

SAFETY AND LOSS PREVENTION SUBJECT GROUP NEWSLETTER

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CONTENTS

Editorial
S&LP - Technical Roadmap 21st Century
Human Factors in the Control Room
How Stable is your Chemical Process.
Just Culture
Book Reviews
Next Issues of LPB and PSEP
News in Brief
Crossword Puzzle No. 21
Diary of Events

EDITORIAL

My attention has been drawn to a Comment in the Flight International journal headed Just Culture. I have reproduced it in this issue, with their permission, to encourage a similar approach in our industry.

The S&LP Subject Group is donating the Inherent Safety training package to each university Chemical Engineering Department in the UK and Ireland.

During the printing of the last issue of the Newsletter, the last line on the exploits of the Safety Consultant has been left out. The piece should read:-

The Blame Game

The Safety Consultant was booked
To take part in a broadcast that looked
At how one could mitigate
The frenzy to litigate
On which the whole country seemed hooked.

His HSE fans quickly queued
To hear the great man interviewed;
But so great was the rush
Some were killed in the crush,
And the Safety Consultant got sued.

TECHNICAL ROADMAP FOR THE 21ST CENTURY.

The article in the July issue of TCE (page 54) sets the scene for a major initiative within IChemE to establish its views on key issues that impact on society. Part of this is to develop position statements on 4 key areas that clearly identify what we as IChemE members see as the challenges faced by society in a global dimension, the solutions we can bring to bear to meet these challenges, and the positions we hold in respect of moving forward in these areas. The 4 areas are: Sustainability and sustainable chemical technology; Health, Safety, Environment and Management of Risk (previously titled Safety, Environment and Societal Risk); Energy, food and water; and Bio systems and bioengineering.

The early drafts of a position paper on HSE and Management of Risk has been put together with contributions from the S&LP Subject Group committee members, Prof. Trevor Kletz, and EPSC Director Richard Gowland and Operations Manager Lee Allford. This consultation process is now being extended to all Subject Group members to develop a further draft that can be used to engage with the whole of IChemE's membership in the fourth quarter of 2006. YOUR contribution is vital to ensure that the final document contains robust positions in respect of S&LP. You will be sent the latest draft position paper during July asking for your feedback. Please take this opportunity to make an important contribution to the way in which IChemE and your Subject Group embraces the challenges presented by the

world we live in wherever you are. I look forward to hearing from you.

John Atherton (athertj@btinterent.com) - co-convenor for the Health, Safety, Environment and Management of Risk Technical Policy Commission.

HUMAN FACTORS IN THE CONTROL ROOM - Design & Operations Meeting in London. 26th January 2006

This one-day meeting, was the third in a series on human factors following on from successful meetings held in 2004 and 2005.

The meeting, drawing an attendance of 46 delegates, set out to explore human factors in the control room in respect of the design of the man-machine interface and issues affecting the responses and performance of operating staff. Six excellent speakers represented a wide range of interested and involved parties, including specialist consultants, operators, regulators and hardware/software solution providers.

The opening presentation from Martin Anderson of the Health & Safety Executive (HSE) provided an overview of the regulators developing approach. Key areas of interest with respect to Human Factors in Control Rooms were highlighted, with “The System” and Staffing Levels/Workload the two current areas of main concern. A useful checklist of human factor issues pertaining to control room centralisation was also presented as a valuable ‘takeaway’, together with an emphasis on the need to challenge common assumptions such as new technology and centralisation allowing reduction in staff or the same staff managing a larger area. For the HSE this is clearly a growing area, with a number of HSE Inspectors currently undergoing extended human factor training.

The second speaker, Liz Cullen of WS Watkins, gave an engaging view of practical application of human factors in control room design, and specifically the integration of old and new facilities during upgrades. An offshore platform case study was used, which focused on a number of human factor challenges identified from amongst other sources, the Safety Case. Pradyumna Pandit of Honeywell Process Solutions next provided an overview of the human factors learnings from the ASM (Abnormal Situations Management) Consortium. Amongst many other useful ‘gems’ from this talk, some interesting statistical data on what causes human related process downtime was particularly useful.

The morning session was concluded by Richard Scaife of the Keil Centre Limited who presented an application of human factors in investigating control room incidents.

