SAFETY AND LOSS PREVENTION SUBJECT GROUP NEWSLETTER

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EDITORIAL

We asked Clive de Salis, Managing Director of Rowan House Ltd and Chair of The 61508 Association, to share with us the top five most common mistakes which he comes across when people apply BS EN 61508 and its related standards. Clive has over 10 years' experience with SIL allocations and assessments in the water, process, chemical and petrochemical industries. The article contains his own opinions but you will ignore his advice at your peril.

EUROPEAN COURT SUPPORTS UK SAFETY LAWS - (Case C127-05 European Commission v United Kingdom)

Today [14 June 2007} the European Court of Justice (ECJ) upheld one of the key elements of British health and safety law — the use of the key phrase *"so far as is reasonably practicable".*

Speaking at the Yorkshire Branch of the Institute of Occupational Safety and Health, Bill Callaghan, Chair of the Health and Safety Commission (HSC) welcomed this decision. Mr Callaghan said:

"I am pleased by this outcome. The Court has rejected the European Commission's claim that the use of "so far as is reasonably practicable" does not implement the Framework Directive. Quite clearly we have been effective in protecting people as currently we have the best occupational safety record in Europe."

'We continue to believe that the right way forward is a proportionate and risk-based approach protecting employees and others effectively, whilst allowing commonsense to be applied when deciding on what protective measures to adopt."

The European Commission challenged the use of the phrase because the directive, which lays down EU employers' duties to protect the health and safety of their workers, has no such qualification. The UK robustly defended the case and today the ECJ dismissed the European Commission's case and ordered it to pay the UK Government's costs.

Notes to Editors

1. The EC brought the case against the UK in the ECJ, challenging the UK's implementation of European Directive 89/391/EEC, on the introduction of measures to encourage improvements in the safety and health of workers at work (The Framework Directive). The Commission's action was founded on the UK's use of the phrase "so far as is reasonably practicable" in section 2(1) of the Health and Safety at Work etc. Act 1974 (HSWA). The EC believed that this amounts to defective implementation of the Directive, which does not contain such a qualification.

2. The EC referred the case to the ECJ (Case C-127/05) on 21 March 2005. An oral hearing at the ECJ in Luxembourg took place on 13 September 2006 and an Opinion, favorable to the UK, was delivered by the Court's Advocate General on 18 January 2007. This is the end of the proceedings: There is no appeals procedure.

3. The EC's claim (as reproduced in the Official Journal) is that the Court should declare that:

   "In restricting the duty upon employers to ensure the safety and health of workers in every aspect related to the work to a duty to do this 'so far as is reasonably practicable', the

United Kingdom has failed to fulfil its obligations under Articles 5(1) and 5(4) of Council Directive 89/391/EEC of 12th June 1989 on the introduction of measures to encourage improvements in the safety and health of workers at work."

4. The EC's complaint is based upon section 2(1) of the Health and Safety at Work etc. Act 1974 which states that it shall be the duty of every employer to ensure 'so far as is reasonable practicable' (SFAIRP) the health, safety and welfare at work of all his employees.The EC considers the SFAIRP qualification placed upon the employers' duty is incompatible with Articles 5(1) and 5(4) of the Directive.

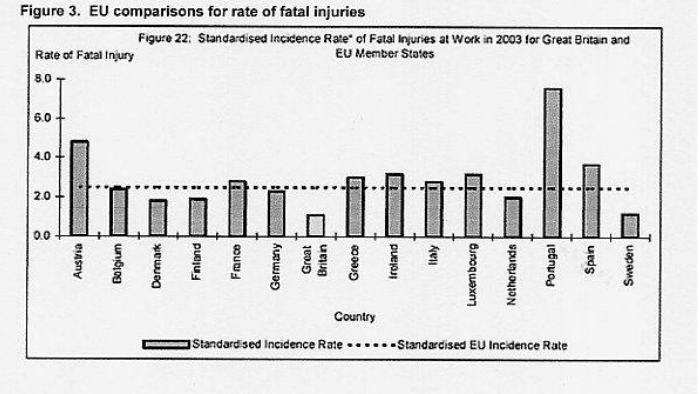
5. The Framework Directive Article 5(1) imposes 'a duty to ensure the health and Safety of workers in every aspect related to the work'. Article 5(4) provides that the Directive "shall not restrict the option of Member States to provide for the exclusion or the limitation of employers' responsibility where occurrences are due to unusual and unforeseeable circumstances, beyond the employers' control, or to exceptional events, the consequences of which could not have been avoided despite the exercise of all due care."

