



Newsletter

EDITORIAL:

Below is a request from the editor of the *Loss Prevention Bulletin* for case histories. I hope that all of you will assist in this process of sharing information. I am reminded of a quotation from a great Victorian engineer Robert Stephenson who, in 1886, said:

“... nothing (is) so instructive to the younger Members of the Profession as records of accidents in large works and the means employed in repairing the damage. A faithful account of these accidents, and of the means by which the consequences were met, (is) really more valuable than a description of the most successful works.”

THE FRANK LEES MEDAL FOR 2000

The Frank Lees Medal is awarded to the best safety related article appearing in an IChemE publication. The prize for 2000 went to Helen Conlin of Entec UK for her excellent article on safe staffing levels (TCE No 711 – 19 October 2000). The committee considered this had an immediate practical value that would benefit safety practitioners. Helen will be presented with the award at the forthcoming Hazards XVI meeting.

THE STUDENT DESIGN PROJECT PRIZE

Hot on the heels of the Frank Lees Medal, we have the S&LP Design Project prize. This was devised to encourage students to focus on safety

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issues when drafting their degree course design projects. The prize for 2000 was awarded jointly to Fergus O’Callaghan and Andrea Colgan of University College Dublin for their project on the design of an acetic acid plant – reactor and drying column. Commenting on the award, adjudicator Simon Turner (Foster Wheeler) praised the report for its coverage of safety issues but noted that many of the entries were light on reference to lessons learned and the principles of inherent safety. Something for universities to bear in mind?

SAFETY ON THE INTERNET

Would you like to know what the COSHH regulations (1999) say?

Are you interested in past incidents such as Flixborough and Bhopal?

Would you like to contact safety organizations in other countries?

Do you need information on Biosafety or incompatible chemicals?

Are you puzzled by acronyms and abbreviations?

Are you interested in Risk Assessment or incident management?

Would you like to see information from a recent conference?

Remember, information on these topics and much more is available on our extensive website, with a simple address: <http://slp.icheme.org/>
Why not have a look?

LOSS PREVENTION BULLETIN

– HELPING US TO HELP OTHERS

The thorough investigation of accidents and the sharing of the lessons learned has for many years been one of the building blocks contributing to safety improvements in the process industries. This is recognised in:

- Responsible Care
- The Seveso II Directive
- HSE Texeco Fire Recommendations

The *Loss Prevention Bulletin (LPB)*, which was established in 1974, contributes to this process through the open sharing of information throughout industry.

To achieve our aims, we rely on organisations being willing to share information by providing details of safety incidents.

This information can be published anonymously if wished, since we believe it is important that lessons can be learned and shared without embarrassment or recrimination.

Articles published in *LPB* are essentially practical relating to all aspects of safety and loss prevention, including the prevention of environment incidents. We particularly encourage case studies that describe incidents and the lessons that can be drawn from them.

COMING UP IN 2001...

We are especially interested in publishing case studies of incidents related to:

- Batch processing
- Instrumentation or PES failure
- Corrosion
- Electrostatic hazards

If you can help or would like to discuss your ideas further, please call the editor, Tracey Donaldson, at the I. Chem. E 01788-578214

Articles are usually up to 2500 words in length. However we are able to accept longer reports which will be written up into articles by members of the editorial panel. Drawings and photographs are welcome. Drawings should be clear, but are usually redrawn before printing. Any material provided can be returned if requested.

Correspondence on issues raised by *LPB* articles is particularly welcome, and should be addressed to the editor.

THE SAFETY CASE

The Safety Inspector said "Please,
Will somebody think up a wheeze
So that I can acquire
All the gen I require
To comply with what COMAH decrees?"

MY FIRST ENTRY INTO A CONFINED SPACE

In 1946, after two years in the Research Department at ICI Billingham, I was sent down to the Works for about 6 weeks to see how the company earned its profits. One quiet Saturday afternoon one of the shift foremen asked me if I would like to go inside a gasholder. Naturally I agreed. The gasholder was the dry type in which a moveable disc separates the gas in the lower part of a cylinder from the air in the upper part and there is a tar and canvas seal between the disc and the cylinder walls.

At a guess the volume of the gasholder was several thousand cubic metres and its height was about three times its diameter. To get inside it we had to go up a staircase onto the roof, through an opening in the centre and then down a Jacob's ladder, a folding ladder, onto the disc. As Figure 1 shows, during half the descent we were clinging to the wrong side of the ladder. Fortunately the gasholder was nearly empty and the angle of the ladder was not too great.

