



Human & organisational factors in the oil, gas & chemical industries

Practical guidance from recognised experts – what you need to know

Key Speakers

Prof Andrew Hopkins: Thinking about safety indicators

(11.30 Wednesday) There is nowadays much discussion of the need for indicators that measure how well safety is being managed in major hazard facilities. Two dimensions of safety indicators can be distinguished: personal safety versus process safety indicators, and lead versus lag indicators. Two influential discussions of the lead/lag indicator dimension have recently appeared – the Baker inquiry following the BP Texas City refinery accident, and a UK HSE publication, "Developing process safety indicators". This paper is stimulated by these two publications and seeks to examine critically the lead/lag distinction. The Baker report also recommends the incorporation of safety indicators into performance pay and the paper goes on to discuss this issue.

Isadore (Irv) Rosenthal: British Petroleum's Texas City Accident: Are the lessons taught likely to be learned and implemented? (13.30 Tuesday) After a brief description of BP's March 2005 catastrophic Texas City Refinery accident, the presentation discusses the Baker Panel's recommendations on the actions BP should take in regard to the lessons learned from this tragic event. It then examines the Panel's findings on BP's failure to fully incorporate lessons learned from its Grangemouth facility's year 2000 accidents into its Texas City Refinery's practices. This review indicates that BP's incorporation into its process safety management systems of lessons learned from its own experience might have substantially decreased the likelihood of the Texas City accidents. The author then speculates on some of the factors that will influence BP's implementation of the lessons learned from its Texas City accident and the likelihood that this implementation effort will be effective.

Cheryl MacKenzie: The US approach and lessons from recent incidents

(16.30 Tuesday) On March 23, 2005, the BP Texas City refinery suffered one of the worst industrial disasters in recent United States history. An explosion and fire killed 15 people and injured another 180, alarmed the community, and resulted in financial losses exceeding \$1.5 billion. The US Chemical Safety and Hazard Investigation Board's investigation revealed that this incident was an organisational accident with process safety deficiencies that extended beyond the process unit and the Texas City refinery to the corporate oversight system of BP Global, where the safety impacts of major organisational change were not effectively reviewed. This presentation will discuss the major lessons learned from this incident, the recommended steps industry and regulators may take to prevent its recurrence, and the common areas of concern the Chemical Safety Board continues to see in its investigations.

Manchester

27-28 November 2007

Manchester Conference
Centre, Weston Building.

Programme



Human
Engineering



Drinks reception
sponsored by
Human Engineering Ltd

Exhibition of human
factors
products and services

Day One

Morning session chair: **John Wilkinson**
Afternoon session chair: **Ronny Lardner**

10.15 Welcome Address **Martin Anderson: Operator error, safety culture, behavioural safety and the Holy Grail**

I will outline various approaches to managing human and organisational failures. I will consider the strengths and weaknesses of these different perspectives in relation to the effective management of major accidents, drawing upon experience of regulating these issues on and offshore. This overview will provide delegates with a framework for the remainder of the conference.

Martin Anderson is a graduate in psychology with two Masters degrees in Ergonomics, and Process Safety & Loss Prevention. He has specialised in the area of human factors and safety management, particularly in relation to major hazards and complex systems for over 15 years. Since 2001 he has been an HSE Specialist Inspector, gaining wide experience of regulating human, management and organisational aspects on over 70 major hazard sites, including planned inspection, incident investigation, safety report/case assessment, provision of expert evidence, and formal enforcement. He is currently leading HSE's response to the safety management, human factors and culture aspects of lessons from the Texas City incident, and is also involved in the follow-up to the Buncefield incident.



11.00 Prof Trevor Kletz, OBE: 25+ Years of Human Factors and Process Safety

Not all accidents can be prevented by changes in design and often changes in procedures are necessary. But design engineers and those who investigate accidents often fail to suggest or make changes in design even when they are cheap and easy to make.

After graduating in chemistry at Liverpool University in 1944, Trevor Kletz joined Imperial Chemical Industries and spent 8 years in research, 16 in production management and 14 as safety adviser to the Petrochemicals Division. In 1978 he was appointed an Industrial (part-time) Professor at Loughborough University. On retiring from ICI in 1982, he joined the University full-time, in 1986 he became a Visiting Fellow and is now a visiting professor and an adjunct professor at Texas A&M University.



