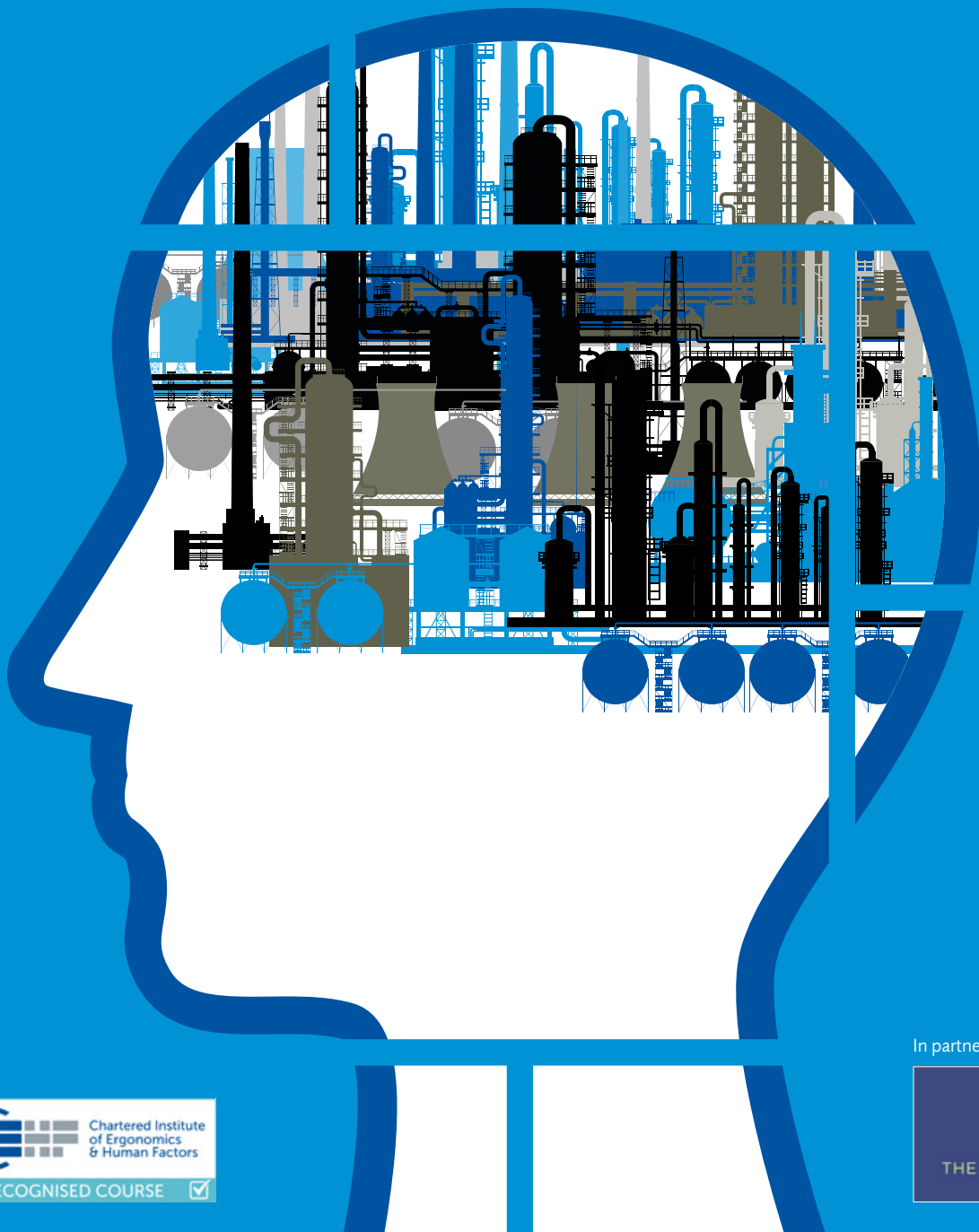




Human Factors in the Chemical and Process Industries

Modular human factors training



In partnership with:



Human Factors in the Chemical and Process Industries

Introduction

There is an increasing emphasis on the importance of managing human factors to achieve improved safety and business performance in the chemical process industries. Major accidents, including those at Texas City and Buncefield, have highlighted the importance of addressing this aspect of performance. However, many of the safety and operational professionals charged with managing human factors have no formal qualifications or training in the human and behavioural sciences.