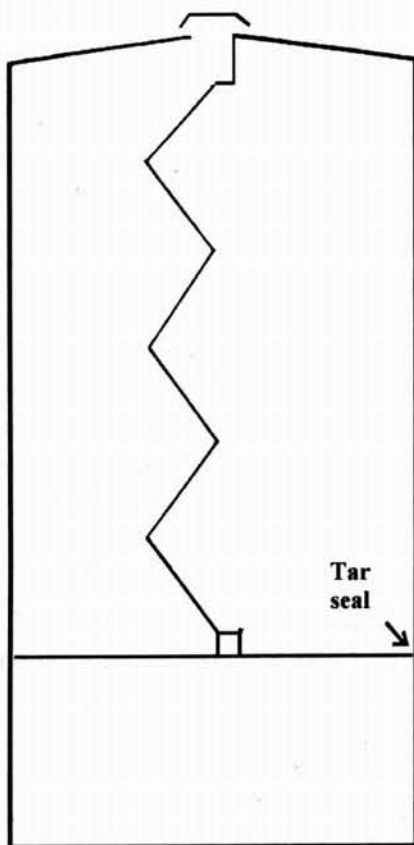


Figure 1 Diagram of dry gasholder showing "Jacob's Ladder"

I cannot remember what was in the gasholder. It may have been coke oven gas, water gas (H_2 plus CO) or producer gas (N_2 plus CO_2). The atmosphere in the gasholder was not tested before we entered, there was no entry permit and no standby man, though the foreman mentioned that strictly speaking there should have been one. The whole experience was eery and I have never forgotten it.

The foreman mentioned that following an explosion in Germany, dry gasholders were out of favour, ICI would build no more and the long-term plan was to replace them by wet gasholders. I never found out what had happened in Germany but recently I came across a reference in *Perry* to an article on a dry gasholder explosion in 1933, which is sufficiently interesting to be worth recounting¹.

The gasholder contained coke oven gas. A section of the bypass pipe was removed for cleaning as it was partially blocked with naphthalene. On the inlet side the section of pipe was isolated by a closed valve (Figure 2) and on the outlet side by a slip-plate. When the missing section was replaced, it was found that the pipe coming from the valve had sunk and the two pipes could not be lined up. It was then decided to remove the support at the end of the replaced section so that

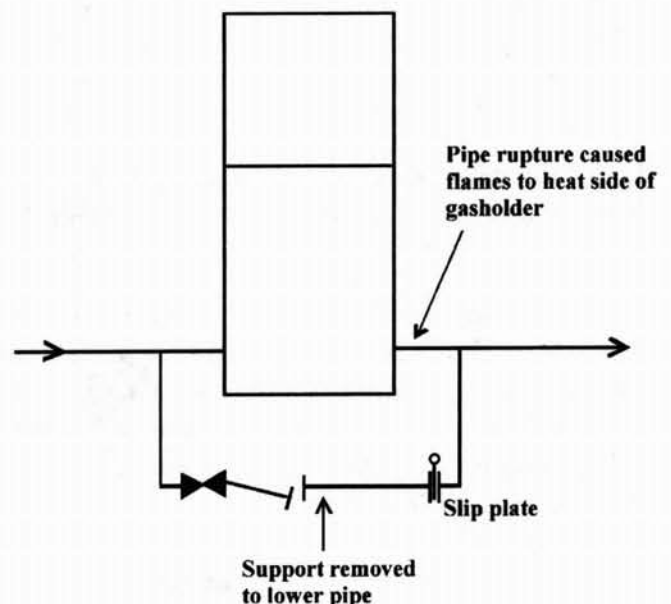


Figure 2

it would also sink. This involved welding. It ignited gas which had leaked through the closed valve and the resultant explosion tore the outlet main close to the gasholder. The flame from this much larger leak went up the side of the gasholder and five minutes later the gasholder exploded. Either the heat distorted the walls or evaporated the tar. Either way, this would allow gas to bypass the disc and mix with the air in the upper portion of the gasholder.

Perhaps this was the explosion in Germany that the ICI foreman referred to. However, I think he said that the German explosion occurred because the disc in a gasholder tilted and jammed and gas got past it and I recall seeing a level alarm on the disc in the ICI gasholder. If anyone knows of any other German gasholder explosions, pre-1946, please let me know.

Trevor Kletz (T.Kletz@Lboro.ac.uk)

1 "The disaster at the Neunkirchen Iron Works", *The Gas World*, 22 April 1933, p 397, a translation from *Das Gas und Wasserfach*, No 14, 8 April 1933.