11.30 Peter Jefferies: Experiences of being a human factors champion on a large COMAH site

Peter Jefferies is Process Hazards Analysis (PHA) Leader at ConocoPhillips Humber Refinery responsible for development and implementation of the PHA and human factors programs. He is a Chemical Engineer with 20 years experience at Humber Refinery which is one of Europe's most complex refineries with over 50 process units and close to 1000 staff. Peter is Chairman of the Humber Bank human factors group, a member of the Energy Institute working group on human and organisational factors and the Buncefield Task Group.



12.00 Andy Brazier: Human Factors in oil, gas and chemicals: what works?

The oil, gas and chemical industries are in many ways dominated by large, multi-national companies. Like super tankers, it can take

them a long time to get going on something new and once they are moving they can be slow to change direction. Therefore, introducing human factors may not always be easy, and taking the wrong approach at the start can have negative results. It is important to understand the people working in the industry. The majority are engineers (like myself) with in-depth knowledge and practical experience. Start talking about the softer issues of human factors and you may not get much of a response. But talk about tasks, especially related to plant and equipment, and they will quickly see that human factors is a potential solution to some of the problems they are familiar with.

Andy is an independent risk consultant specialising in human factors, ergonomics and safety. He has a degree in Chemical Engineering, and has worked in human factors for 14 years, with the last 11 being in consultancy. Andy has extensive experience of the oil and gas industry, including gas terminals, oil refineries and offshore platforms. His expertise covers task analysis, error prediction, managing the risks of change, procedure development, addressing training and competency issues, emergency response, permit-to-work systems, control room operations and culture change.



12.30 Lunch

13.30 Isadore (Irv) Rosenthal: British Petroleum's Texas City Accident: Are the Lessons learned likely to be retained? (See front page for details)

Dr Rosenthal was employed at Rohm and Haas for 38 years in a variety of chemical research, development, business unit and corporate staff positions. After retirement from Rohm and Haas in 1990, Dr. Rosenthal joined the Wharton Risk Management and Decisions Processes Center as a Senior Research Fellow. His areas of research are focused on the management of risks associated with low probability-high consequence accidents, process safety management, market-based alternatives to government regulation of industrial risks and the methodology of risk assessment. He was a member of the United States Chemical Safety and Hazards Investigation Board (CSB). After completing his five year term at the CSB on November 2003, Irv rejoined the Wharton Risk Management and Decisions Processes Center as a Senior Fellow.



14.30 Ian James: Managing human failure - Knowing what might go wrong before it does

Operators in the oil, gas and chemical sectors are very familiar with structured techniques for assessing the risk from plant and equipment failure and ensuring adequate levels of plant and equipment reliability. Reducing the potential for human failure requires a similar structured approach. This presentation will describe a well-established approach for identifying and managing human failure that has been applied in numerous industries, including chemical, nuclear and rail.



Ian has been an inspector with HSE for 16 years. He has experience in a wide range of industry sectors and has spent the last 10 years inspecting major hazard sites in the oil, gas and chemicals sector. His experience includes corporate audits of multi-national companies and investigation of major incidents. Ian provides advice to industry, produces guidance, provides training for HSE staff on human factors, runs workshops and seminars with the industry and intermediaries and presents regularly at other conferences and seminars.

15.00 David Embrey: Human Failure Risk Assessments - Practical Guidance

The HSE guidance suggests that sites subject to the Control of Major Accident Hazard (COMAH) regulations should use qualitative assessment techniques to proactively identify potential human factors issues. This paper examines some of the practical difficulties associated with applying qualitative assessment techniques, together with how these difficulties have been addressed. While the steps in the assessment process itself are fairly straightforward, it is necessary to be aware that in any organisation, there is a finite amount of resource that will be made available for the assessment. This paper discusses resource-related issues to ensure the HF programme delivers maximum benefit.

Dr Embrey originally trained as a physicist, before specialising in human factors in safety critical systems. He is a Visiting Professor at the University of Huddersfield. He has worked for 30 years in nuclear power generation, chemical processing, health care, aviation maintenance and rail transport. He has published more than a hundred technical papers, and reports and a standard textbook on human factors in the process industry: 'Guidelines for Reducing Human Error in Process Safety'. He acted as an expert witness in the area of training for the Longford gas plant explosion investigation in Australia.



