Hazards33

7–9 November 2023, Birmingham, UK

Event guide

IChemE Safety Centre

IChemE

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- Learn from incidents
- Make decisions based on real-time overviews
- Integrate with Enablon Vision Platform

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Welcome

A very warm welcome to Birmingham and to *Hazards 33*! Thank you for making the time to be here with us over the next few days to advance your understanding and application of managing major hazards. We are delighted to bring together so many Hazards practitioners from around the world for what promises to be a stimulating and insightful event.

As always we have a varied and full agenda over the next few days; you will discover a comprehensive programme of presentations designed to stimulate insight into the key major hazard challenges impacting industry. You will hear from a wide range of industry experts who will share insight, experience, and know-how across the full spectrum of process safety topics. We also have a series of facilitated workshops on key process safety topics and developments which will be of interest. Thank you to all our presenters for taking the time to share their knowledge and experience.

The programme for *Hazards 33* includes many practical examples of good practice and application of lessons learnt, that you can learn from and then apply in your own operations. It will also explore the new major hazard implications of the challenges and opportunities facing the industry eg the energy transition, climate change, decarbonisation, protection of the environment, and digitalisation. These are themes that have resonated with previous *Hazards* attendees and we look forward to renewing and deepening the discussions over the next few days.

Don't forget that you can watch videos of our presentations via our Hazards On-Demand portal. With presentations delivered across parallel sessions, this is an excellent way to catch up on content that you missed or to revisit those that interested you the most. The conference papers are also available–see page 12 for more details.

We have built plenty of time into the programme for questions and discussion to facilitate engagement and to help identify common issues. I encourage you all to participate, challenge and ask questions, and to continue your discussions during the session breaks.

We're delighted to welcome our exhibitors to *Hazards 33*, many of whom are long-standing *Hazards* supporters. Please do take the time to meet them during the welcome reception and the refreshment breaks.

Finally, I would like to thank our valued sponsors for their support, and my fellow technical committee members for building the conference programme and facilitating discussions during the event.

I wish you all the most enjoyable and stimulating conference. I hope that you leave feeling reconnected and motivated to encourage the application of good practice back in your workplace, to continue to advance the need for strong process safety leadership, and to champion understanding of the emerging challenges.

Best wishes

Eamon Chandler

Chair, *Hazards 33* technical committee

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Conference programme

Note: the programme may be subject to alteration

Tuesday 7 November 2023

12:00–13:30	Registrations with poster and exhibition viewing	
13:30–13:45	**Opening session** Welcome – Eamon Chandler, Chair, *Hazards 33* Technical Committee	Imperial
13:45–14:30	**Plenary presentation** *Developments in Human Factors and Behavioural Safety* Professor Rhona Flin, Emeritus Professor, University of Aberdeen and Professor of Industrial Psychology, Robert Gordon University, UK	Imperial
14:30–15:15	Refreshment break with poster and exhibition viewing	Britannia

PM	Learning from Incidents Imperial Session chair: Caroline Ladlow	Hydrogen Hazards Trafalgar Session chair: Jérôme Taveau
15:15–15:40	*Catastrophic Incidents – Prevention and Failure* Trevor Hughes, Hughes Consultancy and Research, UK	*Assessment Techniques for Supporting ALARP Demonstration for Energy Transition Projects* Richard Tiffin, ESR Technology, UK
15:45–16:10	*Learning Effectively from Near-miss Reporting* Stuart King, Energy Institute; Tony Gower-Jones; Stichting Tripod Foundation; and Ibrahim Khan, Energy Institute, UK	*Guidance for UK Hydrogen Safety Case Development* Sean Baker and Nikhil Hardy, ERM, UK
16:15–16:40	*Lessons Learned from Past Incidents/Near-misses – WestJet Flight 2652* Abbie Harvey, Civil Aviation Authority, UK	*Hydrogen as a Fuel for Industry: Technical and Safety Challenges* Luke Butcher, ESR Technology and Graeme Cook, Aecom, UK
16:45–17:10	*Identifying and Managing Weak Signals – The Platypus Philosophy* Trish Kerin, IChemE Safety Centre, Australia	*Review of Gaps and Needs in Data Collection and Definition of Equipment Classes, Failure Modes and Safety Equipment for Hydrogen Systems* Marta Bucelli and N Paltrinieri, SINTEF Energy Research AS, Norway

Technical committee

Thank you to our technical committee members who volunteer their time to build the programme and facilitate discussions during the conference:

- Eamon Chandler – Chair
  Consultant, (formerly Royal Dutch Shell)
- James Birch (BakerRisk)
- Matt Clay (Health and Safety Executive)
- Tony Clayton (Environment Agency)
- Paul Coleman (Marsh)
- Leonidas Constantinou (Shell)
- Andrew Crerand (Shell)
- Chris Fort (ExxonMobil)
- Zsuzsanna Gyenes
  (European Commission Joint Research Centre)
- David Hatch (Process Safety Integrity)
- Ashley Hynds (WSP)
- Vira Jogia (VRJ Consultancy Ltd)
- Trish Kerin (IChemE Safety Centre)
- Caroline Ladlow (Kindlow Safety Services)
- Diego Lisbona (Office for Nuclear Regulation)
- Andy Mackiewicz (AMPA Associates)
- Rob Magraw (BakerRisk)
- Angela Rodriguez Guio (BP)
- Arvinder Saimbi (Wood Group)
- Khalid B Shaiful (PETRONAS)
- Felicia Tan (BP)
- Jérôme Taveau (SI Group)
- Christopher Tighe (Imperial College)
- Ivan Vince (ASK Consultants)
- Louise Whiting (Barberton Ltd)
- Azzam Younes (AyEnergi Consulting)

If you are interested in joining the technical committee, visit **www.icheme.org/volunteering-opportunities**

Assurance

Bracebridge
Session chair: Andy Mackiewicz

Threshold Quantity for Process Safety Metrics for Special/Coded Chemicals
Hema Divya Katna, University of Aberdeen, UK and Rahul Raman, Kaypear Engineering LLP, India

Performing a Technical Audit With Some of the Findings
Robert Canaway, Suregrove, UK

Development of a Novel Risk Assessment Methodology to Assess and Communicate the Effectiveness of Risk Control Measures and Strategies Applied to a Covid-19 Scenario
Colin Chambers, April Lockhart and Zoe Chaplin, Health and Safety Executive, UK

Modelling & Simulation

Ballacrane
Session chair: Felicia Tan

Development of a Practical Methodology for Assessing the Major Accident Risks Associated with Carbon Dioxide Pipelines in Areas of Topography
Robert Melville, Alison Thackery and Ian Lines, Kent PLC, UK

Data Driven Gas Dispersion Modelling Leveraging Machine Learning and Artificial Intelligence
Kehinde Shaba, Anglo American, UK

CFD-based Evaluation of Inherently Safer FPSO Layouts
Etienne Guinot, SBM Offshore, Netherlands; Laurent Paris; Efectis France and Josue Quilliou, Gexcon France