The penultimate speaker, Dr Ron McLeod of Shell, gave a well illustrated talk on the progress and challenges experience by Shell with regard to human factors in engineering during recent projects. A number of valuable lessons were presented, and a memorable slide involving a structural support and a large inappropriately placed valve wheel, with a hand written message from the operator to the engineer – let your imagination run wild! This talk also raised the dangers associated with the “normalisation of abnormality”.

The final formal presentation of the day was from Tony Atkinson of ABB Engineering Services. This focussed on the vast experience of the speaker in respect to lessons learned during upgrade projects to operator interfaces and their impact on control room practice.

Delegate and speaker feedback on the day was positive, and we believe there remains an appetite for future seminars around the

human factor, safety culture theme – watch this space.

A further HF related meeting is being planned for January 2007, with focus on either operator competency and proof or obtaining benefits from human factors approaches. Account is being taken of the agenda of the Human Factors Task Force, which is part of the European Technology Platform for Industrial Safety.

John Munnings-Tomes

NOTE ON S&LP SUBJECT GROUP MEETING “HOW STABLE IS YOUR CHEMICAL PROCESS?” HELD AT THE MANCHESTER CONFERENCE CENTRE, 26TH APRIL 2006.

The objective of this one day meeting, attended by a total of 30 persons, was to introduce the concept of thermal stability screening, together with a number of commercially available techniques described by specialists in their use. The meeting concluded with an open forum. Presentation materials from the meeting have been posted on the S&LP Subject Group e-networking toolkit.

The first speaker was Janet Etchells, who is part of a multi-skilled team within HSE responsible for providing guidance and advice on chemical reaction hazards. The importance of thermal reaction screening is emphasised by the 269 incidents that have occurred between 1986 and 2000; averaging about 18 per year, although fatalities are rare. While regulations such as DSEAR/ATEX clearly have an impact on how this area should be addressed, there is a clear training gap with many young graduate engineers not being adequately aware of chemical reaction hazards and how to manage them. The UK Chemical Reaction Hazards Forum has been set up by UK senior process safety professionals within the industry which meets regularly for mutual exchange of information, expertise and ideas. More information on this forum can be found at: <http://www.crhf.org.uk/>

Thomas Glarner of Roche described the practical use and limitations of the Adiabatic Reaction Calorimeter in establishing the maximum acceptable temperatures (MAT) for process and storage. The MAT is derived where the reacting materials can be held for 24 hours at constant temperature without thermal excursion. There is no alternative to testing as prediction of the MAT by calculation has been shown to be extremely unreliable in describing chemical reaction hazards. In the subsequent discussion concern was raised that using a 100°K rule is difficult to apply in practice, and the use of the ARC does not provide data for vent sizing calculations.

Graham Arthur of Syngenta described the Carius Tube Test. While this is considered as “old technology”, it still has a use as a screening technique. As results cannot be linked directly to plant process conditions, a 60°K Rule is applied to define the safe condition. The Carius Tube can be used to examine the effect of materials of construction on reaction kinetics by adding small quantities to the mix, however, the technique is sensitive to sample size. Additionally, sampling intervals can mask extremely rapid increases in temperature although this can be mitigated to some extent by the use of modern detection equipment and computer technologies.

Pierre Reuse stood in for Francis Stoessel of Swissi (Swiss Institute for the Promotion of Safety and Security), describing the use of the Differential Scanning Calorimetry in thermal stability screening. Of particular interest was the guidance given on selection of crucible materials, interpretation of thermograms, the determination of TMR_{ad} (time to maximum rate under adiabatic conditions) and advice on the characterisation of autocatalytic reactions. The conclusion is that DSC is a powerful tool for the investigation of accidents.

David Dale of Pfizer spoke about the use of the Thermal Screening Unit in

developing a thermal stability assessment strategy. Comparison between various test methodologies can show wide differences in on-set temperatures. The TSU, using a small sample size with the capability for rapid agitation, can obtain a good balance between sensitivity and speed of testing. However, increasing pressure is claimed to be a better indication of the onset of decomposition events than rises in temperature.

The final presentation of the day was given by Ron Jones of Alfa Aeser who described the early experiences of using the Rapid Screening Device. A major benefit is the use of glass vials, which are low cost and can give reproducible results, although the vials are pressure limited. The RSD is seen as complimentary to the DSC.

