on-site inspections. She is involved in training on various PSM systems, developing guidance documents on Lead Process Safety Metrics, speaking at international conferences and running technical symposiums worldwide. She is working with the world's leading chemical and oil and gas companies across the UK, US, Europe, the Middle East and Australia.*

After graduating with a Master of Science in Biochemical Engineering from the Technical University of Budapest, Dr. Zsuzsanna Gyenes worked in disaster management for the Hungarian Government. During this time, she obtained a Postgraduate Diploma in Environmental Public Administration. She then moved into a role as a Seveso Site Inspector for Hungary, at this time she also obtained her PhD cum laude on the development of procedures and tools for the improvement of industrial safety against external effects from the National Defence PhD Institution in Military Technology in Hungary.

Following her time as a Seveso Inspector, she was the Head of Section for Nuclear Safety in the National Directorate General for Disaster Management in Budapest. Her most recent role was as a Scientific Technical Office for the European Commission Joint Research Centre, where she worked to assist member states on learning from incidents and Seveso implementation, including land use planning policy. She commenced as the Deputy to the Director of the IChemE Safety Centre in September 2017.

ZGyenes@icheme.org
https://www.icheme.org/knowledge/safety-centre/

Conference Chair – Day 1, Stream 2 | Day 2, Stream 1

Ron Bell, OBE, Principal Consultant – Engineering Safety Consultants (ESC)

Ron Bell, OBE*, B.Sc. (Hons), CEng, FIET, FS Expert (TÜV Rheinland, # 258 /15, SIS) is Principal Consultant at Engineering Safety Consultants (ESC) which is an ERM Group Company.*

From 1992 until 2006, Ron was Head of the Electrical and Control Systems Group in the Health and Safety Executive. In 1998, he was appointed as one of the five UK members of the binational Channel Tunnel Safety Authority, which is a position he held for 13 years. He chairs one of the two IEC working groups responsible for IEC 61508 (the international standard dealing with safety critical systems). He continues to hold that position which he has held since 1988.

He is the author, some jointly, of more than 40 technical publications, including approximately 20 SCI-cited publications.

Hazardex 2021 Chair Profiles

Honours & Awards:

- *In 2005, he received the IEC 1906 Award for his work on functional safety and IEC 61508.*
- *He held a 3-year appointment (2015-2018) as a Royal Academy of Engineering Visiting Professor at Liverpool John Moores University.*
- *He received the Annual Prize in 2014 by the Institute of Measurement and Control (London Section) for Outstanding Contribution to Instrument Engineering.*
- *He was awarded the 2020 Mukaidono Safety Award, in recognition of distinguished services in the international standardisation of functional safety*
- *He received the OBE in the Queen's 2006 New Year Honours.*

ron.bell@esc.uk.net
https://esc.uk.net/

Conference Chair – Day 2, Stream 2

Paul Hague, Head of Scheme Development – CompEx Certification

***Paul Hague**, Head of Scheme Development for CompEx Certification Limited, started his career as an Electrical Technician at ICI Runcorn, before moving into 'Ex' consultancy and later as a CompEx instructor/assessor, and manager at several centres. He initially took the role of Head of Internal Operations at CompEx in October 2019, having previously worked within the company as a Business Development Manager. Paul is responsible for leading the CompEx certification and the Product Management Teams and works closely with the Technical Team to ensure that CompEx delivers a high-quality service.*

paulhague@compex.org.uk
https://compex.org.uk/

1. An enabling regulatory framework to deliver Net Zero

Wednesday 09:30 - 10:10 – Main conference room

Simon Wood, Environment, Health & Safety Specialist – UK Petroleum Industry Association (UKPIA)

As Environment, Health and Safety Specialist, ***Simon Wood*** *provides UKPIA members with expert advice on regulatory developments for environmental, process safety and occupational health and safety topics across the downstream oil sector. Simon Joined UKPIA in January 2020 having previously gained experience with EDF Energy and the British Standards Institution developing and deploying strategies to deliver consensus through improved stakeholder understanding during negotiations.*

Abstract:
Simon will be speaking about the importance of a responsive and flexible role for regulators to enable the transition towards a Net-Zero UK.

The changing face of the energy and fuels sector is likely to see the emergence of a suite of new processes, feedstocks and business models that will in turn come with new safety challenges and methods to manage the risks of their use. Regulators will have a central role in enabling deployment of new technologies to deliver Net-Zero. As companies may deliver fundamentally new ways of producing and supplying their products, consistency, capability and agility is required from regulators.

Hydrogen offers one such example, with the expectation that it will be one of the key energy vectors for uses as widespread as domestic heating, to industry to transport in Net-Zero scenarios. Hydrogen offers particular challenges as a highly reactive element that may move out of the highly specialist applications into transmissions systems that were not designed for it. Each application may need its own form of regulation to enable safe deployment that can be a positive contributor to carbon reductions. There will be a challenge for industry and regulators to work together to manage such challenges.

2. Chemical safety, storage, regulations, and warehousing

Wednesday 10:10 - 10:50 – Main conference room

Tim Doggett, CEO – Chemical Business Association (CBA)

Douglas Leech, Technical Director – Chemical Business Association (CBA)

Tim Doggett *is the Chief Executive of the Chemical Business Association. He has worked primarily in global supply chain and logistics and has held senior positions in various countries. He is a Chartered Fellow of the Institute of Logistics and Transport (CILT) and a qualified Dangerous Goods Safety Advisor (DGSA).*

Douglas Leech *is the Technical Director of the Chemical Business Association based in Crewe. He joined the association in 2003 following over twenty years in the product formulation sector in both health & safety and R & D roles. He is responsible for providing advice and assistance to member companies on legal, regulatory and compliance issues.*

Douglas was involved in major hazards in both operational, training and advocacy roles in the UK and Europe. He participated in the expert group where the harmonisation of Seveso with the CLP regulations was debated over a number of years to provide advice to the European Commission prior to the formulation of the new Seveso III directive.

Abstract:

The changes in UK Legislation after Brexit have had an impact on the way companies handle, import, distribute and export chemicals. This presentation is geared to those that have an interest in all things Chemical safety and would suit the novice and expert alike.

3. What's coming in IEC 61511 Edition 3

Wednesday 11:30 - 12:10 – Main conference room

Dil Wetherill, Managing Director – Method Functional Safety

***Dil Wetherill** is a functional safety consultant and trainer with Method Functional Safety. Dil is a Fellow of the Institute of Measurement and Control, a Chartered Engineer and Functional Safety Expert. He is working as part of the international committee to develop IEC 61511 Edition 3 and sits on the equivalent BSI committee, is vice chair of the 61508 Association and is a member of the InstMC special interest group on Functional Safety. Dil has been working on functional safety for more than 20 years as a product manager, trainer, and consultant.*

Abstract:
IEC 61511-1: Edition 3 is targeted for release in 2023, with the first Committee Draft due for release in early 2021. The presentation will describe the areas of focus for the development of the new edition and the background to the proposed changes.

Of course, it is possible that the proposals will not be approved by the National Committees when they vote on the changes in later in 2021, but the direction that the developments are taking is clear.

This presentation will look at the main changes which are, to some extent, still being debated.