Statistical-based Maintenance for Above Ground Gas Risers in Domestic High-rise Buildings
Simon Au and Pasindu Samaranayake, ERM, Hong Kong

Workshops

Waterloo

15:15–17:15
Human Factors in the Chemical and Process Industries
Presented by IChemE and The Keil Centre

Tuesday 7 November 2023

17:30–18:15	**Trevor Kletz Hazards Lecture** *New Energy and Sustainable Technology* Amir Gerges, Vice President, Group Safety, Shell, US	Imperial
18:15–18:30	**IChemE update**	
18:30–20:00	Welcome reception	Britannia

Wednesday 8 November 2023

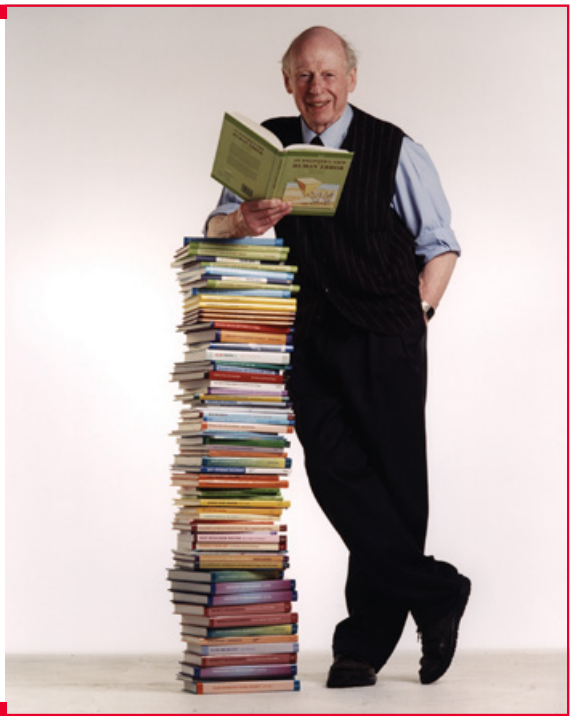
08:30–09:15	**Plenary presentation** *Process Safety Challenges from a North American Perspective* Dr Faisal Khan, Director, Mary Kay O'Connor Process Safety Center, USA	Imperial
09:15–10:00	**Plenary presentation** *Developments in Hydrogen Infrastructure and Strategy* Dr Stuart Hawksworth, Head of Centre for Energy and Major Hazards, Health and Safety Executive, UK	Imperial
10:00-10:30	Refreshment break with poster and exhibition viewing	Britannia

AM	Safety Culture – Leadership Imperial Session chair: Jérôme Taveau	Non-routine Operations Trafalgar Session chair: Louise Whiting
10:30–10:55	*It Starts at the Top – the Effect of Human Factors and Leadership on Safety* Yokogawa YOKOGAWA Co-innovating tomorrow RAP4	*Operational Risk Assessment: Sharing Good Practice for the Control of Major Accident Risk* Tom Downie, INEOS FPS, UK
11:00–11:25	*Engaging Leadership: Getting Better Insights from Incident Investigations* Stuart King, Energy Institute; Tony Gower-Jones, Stichting Tripod Foundation; and Ibrahim Khan, Energy Institute, UK	*Guidelines For Managing Abnormal Situations* Roger Stokes, BakerRisk, UK
11:30–11:55	*Process Safety Leadership Site Visit Toolkit* Ashley Hynds, DNV, UK	*Pre Start-up Safety Review (PSSR): Significance, Common Pitfalls and Insights for an Effective Review* Mohammad Moonis and Mohammad Mulhim, Saudi Aramco, Saudi Arabia
12:00–12:25	*The Difference That Makes the Difference – Identifying and Applying Criteria for Safety Leadership Excellence* Rachael Cowin, Legitimate Leadership, UK	*Outside in Risks (OiR)* Pratik Toshniwal, Shell, India

12:30–13:30	Lunch break with poster and exhibition viewing	Britannia

Process safety pioneer, Trevor Kletz, made a significant contribution to the *Hazards* conference series from its outset in 1960, speaking regularly, reviewing papers and serving on the technical committee for many years.

Following his death in 2013, the annual *Trevor Kletz Hazards Lecture* was created to recognise his contribution.



Hydrogen Experimental Results

Bracebridge
Session chair: Chris Tighe

Lessons Learned from Experimental Tests Concerning Liquid Hydrogen Releases

Federica Tamburini, Federico Ustolin and Nicola Paltrinieri, Norwegian University of Science and Technology, Norway; Ernesto Salzano, Valerio Cozzani, University of Bologna, Italy

Digital Image Processing for the Estimation of the Heat Flux Entering a Liquid Hydrogen Tank Exposed to a Fire

Alice Schiaroli, Norwegian University of Science and Technology, Norway; Giordano Emrys Scarponi, University of Bologna, Italy; Christian Mata, Universitat Politècnica De Catalunya, Spain; Valerio Cozzani, University of Bologna, Italy; and Federico Ustolin, NTNU, Norway

Quantification of Liquid Hydrogen Jet Fires from Large Scale Experiments

Steven Betteridge, Shell, UK

Effect of Hydrogen Depressurization on Steel Pipe in Case of Puncture: Experimental Results and Analysis

Vincent Blachetiere, GRTgaz; Guillaume Leroy, INERIS, Jérôme Poenou; and Magali Polo, GRTgaz, France

Digitalisation

Ballacrane
Session chair: Vira Jogia

Artificial Intelligence in Safety, the Future or a Recipe for Disaster?

Craig Paterson and David Jamieson, Salus Technical, UK

Embedding IOGP Process Safety Fundamentals in the Frontline using AI

Edwin Bailey, Ithaca Energy (UK) Limited, UK

Driving Process Safety Performance Through Intelligent Dashboard

Sai Vijaya Krishna Malluri, HMEL, India

Enhancing Process Safety Understanding Through Virtual Reality: An Interactive Simulation of an Offshore Installation Well Bay

Josh Crawley and Dr E J Bailey, Ithaca Energy (UK), UK

Workshops

Waterloo

An Evolved Approach to Process Safety Management –Combining the Power of PHA, Bowties and Cumulative Risk

10:30–11:00

Bowtie Technique

Bowtie basics & building game

11:00–11:30

Bowtie Tools

PHA to Bowtie, Cumulative Risk & Integration with Vision Platform

11:30–12:00

Bowtie Technique

Bowtie basics & building game

12:00–12:30

Bowtie Tools

PHA to Bowtie, Cumulative Risk & Integration with Vision Platform

Presented by

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Wednesday 8 November 2023

PM	Safety Culture–Operator's Experience Imperial Session chair: Angela Guio Rodriguez	Critical Task Analysis Trafalgar Session chair: Arvinder Saimbi
13:30–13:55	*Enhancing Process Safety* Caroline Myers and Simon Mugford, ExxonMobil, UK	*How to Carry Out Human Factors Assessments of Critical Tasks – CIEHF Guidance* Pippa Brockington, HF Expertise; Lorraine Braben, Lorraine Braben Consulting; and Jamie Henderson, Human Reliability Associates, UK
14:00–14:25	*Safety Culture in an Operating Environment* Ron Ramshaw, Safety Management Solutions, UK	*Using Outputs from Safety Critical Task Analyses to Support Rapid Identification of Human Factors Issues in Related Tasks* Dominic Furniss and Jamie Henderson, Human Reliability Associates; Karam Singh Bhinder, Johnson Matthey, UK
14:30–14:55	*Transition of Engro Fertilizers from Compliance-based to Risk-Based HSE Management System (Process Safety)* Qazi Wasif Ud Din, Sheeraz Hussain Syed and Mohsin Mukhtar, Engro Fertilizers, Pakistan	*How to Carry Out a Human Factors Review of Safety Critical Tasks: Safety Critical Task Analysis* Toby Garner and Simon Layton, MES International, UK
15:00–15:45	Refreshment break with poster and exhibition viewing	Britannia