**THE MAINTENANCE ENGINEER
HAS A NASTY ACCIDENT.**

They told me, Harry Clitus, they told me
you'd been crushed;
They said some pipework fell on you when it
was being flushed.
I smiled, as I remembered, how often you'd
been warned,
To wear protective clothing - advice you
always scorned,
And now that you've been flattened, with
caustic soda sprayed,
Shirt-sleeved, without a hard hat, your
arrogance displayed;
Yet still your witless folly, your macho strut
survives,
In accident statistics and HSE archives.

WHEN ARE WE GOING TO LEARN LESSONS FROM PAST ACCIDENTS?

This is a simple example of the importance of learning lessons. The Observer of the 4th March reported an incident in Johannesburg:

"A stampede in a stairway at a railway station in Johannesburg killed seven people and injured eight others. Commuters were trying to catch a train for Mafikeng, although the platform gate had already closed, on Friday night."

Is this not an image of the Hillsborough Disaster. Now compare the Johannesburg incident with the examples that follow:

"The travelling public is exposed to a variety of hazards, each one stemming from the particular mode of travel. A railway station should be a haven from such dangers, but here again much depends on the design of the station. Towards the end of the bank holiday in April 1892 the crowds who had been enjoying themselves on Hampstead Heath noticed an approaching rain cloud, decided to call it a day and rushed to the nearest station. The

stairway down to the platforms at Hampstead Heath Station was soon jammed with a seething mass of passengers; somebody tripped and fell, but still the crowds came. Two adults and six children were killed. A passenger on a train arriving at the height of the crush described the scene in a letter to the *Hampstead and Highgate Express*:-

"A most painful sight met my gaze. The station seemed like a howling wilderness, shrieking, bustling, and cries of women and children made it a scene almost indescribable."

☆ ☆ ☆ ☆ ☆

"The presence of a large number of children, excitable and unreasoning, is an added hazard to the problem of overcrowding, as a tragedy in 1883 shows. On 16 June of that year a special performance for children of conjuring, marionettes, etc. took place in the Victoria Hall in Sunderland. Advance publicity had suggested presents and prizes for all, and well over 2,000

expectant children turned up. Half were accommodated in the main body of the hall, the remainder in the gallery.

At the end of the show the presents were not handed out but were tossed from the stage into the audience on the main floor for the youngsters to scramble for. The children in the gallery soon realised that to receive a present they needed to get below. They raced down a flight of stairs, along a passage and down another stairway. At the foot of this second staircase was a pair of swing doors, which had been locked into a position so that only one person at a time could get through a 2 ft wide opening; this was a precaution taken by the management to ensure that each person entering had bought a ticket. It was at this "exit" that some 400 hysterical children hurled themselves, those in front being jammed up against the door by others pressing from behind. And, as is the nature of children, some of them tripped on the stairs, adding more small bodies to the squirming pile at the foot of the staircase.

A total of 186 children were crushed to death in the Victoria Hall that day."



"A remarkably similar tragedy had occurred in Malta in 1823, when a locked door and the handing out of goodies to small children were responsible for the loss of life. The accident is the more poignant because the children were being protected in the quiet of a convent from the possible excesses of a public spectacle. Private William Wheeler of the 51st Regiment, then on garrison duty in the Island, wrote about it to his family in England. He describes the annual carnival in Valetta, with its three days of fun and jollity, and continues:-

"Every face seemed to smile with content, until about half an hour after the carnival had closed, when the whole city, I might say Island, was thrown into the deepest sorrow and anguish of mind imaginable.

"I will endeavour to describe the cause as clear as I am able. In Valetta there are a number of families who consider it improper that the children should be spectators of so much extravagance and folly. Each day they send

them to the monastery of Jesus Maria and Joseph, where they are amused and entertained by the monks until dusk, when they are let out to go home to their friends. The children have to pass down a long passage in the centre of which stands an image of the Virgin, here a few priests are stationed to distribute sugar plumbs, sweetmeats etc. to them as they pass. To the poorer sort bread is given. The number of children thus assembled are generally upwards of a thousand. At the bottom of the passage, there is a turn to the right and a flight of about twenty steps, four or five paces from the steps are a pair of folding doors that lead into the street. By some oversight the doors were not opened, the children in front, when they came to the bottom of the steps were buried alive by those who pressed from behind, in a short time the space from the doors to the top of the steps was one solid mass of human bodies. What made it still worse was that a parcel of beggars follow up the rear, to get a share of what is left, so that the poor little creatures in front had no chance to retreat from the danger, but were hurried into it, one on top of the other, until this large space from the top of the steps to the doors was completely crammed with upwards of 500 children. The confusion was beyond description, and before proper assistance would be rendered, upwards of one hundred had breathed their last breath."