An open forum was held at the end of the formal presentations, which yielded considerable discussion along the following lines:

1. Whatever Rule is used, the various 100°K, 60°K, and 50°K Rules are often misunderstood and misquoted. Particular care has to be taken by process engineers to understand the reactions they are designing for or operating with.
2. While the speakers presented DSC as a thermal screening technique, it was emphasised that the generation of pressure is the main hazard, not the elevation of temperature. DSC does not measure pressure so is not necessarily a good indicator of potential hazard. Slow gassing that is accompanied by only weak exothermic, or possibly thermally neutral, activity will be overlooked.
3. Concerns were voiced on how commercial pressures within companies can create pressure to bypass vital process development stages, in particular missing out pilot plant stages. Part of the rationale for developing the TSU is

to shorten the time taken for meaningful testing to take place within a responsible development programme, but this is reliant on having manufactured sufficient material to provide a minimum sample size. The DSC is seen to be the best available technique where only extremely small quantities are available for testing at the early stages of development.

4. Engineers and managers need to know that there is a legal requirement within Europe to adopt inherent safety practices. Unless this is fully recognised, it will be difficult to obtain the benefits in process development that IH can achieve.
5. There is a perceived knowledge gap on chemical reaction hazards within newly graduated chemical engineers. A training video created by HSE about 15 years ago has been offered to Universities, but it was claimed that teachers have considered the way in which the subject matter is portrayed to be too frightening to students! The meeting unanimously agreed that it is better to be frightened by watching a video than experience the consequences on not knowing the basics of chemical reaction hazards when operating in the field. However, some universities, including Newcastle, Sheffield, who offer a S&LP MSc, and Southbank have addressed this issue. An on-line e-training tool is available from IChemE. The discussion moved onto the more general education of students in process safety, with the need for an understanding of “what you don’t know” to be built into the psyche of every newly graduated engineer. A call was made for model degree schemes to include specific

modules to cover critical process safety topics.

6. A final vital point made was the Management of Change to original designs that can have a serious impact on chemical reaction hazards.

John Atherton, and Nathan Olekah
(Salford University)

Just Culture

Eurocontrol wants to spread an open incident reporting system across Europe and beyond, so that safety can benefit

For years the airline industry has been working to develop a just-culture” incident reporting system within which pilots, mechanics and others can report errors or close calls without being subject to a disciplinary process. Only if safety has been wilfully disregarded does blame or retribution enter the equation.

Eurocontrol wants to give a boost to just-culture reporting in the European air traffic management (ATM) community, and is threatening to name and shame states that are making no moves to set one up. The agency has become frustrated at the slow progress of ATM incident reporting in Europe since the accidents at Milan Linate and Uberlingen in 2001 and 2002, both of which were ATM-related and both of which led to fierce retribution against individuals when hidden systemic problems were the cause.

We must change the reporting culture so that admitting errors is seen as positive

The subsequent review of ATM safety identified the need for a healthy incident reporting culture as one of the seven areas requiring attention.

Eurocontrol is sailing into uncharted waters, since it is not the aviation community that is the problem, but national judicial systems. It is therefore addressing an area where it has no direct influence, and is pleading with transport

ministers to try and convince justice departments of the merits of the just-culture case.

There is already international backing for the introduction of improved reporting measures. The European commission’s directive on occurrence reporting in civil aviation is gradually being incorporated into national law and the International Civil Aviation Organisation strongly supports Eurocontrol’s initiative in particular, and the concept in general. ICAO’s Annex 13 spells out that the purpose of accident investigation is to find the cause in order to prevent future occurrences. not to apportion blame.

In many states, however, the introduction of legal protection for voluntary occurrence reporting is controversial, as it is argued that there are other professions that would then require similar protection from the law, creating the need for a major review of national penal codes The answer is that just-culture protection should only apply where safety management is paramount. Aviation safety performance improvement in countries that have adopted just-culture reporting testifies to its effectiveness, and there is no reason why safety incident reporting in non-aviation industries should not also benefit. Where there is no just-culture reporting system, individuals tend to put their own immediate interests first—like keeping their job, or promotion, avoiding disciplinary action and the opprobrium of workmates, any of which could result from reporting an error that will probably go undetected, but which could have been dangerous. The answer is to change the reporting culture so that admitting and reporting individual errors is seen positively because of the benefits it brings to the system — especially where the system may be a part of the problem. This encourages mutual respect and a desire to work together on solutions instead of trying to bury problems without solving them.