15.30 Tea

16.00 Peter Mullins: Managing organisational change on major hazard sites. Experiences from nuclear, oil, gas and chemicals

Practical issues, what works and what doesn't, in the management of safety during organisational changes.

Peter rejoined HSE (HID) in 1998 and was a founder member of HID human factors team. He had extensive involvement in regulating organisational changes across chemical and onshore oil sectors, wrote external guidance on the topic (CHIS 7). He was also involved in developing regulatory approaches to safety culture, and more recently led a review of HSE's approach to H&S management. He was lead author of a recent new edition of HSE's best-selling book 'Essentials of Health and Safety at Work'. He joined HSE ND at the beginning of this year, and is currently involved in regulating safety management and organisational change in nuclear industry.



16.30 Cheryl MacKenzie: Lessons Learned from the BP Texas City Refinery Explosion and Other Incidents

(See front page for details)

Cheryl MacKenzie joined the CSB in September 2004. She has been involved in several CSB incident investigations, including the BP Texas City refinery explosion, Marcus Oil and Chemical tank explosion, Valero McKee refinery propane fire, and MFG Chemical toxic gas release. Prior to her CSB work, Ms MacKenzie completed extensive study and research in the fields of anthropometrics, biomechanics, human information processing, and design. Through critical application of human factors and ergonomic methodologies, she has conducted numerous usability assessments for clients in office, industrial, and virtual-world work settings. Ms MacKenzie is a graduate of Cornell University with a Master's degree specialising in Human Factors and Ergonomics.



17.15 Closing remarks

17.30 Drinks Reception sponsored by Human Engineering Ltd, in the Exhibition Hall Weston Room 1.

Day Two

Morning session chair: Andy Brazier
Afternoon session chair: Liz Butterworth

09.00 Liz Butterworth: Doing Human Factors – What it means for you?

Within the oil and gas industry the need to 'do' human factors is increasingly being recognised. In addition, individual assets and projects are faced with the need to comply with human factors requirements as part of contracts, or to comply with national or company legislation and standards.



However, there remains some uncertainty around what is meant by 'human factors', and what doing human factors actually involves, over and above activities already carried out. The presentation will provide practical guidance with reference to the disciplines of engineering, operations and HSSE. It covers requirements for existing assets and operations as well as greenfield and brownfield projects.

Liz Butterworth (nee Cullen) is a Principal Consultant at Human Engineering and manager of the company's Manchester office which opened earlier this year. Liz holds degrees in Psychology and Human Factors. She has 13 years' experience in applying human factors within a range of industrial sectors, including oil, gas, chemical, rail, aviation, nuclear and defence. Currently specialising in the oil, gas and chemical industries, Liz's main interest is in supporting the integration of human factors within the functions of engineering design, operations and HSSE in order to promote usability and control major accident risk associated with human error.

09.30 Graham Reeves: Integrating People, Plant and Process into Design and Operations

A practical methodology that can be used to ensure human factors issues are addressed in a timely manner throughout a major projects lifecycle will be introduced. The benefits that can be obtained from such an approach will be described with reference to an alternative fuels project.



Graham graduated from the University of Newcastle upon Tyne in 1979 with a BSc in Zoology and a MSc in Public Health Engineering. Employed as an Occupational Hygienist by the Ministry of Defence Navy and as a Specialist Inspector with the HSE before joining BP in 1990. Initially employed as an occupational hygienist but appointed human factors advisor within BP's HSE and Operations Function in 2003. Currently focussing on Human Factors Integration into major projects, incident investigation and fatigue. Chair of the Energy Institute's Human and Organisational Factors Working and member of The International Association of Oil & Gas Producers Human Factors Task Force.

10.00 Ronny Lardner: Improving shift handover, and other safety-critical communications

Maintaining good communication between shifts is of critical importance in continuous process industries. Numerous incidents have occurred due to misunderstanding and miscommunication, leading to fatalities, injuries and commercial losses. This session will explain and demonstrate methods to assess and improve shift handover communication, which are based upon 17 years'

experience of delivering such projects in the chemical process, oil and gas, and nuclear industries.

Ronny Lardner is a Chartered Occupational Psychologist and Director of The Keil Centre Ltd, Scotland's largest privately-owned applied psychology business. Ronny specialises in the human and organisational factors which affect health and safety. Example topics include safety culture, behavioural safety, human error, safe communication, and preventing and managing work-related stress. He was a lead contractor for safety culture in the European PRISM human factors project, and is retained as a human factors expert by several process industry clients to advise on safety and work-related stress.