Private Wheeler relates that over a hundred children were killed and some 400 more injured."



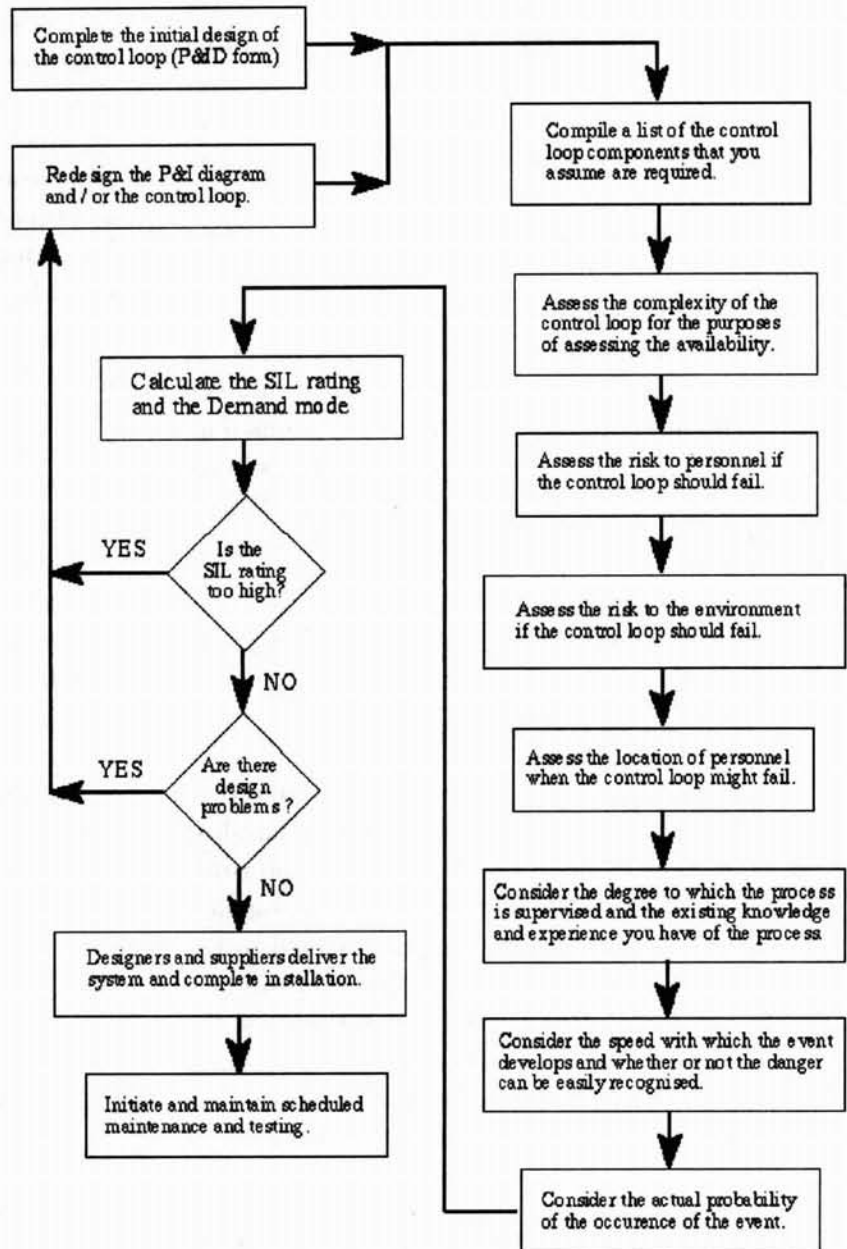
What is the probability of a mistake with this arrangement of flexible hoses?

IEC61508, THE NEW SAFETY STANDARD FOR CONTROL SYSTEMS WHAT EVERY CHEMICAL ENGINEER SHOULD KNOW

The new safety standard, IEC61508, replaces PES1&2 and is now in force. Clive de Salis, Director of Operations at independent process consultants, Rowan House Ltd, introduces what is new and important in this European standard.

Up until this year PES parts 1&2 were the Health & Safety Executive guidance for safety related applications. PES 1&2 gave detailed advice on how to design control systems in situations where safety was important. The guidelines detailed systems for document and revision control as well as going into detail on test procedures and methods for the completed system. PES 1&2 was incomplete in two respects: Firstly the guidelines didn't cover the maintenance of the safety control system after installation and commissioning had been completed, and secondly, they didn't go into specific detail as to how one decided that the application required a safety system. General guidance concerning assessment techniques were included in PES 1&2 but the guidelines left the final decision up to the designer. The new safety standard, IEC61508, goes further than PES 1&2 and gives guidance on both maintenance and testing after installation and gives specific and clear methods for deciding if a control loop has a safety requirement.