4. New edition of IEC 60079-11 Intrinsically Safe Equipment Standard

Wednesday 12:10 - 12:50 – Main conference room

Colin Cameron, Managing Director – Mutech Limited

***Colin Cameron** is a founder and Managing Director of Mutech Limited, an electronics product design and manufacturing service company in the UK specialising in intrinsic safety and functional safety. Mutech was established in 1985 and has been designing and manufacturing intrinsically safe equipment for their clients since 1992. Colin is Convenor of TC31 maintenance team for IEC 60079-11 Intrinsically Safe Equipment standard, member of the maintenance team for IEC 60079-25 Intrinsically Safe Systems, Chairman of the UK National Committee for IECEx, member of UK national mirror committees for IEC/T31 and IEC/T31/SC31G Intrinsic Safety, Chairman of the Technical Committee for the Association of British Mining Equipment Companies.*

Abstract:
Colin Cameron's presentation is on the new edition of IEC 60079-11 Intrinsically Safe Equipment Standard. Edition 6 of IEC 60079-11 was published in 2011. A review of the standard was started by the maintenance team in 2014.

After significant re-organisation, several thousand suggestions for changes, 11 full committee meetings spanning 34 days, 14 full committee Zoom meetings, 22 specific task groups, and thousands of man hours, the long-awaited 7th edition is into its final stages before publication. Publication is expected in 2022, although the final draft stage (FDIS) against which certification is normally accepted, is expected Q3 2021.

This paper presents the significant changes from the 6th Edition, of which there are many. Some are classed as "major technical" changes which essentially mean a tightening of the rules which can have a significant impact on existing equipment, and are usually the changes that are considered when considering the impact on existing equipment of changes to standards. However, there are also a large number of clarifications which define how Edition 6 should have been interpreted, but for many manufacturers this will be different to the way that their equipment was assessed and therefore these could also have a significant impact on existing equipment.

There are also new items in the standard, such as signal isolator components that can transmit at high data rates across a very thin insulator which present great opportunities for improved functionality of intrinsically safe equipment.

Level of Protection "ic" (intrinsic safety for Zone 2 / 22) has moved further from the old Ex "nL" and now explicitly includes some non-countable faults for thermal ignition compliance.

In addition to the technical content, there has been a significant re-organisation of the standard, and there have been some changes in terminology used. This paper will be of considerable interest to all manufacturers, designers and assessors of intrinsically safe equipment.

5. Creating a culture of care

Wednesday 14:00 - 14:40 – Main conference room

Mark Walker, Vice President – DEKRA

Mark Walker *Vice President of Dekra, is an experienced consultant specialising in cultural change and leadership coaching. His wide range of hands-on experience working with organisations both on and offshore worldwide have made him a sought-after trainer and change leader. Mark is committed to help each of his clients improve decision-making and achieve reliable performance. He has worked with various companies, globally across diverse conditions to transform the behaviours of leaders and workers so that projects are delivered on time and safely. He has helped create cultures based on caring for the systems and processes, plants and people, thereby increasing not only safety but also productivity and engagement—even in the midst of trying economic times.*

Mark has trained leaders to leverage skills based on humanity, integrity, and competency in order to create a workplace environment that has trust and respect at its heart. Through his work, he provides scientific tools to track culture from its current status to its desired state. In this way, and by 'holding up the mirror' to leaders' behaviours via coaching, Mark assists organisations facilitate lasting change. Mark has a BSC HONS in combined social sciences.

Abstract:
Organisations can improve their safety efforts and build resilience against catastrophic events by increasing the level of care demonstrated by people in their decision making and behaviour.

The three elements of the Culture of Care are (1) people, (2) processes and procedures, and (3) plant and equipment.

In a Culture of Care, those working within it are collectively motivated to show interest in, and concern for, what's important. This mindset is evident through the decision making, behaviour, and language of leaders – the owners of the culture. And it is felt by everyone who comes in contact with it: employees, contractors, and visitors, alike. Discretionary effort flourishes, procedures are understood and functionally applied, and people protect each other from harm.

When care is demonstrated, organisations can also gain greater productivity, predictability, and efficiency in how things and people work. This drives the resiliency necessary to prevent, control, and respond to upset conditions.

This care is built around a principle that safety is not the absence of incidents but the presence of barriers and that our people are viewed as the solution and not the problem.

Takeaways

- Understand what is meant by a Culture of Care, how is it measured
- Discover what it takes to influence decision making and behaviour
- How Care goes beyond compliance

6. Explosion protection of hydrogen installations

Wednesday 14:40 - 15:20 – Main conference room

Prof. Dr. Thorsten Arnhold, VP Technology – R. STAHL

From 2014 to 2019, Prof. Dr. ***Thorsten Arnhold*** *was the Chairman of the IECEx Conformity Assessment System. Before this, he was the Head of the German Delegation at the IECEx Management Committee for 7 years. In 2020, after the completion of his second and last term as Chairman of IECEx, he became the German member of the IEC Conformity Assessment Board (CAB).*

Thorsten started his career as a Senior Quality Engineer at Commodore Computers. For the last 27 years he has been working for the German Manufacturer R. STAHL, an international market leading company specialising in safety technologies. His current position at R. STAHL is VP Technology. In this position, he is responsible for the research activities of the group, the development of new technologies and the coordination of the standardisation activities.

Abstract:
This presentation will discuss the uses of hydrogen, sourcing from renewable energies, & explosion protection in the production chain. Thorsten will demonstrate the way for safe and sustainable hydrogen infrastructure, with a focus on explosion protection.

Other topics covered included:

- Conventional production methods for hydrogen
- The production of green hydrogen from renewable energies
- Explosion protection in the hydrogen value chain
- The use of hydrogen in our everyday life: possibilities, limits, precautionary measures

7. What is the ‘golden thread’ that links Human Factors, Competence and Compliance problems and solutions?

Wednesday 16:00 - 16:40 – Main conference room

Neil Smith, Head of Workforce Development – Cogent Skills

***Neil Smith** is the Head of Workforce Development at Cogent Skills and is a founder member of the Process Safety Management Competence Programme Board and took a leading role in the development of the UK’s PSM Skills Strategy. The PSM Skills Strategy supports the development of the PSM training standards - assuring that the programme is backed with the highest quality training provision since the establishment of the PSM programme in 2010. Neil continues to provide ongoing support to the PSM Competence Programme Board and Expert Panel.*

Working in partnership with Cogent Skills consultancy subject matter experts and approved trainers, Neil also leads the development of tailored and bespoke PSM training solutions for employers both within the UK and internationally, with clients including National Grid, Unilever, GSK, Tata Steel, British Steel, Johnson Matthey, Tullow Oil, MODEC and Stena Drilling. Neil leads the Cogent Skills consultancy team that supports businesses to evaluate and improve their approach to workforce competence management and human factors and supporting their development of resilient and sustainable competence management systems.

Abstract:
This presentation will look at the ‘golden thread’ that links Human Factors, Competence and Compliance problems and solutions.

The presentation will discuss the following core issues that are highly interdependent and critical to help equip your future workforce with compliance skills and competence requirements:
- Cultures and Behaviours
- Human Factors
- Safety Culture
- Knowledge & Competence
- Regulations - to help keep your ‘License to Operate’
- Process Safety Leadership

We will explore how these topics make a significant contribution to maintaining effective process safety and competence management, as well as enhancing safety and wellbeing – a part of Human Factors regulatory compliance.

8. Crisis communications: from fire to front page

Wednesday 16:40 - 17:20 – Main conference room

Andrew Vincent, Associate Partner – Instinctif Partners

*Business resilience specialist **Andrew Vincent** has over 30 years' media experience as a journalist and consultant. He's skilled in helping organisations improve reputational outcomes from complex, technical challenges and crisis situations—especially those involving multiple stakeholders and regulatory oversight. Andrew has worked in many industry sectors: food, IT, logistics, materials science, consumer technology and more. He's an experienced facilitator and trainer, at home delivering immersive workshops as well as chairing high-level events and discussions involving diverse audiences. He is particularly interested in helping companies develop and implement successful strategies in areas such as issues management, crisis preparedness and live incident response..*

Abstract:
The pace of information sharing is now so fast that as quick as a fire can spread through a plant, so too can the footage of it reach your stakeholders and the media. As engineering businesses, designing risk mitigation strategies and rigorous health and safety is part of your DNA, but crisis communications is also something that affects everyone, not just your communications team.