PM	Safety Culture Imperial Session chair: Ashley Hynds	Safety Critical Task Analysis Trafalgar Session chair: Arvinder Saimbi
15:45–16:10	*How Much Chronic Unease is Enough?* Jan Skriver and Mohammad Shafiq, Sandvik Coromant, Sweden	*Integration of Qualitative Human Factors Safety Critical Task Analysis with Wider Engineering Risk Assessments* Jamie Henderson and Dominic Furniss, Human Reliability Associates, UK
16:15–16:40	*Learning from Process Safety Events – a Culture Improvement Journey* Naseem Qamar Shaikh and Syed Aamir Abbas, Mari Petroleum Company, Pakistan	*Leak Testing When Reinstating Plant – It's More Complicated Than You Think* Michelle Cormack, Perenco and Andy Brazier, AB Risk, UK
16:45–17:15	*Kick Starting Process Safety in the Pulp and Paper Industry in Western Canada* John Riddick and Francesca Apruzzese, Caldbeck Process Safety, Canada	Facilitated discussion
17:15–17:45	Facilitated discussion	

19:00–22:00	Social event (ticket only)

If you have registered to attend the social event, this is indicated on your name badge. This is your ticket, so don't forget to bring it with you. Dress code is casual.

Hydrogen Risk Assessment	Competencies	Workshops
Bracebridge Session chair: Chris Fort	Ballacrane Session chair: Azzam Younes	Waterloo
Rationalising Ignition Probability Models for QRA of Hydrogen Supply Chain Facilities Sriram Raghunath, Shell, India and Andrew Crerand, Shell Global Solutions, UK	***Developing the Skills for our World-class Process Safety Workforce*** Neil Smith and Justine Fosh, Cogent Skills, UK	**13:00-15:00** **Overwhelmed by Safety Critical Task Identification?** Presented by Axiom
To Enclose or Not to Enclose? An Investigation on the Influence of Ventilation Arrangements on Hydrogen Explosion Hazards in Compressors Karina Almeida Leñero and Chris Gold, Gexcon, UK	***IChemE Major Hazards Committee Process Safety Competencies Project – an Update*** Helen Conlin, Essar Oil, UK and Carolyn Nicholls, RAS, UK	
Hazard Assessment of Energy Storage Systems with a Focus on Hydrogen and Hydrogen Derivatives John Evans, Thornton Tomasetti, UK	Facilitated discussion	AXIOM MAXIMISING ASSETS - MINIMISING RISKS

Hydrogen Lessons Learned	Cross-sector Learning (Nuclear)	Workshops
Bracebridge Session chair: Andy Crerand	Ballacrane Session chair: Zsuzsanna Gyenes	Waterloo
Lessons Learned from Hydrogen System Integration Graham Morrison and Karina Almeida, Gexcon, UK	***Development of a Safety Culture Model and Measure for Great Britain's Nuclear Industry*** Nick Shaw, Office for Nuclear Regulation, UK	**15:30-17:30** ***Delta HAZOP*** Presented by IChemE
Lessons Learned from H_2-related Incidents: Criticality of Maintenance Operations Giulia Collina, Abhishek Subedi, Alessandro Campari, Biraj Singh Thapa and Nicola Paltrinieri, Norwegian University of Science and Technology, Norway	***Responding to Climate Change: Improving Resilience to Changing Natural and External Hazards at a Nuclear Fuel Facility*** David Threlfall, Rebecca Bettison and Mervyn Hayes, Rolls-Royce, UK	
Advances in Hydrogen Detonation Modelling with FLACS Djurre Siccama, Gexcon, UK	***Engineering Substantiation in the Nuclear Industry*** Gareth Davies, Sellafield Ltd, Adam Marriott, EDF Energy and Tim Boland, Sellafield Ltd, UK	IChemE
Facilitated discussion	Facilitated discussion	

Thursday 9 November 2023

09:00–09:45	**Plenary presentation** *The New UK Government Initiative on Best Available Techniques and its Implications* Simon Holbrook, Senior Advisor, UK BAT Team, Environment Agency, UK	Imperial
09:45–10:30	Refreshment break with poster and exhibition viewing	Britannia

AM	New Energies Imperial Session chair: Matt Clay	Hazardous Area Classification Trafalgar Session chair: Andy Mackiewicz
10:30–10:55	*Enabling a Safe Energy Transition – How Industry Can Work with its Regulators to Seize the Opportunities of Net Zero* Max Walker, Health & Safety Executive, UK	*Energy Institute Guide 15 Edition 5 Launch (ATEX/ DSEAR)* Tim Jones and Steve Sherwen, RPS Consulting UK and Ireland, UK
11:00–11:25	*Mitigation Strategies for Lithium Ion Battery Energy Storage Systems* Denise Beach, FM Global, USA	*Visualising Flammable Risks in Drainage Systems* Jonathon Lowe, RPS Consulting UK & Ireland and Ian Spriggs, Anglian Water, UK
11:30–11:55	*Performing a Quantitative Risk Assessment for Utility-scale LiFePO4 Battery Energy Storage Systems: a Case Study for First-of-a-kind Installation in South Africa* Liza Smit and Adriaan van Wyk, Proconics, South Africa; Oliver Heynes and Allen Miller, Insight Numerics, USA; Richard Walls and Natalia Flores Quiroz, Stellenbosch University, South Africa; Peter McDonald, Chris Stirling and Andrew Nicholson, Viper Applied Science, UK	*A Critical Evaluation of the Basis of Safety for Zone of Negligible Extent in Area Classification* Keith Johnson and D De'Ath, Sellafield Ltd, UK
12:00–12:25	*Practical Process Safety Decision Making in Decarbonisation and New Technologies Plant Design* Helen Fennell and Stuart Hunter, Petrofac, UK	*HAC to Hazard Hack* Wahid Azizi, DEKRA, UK