Eurocontrol realises that there is a clear

need in many states for national legislative support for non-punitive reporting and assurances of confidentiality. It believes this can and should be based on existing ICAO, Eurocontrol and European Union standards and regulations adopted locally. A major education and awareness campaign is also needed to publicise established best practice.

Meanwhile, Eurocontrol has been trying, through its own rule-making processes, to create obligatory provisions whereby member states require their air navigation service provider (ANSP) to implement formal safety occurrence reporting and assessment systems, and to report the resulting data centrally to Eurocontrol so that endemic problems can be identified and trends recognised. While laudable, the process is taking too long and some states have not even begun this work. Even in states that have the goodwill and motivation of ANSPs, the system is endangered where there is no appropriate modification to the legislature. Without this, the system can be destroyed by a single bad experience.

Only when free reporting practices are introduced in European ATM—and eventually globally—will the traveling public be convinced that safety, rather than protecting individuals, really is the priority.

Comment in Flight International

18-24 April 2006

BOOK REVIEWS

STRATEGIC RISK - A Guide for Directors.

Published by the Institution of Civil Engineers. Priced at £35 ISBN 0 72773467 9

The ICE in conjunction with the Actuarial Profession has issued this guide for risk management to focus the approach of organisations to leadership into this important area. The Guide for Directors

presents a challenging new approach to risk management known as STRATrisk, which helps private and public organisations to focus on the outcomes that really matter. Research shows that in the near future 10% of UK companies which have a credit rating will fail, while others will suffer serious setbacks or fail to exploit major opportunities.

The Guide reveals why managing strategic risks needs a different approach and outlines a recommended methodology. It stresses the necessity for the board to provide risk leadership and create the right culture, communications systems and risk-management frameworks and discusses how to proceed in practice. The accompanying CD-ROM includes information on the aims of the project, project phases, enabling processes and technologies, underpinning fundamental knowledge, demonstration software and video clips.

THE TEXAS CITY DISASTER 1947.

Hugh W. Stephens. Published by University of Texas Press. Price in UK £16.

ISBN 0-292-77723-x

This disaster started on the 16 April with the explosion of the French Liberty ship Grandcamp when loading ammonium nitrate packed in paper sacks. It was suspected that the fire started when longshoremen were smoking during the loading operation. Initially there was a small fire which was attended by the Texas City fire brigade and a refinery fire brigade. The captain of the Grandcamp did not want his cargo ruined by water so he closed the hatches and turned on a steam system. About an hour later yellow and orange smoke billowed out of the ship which then disintegrated in a large explosion which was heard 150 miles away. Damage to buildings up to one mile away occurred. There were many deaths and injured persons but the recovery of all

was hampered by a telephone strike and damage to the police radio system. As help arrived eventually in Texas City, more was to happen. In an adjacent slipway was another Liberty ship, the High Flyer also loaded with ammonium nitrate which was also afire and in the early hours of the following morning it also exploded with considerable force. Crude oil tanks and chemicals in tanks of the refinery and Monsanto's works were set alight. There were 468 dead persons and 100 missing. Injured were estimated at 3,500 persons.

This book gives a vivid account of the incident and the events as they unfolded throughout the following days. There were no emergency plans for the incident and chaos ruled for some considerable time. This book does not tell you how to draw up plans for an emergency as there were none. The book is interesting for those involved in emergency planning as reading it could well trigger a thought on how you would deal with the incredible variety of situations that occurred in Texas City in handling the chaos that reigned for some time.