How prepared are you for the communications challenges you would face when something goes wrong? How quickly could you publish a statement? Do you know already what it would say? And who you would tell?

Using real crises as examples, this session will set out the principles of best practice crisis communications and give you the key actions to take back to your business. It will cover:
- Stakeholder communications in a crisis
- Developing a best practice crisis communications plan
- Preparing to communicate
- Managing the media
- Social media in a crisis
- Why culture impacts successful crisis communications

9. Taking Responsibility for Repairs to Ex rated machinery

Wednesday 11:30 - 12:10 – Seminar room

Karl Metcalfe, Technical Advisor & Ex Trainer – Association of Electrical & Mechanical Trades (AEMT)

***Karl Metcalfe**, Technical Support for the AEMT, has worked within the rewind industry since 1987 developing a broad and deep knowledge of the sector. Starting his apprenticeship at York based service centre Eclipse Engineering, Karl trained as a time served electrical rewinder and fitter, where he worked extensively with low voltage machines, pumps and gearboxes. In 2011, he left Eclipse to move into sales then moved on to Featherston as workshop manager, where he gained experience in handling medium to high voltage equipment. He later became works manager of Kirkby Lindsey in 2015 where he was also the responsible person for signing off all Ex hazardous area equipment.*

Abstract:
Operating equipment in potentially explosive atmospheres comes with a certain amount of responsibility. Not least using components with the correct equipment protection concepts for the working environment. When maintenance and repairs are required, it is important that owners/operators understand what is expected of them to ensure continued safety and reliability.

Any business that has identified zoned areas within its premises is expected to adhere to a number of international and regional standards including BS EN IEC 60079-19:2019. This states the responsibilities of operators, managers and repairers to ensure that all equipment is properly handled and fit for continued service.

When Ex equipment needs to be sent for a repair or overhaul then a facility with sufficient handling equipment and competencies should be selected to complete the work. Each machine should have its own dossier containing all the required paperwork, including details of any previous repairs and inspections. This dossier should accompany the equipment to any approved service centre. A qualified repair centre will ask for this information and they will also provide all the evidence required to determine if it is qualified to deliver the repair.

Following the guidelines and taking on the responsibilities of operating ex-rated equipment goes a long way to minimizing the risks associated with zoned areas, keeping both employees and equipment safe. In the event of an incident involving equipment in a zoned area, the investigation into the cause will start with the information dossier for all the equipment in the affected area.

If any repairs have been completed by service centres that did not comply with the international standard, this could be seen as a failure to meet the terms of the insurance policy. As such, this could have major implications for funding any repairs as well as increasing the cost of future insurance policies.

Both managers and maintenance staff involved with Ex rated equipment are encouraged to broaden their knowledge of this specialised area and attend training courses appropriate for their role. This will enable the business to implement the necessary operational and managerial processes to comply with the international standard.

The AEMT has an Ex register (www.ex-register.com) which lists all members that hold various certifications including ISO 9001, and AEMT Ex Assessment Certificates. IECEx service centres are independently audited by a notifying body and maintain their 3-year refresher training to achieve certified accreditation.

10. Design and operation of effective toxic shelters

Wednesday 12:10 - 12:50 – Seminar room

Robert Magraw, Operations Manager – BakerRisk

Robert Magraw *is the Operations Manager of BakerRisk Europe Ltd. He has an extensive career of over thirty years in safety and risk management, including twelve years in the oil, gas, and petrochemical sectors and over eighteen years in the nuclear industry. His main areas of technical practice currently include PHA, SIS/SIL, QRA, audit, insurance risk engineering, and management system development. He was previously head of environment, health, safety, and quality for an international nuclear services company. He also managed the corporate HSE management system and assurance program for a major international nuclear business with a global portfolio of nuclear and non-nuclear operations.*

Robert is a member of IChemE Hazards Technical Committee and the European Process Safety Centre Technical Steering Group. He is also a TUV certified functional safety engineer. He has presented technical papers and workshops at numerous conferences in Europe and the Middle East.

Abstract:

Toxic gas hazards are common at refining, chemical processing, and related industrial sites and often contribute significantly to the overall on-site risk posed by site operations. The risks associated with an accidental release of toxic material are normally addressed by sheltering-in-place and/or evacuating as part of the overall risk management strategy.

A shelter-in-place (SIP) enclosure, or toxic refuge, is intended to protect facility personnel in the event of a toxic (or flammable) gas release, whether they are already inside the SIP enclosure or they take shelter in response to a release.

The presentation will examine the characteristics of an effective toxic sheltering strategy, including shelter design, emergency planning, and culture. Aspects of design will include layout, leak tightness, gas detection, and ventilation isolation. Emphasis will be placed on the importance of ensuring the capabilities and limitations of the SIP form part of the emergency plan and that a clearly defined fallback plan exists should the SIP be compromised. The effectiveness hinges on the development of a culture that ‘buys-in’ to the strategy.

The challenges of maintaining these characteristics and common shortcomings in design, maintenance, and operation of toxic shelters observed by BakerRisk’s engineers over hundreds of site visits to facilities worldwide will be highlighted.

A risk-based approach will be outlined that can be utilised to help determine how risk can be minimised to as low as reasonably practicable.

11. What's involved in achieving UKCA 'Ex'

Wednesday 14:00 - 14:40 – Seminar room

Glynn Warren, Product Specialist – Exloc

Glynn Warren *studied for his BSC (Hons) degree in Leicester and has worked in the Hazardous Area equipment sector since the late 1990s, either in Sales or Product Management. He is currently working part time for Exloc Instruments as a Product Specialist.*

Abstract:

As a result of the UK leaving the European Union (Brexit), the UKCA mark (UK Conformity Assessed) will be phased in to replace the CE mark (European Conformity) for applicable goods to be placed in Great Britain (England, Scotland and Wales). For Products traditionally sold with ATEX marking, UKCA 'Ex' (or UKEX) will be required in Great Britain.

From 1st January 2023, only the UKCA mark will be acceptable for goods placed in Great Britain and the CE mark will no longer be accepted.

In order for a product to receive UKCA 'Ex' marking, it should be approved to the latest version(s) of the EN 60079 standard(s). So, for example, an Exd product should be to EN 60079-1 2014, not 2007. This may lead some manufacturers, particularly those from overseas, or with only a small presence in the UK market, to consider the work required too costly and thus decide to withdraw product.

In this presentation, we will look in detail at what is actually involved in achieving the UKCA 'Ex' mark and the associated QAN (Quality Assurance Notification). We will consider the likely costs and an example of how even an older product can be successfully approved in an affordable manner.

12. Improving inspections with advanced use of hazardous area data and mobile devices

Wednesday 14:40 - 15:20 – Seminar room

Steve Pearson, Executive Chairman – Phusion IM

Steve Pearson *is a Chartered Engineer with a practical engineering knowledge of all phases of major projects. Prior to forming Phusion, Steve worked for BP as a Senior Engineer, specialising in Instrumentation, Control and IT issues.*

He is widely recognised as an authority in the field of engineering content management and is regularly asked to speak at conferences and seminars. Steve has helped many organisations to define their information needs and his practical and pragmatic approach to handling engineering content has enabled clients to save many millions of pounds.

Abstract:
Advanced use of hazardous area related data and documents, combined with mobile devices to substantially improve inspections and reduce time and cost. The inspection of equipment rated for hazardous areas are subject to repeat mandatory inspections with the completion of IEC 60079-17 check sheets.