12:30–13:30	Lunch break with poster and exhibition viewing	Britannia

Human Factors	Engineering & Design	Workshops
Bracebridge Session chair: Trish Kerin	Ballacrane Session chair: Diego Lisbona	Waterloo
Human Factors Health Check: An Approach to Assessing Compliance with the Human Factors Operational Delivery Guide Julie Bell and Pippa Brockington, Human Factors Expertise, UK	***Verifying Compliance with Blowdown Performance Standards Using Advanced Analytics*** Anthony Teodorczuk and Daniel Rowe, SBM Offshore, Monaco and Morgan Bowling, Seeq, USA	**10:15-12:15** ***Unlocking Exceptional Plant and Facility Performance with SMART ASSETS: Harnessing Advanced Analytics for Actionable Insights*** Presented by PETRONAS PETRONAS
Human Factors Issues and Solutions When Undertaking Major Projects on Operational Sites Andy Brazier, AB Risk and Nick Wise, SSE Thermal, UK	***Hydrogen Failures Without Hydrogen*** Conor Fraser, Axiom, UK	
Making Safe Decisions – Our Brains Are Our Worst Enemy Daryl Wake, DEKRA, UK	***The Practical Application of Radio Frequency Interference Assessment*** Steve Sherwen, RPS Consulting UK and Ireland, UK	
Data Analysis of Behavior Barrier in Permit to Work System Anshulkumar Tiwari and Shrikant Kamle, HMEL, India	***Phishing for Biohazards–Understanding Industrial Cyber Risks to Biosafety*** Gavin Oldroyd and Fan Ye, Environmental Resources Management (ERM), UK	

Thursday 9 November 2023

PM	New Energies	Human Factors
	Imperial Session chair: David Hatch	Trafalgar Session chair: Trish Kerin
13:30–13:55	*Good Practices on Effectively Managing Process Safety Issues When Replicating a Modular Midscale LNG Design* Veronica Luna, Fluor Corporation, Philippines	*Jump to It! - A New Model for Safety Alarm Operator Response Time Requirements that Avoids Misplaced Conservatism* Harvey Dearden, SIS Suite and Andy Brazier, AB Risk, UK
14:00–14:25	*Explosion Safety in Anaerobic Digestion Sites: Where It Can Go Wrong and Guidance to Avoid That Happening* Sarah Bergin, Graham Atkinson, Alan Beswick, Brian Crook, Tim Small and Lee Schilling, Health & Safety Executive, UK	*Situation Awareness as a Factor in Accidents and Incidents* Graeme Dick and Mike Pollard, Reflekt AS, Norway
14:30–14:55	*Historical Analysis on Wind Turbine Fire Incidents* Vahid Foroughi, ERM, UK and Adriana Palacios, Universidad de las Américas, Puebla, México	*Extracting Performance Influencing Factors (PIFs) from Accident Reports* Andrea Rossi and Richard Or (Ming Ho Or), Empirisys, UK
15:00–15:25	Facilitated discussion	Facilitated discussion

15:30–16:00	**Closing session**	
	Eamon Chandler, Chair, *Hazards 33* Technical Committee	Imperial

Presentation videos and papers

Don't forget that you can watch *Hazards 33* presentations and download the conference papers on the Hazards On-Demand portal.

If you're new to the Hazards On-Demand portal, or need a reminder about how to log on, check your email for more details.

bit.ly/hazards-on-demand

You have unlimited access to the Hazards On-Demand portal until November 2024.

As an added bonus, you'll also find a large selection of presentations and papers from previous *Hazards* conferences.

Please note that not all presenters have provided videos/papers to accompany their presentations.

Environmental & Climate Change

Bracebridge
Session chair: Tony Clayton

Valuation of the Environment for COMAH Cost-benefit Analysis

Amaia O'Reilly, Energy Institute and Rob Ritchie, RAS, UK

NaTech Hazards – What Are They? Why Should We Care? And What Can We Do?

Aimee Russell, Carolyn Nicholls and Robert Ritchie, RAS, UK

Adapting Hazard Studies to Reflect Climate Change

Mike McKay, TÜV Rheinland Industrial Services and George Watson, Manchester University, UK

Facilitated discussion

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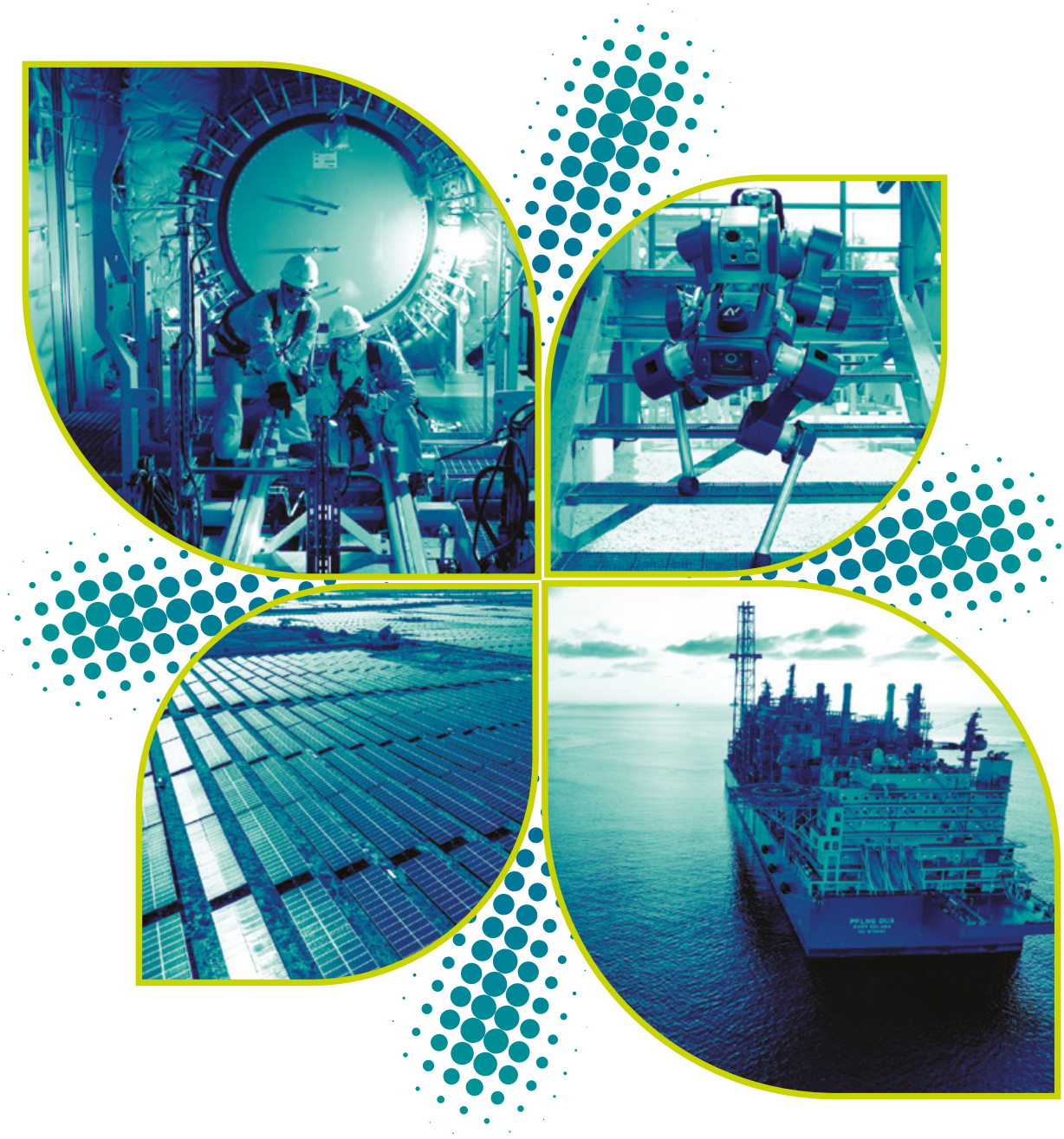

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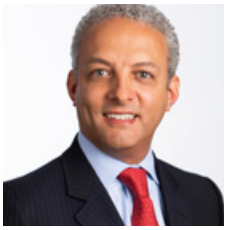
Plenary speakers

Amir Gerges

Vice President for Group Safety, Shell, US



Trevor Kletz Hazards lecture

Amir is Vice President for Group Safety in Shell. In his current role he is responsible for leading the safety improvement journey for all Shell assets, projects and functions.