John Bond

ARTICLES IN THE NEXT ISSUE OF THE LPB AND PSEP

LPB - Issue 190, August 2006
PIPELINES AND PIPING: SPECIAL ISSUE

- Information for authors and readers
- A tale of three pigs
- Clearing a blocked pipeline averts a possible environmental incident — powder transport principles
- Gas leak during pipeline riser modifications
- Overpressure in isolated relief valve body and downstream piping
- Pipeline insurance—technical aspects of underwriting and claims
- Frozen steam condensate results in pipe rupture and fire in a refinery
- Malfunctioning isolation valve leads to a gas release from a pig receiver

- Learning from ductile iron incidents
- Bulletin briefing
- Events

PSEP - Issue 84, July 2006

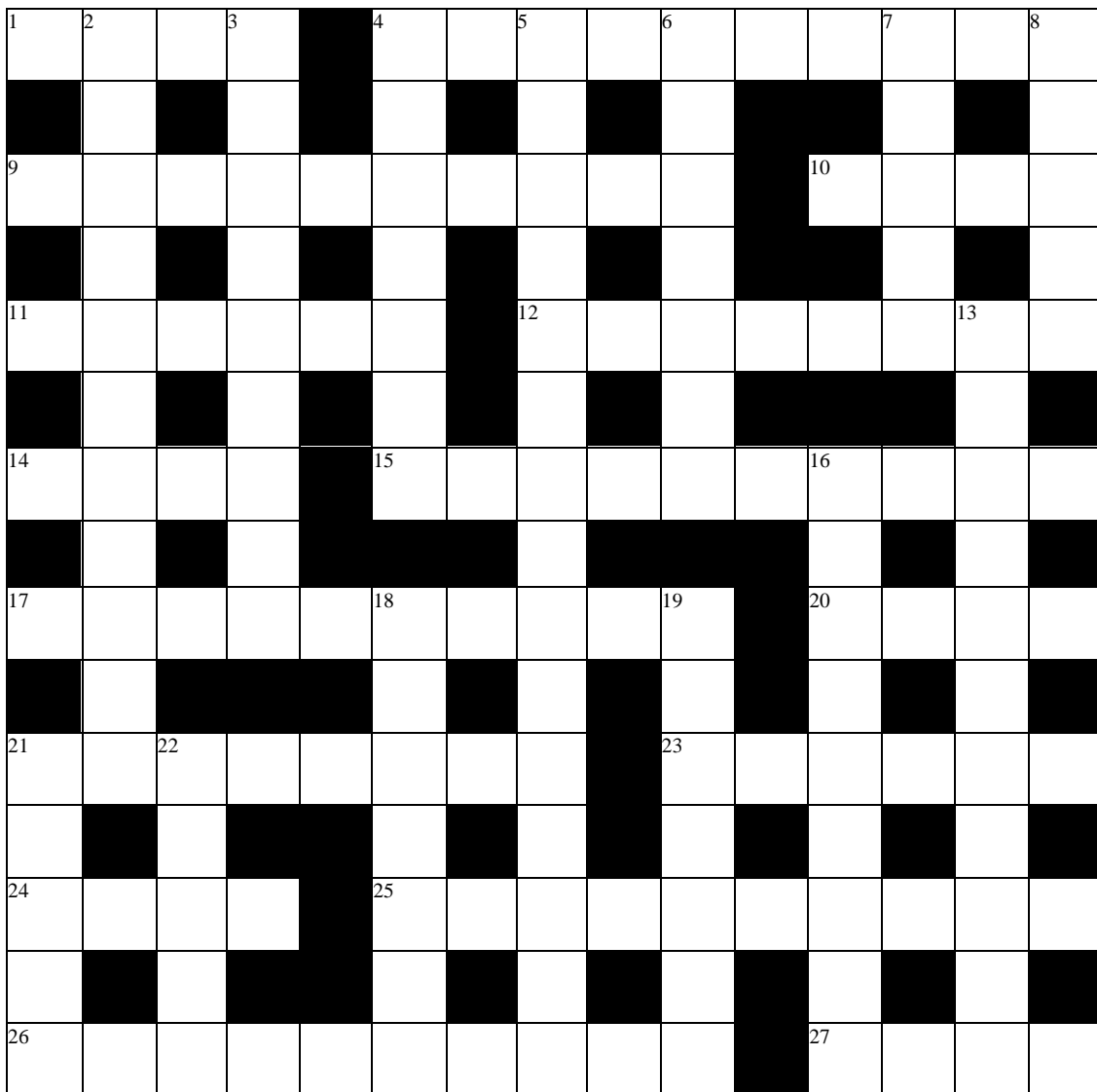
- Feasibility of Recharging Reclaimed Wastewater to the Coastal Aquifers of Perth, Western Australia.
- Technical and Economical Evaluation of a Thermal, and Two Oxidative Techniques for the Reduction of Excess Sludge Production.
- Safe Recycling of Sewage Sludge on Agricultural Land—Biowaste.
- Preparation of Adsorbents from Sewage Sludge by Steam Activation for Industrial Emission Treatment.
- Utilization of Bauxite Slag for the Purification of Industrial Wastewaters.
- Life Cycle Assessment (LCA) Applied to the Design of an Innovative Drying Process for Sewage Sludge.
- Combination of Thermal Treatments and Anaerobic Digestion to Reduce Sewage Sludge Quantity and Improve Biogas Yield.
- Mesophilic Biohydrogen Production from Olive Pulp.
- Thermodynamic Study of Heavy Metals Behaviour During Municipal Waste Incineration.
- Combustion of Low Calorific Gases from Landfills and Waste Pyrolysis using Porous Medium Burner Technology.
- Synthesis of Hydroxyapatite with the Mechanochemical Treatment Products of PVC and CaO.
- Photolytic Destruction of Halogenated Pyridines in Wastewaters.
- Practical Supercritical Water Reactor for Destruction of High Concentration Polychlorinated Biphenyls (PCB) and Dioxin Waste Streams.