6. The UK did not accept that it has failed to properly implement the Framework Directive. The UK believes that the wording of s2 (1) of the HSWA, as interpreted by the UK courts, achieves the aims of the article. Furthermore, this is demonstrated by the UK's health and safety performance record, which is among the beat in Europe.

7. The 'so far as reasonably practicable' wording has been a long standing feature of English law and predates even the Health and Safety at Work etc. Act 1974 (HSWA). It introduces flexibility into the law and contrasts with some other Member State legal systems where the law is written in absolute terms but courts can apply flexibility and proportionality in their judgements. There is a strong body of case law, such as Edwards v National Coal Board 1949, (which revolved around whether it was reasonably practicable to prevent any possibility of a rock fall in coal mines) on which its current interpretation is now based.

8. Great Britain's achievements in health and safety performance are commendable on an international basis. Though some care is needed when making comparisons between countries, the EU has published the chart, reproduced in Figure 3 below, showing the annual rate of workplace fatalities in 15 Member States (2003 figures). On this basis Great Britain has the lowest rate of 1.1 per 100,000 workers compared with the EU average of 2.5.

Figure 3. EU comparisons for rate of fatal injuries



Reference

http://www.hse.gov.uk/press/2007/c07007.htm

FLIXBOROUGH 2007

This well attended symposium (at UCL in April), with participants from overseas, testified to the continuing significance of the explosion that destroyed Nypro's caprolactam plant at Flixborough in 1974 and the continuing controversy engendered by the 'official' explanation.

The 1974 Court of Inquiry identified an ill-designed temporary by-pass as the sole defect in what the Court said was a "well-constructed and designed plant". Both then and since, very few engineers accepted such a description of a plant design with an inventory of over 200 tonnes of cyclohexane circulating at 8bar and 150ºC without shut-off valves. To its credit, the HSE and IChemE ignored this and other conceptually and scientifically flawed conclusions and, in mitigation, publicised the concept of "inherent safety" and other lessons that derived from investigations that the Court of Inquiry had dismissed.

I was at school in 1974 but, by the time I graduated as a chemical engineer, other incidents and accidents and their Public Inquiries had identified multiple causes within escalating multiple events, leading to the expectation of investigators that they need to examine all possible combinations of defects and events in order to identify the cause. In contrast, the Flixborough Inquiry focussed on a simplistic single-defect single-event explanation and astonishingly cites the improbability of multiple events as a reason for their rejection in favour of a more probable single event!

Subsequent disasters and Public Inquiries also have shed light on some of the technical issues – notably, in the case of Piper Alpha, how quickly a pressurised pipe can fail when subjected to a turbulent jet flame. The Flixborough Court of Inquiry dismissed this possibility with scorn, when it was put to them by Dr. Keith Gugan in his alternative hypothesis and, by so doing, contributed towards the ignorance of this phenomenon that still existed when Piper Alpha was designed.

The two main protagonists at the symposium were John Cox - whose multi-step explanation of the events had been rejected by the Court in 1974 in favour of their single-event scenario - and Jim Venart who, many years afterwards, devised a variant of the Court's single-defect explanation with a radically different mechanical engineering analysis and pre-explosion combustion scenario. The third main speaker was David Dale who presented a short paper, co-authored by Robin Turney, on the lessons everyone endorsed in 1974, irrespective of their opinions on the triggering events that culminated with the explosion.