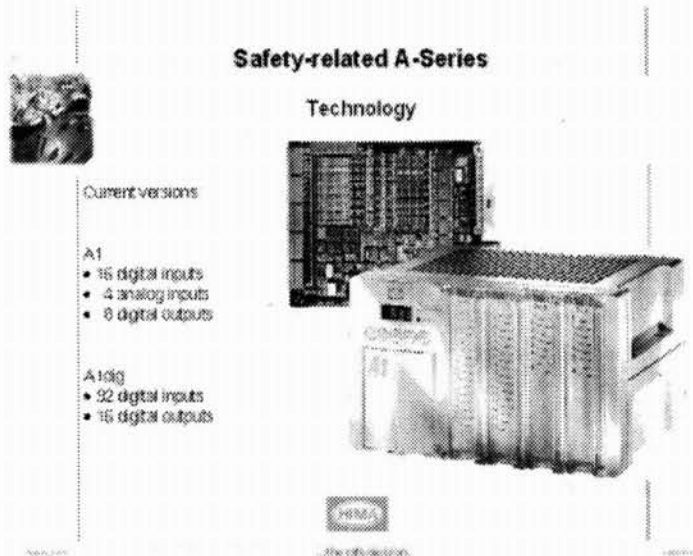
An example of the normal sequence of events required to design, supply, install and operate a



Typical qualitative route to control loop assessment

control loop using qualitative analysis to IEC61508 is given in the flow chart above:

The most important change is that IEC61508 gives specific methods for determining the safety integrity level required for each control loop. The safety integrity level is referred to as the *SIL*



lacks detail in the standard. It is to be hoped that clearer guidance will become available.

The *SIL* rating assessment also takes into account the structure and complexity of the control loop. At the design stage of a new process control system it will be this aspect that will most often cause an individual control loop to be reassessed. This is because each time the structure and content of a control loop is changed, either by a process modification or by a suppliers request, the control loop should be reassessed to determine if the same *SIL* rating still applies.

rating within the standard. The *SIL* rating will be a number from 0 to 4. A *SIL* rating of 0 is a control loop that has no special safety requirement and in which standard control components can be used. Thus, in future, all control loops will need to be assessed by one of the recognised methods to determine if the control loop has a safety requirement. If the analysis shows that some control loops have a *SIL* rating of between 1 and 4 then the designer and supplier of the control system is required to use equipment certified for that rating or better for those loops.

It is a good rule-of-thumb that if failure of the control loop might put personnel or the environment at risk then the loop will have a *SIL* rating between 1 and 4. The actual assessment methods take into account factors such as the user's established experience of the process as well as the likelihood of personnel being present. With beneficial factors such as these being allowed in the assessment process a control loop might still be *SIL* 0 even though there is an identifiable risk.

The new standard, IEC61508, requires that a control loop be assessed both in terms of risk to personnel and in terms of risk to the environment. Guidance for the former is very clear and precise in the standard whereas guidance for assessing the risk to the environment

The *SIL* rating applies to the whole of the control loop, not just the PLC or process controller. Thus the *SIL* rating applies from the input devices (transmitters, switches etc.) to the output device (control valve, pump etc.). The *SIL* rating tells the designer and supplier of the control loop the required operational availability of the control loop. To complete the information required by the designer and supplier of the control system it is necessary to decide whether the control loop is required to operate in its safety mode continuously or for only part of the time. A batch chemical process may require a particular control loop to only operate in its safety mode for 2 hours per day, whereas a continuous process requires the control loop to operate in its safety mode all the time. Thus the user should be able to tell the designer and supplier of the control loop whether the loop is to operate in *High Demand* mode (i.e. continuously in safety mode) or in *Low Demand*. Within IEC61508 the table that shows the required operational availability for a given *SIL* rating is divided into two columns, one for *High Demand* and one for *Low Demand*.

The requirement for PLCs and process controllers is commonly misunderstood. The PLC or process controller which is used as part of the *SIL* rated control loop needs to be certified as a complete unit. The *SIL* rating does not just apply to the input and output cards but rather it

applies to the whole controller. This is an understandable position to be adopted by IEC61508 since the modification of software in the controller has the potential to affect the performance of the control loop that has a safety requirement.