Human Factors in the Chemical and Process Industries provides modular training designed to meet the needs identified in the process industries. Established in 2009 by the Keil Centre and IChemE, the programme intends to develop an understanding of the core human factors issues and outline how to manage them to achieve improved safety performance.

Topics are organised to cover the UK Health and Safety Executive's top human factors issues in major hazard sites, but these topics are just as applicable and relevant to non-UK regulatory frameworks. The content has been developed in consultation with IChemE's safety and loss prevention specialists.

Key features

- Content covers human factors in process safety, health and safety, with links to other aspects of business performance
- A modular programme
- Advice to help implement human factors solutions
- Training is delivered by recognised human factors professionals with significant process industry experience

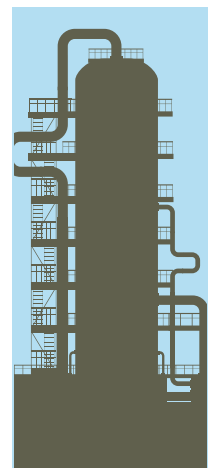
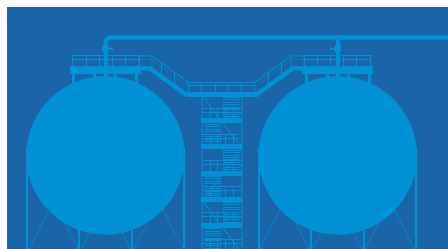
The modules

Human Factors in the Chemical and Process Industries consists of four modules which, together with independent study, provides a broad human factors educational programme :

- Managing Human Factors
- Managing Human Failure
- Strengthening Organisational Performance
- Human Factors in Design

Modules include a mix of theory, case studies, discussion and practical exercises in small groups.

You can sign up to complete the whole programme or just attend single modules to develop understanding of a particular area of human factors. Modules can be completed in any order.



Who should attend?

The programme is specifically designed for those who want a comprehensive overview of the subject matter, access to practical research-based tools and approaches, and discussion in small groups with acknowledged industry experts. This may include:

- HSE managers and advisors
- operations managers
- safety engineers
- chemical/process engineers
- in-house human factors advisors

Specific engineering disciplines (eg control and instrumentation, piping, electrical, mechanical) may be interested in module 4 (*Human Factors in Design*).

Learning outcomes

- Understand what human factors is and how it affects human performance, health and safety
- Understand how human factors needs to be managed within an organisation, including the scope and involvement of different parties
- Develop knowledge about specific topic areas related to major accidents and how to reduce the related risks
- Understand and gain practical use of common tools and techniques used within human factors
- Understand how to apply certain human factors tools
- UK participants – act as the COMAH operator's intelligent customer for human factors*

* The COMAH delivery guide has a specific clause relating to technical competence in human factors, suggesting that COMAH operators should demonstrate proportionate access to HF expertise.

This can be supplied as external competent support (such as from a Chartered Human Factors Specialist accredited by the Chartered Institute of Ergonomics and Human Factors). However, it is emphasised that the COMAH operator must maintain an effective intelligent customer capability and secure local ownership of key HF standards and their implementation, developing and maintaining a suitable level of in-house HF expertise.

Human Factors in the Chemical and Process Industries aims to develop a broad understanding of human factors in support of the in-house human factors advisor who acts as the COMAH operator's intelligent customer.

The Keil Centre

Human Factors in the Chemical and Process Industries is delivered in partnership with The Keil Centre, a private consultancy practice of chartered psychologists and chartered ergonomics and human factors specialists based in Edinburgh, UK and Perth, Australia. Established in 1983, The Keil Centre has longstanding links with the process industries through its international commercial consulting activities and involvement in IChemE safety events, and the European Process Safety Centre's activities.