Minimising the time inspections take without compromising safety is a goal of many prudent organisations. This presentation will show you how inspections can be tackled differently to reduce time on site, increase the long-term effectiveness of inspections and improve management of change.

Evidence shows the advanced use of related data and documents combined with mobile devices will substantially reduce the time spent carrying out inspections without cutting any corners.

Halving your costs is achievable if you adopt the techniques explained.

13. Digitalisation and the advantages of e-learning

Wednesday 16:00 - 16:40 – Seminar room

Rolf Kinck, Senior Instructor – Trainor

Morten Aasen, Chief Commercial Manager – Trainor

Rolf Kinck *is Senior Key Account Manager at Trainor. His area of responsibility in Trainor is customers within sectors such as oil & gas, industry, engineering and electrical installation companies. His extensive experience from electro and automation work in the Norwegian Navy and as sales manager for IKM Instrutek, accompanies several years as a Trainor course instructor before joining the sales team.*

Morten Aasen, *Chief Commercial Officer at Trainor, is responsible for customer interactions and the internalization of Trainor. His career contains of decades within the maritime sector, the latest 7 years in a leading maritime education company. Morten has a vast experience from companies developing digital training solutions and competence management solutions for the oil and gas sector.*

Abstract:
With so many poorly designed and written courses, no wonder e-learning often has a bad reputation. However, designed right, e-learning is a highly pedagogic, entertaining, and effective training method and can be used as stand-alone training or blended learning together with classroom and practical training.

It's all about increasing knowledge and do training as efficient as possible. The key to success lays in the quality, and creative use of new technology that makes e-learning a preferred choice of training on specific subjects.

How to truly make high quality e-learning that engages and motivates the students?

For most workers, training is purely a necessity. To change this attitude, we need to make high quality courses, engaging and inspiring every worker to learn, develop and remember. Trainor will discuss the processes needed to ensure content quality and the best learning outcome for the targeted audience, how to improve engagement and the highest learning retention and use of e-learning in combination with classroom and practical training to reduce knowledge fatigue and improve learning experience.

14. Intelligent lighting control for explosion proof areas

Wednesday 16:40 - 17:20 – Seminar room

Steve Williams, Sales Director – Hazardous Lighting Solutions

Steve Williams *is Sales Director of Hazardous Lighting Solutions, a specialist lighting company based in the Northwest of England.*

Abstract:

This paper aims to explain the operational and technical merits of using intelligent lighting control within explosion proof areas designated Zone 1, 21, Zone 2, 22 under ATEX and IECEx certification.

We are all aware of the need for more energy efficient systems, cost efficient products and carbon reduced solutions. These requirements are increasing on a day-to-day basis and we believe that using intelligent control options will help toward meeting these daily requests. Our solution to this was to look at the possibility of adapting intelligent lighting controls for explosion proof applications, we therefore decided on the following.

Making the best use of up-to-date wireless control systems mounted within conventional standard and emergency explosion proof lighting fixtures which have been recertified to the ATEX and IECEx standards.

The equipment has been designed to ensure that the required illumination is delivered and controlled at the appropriate location and that no centralised control device is required, we ensure that with the components used each lighting fixture becomes its own intelligent controlled device without the need for any onsite additional wiring.

The main driving point was how to overcome the ongoing lighting problems faced by the site maintenance teams when confronted with extended downtimes, notification of intermittent lighting failures, and their locations, general lighting maintenance problems and ongoing difficulties with emergency lighting procedures as required by the current standards. Our research indicated that all these points could be substantially reduced when using intelligent controls.

15. Cyber Security for Senior Managers

Thursday 09:40 - 10:20 – Main conference room

Peter Davidson, Executive Director – Tank Storage Association (TSA)

***Peter Davidson** is Executive Director of the Tank Storage Association (TSA) which represents the interests of over 45 companies who operate around 300 terminals in the UK or provide equipment and services to the sector. Peter joined TSA following 10 years as the director of Safety, Commercial & Projects at the UK Petroleum Industry Association. Previous to this, Peter managed the Safety Automation Group for ABB in the UK. Peter has responsibility for the day-to-day management of the association, leading on lobbying & advocacy activities and working with the Federation of European Tank Storage Associations (FETSA).*

Abstract:
This presentation from Peter Davidson, Executive Director of the Tank Storage Association, will provide advice for senior managers to ensure that risks are being managed and minimised. In managing cyber security risks, businesses will also reduce risk to commercial activities and protect their reputation.

The presentation will cover:
• Governance: roles and responsibilities, reporting, accountability, organisation structure, vision and culture
• Staff competencies: knowledge, skills and experience
• Management system documentation: letting people know what is required
• Audit of management systems and technical aspects, and monitoring of key performance indicators: making sure procedures and countermeasures keep working
• Managing supply chain risk

The presentation will align closely with the soon to be published *"Chemical and Downstream Oil Industries Forum Guidance on Cyber Security for Senior Managers".*

16. The use of artificial intelligence in safety related applications

Thursday 10:20 - 11:00 – Main conference room

Sarabjit Purewal, Principal Specialist Inspector – UK Health & Safety Executive (HSE)

Sarabjit Purewal *OBE BSc PGDip CEng MIET is a Principal Specialist Inspector and the portfolio lead for cybersecurity and emerging technologies in the Health and Safety Executive (HSE). Sarabjit started his career with the CEGB in the electricity supply industry working on automation of conventional and nuclear power plant.*

He later worked with Kennedy and Donkin Consulting Engineers as the engineering manager of the Power Group, and then with Mott MacDonald as divisional director, before moving to the Health and Safety Executive where he has worked on a number of technical areas, been an advisor to the Minister for health and safety, and led operational teams in the major hazards sector in the HSE.

He was awarded an OBE for services to health and safety and cybersecurity in 2020. Sarabjit sits on a number of technical committees in the IET, RITICS and BSI GEL/065.

Abstract:
There are applications emerging in many sectors that are using some aspects of machine learning that can directly or indirectly affect safety. This presentation will describe the range of applications emerging, the opportunities that this technology brings and the associated risks.

It will describe the work that the HSE is doing in developing guidance, describe the issues, and developing an industry agnostic approach to dealing with such issues.

17. Ensuring compliance for fire & gas detection

Thursday 11:30 - 12:10 – Main conference room

Randall Williams, Project Engineer – Proeon Systems

Randall Williams *(BSc, GIFireE) has been working in the fire safety industry since 1988 as a Fire Alarm Engineer and Fire Risk Assessor. Randall was a member of the BSI Committee which drafted BS 60080 and he leads the Fire & Gas Team at Proeon Systems Limited in Norwich, (UK).*

Randall is an experienced Fire Risk Assessor specialising in Industrial Fire and Gas Risk Management. He is a Graduate of the Institute of Fire Engineers (GIFireE) in 2013 and graduated with BSc Fire Protection Management & Technology from California State University, Los Angeles, California in 1986.

Abstract:
Unpacking the new British Standard 60080 for Auditors, Local Authorities (Inspectors / Fire Authorities) and responsible person (company and managers).

The Management of Health & Safety at Work Regulations 1999 requires that any gas detector location design be undertaken by a competent person with sufficient training and experience or knowledge. These are the legal obligations of the 'Responsible Person.'

The recent publication of BS60080 provides some guidance on to the challenging activity of designing flame & gas detection systems by deciding the quantity and location of the field detection. In many cases the Responsible Person (the person who is in control of the facility) will not have the training, skills or experience to design or review the Gas Detection Locations as required by HSE.