The symposium began with John Cox outlining the investigations of 1974 and the reasons why every investigator then agreed that the final phase before the main explosion began when the 20" by-pass line jack-knifed and allowed at least 40 tonnes of cyclohexane to escape from two open 28" nozzles.

The disputed issues at that time were about what (if anything) preceded this failure. He outlined the metallurgical investigation that had led him (and others) to conclude that at least two other significant items of equipment – a 200NB pipeline and a set of fin-fan coolers - must also have failed before the main explosion and hence, barring an extraordinary coincidence, must have been part of a chain of events. His presentation included a cinefilm taken less than a minute after the main explosion that appeared to show that the 200NB line must have already burst.

The symposium also heard from one of the many eyewitnesses who had reported having seen something other that the 20" line failure as the first event and his explanation of why he disagreed with the Court's interpretation of his evidence.

Jim Venart then presented his alternative explanation for the failure of the 20" line in two stages, with the initial failure due to flow-induced fatigue in one of the bellows. This resulted in the escape of a much smaller quantity of cyclohexane from only one nozzle until the main explosion caused the second bellows to fail.

During the presentations, it was apparent that each speaker had been in dispute over the others explanations for some time, with Venart challenging some peripheral issues concerning Cox's hypothesis, and Cox defending his "holistic" explanation and challenging Venart to show how his theory explains all of the physical and eyewitness evidence.

However, the main challenge to Venart's hypothesis came from Peter Evans of TES (manufacturers of the bellows) who stated that in his opinion, the bellows had been subjected to major forces having a similar orientation, quite unlike the mode of failure that Venart was suggesting. Peter Evans also gave the opinion that it was highly unlikely (but not impossible) that the flow-induced vibration in the dog-leg would match the natural frequency of the bellows convolutions, and so cause a fatigue failure.

In fairness to Jim Venart, it should be recorded that he is still convinced that his hypothesis is a valid explanation. His hypothesis, as well as John Cox's appear in detail on a CD the organisers have produced with all the supporting documentation, photographs and reports from 1974-75 along with the Proceedings of the symposium and can be purchased for £50 from Flixborough2007@aol.com

The CD is therefore an invaluable source of information on the Flixborough investigations that will stand the test of time long after the controversies raised at the symposium have been resolved. Readers of *The Chemical Engineer* (May 2007) already will have seen that Trevor Kletz has recommended, "**There are so many lessons to be leant from Flixborough that it is an ideal case history for discussion in chemical engineering university courses**".

Peter Speller, 18/07/2007

SHARING LESSONS LEARNED FROM ACCIDENTS - A "JUST CULTURE" APPROACH

A meeting of the Hazards Forum, sponsored by Corus, was held on the 19th June 2007 at the Royal Academy of Engineering premises. Dr. David King, Chief Inspector of Air Accidents and Head of the Air Accident Investigation Board (AAIB) chaired the meeting. In his opening remarks he said that the aviation industry had tried using the "Blame Free Culture" but it did not work. Even if the best and most effective investigation were carried out on an accident but not widely disseminated, then as a consequence, nothing would change and the total effort was wasted.

The AAIB had the purpose of improving aviation safety by determining the causes of air accidents and serious incidents and making safety recommendations intended to prevent recurrence without apportioning blame or liability. To allow free dissemination we need the right context – 'The Just Culture'.

President Assad Kotaite of the International Civil Aviation Organisation had stated:

"Given the forecast for sustained growth of air transport in coming years, it is essential that all Contracting States of ICAO cooperate in reducing the number of accidents worldwide. Effective safety oversight systems and transparency in the greater sharing of information is how we can best achieve this objective."

The year 2004 was the safest in terms of fatalities since ICAO's creation in 1944 but August 2005 was one of the worst months in history. We cannot be complacent. Five major accidents claimed at least 330 lives. First half 2005 1/3 of the worlds fatal accidents were in Africa and this represented less than 5% of the global traffic.