The new standard doesn't just stop at the installation and commissioning of a control loop. It also requires that you maintain, test and prove the operation and availability of the control loop throughout its working life. Herein lies a little potential trap for the end user who has to maintain the loop. We mentioned reliability and availability figures earlier. A manufacturer of a control component is free to tell the test house the frequency of maintenance and testing recommended for that component. The test house will test and approve the *SIL* rating for that component based on the recommended maintenance and testing frequency. Thus some components might have a requirement to test them several times per year in order to meet the *SIL* rating. Hence it will always pay for you to specify to the designer and supplier of the control loop the minimum allowable retest period to avoid finding that you've been supplied with a low-cost component that has a high frequency of testing and maintenance.

Most of the testing authorities can support you in providing information about the products that have been certified. Germany has currently done most of the certification work to the new standard. Information on the products that are certified can be found on TUV's website (www.isep.de/plclist.htm). Since Health & Safety in the UK puts the onus on the end user to be satisfied that the installation is right then it pays to check the latest available information.

The new standard, IEC61508, lays down rules for ensuring safety in control loop design, supply, installation and maintenance and will improve and enhance safety within our industry.

Clive de Salis B.Sc (Chem Eng), M.I.Chem.E., C.Eng.
Director of Operations, Rowan House Ltd.

The writer welcomes correspondence on the subject of process control. E-mail via www.rowanhouse.co.uk

MAKE IT WORK FOR YOU!

The S&LP Group is running a meeting on 24th May at BP, Sunbury on Thames which looks at the fundamentals of IEC 61508 protection systems. Entitled ***Instrument Protection Systems – Safety Integrity Level Determination – how to make it work for you*** this includes speakers from BP, CASS, HSE and University of Sheffield. Contact John Picken at the IChemE for further details (jpicken@icheme.org.uk) or visit <http://slp.icheme.org>

RISK EDUCATION WEBSITE

The Chemical Industry Education Centre (CIEC), based at the University of York, is working on a web site project sponsored by the Institute of Materials. The site is aimed 11-18 year olds and is being developed to promote the understanding of risk and its relevance in the decision-making processes.

Key targets are:

- ❖ to improve awareness of the issues faced when considering risk.
- ❖ to enable students to appreciate the role of statistics in evaluating risk.
- ❖ to develop skills of analysis and interpretation by following activities based on contemporary issues and practices.

The project will contain examples taken from the chemical and allied industries with up to date statistical information on risk and its assessment. One example will be a comparison of the manufacture of PVC and the production of timber as "parallel" materials in the construction industry. Others could include how processes have been developed to improve safety in the chemical industry.

If any members feel that they can contribute data, or would be willing to comment on case studies as they are written, please contact the project officer Cliff Porter (Tel: 0151 222 2512, e-mail: Cliffp@tesco.net or CIEC, University of York, Heslington, York, YO10 5DD). To check out what the Centre has done to date on other projects, visit the web site at <http://www.york.ac.uk/org/ciec>

UNCONTROLLED REACTIONS??

The S & LP Group is running a one day seminar on *emergency exothermic venting in batch chemical manufacturing* on 22 June at Syngenta, Huddersfield. This includes contributions from leading experts in the field, notably Janet Etchells and Robert Turner of the HSE. It will interest safety practitioners and regulators who work in fine and speciality chemical manufacturing and students, too, are very welcome (up to ten free places available). Contact John Picken at the IChemE for further details (jpicken@icheme.org.uk) or visit <http://slp.icheme.org>

NEWS BRIEF.

PAIR JAILED FOR USING MOBILE PHONE IN HOSPITAL.

Two young Edinburgh men - David (24) and his friend Bryan ... (22) - became the first people recorded as being jailed for use of a mobile phone inside a hospital contrary to both regulations and prominent warning signs.

When David was admitted for treatment to a serious facial wound sustained at a friend's engagement party he was placed in a waiting room. He produced a mobile phone and ignored repeated staff requests to switch off. Police were called and the pair arrested.

David was jailed for three months, Bryan for 30 days.



MOBILE PHONE OFFENCE BRINGS 70 LASHES

A captain in the army of Saudi Arabia continued to use his mobile phone during the take-off of an internal passenger flight despite the orders of the crew to switch it off. The captain was sentenced to 70 lashes by the court. The incident delayed the aircraft's departure for half an hour while take-off was aborted and airport security staff escorted the offending officer the plane.



READ THE LABEL!