So, the question remains, how can an external inspector or fire safety auditor review the safety at a site and determine that the responsible person (company and managers) have done all that is reasonably practicable to protect any operatives at risk? In the UK the legislation is clear. On the 1st February 2016 the Health & Safety Executive (HSE) in the UK released new guidelines regarding sentencing for Health & Safety breaches responding to; 'concern that previous fines for serious and fatal corporate health and safety offences were too low in relation to the harm caused.' Included in the guidelines rated as 'High' culpability it states; 'failing to put in place measures that are recognised standards in the industry.' The Sentencing guidelines define culpability as high when the 'Offender fell far short of the appropriate standard; for example, by: failing to put in place measures that are recognised standards in the industry'

As part of the committee that drafted BS60080, the author will unpack the practical application of the standard and how to demonstrate compliance to enforcement authorities and support the Responsible Person. In detail the paper will cover:

- Hazardous Area Safety System Cycle
- Risk Assessment
- Gas and Flame Detection Mapping
- System Design & Specification
- System Installation & Service
- Periodic Reviews.

18. Application of DSEAR to manage the safe operation of hydrogen installations

Thursday 12:10 - 12:50 – Main conference room

Paul McLaughlin, Consultancy Team Lead – Kiwa Gastec

Paul McLaughlin *is the Consultancy Team Lead at Kiwa Gastec. Kiwa Gastec provides energy consultancy services including feasibility studies, research and development, verification of greenhouse gas emissions, operative certification and product testing services for a wide range of commercial customers. A chartered engineer with 18 years of consultancy, design and operations experience in the chemical industry, Paul concentrates on innovative research and development issues, and technical support to clients focussing on hydrogen gas applications. His industry experience in hydrogen production and chemical plants is particularly valuable for projects supporting hydrogen production, handling and use.*

Abstract:

There is growing interest in the use of hydrogen as part of a decarbonised energy system, with the UK government recently publishing its hydrogen strategy.

As a result, more organisations are starting to carry out product and service development for hydrogen applications. Whilst the use of any flammable gas requires compliance with DSEAR, hydrogen's reputation as a particularly energetic substance is of prime safety concern in many users' minds. Areas of commonality and difference between hydrogen and natural gas will be discussed, along with upcoming guidance to help ensure safe operations.

19. Ignition prevention is only for electrical equipment?

Thursday 14:00 - 14:40 – Main conference room

James Steven, Development & Innovation Manager – DNV

James Steven *is an electrical and electronic engineer with over 20 years' experience of dealing with hazardous environments and applications. Having worked across the consumer, maritime, oil & gas and nuclear industries has provided a wide range of experience being able to draw upon the best practices across these sectors. He now holds the role of Development & Innovation Manager Product Assurance at DNV UK where he leads the Business Development and New Service/Application Development for the oil & gas supply chain markets. He has been key in extending DNV's Hazardous area Services to the UK.*

Abstract:

The application of ignition risk management for electrical equipment/apparatus, is handled relatively well by the industry. However, there is still much confusion on how to identify, manage and document non-electrical risks.

With the introduction of ISO/IEC 80079 -36, -37, -38 and the subsequent harmonisation under ATEX Directive (2014/34/EU), clarity on the requirements has led to many issues being highlighted when assessing equipment. This is not through the introduction of new sources of ignition but rather that the identification and understanding of the hazards from non-electrical equipment/apparatus more widely visible.

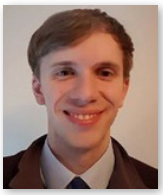
For example, now that IEC TS 60079-46 has become mandatory (since 1st Jan 2020) it is highlighting issues with "assemblies" as this expects non-electrical equipment/apparatus to be certified.

We will look briefly into the history and how potential ignition risks have "traditionally" been understood with respect to equipment/systems currently/commonly in use.

We will also investigate the main non-electrical ignition risks and some common applications or considerations we see causing confusion with products going to market.

20. The importance of considering the role of the user early in the assessment and design process

Thursday 14:40 - 15:20 – Main conference room



Ewan Povall, Senior Consultant – RPS Group

Chris Heath, Graduate Consultant – RPS Group

Ewan Povall *is a Human Factors Specialist with experience in supporting the development of designs, safety assessments and operational arrangements to ensure that Human Factors relevant good practice is incorporated in a pragmatic and proportionate manner to help provide suitably safe, efficient and operable equipment, systems and facilities.*

Ewan's background in Psychology and Applied Behavioural Analysis have given him an interest in human performance and the physical and psychological drivers behind human behaviour. During his time in the nuclear industry Ewan has gained experience of applying and writing ergonomic guidance to support designs for a wide range of users as well as reviewing existing designs/systems to identify potential deficiencies that could lead to safety consequences or operator error.

Chris Heath *a Graduate Human Factors Consultant in his first year at RPS, after graduating from a MSc in Human Factors with Inclusive Design at Loughborough University. Chris is developing and applying his knowledge of Human Factors methods within High-Hazard Industries while working towards becoming a Chartered Ergonomist and completing the National General Certificate in Occupational Health and Safety.*

Chris' background in Human Factors follows on from an Industrial Design undergraduate degree which together has given him a strong understanding of the impact Human Factors can have within design and experience in utilising HF methods throughout the design process to develop products and systems which aim to fully consider the user within the wider context of use and the environment.

Abstract:

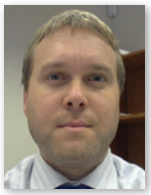
We've all experienced bad design in the everyday products and systems we use, often these lead to frustration rather than impact on your health or safety. Poor designs are typically caused by not designing the task or equipment with full consideration of the range of users, its context of use or environment.

Human Factors (HF) as a discipline plays an integral role within many industries and early involvement can be vital to ensuring a good ending – a well-designed piece of equipment, system or process. Human Factors is concerned with the understanding of how humans interact with all elements of a system. When the role of the operator is considered holistically with all other aspects of the system the final design becomes more usable and error tolerant. Within high-hazard environments effectively integrating Human Factors becomes crucial for ensuring the reduction of risk and improving overall system and operator performance.

This presentation illustrates the impact HF involvement has, as well as the importance on the timing of its inclusion, in increasing usability, safety and error tolerance within a system. Early and effective HF input is necessary to influence design throughout a project's lifecycle, in doing so many benefits will be seen beyond the immediate operational improvements.

21. Changing an unknown known into a known known in Functional Safety

Thursday 09:40 - 10:20 – Seminar room



Andrew Derbyshire, Principal Safety Engineer – DNV

Chris Bell, Consultant, Asset & Management Systems – DNV

Andrew Derbyshire *is a Principal Safety Engineer at DNV specialising in Functional Safety consultancy and independent conformity assessment activities throughout the lifecycle. Andrew is an Incorporated Engineer and a Registered Functional Safety Engineer (RFSE) with the InstMC and a member of several institutions such as the IET, InstMC and SaRS where he provides voluntary services in professional review interviews for prospective IEng/CEng/RFSE candidates and review of candidates CPD record for maintaining their RFSE. Andrew is a registered Chairperson and Assessor for several clients such as Shell, ConocoPhillips and Bluewater providing full lifecycle support from Identification of Hazard and Determination of Risks through to Independent Safety Assessments. He is also a member of the IEC 61508 Association management committee and the current chair and a director of The CASS Scheme which is a non for profit organisation aimed at promoting the correct use of the IEC 61508 group of standards*

Chris Bell *is a Chartered Mechanical Engineer with experience in both technical safety and industrial research and development. He holds a PhD in Physics. Currently Chris works with DNV, where he works on the development of new technologies and digital tools for use in the oil & gas sector with a focus on technical safety and asset integrity. More recently Chris has been involved with data mining and the use of machine learning to improve current engineering practices with regards to FSA's, EX management and Asset Integrity.*

Abstract:

The introduction of edition 2 IEC 61511 has brought with it a set of new challenges to the process industry. The standard now calls for mandatory stage 4 functional safety assessments (FSA) to be performed periodically in service and to monitor the actual behaviour of the safety system.