NEWS IN BRIEF

Crash Course for unwitting health and safety staff

Twenty-one health and safety delegates had to be rescued by fire fighters after an

CROSSWORD PUZZLE No. 21



ACROSS

1. Acronymic car fuel. (4)
4. Some of this other maleic acid has the same temperature. (10)
9. Not a nuclear powered submarine - it's much smaller. (10)
10. O, is this a gasket? (4)
11. In retrospect this American wasn't a snob. (6)
12. Before a peak, a silly fellow stirs things up. (8)
14. Where there's a lot of 13. (4)
15. Stuff to make ones expiry certain. (5, 5)
17. Support waistless dresses for afternoon work. (10)
20. Cockney isn't (4)
21. If beheaded, she could let out a great blast. (9)
23. Ensemble singing that includes a learner could have a sedative effect. (6)
24. The river is said to flow very sluggishly. (4)
25. Middle East oil sultanate is just part of English madness. (10)
26. Have fun with merry poets measuring high temperatures. (10)
27. Turn back before the highpoint of Sicily. (4)

DOWN

2. Quitted a sin to get half way to heaven. (11)
3. Some invent stacks of reasons for airing a problem. (4, 5)
4. Infuriate high church ritual. (7)
5. In other words, surgeon's exhaustion can be an industrial hazard. (8, 7)
6. Shock on first hearing of race riots in feudal York. (7)
7. Nothing in the fog is damp. (5)
8. Half regulators returned for small firearm. (5)
13. Finding ones way around especially, say, in China. (11)
16. Put back flagstones, make a speech, and vanish into thin air. (9)
18. A liquid hydrocarbon upset a pet hen of mine. (7)
19. Areas where those who choose the English team omit the French. (7)
21. A serving of ice cream hits the headlines. (5)
22. Pipe between stair treads. (5)

Answers to Crossword Puzzle No. 20

Across

1. Contra
5. Mistakes
9. Endanger
10. Unsafe
11. Vermin
12. No backup
14. Tripropylene
17. Manslaughter
20. Sandbags
22. Tumble
23. Dynamo
25. Haunting
26. Methanal
27. Egress

Down

2. Ounces
3. Traumatized
4. Argentina
5. Mariner
6. Squib
7. Ass
8. Effluent
13. Calorimeter
15. Pitot tube
16. Catalyse
18. Gasohol
19. Plants
21. Adorn
24. Ash