There was, however, a battle with governments who were trying to criminalise accident investigation. A Joint Resolution was passed on the 17th October 2006:-

"…a growing tendency of prosecutors & judges to seek criminal sanctions in the wake of aviation accidents, even when the facts do not appear to support findings of sabotage, criminal negligence or wilful misconduct.

….we have progressively elevated the system to its current high level of safety, in part, because the industry has been permitted to conduct thorough investigations and **collect complete information** about the causes of accidents.

This resolution was signed by:-

Flight Safety Foundation
Royal Aeronautical Society
Academie Nationale de l'Air et de L'Espace
Civil Air Navigation Services Organisation

Dr. King then introduced Professor James Reason who he said had done much work on the Just Culture approach in the aviation industry.

Prof. Reason said that he wished to talk about Beyond Hindsight Bias rather than Just Culture. He said there were problems with the past because we could not recover the 'whole truth' of the accident in the investigation. The past was never wholly knowable, there could be some 'hard' facts with the rest being best guess and theory. There were often alternative views. He then discussed in detail the following accidents giving some of the alternative possibilities:-

- *Papa India* air crash, Staines (1972) - They knew what happened but not 'how' or 'why'
- Moorgate tube crash (1975) - Suicide was the default possibility
- Mt Erebus air disaster (1979) - System failings (Mahon), not just human error (Chippindale)
- Chernobyl (1986), Dryden Report (1989) - As above, but also invoking remote contributions.
- *Columbia* spacecraft crash (2003). CAIB (Gehlen) Report - Outcome bias and counterfactual fallacy

Traditionally, investigations had been limited to the persons directly involved but current accident prevention views supported the notion that additional preventive measures could be derived from investigations if management policies and organizational factors were also investigated.

In the CAIO Report 8th Edition Annex 13 (1994) it reported:-

1.17. *Management information*. Accident reports should include pertinent information concerning the organisations and their management involved in influencing the operation of the aircraft. The organisations include . . . the operator, air traffic services, airway, aerodrome and weather service agencies; and the regulatory authority. Information could include organisational structure and functions, resources, economic status, management policies and practices . . .

There was thus an ever-widening search for the 'upstream' factors from the Individuals, to the Workplace, to the Organization, to the Regulators and to the Society at large. This movement to the management system area was echoed in many hazardous domains. But has the pendulum swung too far? From Individual Responsibility to Collective Responsibility

With the *Chernobyl* accident, Valeri Legasov attributed the disaster to the errors and violations of the operators. Two years later (in a pre-suicide tape) he said that the disaster stemmed principally from the faulty running of the Soviet economy - particularly in regard to the control rod design

In the *Columbia* spacecraft crash (2003). The CAIB (Gehlen) Report said:- 'In our view, the NASA organizational culture had as much to do with this accident as the foam.'

'When the determinations of the causal chain are limited to the technical flaw and individual failure, typically the actions taken to prevent a similar event in the future are also limited . . .'

But in the *CAIB Report (Ch. 5)* we get:-

'The causal roots of the accident can be traced, in part, to the turbulent post- Cold War policy environment in which NASA functioned during most of the years between the destruction of *Challenger* and the loss of *Columbia*.'

These remote factors give some concerns as they had little causal specificity, they were outside the control of system managers and were mostly intractable. Their impact was shared by many systems and the more exhaustive the inquiry, the more likely they were to identify remote factors. Their presence did not discriminate between normal states and accidents; only more proximal factors do that.

All accident investigations revealed systemic shortcomings as they were present in all organizations. It was then a short step to argue that these latent 'pathogens' caused the accident. There were always organizational interventions that could have thwarted the accident sequence. Organizational factors were conditions rather than causes.