In this paper, we present a computational method for analysing a large number of maintenance records using a variety of data mining techniques. Currently many technical authorities (TAs) and asset operators are aware of problems on their plant but struggle to demonstrate the cause, for example "repeat offenders", or even that a problem exists at all, due to the way data is recorded in plain text.

The processes detailed in this paper can easily be applied other systems and assessment criteria's such as IECEx, ATEX where classifying data into distinct categories for trending and analysis purposes can be deemed useful.

As well as the use of machine learning this paper will also discuss a case study done by DNV where a cross-industry process for data mining (CRISP-DM) sprint methodology was used to manage data science projects as an example of how best to unlock the value from maintenance data.

22. Safe delivery of integrated control and safety systems

Thursday 10:20 - 11:00 – Seminar room

James Jordan, Technical Control & Safety System Lead – Arete Project Delivery

***James Jordan** has led the technical control and safety system delivery on some of the world's largest automation projects for both greenfield and brownfield scope. Managing the technical delivery of these projects using remotely located teams and with expertise in project delivery within the oil & gas, nuclear, petrochemical, pharmaceutical and manufacturing sectors.*

Abstract:

The digital transformation of Manufacturing 4.0 and IoT is one of the major driving forces for the uptake of more advanced automation with these systems delivering greater efficiencies but becoming more complex and more integrated. Even without using integrated control and safety systems the Basic Process Control System and the Safety Instrumented System are becoming highly interconnected.

So how do we ensure that we can safely deliver these complex automation projects. This is subject of the proposed talk to outline a delivery methodology to ensure not only safety and compliance but also to ensure that these projects are delivered effectively.

The talk will outline a robust project execution methodology along with the execution structure and scope of a typical safety instrumented system / automation project from the FEED phase through to completions and acceptance. The model will provide information on the primary execution processes and the relationships between the internal execution processes of the customer, the Main Automation Contractor, System Integrator, and the EPC contractors, and how these processes interact and integrate to achieve a common approach for project execution.

The talk will focus on the safety aspects of the automation delivery and cover the control and safety system designed, CHAZOP, alarm management, graphics/HMI, and cybersecurity and how these activities need to integrate, the process and procedure which should be followed, and the do's and don'ts learnt from past projects.

23. Explosion hazard occurrence on the surface of thermocatalytic sensing elements

Thursday 11:30 - 12:10 – Seminar room

Dr. Alexander Zalogin, General Director – NANIO CCVE (Russian Certification Centre of Ex and Mine Equipment)

Dr. Alexander Zalogin *is the General Director of NANIO CCVE – Certification Centre of Explosion-proof and Mine Equipment, Chairman of the Interstate Technical Committee for Standardization MTC 42 "Explosion-proof and Mining equipment", Chairman of the National Technical Committee for Standardization of the Russian Federation TC 403 " Equipment for explosive atmospheres (Ex-equipment)", and Deputy Head of the Russian National Body (RNO) of the IEC System for certification to standards relating to equipment for use in explosive atmospheres (IECEx System).*

Alexander is also Head of WG 16 " On safety of equipment for working in hazardous environments" of the EU – Russia Industrialists' Round Table Task Force 8 «Technical regulations» for the approximation of provisions of the legislation in the field of technical regulation between the Customs Union and the European Union, an Assessor in the IECEx System recognized in three categories: certification of Ex-equipment, testing, evaluation of the quality system.

In the period from 2011 to 2016, he was the Deputy Chairman of the IECEx System. In the period from 2016 to 2017 – Acting Chairman of the IECEx System. As an Assessor of the IECEx System, Alexander takes an active part in the assessment of bodies and laboratories that are candidates for the acceptance in the IECEx System, the re-assessment of accepted ones, and the interim inspection control of the ExCBs and ExTLs. He is a member of the working groups ExAG IECEx Assessment Group, ExMCWG05 Assessment and Audit of Manufacturer's Quality systems, ExMCWG04 Technical Reference Group for Assessment of ExCBs and ExTLs and ExTAGWG11 Material Data. Alexander is the author of 90 scientific papers and has 16 inventor's certificates.

Abstract:
This paper relates to the safe use of thermocatalytic sensors (TSE) in explosive atmospheres. Thermocatalytic sensors with a platinum sensing element and with the protective grid removed from the sensing element have been shown to ignite a mixture of 21.0% v/v hydrogen and air flowing across the sensing element after the sensing element was exposed to a flowing mixture of 35.0% v/v hydrogen and air.

This phenomenon is due to the development of autocatalysis reaction, even without any power supply.
Four stages of tests have been performed to verify this thesis. It has been shown that the behaviour of a thermocatalytic sensor in the presence of high concentrations of hydrogen, both in the presence and in the absence of a power supply, is identical due to the development of an autocatalytic reaction, i.e. under certain conditions a thermocatalytic sensor with a damaged protective metal flame arrester, even in the absence of a power supply, is a potential source of ignition and, therefore, the absence of a flame arrester of a sufficiently reliable design evaluated as an element of explosion protection, for example, as a flameproof enclosure of the "d?" type, is unacceptable.

24. Flange guards – their use and applicability in managing hazardous area zoning

Thursday 12:10 - 12:50 – Seminar room

James Park, Process Safety Consultant – RAS Ltd

***James Park** is a Process Safety Consultant at RAS Ltd. He studied for his BSC and Master's degrees at the University of Liverpool before joining RAS Ltd in 2014. While working at RAS Ltd James has developed an interest in the DSEAR regulations and is experienced in the classification of hazardous areas and demonstrating compliance for a variety of facilities across the UK.*

Abstract:

Flange guards help to prevent or reduce the extent of flammable mists but there is limited information available on their use and applicability, especially for managing hazardous area zoning and zone classification.

There is also limited evidence of their functionality i.e. testing to ensure that they perform sufficiently. The impact of flange guards on hazardous zoning requirements is also unclear within industry guidance, nor is there an internationally recognised standard for such equipment.

There has been some attempt to develop guidance on the use of flange guards, however at present there is a lack of international recognition. Evidence points to flange guards becoming more prevalent in the future, and certainly, under the right specification, a useful measure for controlling flammable mists. But before hazardous area zones can be managed and classified differently on the basis of flange guard installation, time needs to be spent developing a suitable standard and more guidance on their applicability and functionality needs to be available. Until then, using flange guards to remove hazardous zones should be treated with caution and robust management systems should be in place to identify where their installation is appropriate onsite.

25. Proactive risk management using IIoT and wearables

Thursday 14:00 - 14:40 – Seminar room

Kevin Boyd, Director – 2Value Solutions

*For the past 3 years, **Kevin Boyd** has been providing consultancy services in the Connected Worker space for HSSE, helping leading edge IIOT and wearables start-up companies deliver viable solutions to industry problems, specifically for use in hazardous areas on offshore platforms, onshore gas terminals, refineries and chemical plants.*

Focus areas have included using digital technologies to improve worker health & safety, process safety and reduce emissions. Prior to 2Value, Kevin's roles focused on maximising the business value delivered from Connected Worker digital technologies applied to Operations, Maintenance and Logistics.

Abstract:
Too often safety professionals may feel as if they're holding the parcel when the music stops. Despite best efforts, things still go wrong and the HSE team are left to manage the consequences as best they can.

But what if it didn't need to be this way? What if HSE teams had early warning of the changing risk picture, allowing them to take action before the incident happens?