He started his career with Shell in Egypt in 1998 as a Facilities Engineer, and from there moved on to take various technical and business leadership roles for Shell in the UK, Norway, Korea, Russia, USA and The Netherlands.

Prior to his current role, Amir was Vice President for Shell's Permian Assets in the US. He holds a BSc in Construction Engineering and MSc in Environmental Sciences from the American University in Cairo. He is a Fellow of the Energy Institute (FEI) and a Chartered Petroleum Engineer (CEng.).

Amir served as a board member of the Texas Oil & Gas Association (TXOGA), the Permian Road Safety Coalition, and the Permian Strategic Partnership.

During his presentation, Amir will talk about new energy and sustainable technology covering topics related to energy transition and safety.

Professor Rhona Flin

Emeritus Professor, University of Aberdeen and Professor of Industrial Psychology, Robert Gordon University, UK

Professor Flin has conducted applied research for several decades, including research examining non-technical skills and safety climate. She has written several textbooks on non-technical skills, including the key text *Safety at the Sharp End: A Guide to Non-Technical Skills*.

She is a fellow of several societies, including the British Psychological Society and the Royal Aeronautical Society. She is a member of multiple groups, including the Military Aviation Authority. She is also on the editorial board for several applied academic journals.

In her presentation, Rhona will talk about current developments in human factors and behavioural safety, particularly focused on non-technical skills, and how this may translate to an improved safety culture.

Dr Faisal Khan

Mike O'Connor II Chair Professor and Director, Mary Kay O'Connor Process Safety Center, US

Dr Faisal Khan is Mike O'Connor II Chair Professor and Director of the Mary Kay O'Connor Process Safety Center at Texas A&M University and Director of Ocean Energy Safety Institute, a US Department of Energy and US Department of Interior funded applied R&D initiative.

Dr Khan is former Professor and Canada Research Chair (Tier I) of Offshore Safety and Risk Engineering at Memorial University of Newfoundland, Canada. He is the founder of the Centre for Risk Integrity and Safety and Engineering. His research interest areas include process safety, system safety and security, extreme event modelling, asset integrity and risk engineering.

He is a Fellow of the Canada Academy of Engineering. He has authored over 500 research articles in peer-reviewed journals and mentored 80 PhDs and 85 master students. He is Editor-in-Chief of the *Journal of Process Safety & Environmental Protection* (IChemE) *and Safety in Harsh Environments* (Nature Springer).

In his presentation, he will be talking about the challenges facing process safety from a North American perspective.

Stuart Hawksworth

Head, Centre for Energy and Major Hazards, Health and Safety Executive, UK

Stuart Hawksworth is Head of the Centre for Energy and Major Hazards at the Health and Safety Executive's Science and Research Centre in Buxton in the UK, with 30+ years' experience in process safety research and particularly relating to hydrogen safety.

He was President of the International Association for Hydrogen Safety (IAHySafe) from 2018 to 2022 and is now an Honorary Member. He is also a member of the Clean Hydrogen Partnership's European Hydrogen Safety Panel and a visiting Professor at the University of Ulster.

In his presentation, Stuart will talk about current developments in hydrogen infrastructure and strategy and how this relates to its safe use across the process and related sectors both now and in the future.

Simon Holbrook

Senior Advisor, UK BAT Team, Environment Agency, UK

Simon has a background in chemical engineering, with 35 years' professional experience, spanning research & development, pollution control and process safety. He has detailed knowledge of many industrial sectors from his experience in both the private and public sectors, including energy, waste and the manufacturing of consumer goods.

He is currently a Seconded National Expert at the European IPPC Bureau in Seville, working as lead author on the reviews of the Large Volume Organic Chemical Industry BREF and the Waste Incineration BREF.

In his presentation, Simon will give an update on the new UK Government initiative on Best Available Techniques for the UK (UK BAT) and what implications this may hold for the process industry sector experience.

MES

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- Corrosion Management & Risk Based Inspection (RBI)
- Maintenance Engineering
- Computerised Maintenance Management System (CMMS)

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Our Safety Engineers are TÜV Rheinland, and EXIDA certified and are competent to apply international safety standards at each of the safety life-cycle stages.

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Process Safety typically involves protecting against Major Accident Hazards. Our process safety team has wide-ranging experience and knowledge of functional safety, IEC 61511 process safety and IEC 61508 umbrella safety standards, and regulatory compliance across multiple industries.

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- Allocation to protection layers
- SIL Verification
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Simon O'Shea
Industrial & Safety Systems
soshea@neodyne.ie

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AXIOM
MAXIMISING ASSETS - MINIMISING RISKS

Axiom is an award-winning multi-disciplined engineering consultancy. We deliver pragmatic, value-adding asset management solutions to a range of sectors including energy, pharmaceutical, chemical, oil & gas, bulk storage and food industries.

We are committed to excellence and supporting our clients across the UK and globally from our regional offices in the major hubs of Teesside, Humber, North West and Grangemouth.

With recognised integrity management capabilities, our people and services are uniquely positioned to identify and mitigate key through-life risks. Delivering process safety, mechanical and materials engineering in addition to inspection solutions to support you, our valued partners across the entire asset life cycle.

www.axiom-ltd.com

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PETRONAS

PETRONAS is a dynamic global energy group with presence in over 100 countries. The Group produces and delivers energy and solutions that power society's progress in a responsible and sustainable manner.

PETRONAS seeks energy potential across the globe, optimising value through its integrated business model. Its Group portfolio includes cleaner conventional and renewable resources and a ready range of advanced products and adaptive solutions.

Sustainability is at the core of what the Group does, as it harnesses the good in energy to elevate and enrich lives. Our passion for progress drives us to create better solutions that benefit people, our partners, and the planet. People are our strength and partners for growth, driving passion for innovation to progress towards the future of energy sustainability.