The 'conditions' in these disasters were poor safety culture, inadequate tools and equipment, poor design and construction, etc, etc. Disasters happened because:-

UNIVERSALS-Tensions between production and protection create

CONDITIONS - latent factors that collectively produce defensive weaknesses that

CAUSES - permit chance conjunctions of local triggers and active failures to breach all the barriers and safeguards.

There was then a general discussion on Professor Reason's talk but little said about getting industry to share information other than to note that the aviation industry had succeeded in sharing information as a natural way of preventing repeat accidents.

Both speakers were thanked for their presentations and Corus for providing the venue and food,

RISK, RESPONSIBILITY, REGULATION: WHOSE RISK IS IT ANYWAY?

A meeting of The Foundation for Science and Technology was held on the 9 May 2007 and addressed by:

Rick Haythornthwaite, Chairman, Better Regulation Commission
Sir David Omand GCB, War Studies Department, King's College London
Verena Ross, Director, Strategy and Risk Division, Financial Services Authority

The event summary and an abstract of the statements is available
www.foundation.org.uk

THE TOP FIVE COMMON SERIOUS MISTAKES MADE WHEN IMPLEMENTING BS IEC 61511 and BS EN 61508

We are going through a period in the implementation of the new standard for safety critical systems, BS EN 61508, and its associated guidance standards (such as BS IEC 61511 for the process industries) in which there is a considerable amount of misleading information being promoted. I will deal with five of the most common mistakes that I have seen so far.

I have deliberately simplified a number of details in order to make the concepts and the pitfalls clear.

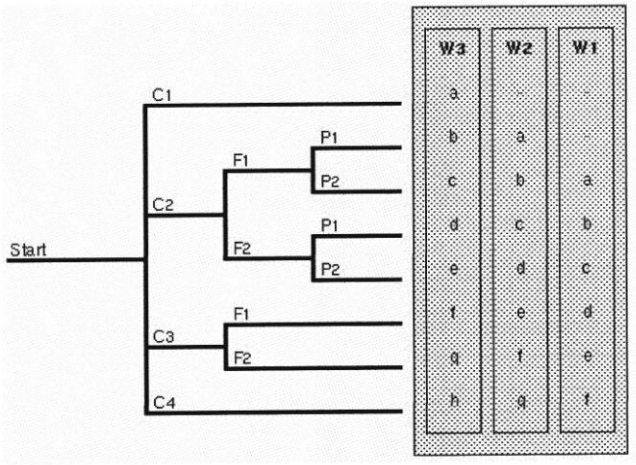
Number 1 common mistake: Example risk graph used out of IEC61508 without thought.

The most common mistake made is where a supplier or contractor uses a risk graph directly from Part 5 of BS EN 61508 but uncalibrated. BS IEC 61511 states that calibration should be undertaken by a team of engineers knowledgeable in the process. The act of calibration is designed not just to make the values in the graph match the required target tolerable risk values for the selected unwanted outcome but also to design the shape of the graph to contain sufficient properly defined parameters to properly assess the risks.

It is totally incorrect to use any of the example risk graphs directly from Part 5 of the standard without adjustment either to the shape or the values applied.

The usual risk graph I see is Figure D.2 from Part 5 of the standard and when I see it, then just like any inspector, I can usually tell just by a single quick glance that it is completely uncalibrated. Indeed I am aware of two cases in which the graph was used and the HSE inspector politely pointed out that the implied tolerable risk value completely disagreed with the site's COMAH report (which also contains tolerable risk values for fatality rates) and when asking how the graph structure related to the particular industry was left with a muddled and confused muttering.

Figure D.2 diagram from Part 5 looks like this:



Two things happen if you use this. One is that the values are virtually always too high with huge consequential increased costs and the other is that the term W is so difficult to assess properly that people will resort to vague sweeping decisions that substantially deviate from reality.

Editor's note: If you are engaged in the application of functional safety then you should be familiar with IEC 61508 and the meaning of the letters in the chart. If you are new to the subject and just browsing then the following key could be useful. But please do not use it without expert advice or until you are totally familiar with the standard and its application.