What if you knew when a worker was first exposed to a high noise level or sniff of Benzene, where and for how long? Having this real-time visibility at your fingertips would allow you to quickly identify an issue you weren't previously aware of, put the necessary mitigations in place, and automatically monitor these mitigations to ensure they are working.

As digital technologies in the form of IOT sensors and wearable devices come to the market, this vision is increasingly becoming a reality.

This paper will suggest that new ways of collecting data related to the worker and the environment they work in (or travel through) are needed to help the industry transform from traditional reactive/preventive ways of working to more proactive/predictive ways. This approach isn't new - we've seen this transformation happen in Maintenance & Reliability, so why not in HSE too?

As the industry thirst for predictive analytics grows, so does the challenge of capturing and integrating larger quantities of high quality real-time data in an easy, inexpensive and automated way. Unlike Maintenance, where the asset under analysis is typically fixed in one location, HSE data often relates to the individual worker and the environment they are exposed to, which can vary during the working day. Ideally, a new mobile method of data capture is needed which follows each worker as they move.

With the advent of the Connected Worker, this is now becoming possible. Smart garments with plug-in miniaturised sensors are emerging which allow gas, noise and other data to be captured and processed "on the worker" to detect anomalies and early risk indicators. Worker exposure levels, fatigue and even early signs of fugitive emissions could be detected in this way.

As risks are detected or predicted, real-time mitigations could be deployed enabling the opportunity to streamline some preventive measures used today and reduce the cost impact to the bottom line and worker time.

So where are we with all of this? Closer than you may realise.

26. Operations-maintenance synergy at petroleum process facilities

Thursday 14:40 - 15:20 – Seminar room

Bassey Okon Bassey, PhD Researcher – Cranfield University

Bassey Okon Bassey *is a PhD Researcher in Energy (Oil and Gas) at Cranfield University, Cranfield, UK. He is currently an ERASMUS+ Scholar at TOTAL Energies Centre for Science and Technology Research at Pau, France, where he works on flow assurance optimisation in multiphase petroleum pipelines. Bassey has been a research consultant, technical marketer and career development coach in private practice for 16 years and counting. He was previously an Hourly Paid Lecturer at Coventry University, UK, upon graduation there with an MSc in Petroleum and Environmental Technology.*

He had worked as an Operations Engineer for Northwest Petroleum and Gas Company Limited for five years; during which he was the maiden research and modification team lead, operations-maintenance synergy coordinator (operations), flow assurance team deputy lead and onboarding lead for his department.

Bassey also holds a BEng in Petroleum Engineering from Federal University of Technology, Owerri, Nigeria. He has completed several relevant professional certifications including NEBOSH, process safety, technical risk assessment, COSHH, oil spill control, first aid, operations and maintenance excellence. He is an active member of the Energy Institute, IMarEST, IMechE, InstMC, NACE, ICorr, SOE, SPE and several other international professional societies. With over 20 conference and journal papers to his credit; his research interests are flow assurance, asset integrity, process optimization and safety, and engineering sustainability.

Abstract:

As oil prices plummet, operators are under increasing pressure to ‘’sweat the asset”. While industrial organisations expand and optimize operations to meet energy demand, they must commit to consistently optimize asset integrity.

Operations personnel are typically concerned with meeting production targets while maintenance teams primarily focus on minimizing breakdowns. Striking a balance between both goals has remained a major root of occupational conflicts in many process facilities, thereby threatening both process and human safety.

This paper elaborates these areas of conflicting interests and consequences using petroleum transportation and storage facilities in the Gulf of Guinea as case study, discusses how conflicts were progressively addressed and highlights the significant outcomes. A key strategy in fostering operations-maintenance synergy (OMS) was appointing an interface coordinator from each department; existing field personnel with working knowledge of the equipment functionalities and typical malfunctions.

Each coordinator performed facility inspections and post installation and/or maintenance monitoring surveys independently, then a combined gap analysis quarterly. Qualitatively, the OMS intervention was observed to progressively evolve a workplace where maintenance, operations and SHE functions formed sustainable partnerships for production excellence and occupational harmony.

Quantitative results included improved data mining for operational decisions, more efficient maintenance planning and execution, prompt response to faults, enhanced asset integrity, increased productivity and continuous improvement in the safety management system.

These were demonstrated through reductions in audit queries, non-productive time, lost production, customer complaints over supply delays, staff turnover and avoidable demurrage payments on chartered tankers. Lessons learnt and recommendations are hoped to contribute towards addressing asset deterioration, workplace conflicts, process safety accidents and other avoidable negatives in process industries upon diligent application.

This study is also a classic example of how local content, available human capacity and existing systems could be better managed for business growth and creating a conducive working environment.

EXHIBITION CONTACTS

ANT Telecommunications – Stand 25
Unit 5, The Courtyard, Meadowbank, Furlong Road, Bourne End, Buckinghamshire, SL8 5AU, United Kingdom
Tel: +44 (0) 1494 833100
Email: info@anttelecom.co.uk
Web: www.anttelecom.co.uk

C&P Engineering Services – Stand 20
Gorseinon Road, Gorseinon, Swansea, SA4 9GE, United Kingdom
Tel: +44 (0)1792 897002
Email: info@cpengineering.co.uk
Website: www.cpengineering.co.uk

CCG Cable Terminations – Stand 22
Unit B Metcalfe Road, Skippers Lane Industrial Estate, Middlesbrough, TS6 6PT, United Kingdom
Tel: +44 (0) 1642 430346
Email: sales@ccgcablegland.co.uk
Website: www.ccgcablegland.co.uk

Cogent Skills – Tabletop
5 Mandarin Ct, Warrington, WA1 1GG, United Kingdom
Tel: +44 (0)1325 740 900
Email: industry@cogentskills.com
Web: www.cogentskills.com

CompEx Certification Ltd – Stand 32
3rd Floor Redwither Tower, Redwither Business Park, Wrexham Industrial Estate, Wrexham, LL13 9XT, United Kingdom
Tel: +44 (0) 800 0852308
Email: info@compex.org.uk
Web: www.compex.org.uk

Connectivity – Tabletop
Blair House, High Street, Tonbridge, Kent, TN9 1BQ, United Kingdom
Tel: +44 (0) 1732 359990
Email: connectivity@imlgroup.co.uk
Web: www.connectivity4ir.co.uk

Dialight – Stand 27
Leaf C, Level 36, Tower 42, 25 Old Broad Street, London, EC2N 1HQ, United Kingdom
Tel: +44 (0) 203 058 3540
Email: sales-europe@dialight.com
Web: www.dialight.com

Dynaco – Stand 11
Waverstraat 21, Moorsel, B-9310, Belgium
Tel: (+32) 491 61 71 90
Email: info@dynaco.eu
Web: www.dynacodoor.com

EXHEAT Industrial – Stand 3
Threxton House, Threxton Road Industrial Estate, Watton, IP25 6NG, United Kingdom
Tel: +44 (0)1953 886252
Email: sales@exheat.com
Web: www.exheat.com

Exloc Instruments – Stand 9
Unit 7, Riverside Court, Delph, Oldham, OL3 5FZ, United Kingdom
Tel: +44 (0) 1457 239301
Email: sales@exloc.co.uk
Web: www.exloc.co.uk

Ex-Machinery Explosion Proof Equipment – Stand 15
Tinstraat 33, 2984 AN Ridderkerk, Netherlands
Tel: +31 180 472880
Email: info@ex-machinery.com
Web: www.ex-machinery.com