A woman in Jefferson County, New Jersey, mistook super-glue for eye drops and only discovered her problem when the lids of one eye were stuck fast. She immediately called the police and the rescue squad took her to the hospital where doctors remedied the error. A spokesman confirmed that she had suffered no lasting damage but was not seeing anyone just yet.

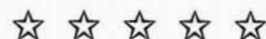
AMPUTEE USED NAIL GUN TO END IT

When he accidentally amputated one hand with a powered mitre saw, a construction worker in Bethlehem, Pennsylvania, experienced so much pain that he repeatedly shot himself in the head with a pneumatic nail gun. Police said that when found he had at least a dozen 1 inch nails in his scalp. He later underwent surgery to re-attach the hand and doctors pronounced his condition as stable.



EPSC ANNUAL REPORT 2000

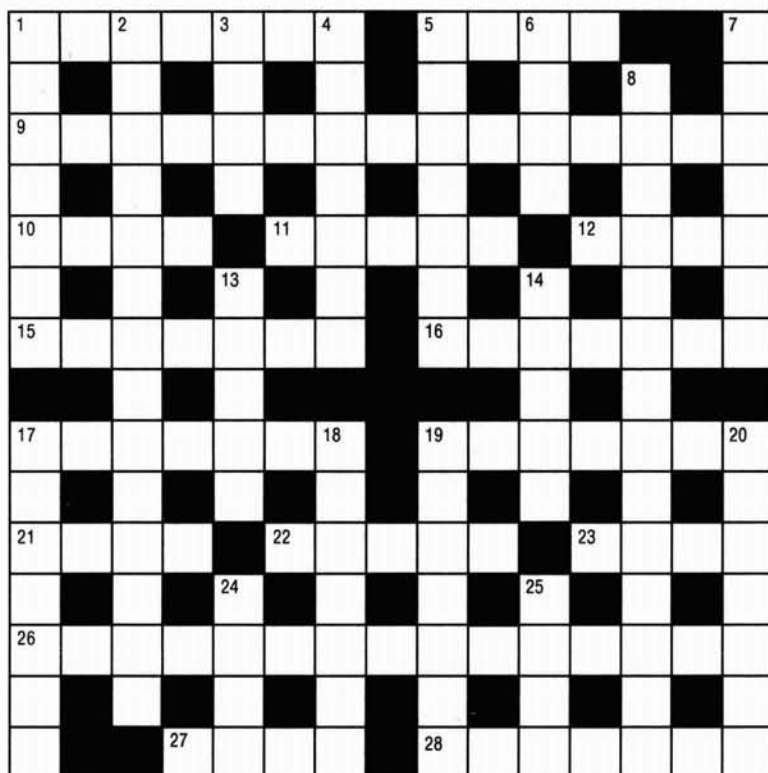
The European Process Safety Centre (EPSC) has published its Annual Report for 2000. This is the eighth year that EPSC has been in existence and the report highlights a busy year with on-going work in benchmarking and information exchange on safety related matters. Publications included a book *Safety, Health and Environment Management Systems for Small To Medium-Sized Enterprises* as well as reports for member companies on a variety of safety topics. A future publication on *Hazards Identification* is planned. As from April 2001, EPSC will be the Project Co-ordinator for PRISM (Process Industries Safety Management) Human Factors Network – an EU backed initiative to improve safety by applying the human factors approach. For more information on EPSC, contact Alison Schaal (tel +44 1788 534409; fax +44 1788 551542; e: epsc@icheme.org.uk) or visit the web site (<http://www.epsc.org>).



HSE STRATEGY PLAN

The Health and Safety Commission held an open discussion on its strategy plan for 2001 to 2004 on 15 January 2001. Both Derek Lohman and Miles Seaman attended the meeting on behalf of the IChemE's Safety, Health and Environmental Policy Committee. The draft plan for the HSE can be downloaded in pdf format from www.hse.gov.uk/action/index.htm.

CROSSWORD PUZZLE No. 8



DOWN

1. Editorial way of preventing static lac. (7)
2. Positioning tin around critical temperatures. (8, 6)
3. Add something to the product, thick-head. (8, 6)
4. Stripecy sort of metal. (7)
5. Polonium is on sulphur and they're toxic. (7)
6. Greedy beasts can also be intelligent. (4)
7. Even dangerous substances can be absorbed in absolute safety. (7)
8. Cooking on the equator, say, allows certification. (3, 4, 7)
13. Get in touch and keep the fire going. (3, 4)
14. Spooky and spicy. (5)
17. Fragrant anger. (7)
18. Advertisement for a hearer needing protection. (3, 4)
19. You fly and breathe by it. (7)