10.30 Break

11.00 Alan Jackson: Competence management – assuring the performance of safety critical personnel on demand.

It is common for major hazard sites to cite competence of operators as a key control measure in their COMAH safety reports. However, they often have difficulty in demonstrating how they achieve this in practice. This paper looks at the practical application of competence management systems on major hazard sites in order to assure the performance of safety critical personnel on demand.

Alan Jackson is a Specialist Inspector of Health and Safety (Human Factors) in HSE Hazardous Installations Directorate Human and Organisational Factors Team. Alan has been providing specialist support to HSE front line activities for 30 years. His current focus is on the assurance of human performance in the major hazards sector.



11.30 Prof Andrew Hopkins: Thinking about safety indicators (See front page for details)

Dr Andrew Hopkins is a sociologist at the Australian National University in Canberra. He is the author of numerous articles on the management and regulation of occupational health and safety, as well as several books, including *Managing Major Hazards: The Lessons of the Moura Mine Disaster*. The publication of this book led to a request that the author appear as an expert witness at the Royal Commission into the causes of the fire at Esso's gas plant at Longford in Victoria. Dr

Hopkins' submission to the Commission outlined the many similarities in the way management in these two disasters failed to heed warning signs. Following on from his successful book 'Lessons from Longford: the Esso Gas Plant Explosion', Andrew's most recent book is 'Safety, culture and risk: The Organisational Causes of Disasters'.



12.30 Lunch

13.30 Justin McCracken: Human and organisational factors: An overview of HSE's strategic and operational activities.

HSE has a long and successful track record in raising the profile of human and organisational factors in health and safety. This talk will provide an overview of HSE's recent and current initiatives relating to these factors in the oil/gas/chemicals and nuclear industries. Justin will also outline HSE's view of how these factors contribute to the management of major accidents, and



present our expectations of duty holders in these areas.

Justin took up post as HSE's Deputy Chief Executive (Operations) on 1st April 2002. He is responsible for all of HSE's operational directorates, covering field operations (including manufacturing and service sectors), operational policy, nuclear safety and hazardous installations, such as chemicals, petrochemicals and off shore oil exploration. Justin is based in HSE's Liverpool HQ but also maintains an office in London. A physics graduate, Justin joined ICI in 1976 as a research scientist and moved from there into process development and plant management. His subsequent posts in ICI took him into marketing and business management in the UK and overseas, culminating in worldwide responsibility for ICI's catalyst and technology licensing business. In 1998, he joined the Environment Agency as NW Regional Director. There he was responsible for all the activities of the Agency in North West England, including regulation of process, water and waste industries, river habitats and fisheries improvement, flood defences and promotion of sustainable development.

14.00 John Wilkinson: Pulling it all together – where do you start?

By drawing together key themes from the previous two days, this session will assist delegates in forming a strategy for the effective management of human and organisational factors on major hazard sites.

John has worked in HSE for 18 years, joining from industry, and has a psychology background. He has worked as a regulatory inspector in general manufacturing, construction, and in the steel and foundry industries before joining the Chemicals and Hazardous Installations Division (CHID) in 1997. He joined the new Hazardous Installations Directorate's (HID's) human & organisational factors team in September 1999 and became Team Leader in 2003. John inspects widely across the UK on COMAH sites, manages the human factors team and strategy, provides advice to other HSE directorates and to industry, coordinates and produces guidance, manages research, and provides training for HID inspectors on human factors.



14.30 Panel of HSE, industry and keynote speakers

15.30 Closing remarks

Day Two: Optional workshop

Managing Human Failures

Workshop leaders: Fiona Brindley & Ian James, HSE

Fiona Brindley has worked as a regulatory inspector in HSE for 20 years and has experience across a wide range of industries including general manufacturing, steel and foundry, and services sectors. Fiona joined the Hazardous Installations Directorate in 1998 and since then has concentrated exclusively on the major hazards industries.

Fiona joined the HID Human Factors team 2 years ago bringing her knowledge and experience of inspections and investigations in the onshore chemical industry to the human factors team. Working predominantly on COMAH sites, her main focus has been on assuring human reliability in the control of major accident hazards. Fiona regularly gives presentations to industry groups and the wider scientific community through seminars, training workshops and conferences.