Our values are embedded in our culture as the backbone of our business conduct, reflecting our sense of duty and responsibility in upholding our commitment towards contributing to the well-being of peoples and nations wherever we operate.

www.petronas.com

Wolters Kluwer

Gold sponsor

Wolters Kluwer is a global provider of professional information, software solutions, and services. Through a vast organisational portfolio, Wolters Kluwer businesses help customers make critical decisions every day by providing expert solutions. Enablon, a Wolters Kluwer business, connects the dots between EHSQ, risk and compliance, ESG and operations through the implementation of various software solutions, including the Bowtie software suite.

We believe risks can only be managed when completely understood. This is where the bowtie method comes in, a popular approach in the field of operational risk management. The bowtie method is unique in its ability to visualise complex risks in a way that is understandable, yet also allows for detailed risk-based improvement. Besides being easy to understand, bowties also provide an overview and insight in risk analysis and assessment. As a result, bowtie diagrams reduce complexity to a manageable size without losing context and focus on the critical elements. Additionally, bowtie diagrams can be used to demonstrate that risks are being controlled and provide management with the assurance data. Due to the visual power of the bowtie diagram, many regulators recommend bowtie diagrams to be used in safety-studies or safety-cases.

Improve your business by using proven barrier-based methods.

www.wolterskluwer.com/enablon

YOKOGAWA
Co-innovating tomorrow™

RAP4

Gold sponsor

Yokogawa Electric Corporation provides advanced solutions in the areas of measurement, control, and information to customers across a broad range of industries, including energy, chemicals, materials, pharmaceuticals, and food. Yokogawa addresses customer problems regarding the optimisation of production, assets, and the supply chain with the effective application of digital technologies, enabling the transition to autonomous operations.

Founded in Tokyo in 1915, Yokogawa continues to work toward a sustainable society through its 17,000+ employees in a global network of 122 companies spanning 61 countries.

Yokogawa UK Limited, a subsidiary of Yokogawa Electric Corporation, combines innovative and cutting-edge technology with project management, engineering and consultancy services and delivers operational excellence, safety and reliability throughout project delivery and maintenance life cycle.

Through the office in Swansea, safe digital Control of Work solutions are developed under the name of RAP4. The RAP4 Software System is an intelligent alternative to digitising paper-based systems to provide a configurable and highly scalable solution. The result being a much safer, more efficient, and cost-effective asset.

RAP4 was originally created as an application for the high hazard oil and petrochemical industry but has now expanded into other industries like chemicals, pipelines, steel, property maintenance, logistics, ports, industrial cities, pharmaceutical, gas distribution networks, liquified natural gas, biofuels, cement and more on the way.

www.yokogawa.com | www.yokogawa-rap.com

Silver sponsor

At BakerRisk, we don't just work for you, we work with you as a partner to keep your people and facilities safe by offering a broad range of services.

For over 35 years, our professionals have shared expert industry knowledge and skills, while utilising the latest tools and methodologies to provide solutions tailored to our clients, helping them manage their risk exposures. We are especially proud of establishing many long-lasting business relationships with our clients, some spanning decades.

Our clients know we will not only meet their needs but exceed their expectations with sound solutions and advice. In addition to client-tailored services, BakerRisk also regularly supports safety committees and forums worldwide in an effort to proactively identify industry needs and develop innovative approaches to address those concerns.

www.bakerrisk.com

At ERM, sustainability is our business.

With more than 50 years of experience, ERM encourages clients to move beyond traditional compliance and corrective programs so that they can maximise the return on their investments in safety– to safeguard lives, protect assets and strengthen reputation.

ERM helps organisations to:

Silver sponsor

- strengthen their existing safety culture and demonstrably improve their safety performance
- reduce risks by developing skills to better observe unsafe behaviours, identify hazards and empowering people to take action
- enhance the effectiveness of leaders, employees and contractors to promote safer outcomes
- reinvigorate existing processes and progammes – maximising the value of safety investments.

We have a broad and diverse global consulting team that includes health, safety and risk management consultants, stakeholder management consultants, data analysts, human factors specialists, engineers, and coaches.

www.erm.com

Silver sponsor

ESR Technology
Engineering, Safety & Risk

We are delighted to continue our long-running support for one of the world's leading process safety conferences.

As one of the UK's leading engineering, safety and risk consultancies, ESR Technology provides pragmatic, independent and specialist support to operators, designers and contractors to manage safety and reliability in all sectors where safety is critical and performance improvement through innovation is the competitive edge.

Working in partnership with our clients, we deliver a specialist consultancy service. Our core services include:

- hazard analysis facilitation
- duty holder support for safety cases/safety reports
- major hazard quantified risk assessment
- consequence modelling, including computational fluid dynamics. We employ state-of-the-art tools, techniques and software, many developed in-house by our internationally recognised experts
- technical/process safety assessments
- fire engineering, including 3D fire and gas detector mapping
- specialist support to decommissioning and energy transition projects
- advanced offshore non-destructive testing joint industry project
- forensic engineering of failed mechanical assets
- expert witness.

We look forward to welcoming clients and colleagues, old and new onto our stand.

www.esrtechnology.com

Silver sponsor

human reliability

With more than 40 years of experience, Human Reliability Associates (HRA) is one of the most experienced human factors consultancies in the UK.

We have worked with a global portfolio of clients in safety and quality critical industries such as oil and gas, nuclear and conventional power generation, patient safety, and pharmaceutical manufacturing.

We provide training courses to gain a deeper understanding of the factors influencing human performance. We provide both face to face and internet-based training using case studies to develop practical analysis skills.

Our SHERPA software platform has been used for 20 years to enable organisations to carry out their own human factors analyses. SHERPA offers a wide range of tools such as Task Analysis to support human error analysis for safety reviews the development of risk-aware procedures.

www.humanreliability.com

Silver sponsor

MES is an international specialised process safety, risk management and asset integrity consultancy, with extensive experience in the clean energy, oil & gas, petrochemical & refining, chemical, manufacturing and transportation industries.

MES supports clients through all engineering design phases, as well as asset owners during operations, maintenance and decommissioning phases.

MES' strategically located offices currently provide local support to clients in Europe, Middle East, Asia, Africa and the Americas. With an unparalleled balance of technical experience and customer focus, MES have contributed to over 1,000 projects and more than 200 international operators and contractors worldwide.

MES has a team of highly-qualified and dynamic consultants with the ability to provide specialised integrated services in the following fields:

- process safety
- risk management
- reliability engineering
- asset integrity solutions
- hydrogen and CCUS consultancy
- computational fluid dynamics modelling
- 3D fire and gas mapping
- human factors
- software solutions
- training

www.mes-international.com

Silver sponsor

NeoDyne is a leading Irish & UK industrial automation and electrical engineering company, providing functional safety, control and automation solutions and services to the food & beverage, pharmaceutical and energy sectors.

For over 25 years, we have designed and implemented turnkey industrial safety systems tailor-made to your business. Our certified functional safety experts support you through the entire safety lifecycle, from risk assessment to operations and maintenance.

We employ standardised statistical and analytical techniques for safety instrumented systems design and complete our studies as per the relevant process and machine safety standards. We partner with global technology companes to deliver world-class automation, safety and security-critical systems that transform our customer's processes.