CIEHF Technical Member Grade

Completion of all four modules enables delegates to develop at least an awareness of more than 50% of the competency areas specified by the Chartered Institute of Ergonomics and Human Factors (CIEHF). This is one of the key eligibility criteria required for successful achievement of the Technical Member grade of CIEHF. Additional 'at work' application of the theories and tools being taught on the course will be required, as will the need for delegates to be applying human factors for a significant part of their work. *Human Factors in the Chemical and Process Industries* therefore provides a sufficient foundation through which the Technical Member grade of CIEHF can be achieved.

The modules

Module One		Managing Human Factors
Provides an introduction to the key human factors concepts within risk management, and examines how to manage organisational change, safety culture and behaviours, and safety critical communications.		
Human factors in risk management	<ul style="list-style-type: none"> ■ overview of programme ■ what is 'human factors'? ■ why is it important for health and safety? ■ managing and measuring the company's performance in relation to human factors 	Janette Edmonds, Ergo Innovation
Managing safety critical communications	<ul style="list-style-type: none"> ■ what is effective communication? ■ a model of communication failures ■ approaches to making communication robust ■ how to assess shift handover communications arrangements ■ assessment and improvement ■ control of work case study 	Richard Scaife, The Keil Centre
Managing safety culture & behaviours	<ul style="list-style-type: none"> ■ what is safety culture? ■ models of safety culture ■ considerations for measuring culture ■ developing culture and overcoming blockers 	Richard Scaife, The Keil Centre
Managing organisational change	<ul style="list-style-type: none"> ■ what is organisational change ■ effects on safety ■ some examples from serious incidents ■ typical problems encountered ■ interventions 	Janette Edmonds, Ergo Innovation
Module Two		Managing Human Failure
Explores how to pro-actively manage human errors and non-compliances, analyse human failures contributing to incidents and manage performance under pressure.		
Reducing human error	<ul style="list-style-type: none"> ■ what makes error more likely? ■ how can we make people safer? ■ identifying safety critical tasks ■ analysing tasks ■ conducting human reliability analysis 	Janette Edmonds, Ergo Innovation
Managing non-compliance	<ul style="list-style-type: none"> ■ the significance of non-compliant behaviour in incident causation ■ different types of non-compliance ■ factors that provoke non-compliance ■ ABC analysis – a tool to understand decision making in the context of non-compliant behaviour ■ what can be done to reduce the likelihood of non-compliance 	Charles Shoesmith, Psychologica
Human factors in incident investigation	<ul style="list-style-type: none"> ■ human factors in the investigator <ul style="list-style-type: none"> ■ common human failings in investigators ■ interviewing skills – best practice ■ human factors in the investigation <ul style="list-style-type: none"> ■ key steps ■ recent best practice guidance ■ case study 	James Bunn, Health and Safety Executive
Managing performance under pressure	<ul style="list-style-type: none"> ■ understanding stress and its consequences ■ causes of stress: chronic and acute ■ managing pressure at work ■ improving resilience 	Ken Gray, The Keil Centre

Module Three		Strengthening Organisational Performance
Provides key pointers for strengthening organisational safety through effective management of training and competence, staffing and workload, supervision and safety leadership, and fatigue-related risk.		
Managing fatigue	<ul style="list-style-type: none"> the consequences of fatigue for human performance managing fatigue using a Fatigue Risk Management Plan fatigue-related performance indicators investigating fatigue-related incidents 	Paul Jackson, Fresh Air Alertness Management
Staffing & workload	<ul style="list-style-type: none"> staffing, workload and process safety methods for workload measurement and prediction HSE staffing assessment method CRR348/2001 case study practical 	Janette Edmonds, Ergo Innovation
Training & competence	<ul style="list-style-type: none"> impact of competence on safety competence management systems developing and assessing competence competence assurance 	Ed Corbett, Health and Safety Executive
Effective supervision and safety leadership	<ul style="list-style-type: none"> effective supervision: its role in performance management and improvement supervision models: understanding when flexibility is needed and how to achieve it supervision and culture: exploring the links between supervisory behaviour and team and organisational culture 	Chiara Amati, The Keil Centre