DIARY OF SAFETY EVENTS

GROUP	TITLE OF MEETING	PLACE AND CONTACT	DATE
Hazards Forum	Improving Risk Management of Critical Computer Controlled Systems	Institution of Electrical Engineers, London Tel: 0207-665-2202 www.hazardsforum.co.uk	Postponed
S&LP Subject Group With the I.Mech.E	<p>Asset Integrity Management in the Process Industries</p> <p>A one day meeting organised jointly by the IChemE Safety & Loss Prevention Subject Group and Milton Keynes Centre, and the IMechE Pressure Systems Group which will focus on the integrity management of process equipment and protection systems using series of risk based techniques that address design, operations, maintenance and inspection.</p> <p>Selected speakers from the industry, regulatory authorities and consulting will give an overview of integrity management. The meeting will also present a sample of techniques and methods used for systematising and improving integrity management, such as Risk Based Inspection. This meeting will be of particular value to managers of the chemical and process industries, as well as practitioners in the areas of safety, maintenance and inspection.</p>	<p>National Hockey Stadium Silbury Boulevard Central Milton Keynes Buckinghamshire MK9 1HA</p> <p>For further information regarding this event, please see www.icheme.org/pdfs/AssetIntegrity280906.pdf</p> <p>If you have any problems with this link, please email me for the document, gjones@icheme.org</p>	Thursday 28 Sept. 2006
S&LP Subject Group	New fuels and carbon sequestration	Health and Safety Laboratories Buxton	9 November 2006
S&LP Subject Group with Fire and Blast Information Group	Disseminating the Lessons Learnt from recent Onshore and Offshore Accidents - including BP Texas City Refinery, Mumbai offshore platform and Buncefield Storage Depot		6 December 2006
European Process Safety Centre	Human Factors in Process Safety: Lessons, Best Practice, Tools & Techniques around Europe.	<p>Schiphol, Netherlands</p> <p>www.icheme.org/forms/HumanFactorsRegistration.htm Tel: 01788-534409</p>	5 & 6 October 2006
S&LP Subject Group	Continuing programme on Human Factors Theme		January 2007
IChemE and EFCE	12 th International Symposium Loss Prevention and Safety Promotion in the Process Industries	<p>Edinburgh International Conference Centre Contact R. Cragg IChemE Tel 01788-534476 Email rcragg@icheme.org.uk</p>	22 – 24 May 2007



**ASSET INTEGRITY MANAGEMENT
IN THE PROCESS INDUSTRIES
28th September 2006**

At the National Hockey Stadium, Milton Keynes

A one day meeting organised jointly by the IChemE Safety & Loss Prevention Subject Group and Milton Keynes Centre, and the IMechE Pressure Systems Group which will focus on the integrity management of process equipment and protection systems using series of risk based techniques that address design, operations, maintenance and inspection.

Selected speakers from the industry, regulatory authorities and consulting will give an overview of integrity management. The meeting will also present a sample of techniques and methods used for systematising and improving integrity management, such as Risk Based Inspection. This meeting will be of particular value to managers of the chemical and process industries, as well as practitioners in the areas of safety, maintenance and inspection.

The programme will start at 10.00 am, with registration from 09.30, and will conclude no later than 17.00 following an open forum. Lunch will be provided. The meeting will take place in the Abbey Suite.

Programme:

**Co-Chairs: Dr. Ken Patterson – Group SHE Manager Synthomer Europe;
Mr John Wintle – Vice Chairman Pressure Systems Group IMechE**

- 10.00 A regulator's view of integrity management - Mechanical integrity of pipework and atmospheric storage tanks, Mike Skellett, HSE
- 10.30 A designer's view of the implementation of Instrumented Protective Functions. Data lifecycle, from the designer to the operator, Peter Weller, Shaw Group
- 11.00 Coffee break
- 11.30 Development, engagement and implementation of a global BP Group Integrity management standard, Peter Elliot, BP
- 12.00 Measuring asset integrity - how do we know if we are getting it right? Bo Malmqvist, DNV
- 12.30 Buffet lunch
- 13.30 Failures in process infrastructure - surveying the legal wreckage, Kirsti Olson, Maclay, Murray & Spens
- 14.00 The scope of an Engineering, Procurement and Construction project - Asset integrity considerations within the project lifecycle, Lyn Fernie, Aker-Kvaerner Consultancy Services
- 14.30 Increasing maintenance effectiveness through equipment criticality and vulnerability studies, Brian Hudson, ABB, John Richardson, Hydro Polymers
- 15.00 Coffee break
- 15:30 Implementation of an integrated Risk Based Inspection (RBI) system for an onshore installation in Kuwait, Panos Topalis, DNV
- 16.00 Open forum
- 17.00 Close

For further information contact:

Panos Topalis; tel:: 020 77166506, email: panos.topalis@dnv.com
or visit: www.icheme.org/pdfs/AssetIntegrity280906.pdf