F.E.S (Ex) – Stand 31
20 Wilton Road, Humberston, Grimsby, Lincolnshire, DN36 4AS, United Kingdom
Tel: +44 (0) 1472 598987
Email: enquiries@fes-ex.com
Web: www.fes-ex.com

Link Instruments – Stand 8
The Courtyard, Steepmarsh,
Petersfield, Hampshire, GU32 2BJ,
United Kingdom
Tel: +44 (0)1730 897 115
Email: sales@linkinst.com
Web: www.linkinst.com

Meltron – Stand 14
Laivakatu 3, Helsinki, FI-001 50,
Finland
Tel: +358 9 6226 550
Email: info@meltron.fi
Web: www.meltron.com

Mobexx – Stand 12
Unit 21, Blakemere Centre, Chester
Road, Sandiway, CW8 2EB,
United Kingdom
Tel: +44 (0)8455 441 254
Email: sales@mobexx.co.uk
Web: www.mobexx.co.uk

Mutech Ltd – Stand 10
Colin Cameron – Managing Director
Unit 9, Wharfside Business
Park, Irlam Wharf Road, Irlam,
Manchester, M44 5PN,
United Kingdom
Tel: +44 (0) 161 872 0400
Email: sales@mutech.co.uk
Web: www.mutech.co.uk

NEPIC (North East of England Process Industry Cluster) - Tabletop
Room H224, The Wilton Centre
Wilton, Redcar
Cleveland
TS10 4RF
Tel.: +44 (0) 1642 442 560
Email: enquiries@nepic.co.uk
Web: http://www.nepic.co.uk

Pepperl+Fuchs – Stand 18
77 Ripponden Road, Oldham,
Lancashire, OL1 4EL,
United Kingdom
Tel: +44 (0) 161 633 6431
Email: sjwebster@gb.pepperl-fuchs.
com
Web: www.pepperl-fuchs.com

Petrel – Stand 34
22 Fortnum Close, Kitts Green,
Birmingham, B33 0LB,
United Kingdom
Tel: +44 (0)121 783 7161
Email: sales@petrel-ex.co.uk
Website: www.petrel-ex.co.uk

R&M Electrical Group – Stand 16
Unit 2, 362 Spring Road,
Southampton, Hampshire,
SO19 2PB, United Kingdom
Tel: +44 (0)2380 231800
Email: info@rm-electrical.com
Website: www.rm-electrical.com

Rheintacho UK – Stand 21
Enterprise Court, Pit Lane,
Micklefield, Leeds, LS25 4BU,
United Kingdom
Tel: +44 (0) 113 287 4411
Email: sales@rheintacho.co.uk
Web: www.rheintacho.com

ROSE - Phoenix Mecano Group – Stand 17
26 Faraday Road, Aylesbury,
Buckinghamshire, HP19 8RY,
United Kingdom
Tel: +44 (0) 1296 611660
Email: enclosuresales@pmgb.co.uk
Web: www.rose-systemtechnik.com

Roxby Training Solutions – Stand 31
Unit W1 Wellington Court, Preston
Farm Business Park, Stockton-on-
Tees, TS18 3TA, United Kingdom
Tel: +44 (0) 1642 438700
Email: j.dean@roxby.com
Web: www.roxby.com

RUGGED MOBILE Systems – Stand 29
The Carriage House, Brynkinalt
Business Centre, Chirk, Wrexham,
LL14 5NS, United Kingdom
Tel: +44 (0)1691 900222
Email: sianjones@rm-systems.co.uk
Web: www.ruggedmobilesystems.co.uk

SAFT – Stand 2
26 Quai Charles Pasqua, 92300
Levallois-Perret, France
Tel: +33 (0) 549 55 59 44
Email: celine.bernard@saftbatteries.com
Web: www.saftbatteries.com

Sella Controls – Stand 6
Carrington Field Street, Stockport,
Cheshire, SK1 3JN,
United Kingdom
Tel: +44 (0)161 429 4500
Email: sales@sellacontrols.com
Web: www.sellacontrols.com

SeSys – Tabletop 2
Unit 1 Rotherbrook Court, Bedford
Road, Petersfield, GU32 3QG,
United Kingdom
Tel: +44 (0) 1730 230530
Email: info@sesys.com
Web: info@sesys.com

SGS Baseefa – Stand 23
Rockhead Business Park, Staden
Lane, Buxton, Derbyshire, SK17
9RZ, United Kingdom
Tel: +44 (0)1298 766600
Email: Baseefa@sgs.com
Web: www.sgs.co.uk/sgsbaseefa

Site Bright – Stand 5
6 The Dell, Four Ashes,
Wolverhampton, WV10 7DF,
United Kingdom
Tel: +44 (0)1902 791855
Email: info@site-bright.co.uk
Web: www.shindaiwa.co.uk/site-
bright/

Tech-Ex Systems – Stand 33
Coventry Technology Park, Puma
Way, Coventry, CV1 2TT,
United Kingdom
Tel: +44 (0) 2476 792 620
Email: info@tech-exsystems.com
Web: www.tech-exsystems.com

Tempa Pano UK – Tabletop 1
Unit 5, Centre 21 Industrial Estate,
Bridge Lane, Warrington, WA1 4AW,
United Kingdom
Tel: +44 (0) 1925 811290
Email: info@tempapano.co.uk
Web: www.tempapano.co.uk

Thorne & Derrick – Stand 3
Unit 7, Lumley Court, Drum
Industrial Estate, Chester-Le-Street,
DH2 1AN, United Kingdom
Tel: +44 (0)191 410 4292
Email: tmcdonald@
thorneandderrick.co.uk
Web: www.heatingandprocess.com

Total Rental Solutions – Stand 1
Tracey Hays – Marketing Specialist
Unit H3, Morton Park Way,
Darlington, DL1 4PH,
United Kingdom
Tel: +44 (0) 1325 609040
Email: info@trs-hire.com
Web: www.trs-hire.com

Trainor – Stand 26
Prestegaten 3-5, NO-3126
Tønsberg, Norway
Tel: +47 33 37 89 00
Email: post@trainor.no
Web: en.trainor.no/cms/

TUV SUD – Stand 4
Octagon House, Concorde Way,
Segensworth North, Fareham,
Hampshire, PO15 5RL,
United Kingdom
Tel: +44 (0)3300 169 924
Email: info.uk@tuvsud.com
Web: www.tuvsud.com/uk

Zalux – Stand 30
Avda. Manuel Rodríguez Ayuso
114, P-1ª, P-2. Centro Empresarial
Miralbueno, Zaragoza, 50012,
Spain
Tel: +34 976 46 22 00
Email: info@zalux.com
Web: www.zalux.com

Published by **IML Group**

www.connectivity4ir.co.uk

Connectivity – Everything you need to know about how to get the best out of Industry 4.0 and the Industrial Internet of Things.

Panel Building & System Integration – The UK's only dedicated multimedia platform for panel builders and system integrators.

www.pbsionthenet.net

www.dpaonthenet.net

Design Products & Applications – The UK's best multimedia platform to reach engineering designers, covering a broad range of engineering disciplines and industrial sectors.

Electronic Product Design & Test – The UK's leading technical journal for electronics design, manufacturing & test engineers.

www.epdtonthenet.net

www.hazardexonthenet.net

Hazardex – Dedicated to providing the latest information relevant to those responsible for safe operations within hazardous environments around the world.

CEE – With over 30 years' experience serving the region's senior engineers who design, maintain or manage control/instrumentation systems and equipment, CEE provides readers with both global and regional insight that adds value to their business operations.

www.controlengeurope.com

IML Group plc
Blair House, High Street, Tonbridge, Kent, TN9 1BQ United Kingdom
Tel: +44 (0) 1732 359990 Email: subscriptions@imlgroup.co.uk