Module Four		Human Factors in Design
Examines the key human factors issues to address at the design stage, looking at how to integrate human factors within engineering programmes, how to develop effective procedures, human machine interfaces, and process plant and control rooms.		
Integrating human factors in design	<ul style="list-style-type: none"> key human factors issues to address within design key HFE activities at different life cycle phases HFE roles, responsibilities and competencies risk screening for HFE setting up a corporate standard for HFE in capital projects 	Janette Edmonds, Ergo Innovation
Developing effective procedures	<ul style="list-style-type: none"> introduction: to err is human procedures and risk – when things go wrong creating safety – when procedures are safety critical procedures as part of risk management how to develop good procedures how to write usable procedures putting procedures to work and managing change 	Ian Hamilton, Human Engineering
Human machine interface	<ul style="list-style-type: none"> Human machine interface design displays and controls principle of compatibility control panel design software interfaces and alarm handling case study review of a major accident 	Janette Edmonds, Ergo Innovation
Plant and control room design	<ul style="list-style-type: none"> plant design: work area design and access design for maintenance, materials handling, environmental ergonomics building and control room design: building arrangement, control rooms, workstations/consoles, environmental ergonomics 	Fiona Johnson, The Keil Centre

Delivery format and dates

Modules are available both online and in-person.

Our online modules are delivered across four live sessions (approximately two hours in length each) on consecutive days. There are a choice of session times to accommodate different time zones. The live sessions with the trainers are supported by pre-course reading and independent study using pre-recorded videos.

Our face-to-face modules are held in Edinburgh, UK over two days. Pre-course reading is issued beforehand.

Visit www.icheme.org/human-factors to see scheduled dates.

More details

Visit www.icheme.org/human-factors

In-company training

We can also deliver customised human factors training in-company, face-to-face or online. Contact courses@icheme.org to discuss this option.

Course prize

Delegates who complete all four modules are eligible to enter for a course prize for best application of human factors knowledge. Previous winners of this award include:

Ron Rawmshaw, Head of HSSE, Interconnector, UK (2017)



“ *Human Factors in the Chemical and Process Industries is ideal for anyone who wishes to become an intelligent customer in the subject. All the presentations are delivered by experienced human factors professionals providing a detailed overview of the core human factor issues and advice on how to implement solutions. The course also provided a good opportunity to network and test assumptions with other professionals faced with similar issues. For anyone with responsibilities for major hazard sites the course provides an excellent learning opportunity and is an important addition to the health and safety toolbox.* ”

Ian Taylor, Process Safety Assurance Engineer, SABIC Petrochemicals, UK (2018)

“ *As an engineer and member of the Institute of Occupational Safety and Health (IOSH), the Human Factors in the Chemical and Process Industries course took my understanding of human factors to a new level. It is geared towards providing practical support to delivering a human factors improvement agenda and has given me the confidence to lead the human factors agenda at a top tier COMAH site. I found it particularly refreshing to engage with the course tutors who are all psychologists. They bring a different perspective on the topic – more focused on how people think instead of being driven by numbers and metrics as us engineers tend to be. I would highly recommend this course for anyone who is planning to be involved in the human factors agenda at their site/operation.* ”



Thomas Willer, Occupational Safety and Health Manager, Evonik Corporation, USA (2019)



“ *Evonik believes that a deeper understanding of human factors is key to the future of the chemical industry because humans are the common denominator in everything we do. Human factors is so much more than “operator error”. Human ideas and innovation create products for our customers. Humans design, operate, and maintain our production facilities delivering these products safely and sustainably. Humans utilise these products to improve quality of life. This course has opened my eyes to the untapped potential to be more proactive incorporating human factors not just in our production facilities but at every level and every part of our global organisation.* ”

Trainers

Dr Chiara Amati, Director, The Keil Centre

Chiara is a Chartered Occupational Psychologist and Coach who has worked in the fields of wellbeing, management and leadership development across private and public sectors, in the UK and worldwide. She has extensive experience of supporting clients in various industries, including high hazard, in relation to the assessment and development of safety culture and safety leadership, and she has considerable experience of delivering training that generates insight and brings behavioural change. Chiara is a registered Occupational Psychologist with the HCPC and an Associate Fellow of the British Psychological Society.