Discover how NeoDyne's comprehensive functional safety services can help you improve your process and machine safety and demonstrate functional safety compliance.

www.neodyne.ie

Silver sponsor

TÜVRheinland®
Precisely Right.

TÜV Rheinland is a leading provider of technical services worldwide. Founded in 1872 and headquartered in Cologne, Germany, TÜV Rheinland employs 20,000 people in over 65 countries.

The group provides a broad range of testing, inspection and certification services to ensure the safety, reliability and regulatory compliance of assets and components throughout their lifecycle; as well as technical consulting and training to industrial, transportation, products and healthcare sectors.

For over 145 years, we have been developing solutions to ensure the safety and quality of the interaction between man, technology, and the environment. We firmly believe that social and technological progress are intrinsically tied together.

The Group's mission and guiding principle is to achieve sustained development of safety and quality in order to meet the challenge arising from the interaction between man, technology and the environment.

www.tuv.com/landingpage/en/technical-engineering-consultancy

Poster competition sponsor

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We know the people that turn ideas into reality.

Finding the very best talent for the chemical industry is vital to examine processes, support the movement into new technologies and drive innovation.

Eleven connect dynamic people and businesses where bold ideas will help shape the world.

We make the hiring process effortless. Working in partnership with clients, Eleven represents their brand to the highest degree. We will find the best talent to fit the role and skills required, as well as ensure candidates align with company culture and future vision.

www.elevenassociates.com/cm/sectors/chemicals

Exhibitors

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Science and technology has the power to change our world, transforming our lives in ways few of us ever imagined. Cogent Skills drives, develops and delivers the skills needed to ensure businesses, employees, and industry are future-ready.

Prepare for tomorrow with the right skills and capabilities in place today. As specialists in skills for science and technology, we're here to ensure your business, your people and our industry are future-ready.

We are specialists in training: tailored training courses to develop your workforce capability. Employer collaboration: working together to address critical skills gaps. Consultancy services: a range of specialist services to develop your skills base in high-hazard industries.

www.cogentskills.com

We are a behavioural change and process safety consultancy company. Collaborating with our clients, we assess your process safety and influence the safety culture with the aim of 'making a difference´.

We deliver the skills, methods and motivation to change leadership attitudes, behaviours and decision-making among employees; our goal is to support our clients in creating a culture of care and measurable sustainable improvement of safety outcomes. We help you understand and evaluate risks, and work together to develop pragmatic solutions. Our value-adding and practical approach integrates specialist process safety management, engineering and testing. We seek to educate and grow client competence to provide sustainable performance improvement.

The breadth and depth of our expertise makes us a valuable global partner for a safe and sustainable future.

www.dekra-uk.co.uk

Eigen was formed sixteen years ago by a group of oil and gas specialists who believed they could help operators deliver more impact by joining together: a whole delivering more than the sum of its individual specialist parts.

Since then we've delivered on our promise to create new value for our clients by deploying our oil and gas know-how and digital innovation on some of the industry's demanding operational challenges.

www.eigen.co

Our aim is to achieve safer, better performing, more environmentally responsible, and, ultimately, more sustainable businesses. We work with organisations that share our belief that changing culture is essential.

In order to achieve change we follow a three-step process "The Empirisys Approach". This three-step process is our way of understanding your business, letting our data scientist gather unique insights from the data, and mapping out performance-based processes to drive meaningful change.

www.empirisys.io

Mitigate the risk from flange failures with SUREBAND, a simple but effective flange guard design.

Becoming site standard across the chemical industry, SUREBAND overcomes issues associated with conventional safety shield designs that haven't changed in 40 years:

- quick fit connection – no pull-cords
- all-polymer, chemical resistant materials – longer service life
- multi-size function – more site flexibility.

With a growing number of shield designs now on the market, it is critically important to select a design which is fit for purpose for your process application. At Flangeguards, safety shields is all we do. Be sure, be safe, choose Flangeguards.

www.flangeguards.com

Established nearly 200 years ago, FM Global is a mutual insurance company whose capital, scientific research capability and engineering expertise are solely dedicated to property risk management and the resilience of its client-owners. These owners, who share the belief that the majority of property loss is preventable, represent many of the world's largest organisations, including many of the world's largest chemical and pharmaceutical companies. They work with FM Global to better understand the hazards that can impact their business continuity in order to make cost-effective risk management decisions, combining property loss prevention with insurance protection.

www.fmglobal.com

We specialise in the application of human factors in major hazard industries. Julie and Pippa are ex-Principal Specialist Inspectors for the Health and Safety Executive. Their expertise in Human Factors and in depth understanding of regulatory requirements can help you navigate the Human Factors Roadmap. If you want your HF systems to meet regulatory requirements then get in touch!

www.hf-expert.co.uk

Founded in 1922, the Institution of Chemical Engineers (IChemE) is the UK-based and internationally recognised qualifying body and learned society for chemical, biochemical and process engineers. We exist to advance chemical engineering's contribution for the benefit of society.

Visit our stand to discover the latest in process safety training, top publications, and new developments from the Institution and the IChemE Safety Centre. Our staff team will be happy to answer any questions about your membership, training, networking, or career development needs.

www.icheme.org

The Mary Kay O'Connor Process Safety Center (MKOPSC) is the world's foremost university-based process safety centre. It serves industry, government, academia and the public and is an education and research resource to all stakeholders.

MKOPSC is guided by a steering committee of consortium member companies and a technical advisory committee of industry experts. Industry guidance ensures that Center activities are relevant to the actual practice of process safety.

Over the past 20 years, the body of work created by the Center has led it to be recognised as an unbiased, science-based organisation focused on creating dialogue and consensus on difficult scientific topics, amongst all stakeholders.

psc.tamu.edu

ORION
SAFETY CONSULTING

Orion is a software company with a focus on providing comprehensive, robust solutions for the safety industry.

Orion produces the independently verified, onshore QRA software, SAIPH. With its intuitive user interface, SAIPH can produce a wide range of risk metrics including risk contouring, F-N curves, individual risk, occupied buildings risk assessments and risk transects. Results can be easily interrogated to determine key risk drivers to aid safety design.

SAIPH has been used on projects globally including the new energies arena.

Visit our stand to see how SAIPH can help your business.

www.orionsc.uk

Petrofac

Petrofac is a leading international service provider to the energy industry. Our teams design, build, manage, operate and maintain offshore and onshore facilities upstream, downstream and across the renewables sector. Our 41 years track record of safe and reliable execution is underpinned by a cost effective, local delivery model along with training and competence solutions that support safe, skilled and competent workforces globally.

With around 7,950 employees, Petrofac operates out of seven strategically located centres and has a further 24 offices worldwide.

We always bring the right energy to enable our clients to meet the world's evolving energy needs.

www.petrofac.com

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rps MAKING COMPLEX EASY

RPS provides specialist consultancy support to assist those with responsibility for process health and safety to achieve compliance. We have the ability to support all health and safety requirements, from design through to the operation of the facility.