ACROSS

1. Traffic jam can restrict the flow in a 5 ac. (7)
5. Musical instrument or wine cask. (4)
9. Implement for dealing with a flat battery? (3-8, 4)
10. Greek jot or tittle. (4)
11. H.S.E. to alter the culture of an organisation. (5)
12. Sat around while head hit out. (4)
15. Pointers to the time of day. (7)
16. Perceives there's a dog in it and makes safe. (7)
17. Dangerous when the little devil has a vein of ore. (7)
19. Wearing away a prize. (7)
21. Curl up with electric current. (4)
22. Refer changes to one of our Euro brethren. (5)
25. French gold for a German lady. (4)
26. Gin all right, Aunt? It'll make things much brighter. (7, 8)
27. Pollution in old London. (4)
28. Consumer of the last employer. (3, 4)

20. We don't get any. (7)
24. Noisy container. (4)
25. Lighten the load in the lean-to. (4)

ANSWERS TO No. 7 CROSSWORD PUZZLE



Answers will appear in the next issue.

FORTHCOMING MEETINGS OF SUBJECT GROUPS AND OTHER MEETINGS OF INTEREST TO THE SAFETY AND LOSS PREVENTION SUBJECT GROUP

Group	Title of Meeting	Place & Contact	Date
IChemE	Applied Hazard & Operability Studies (3 day course)	Harrogate Sylvia Kilner skilner@icheme.org.uk 01788 578214	30 Apr - 2 May-01
IChemE	Computer Control: Safe Practice (4 day course)	University of Sheffield Sylvia Kilner skilner@icheme.org.uk 01788 578214	14/17 May-01
Hazards Forum	The Social Applications of Risk	Royal Academy of Engineering, London 020 7665 2158 www.hazardsforum.co.uk	15 May-01 (16:45 - 19:30)
IChemE	Industrial Electrostatic Hazards (1 day course)	Cork, Ireland Sylvia Kilner skilner@icheme.org.uk 01788 578214	15 May-01
Environmental Protection SG	IPPC 2001	London Underground Ltd, Canary Wharf, London John Picken jpicken@icheme.org.uk	15 May 01
IChemE	Chemical Hazard Assessment (1 day course)	Cork, Ireland Sylvia Kilner skilner@icheme.org.uk 01788 578214	16 May-01
Environmental Protection SG	Waste Minimisation 2001	London Underground Ltd, Canary Wharf, London John Picken jpicken@icheme.org.uk tel: 01788 578214; fax: 01788 534407	16 May 01
ICE	Health & Safety: is it high enough on the political agenda? - talk by Rt Hon Michael Meacher, Minister for the Environment	ICE, Westminster, London Adora Xavier adora.xavier@ice.org.uk tel: 020 7665 2213; fax: 020 7799 1325	23 May-01
Safety & Loss Prevention SG	Instrument Protection Systems - Safety Integrity Level Determination - how to make it work for you	BP, Sunbury on Thames John Picken jpicken@icheme.org.uk tel: 01788 578214; fax: 01788 534407	24 May-01
IChemE	Explosion Hazards of Solvents & Gases (1 day course)	Cork, Ireland Sylvia Kilner skilner@icheme.org.uk 01788 578214	12 Jun-01
IChemE	HAZOP Study & Its Management (2 day course)	Leeds Sylvia Kilner skilner@icheme.org.uk 01788 578214	18/19 Jun-01
EFCE & The Royal Swedish Academy of Engineering Sciences	10 th International Symposium on Loss Prevention and Safety Promotion	Stockholm, Sweden Conference Secretariat LP2001@stocon.se	19/21-Jun-01
IEE	People in Control - an International Conference on Human Interfaces in Control Rooms, Cockpits and Command Centres	UMIST, Manchester Sara Nash 0207 344 8425 http://www.iee.org.uk/Conf/PIC2001/	19/21 Jun-01
Safety & Loss Prevention SG	Emergency exothermic venting in batch chemical manufacturing	Syngenta, Huddersfield John Picken jpicken@icheme.org.uk tel: 01788 578214; fax: 01788 534407	22 Jun-01
EFCE	3 rd European Congress of Chemical Engineering	Nuremburg, Germany Christina Hass ECCE@dechema.de	26-Jun-01
Institution of Chemical Engineers in Australia	6 th World Congress of Chemical Engineering	Melbourne, Australia Meeting Planners chemeng@meetingplanners.com.au	23-Sep-01
North West Branch (IChemE)	Hazards XVI - analysing the past; planning the future	UMIST, Manchester Mike Adams mike.j.adams@talk21.com	5/8-Nov-01