James Bunn, Specialist Inspector, Energy Division, Health and Safety Executive

James was formerly a Principal Human Factors Consultant with the Keil Centre. He has a Masters in Ergonomics and is a Chartered Ergonomics and Human Factors Specialist, a member of the Institute of Ergonomics and Human Factors and a member of the Institute of Industrial Accident Investigators. He has a broad experience base, having previously worked for the UK health & safety regulator and the energy sector in Norway. James was the human factors specialist member of the multi-disciplinary team that investigated the terror attack on the In Amenas Tigantourine gas facility site in Algeria. This was a major incident which received international media coverage and resulted in a public inquest in the UK. He is an experienced human reliability analyst and covers several areas of human factors.

Ed Corbett, Head of Human Factors & Organisational Performance, Health and Safety Executive

Ed is a Chartered Occupational Psychologist who heads up the Health and Safety Executive's (HSE) commercial Human Factors and Psychology teams. Working for the national regulator, Ed has a detailed understanding of regulatory requirements and how duty holders can demonstrate compliance. Based at its Buxton laboratory, Ed contributes significantly to HSE's cutting edge research in human factor and safety science. Before joining HSE, he worked as a consultant and coach across a broad range of industries, specialising in helping organisations develop leadership capability. Today he combines his regulatory understanding, scientific knowledge and real world experience to help organisations achieve sustainable health and safety improvement. He provides technical human factors support to HSE inspectors on various topics, including competence assurance, he has developed competency systems for organisations operating in major hazard sectors, and he contributes towards industry guidance. He has experience working in various aspects of human reliability, from conducting safety critical task analyses; through to providing input to engineers on equipment/plant design; and, development of operational and emergency procedures.

Janette Edmonds, Director, Ergo Innovation

Janette is the course director of the *Human Factors in the Chemical and Process Industries* programme in UK/Europe and a former director of the Keil Centre. She is a Chartered Ergonomics and Human Factors Specialist, a Fellow of the Institute of Ergonomics and Human Factors, and a Chartered Member of the Institution of Occupational Safety and Health. She has a BSc in Psychology, an MSc in Ergonomics, and 28 years of practitioner experience within various industries. Her experience includes chemical processing, oil and gas, rail, emergency services, defence, telecoms, but also medical and consumer product design. Janette has experience in most aspects of human factors practice, but her main areas of specialism include human factors in engineering design, development of procedures, human factors in incident investigation and human reliability analysis. She was the lead author and editor for the Elsevier book *Human Factors in the Chemical and Process Industries: Making it Work in Practice*.

Ken Gray, Director, The Keil Centre

Ken is a Chartered Psychologist, a registered Occupational Psychologist with the HCPC and an Associate Fellow of The British Psychological Society. He leads the Business Psychology and Wellbeing services at the Keil Center and his cross-industry experience includes local and national Government, energy, chemical, aeronautical, mining, construction, housing, engineering, steel, FMCG and oil & gas. He applies powerful psychometrics, facilitation and coaching techniques that inform both personal development choices, and help to strengthen and sustain productive team working relations. He also works with client organisations to develop behaviour standards, competencies, robust selection, development and performance review systems. In 2010, he was shortlisted for the British Psychological Society Practitioner of the Year Award.

Ian Hamilton, Consultant, Human Engineering Ltd

Ian began his career in human factors in the defence sector in 1984 and then moved to air traffic management. He has worked as a human factors professional for 36 years and for the past 28 years he has worked in consultancy. He has expanded his areas of interest to include most aspects of human factors practice, although he maintains a particular interest in workload modelling, human performance prediction, and human factors integration. Previously, Ian was a founding partner in Human Engineering where he led the growth of the professional team, managing work in the defence, air, rail, utilities and oil and gas sectors. Most recently his work has focused on the management of major accident risk and process safety culture. He has a BSc in Psychology, an MSc in Ergonomics, is a Chartered Psychologist and a Chartered Fellow of the Institute of Ergonomics & Human Factors.