RPS provides solutions to complex health and safety concerns relating to construction, property compliance, process safety or health and employee wellbeing. Core services include ATEX/DSEAR, asbestos, BowTie analysis, CDM, COMAH support, defence specialist services, fire engineering and safety, functional safety, hazard identification, health and safety, legionella, nuclear specialist services, occupational health, occupational hygiene, and risk assessment/analysis.

www.rpsgroup.com

SISSuite

SISSuite™ is a software tool set for the management of process safety and functional safety lifecycle engineering for Safety Instrumented Systems.

Lifecycle Engineering covers the entire safety lifecycle for early lifecycle engineering phases and continues through to operations and maintenance for plant operations.

HAZOP module tailored parameter and guideword listings, action tracking.

Advanced LOPA Module assign your calibrated tolerable risk targets and quickly determine a required SIL level and RRF.

SRS Easily create SRS documents.

PST Process Safety Time application.

SIL Check Uses the Reliability Block Diagram (RBD).

Leading Indicator Analysis Provides LI measures for each SIF.

www.sissuite.com

Viper Applied Science has over three decades of experience between them in the fields of blast, shock and vibration, structural dynamics, computational physics and numerical methods.

All our team have a background in engineering consultancy, and the software we write and services we offer our clients reflect this. We pride ourselves in developing practical, usable, real world solutions that don't cost the earth.

www.viper.as

Conference supporters

The Fire and Blast Information Group (FABIG) was created in 1992 following the Piper Alpha disaster, to collate and disseminate the latest knowledge and best practice in fire and explosion engineering within the oil and gas industry, via a range of activities including the organisation of technical meetings, the development of technical publications and participation in research projects.

The range of technical topics covered by FABIG has broadened over the years and now goes beyond hydrocarbon related hazards to cover all major industrial fire and explosion hazards, both offshore and onshore.

www.fabig.com

Founded in 1989 by the four principal engineering institutions, and now with members from other engineering bodies, the public sector, the charity sector and industry, the Hazards Forum's mission is to enable inter-disciplinary learning between professionals for the prevention and mitigation of hazards and disasters.

Our vision is to be widely recognised as the independent enabler of the most needed debates, as a key source of interdisciplinary knowledge on the control of major hazards.

www.hazardsforum.org

Conference media partner

Tank Storage magazine is the only audited publication dedicated to the bulk liquid and gas storage sector. It is a premier source of news, analysis, and insights, with global coverage of the tank storage industry.

Published five times a year, with over 3,600 readers every edition, and with plenty of exclusive online content, don't miss out. Become a member of the Tank Storage community today.

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If you are interested in sponsoring or exhibiting at next year's event, contact our colleagues at Media Shed: +44 (0)20 7183 1815 / ichemeevents@media-shed.co.uk

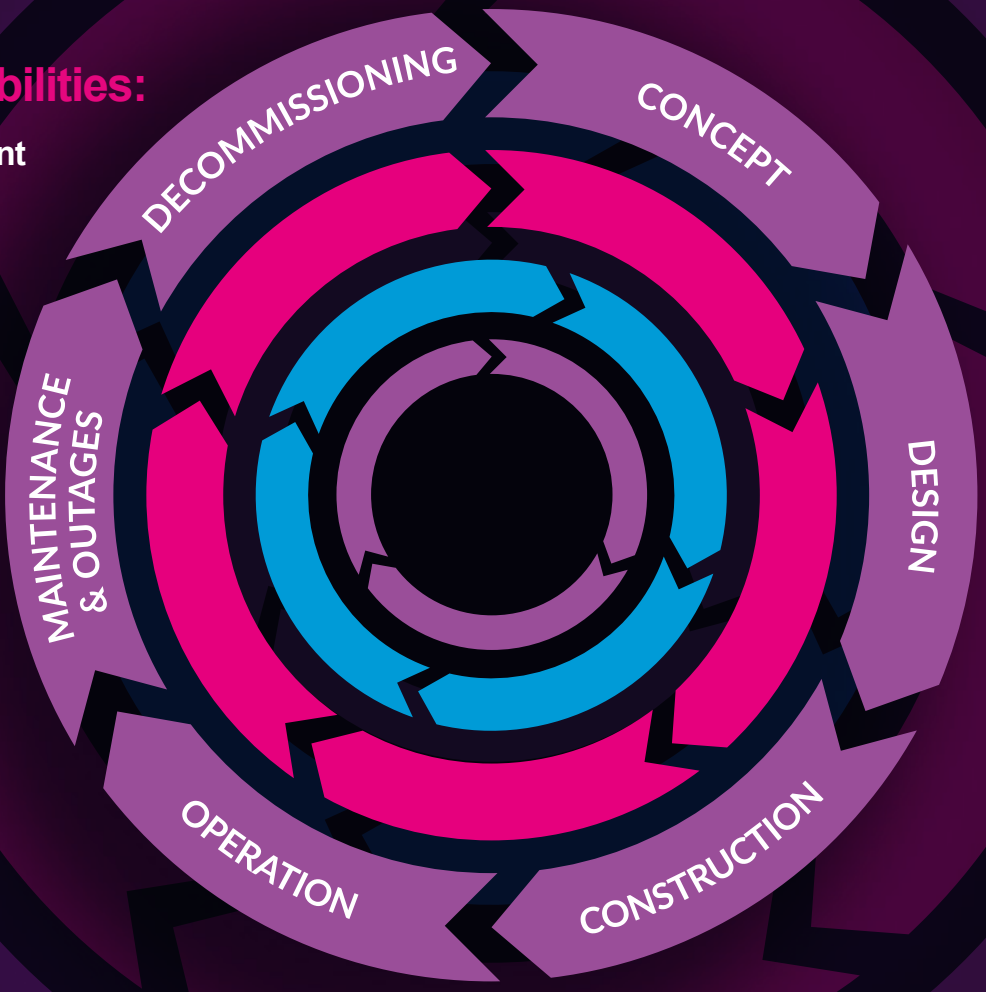
AXIOM are delighted to be working in partnership with the IChemE as Gold Sponsors at this year's Hazards 33

Working in partnership with you, our support is delivered via our regional offices in the UK industry hubs of Teesside, Humber, North West and Grangemouth. Our collaborative approach ensures that we listen, taking an informed view to understand the challenges faced by our clients, delivering safe and tailored solutions. Delivering our award-winning capabilities across a range of industries including Energy, Pharmaceutical, Chemical, Oil & Gas, Bulk Storage & Distribution and Food sectors, **AXIOM**'s reach extends globally to deliver class-leading, value-adding solutions which comply with industry best practice.

AXIOM's Inspection, Materials, Mechanical and Process Safety Engineering teams are seamlessly integrated, combining operational experience and technical expertise to support sustainably safe operations as your true through-life Asset Management Partner.

Process Safety Capabilities:

- **Process Hazard Assessment**
- **Consequence Modelling**
- **Occupied Building Risk Assessment**
- **Pressure Relief Life Cycle Services**
- **Functional Safety**
- **DSEAR Risk Assessment**
- **Fire Risk Assessment**
- **Human Factors**
- **COMAH**



AXIOM
MAXIMISING ASSETS - MINIMISING RISKS

Find out more about our asset life cycle solutions at

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