Dr Paul Jackson, Fresh Air Alertness Management

A Chartered Psychologist with over 20 years' experience, Paul works with organisations involved in safety-critical industries (eg aviation, rail, oil and gas, mining and road transport) helping them to manage workforce fatigue. He has extensive experience of supporting clients with fatigue risk management, including BP, Shell and Newmont Mining. He also conducted fatigue audits at mine sites and oil and gas installations around the world. Prior to that, he was Research Programme Manager at the UK Department for Transport (DfT). He completed his PhD at Imperial College, University of London, he holds an MSc degree in Environmental Psychology and a BSc (Jt Honours) in Psychology and Sociology.

Fiona Johnson, Human Factors Consultant, The Keil Centre

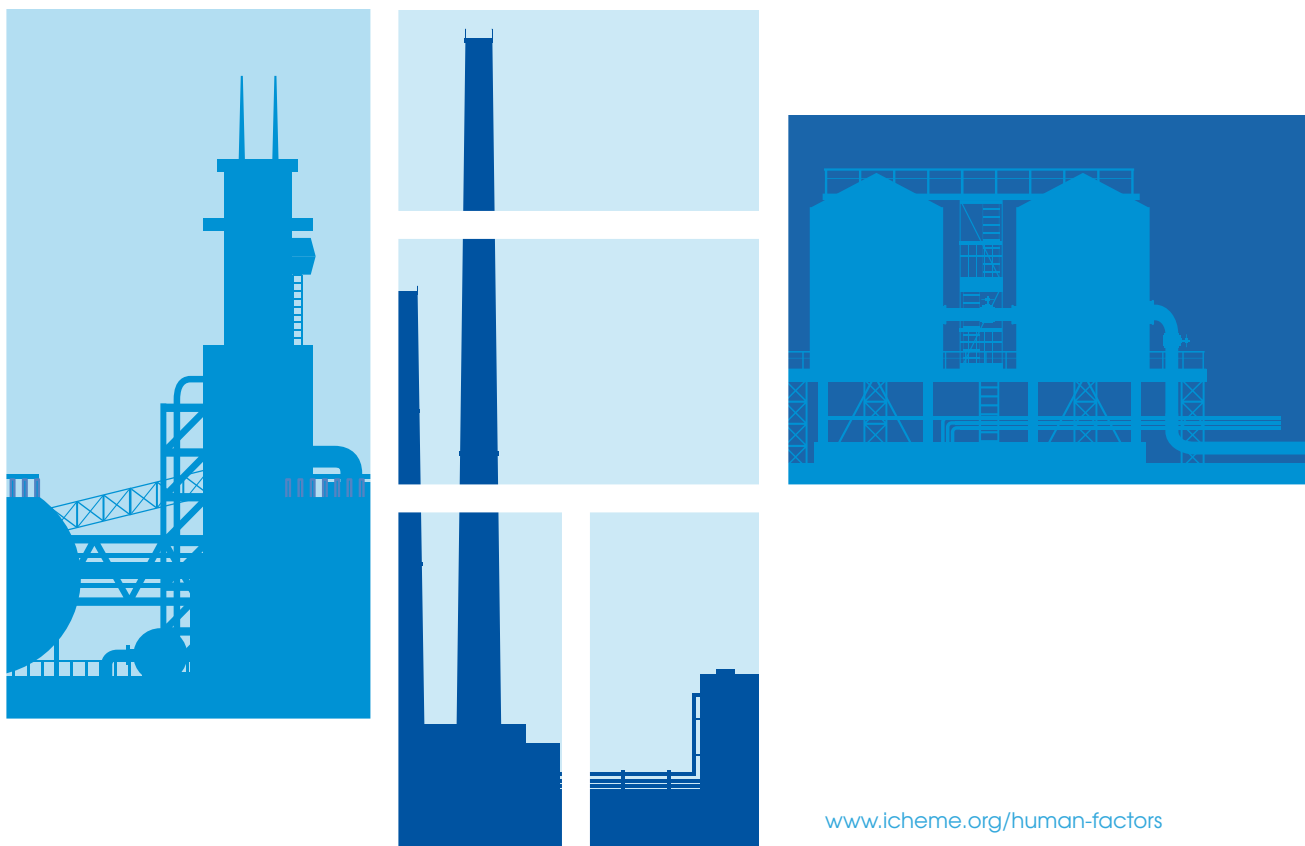
Fiona gained extensive experience in the oil & gas and energy sectors working as an instrument/electrical and process safety engineer for 16 years before having a career change into human factors. She has managed process and infrastructure projects across the full project life cycle and provided the human factors expertise for small to complex, large-scale projects, including several plant, control room and control system projects. She has considerable experience across the spectrum of human factors areas, including safety critical task analysis, safety culture and procedure design, and she brings a unique perspective from having an engineering and human factors background. Fiona has a Bachelors' degree in Physiology, a Bachelors' degree in Engineering and a Masters' degree in Ergonomics.

Richard Scaife, Director, The Keil Centre

Richard is a Chartered Occupational Psychologist, a Chartered Ergonomics and Human Factors Specialist, a Fellow of the Institute of Ergonomics and Human Factors, and a Chartered Scientist. He has a BSc in applied Psychology, an MSc in Occupational Psychology, and over 30 years of practical ergonomics experience within various industries. Before joining the Keil Centre, he spent six years working for National Air Traffic Services, latterly as the head of human safety in their human factors unit, and four years working on the design of military sensor systems, primarily for aircraft. Richard specialises in all aspects of human factors, particularly organisational safety, human safety analysis (including human error) and incident investigation. He has cross-industry experience, providing consultancy expertise and training. He was awarded the British Psychological Society Practitioner of the Year Award in 2006.

Charles Shoesmith, Managing Director, Psychalogica

Charles is a Chartered Psychologist with more than 35 years of international experience consulting in the area of individual and organisational behaviour, cultural development and learning, often with an emphasis on health and safety. He has particular expertise in the design and development of innovative and effective solutions to complex organisational and people performance issues. He is an extremely effective presenter and trainer, applying his background in learning and educational theory to tailor courses to meet specific needs.



Just some of the many companies who have enrolled delegates on the *Human Factors in the Chemical and Process Industries* programme since it began in 2009:

Air BP	Finnish Safety And Chemicals Agency	Pfizer
Air Liquide	FMC Chemicals	PM Group
Akzo Nobel	Fujifilm Imaging Colorants	Premier Oil
Amec Foster Wheeler	Futamura Chemicals UK	Procter & Gamble
Anglo American	Gassco AS UK	PX Group
AstraZeneca	Glaxo Smithkline	Repsol
Atkins	Harbour Energy	Rhodia
Babcock International	Health & Safety Executive	Rolls Royce
BAE Systems	Hellenic Fuels & Lubricants	SABIC Petrochemicals
Baker Hughes	Hexion UK	Saudi Aramco
BASF	Huntsman	SBM Offshore
Bechtel	Imerys	Scottish Environment Agency
Bilfinger UK	Ineos	Scottish & Southern Energy
BOC	Interconnector UK	Sellafield Ltd
Borealis Polymers	Invista	Shell
BP	Jacobs	Sinclair Oil Corporation
Calor Gas	Johnson Matthey	Solenis
Capenhurst Nuclear Services	KCA Deutag	Springfield Fuels
Centrica Storage	Kemira	Statoil
CF Fertilisers	Lanxess Solutions UK	Syngenta
Chemoxy International	Lenzing Fibres	Synthomer
Conoco Phillips	LyondellBasell	TAQA Bratani
Costain	Maersk Oil & Gas	Tate & Lyle
Croda	Mexichem Fluor	Total
Danone Baby Nutrition	MWH Treatment	Urenco
DNV GL	National Grid	Vale Europe
Dow Corning	National Nuclear Laboratory	Valero Energy
EDF Energy	Neste	Valtris Speciality Chemicals
Essar	Novartis	Veolia
Esso	Office for Nuclear Regulation	Versalis
Evonik	Oil and Pipelines Agency	Vertellus Specialities
Exolum Pipelines	OMV	Victrex
Exxon Mobil	Perenco	Whyte & Mackay
Fennovoima	Petrofac	Wood



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