C = the consequence of the hazardous event which you have identified

F = the frequency of, and exposure time in, the hazardous zone

P = the possibility of avoiding the hazardous event

W = the probability of the hazardous event taking place

Number 2 common mistake: Simple 2D Risk Matrix used

The next two mistakes occur generally but are particularly prevalent where a software package has been purchased. They are closely related to mistake number 1. If you choose to use a risk graph then it is essential that it is calibrated for shape, structure, definition and final calculated values. This mistake is similar in that in both cases the software prevents the correct values from being applied.

There are two general types of software available. One does a simple two dimensional risk matrix which combines overall probability with severity of outcome. This falls down on several accounts, not least that common mode failures can't be covered by such a crude assessment, that many such graphs forces you to have a SIL loop where the outcome is severe even though the probability is truly negligible and also that the calculation of probability of the event is usually too complex to be accurately assessed as a single parameter. These matrices are wrong so often that it is far more often true than false to say that such matrices do not give SIL assessments.

Typical risk matrix:

Note 1: Refer to section 7.4

SAFETY ASSESSMENT CRITERIA				
Consequence of Incident / Likelihood of Occurrence	**Extensive** Several fatalities	**Serious** Serious injury to one or more persons. Single fatality	**Minor** Loss time injury requiring hospitalisation	**Minimal** Minor injury
High Could happen as much as once a year	N/A Note 1	SIL 3	SIL 2	SIL 1
Moderate Could happen as much as once in ten years	SIL 3	SIL 2	SIL 1	N/R
Low Could happen once in lifetime of plant	SIL 2	SIL 2	N/R	N/R

I have usually found that someone has copied a major oil industry matrix WITHOUT adopting the system that goes with it.
Such risk matrices are useful only for a first sweep to reduce the area of study, they do not give a SIL assessment. The major oil industry only uses the matrix as a first sweep. It doesn't give a SIL assessment.

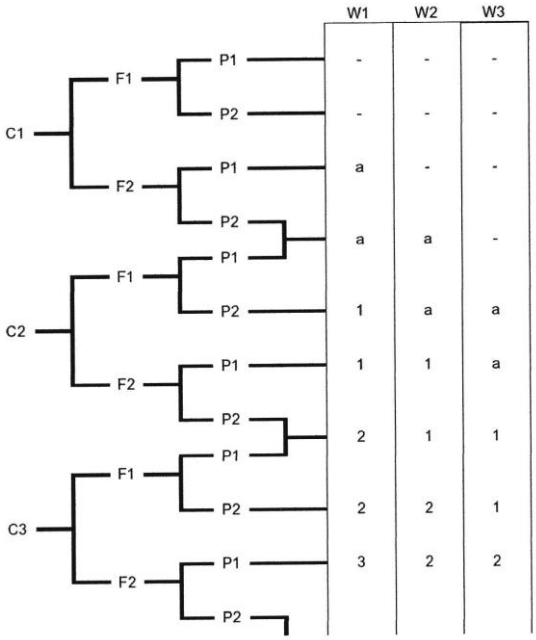
Number 3 Common mistake: I can let a software package provide the expertise

This third mistake occurs generally but is again particularly prevalent where a software package has been purchased where it is usually not obvious that it has been hidden. It is closely related to mistake number 1. The danger particularly occurs where a software package is seen as calculating the answer for you as a means of avoiding needing the skills yourself to apply the right SIL assessment correctly. As mentioned before: If you choose to use a risk graph then it is essential that it is calibrated for shape, structure, definition and final calculated values. Once again the software prevents the correct values from being applied.

The superficial flexibility of the software makes this type of mistake one that you only find out about later. Here you have the second type of software (the first was mentioned in mistake no.2) in which you appear to be able to design and build your own risk graph and put in values ... that is until you try to put the row of values for row 3 higher than those in row 4 or even try to add in extra parameters that aren't on the UKOOA type graph. It's all fine so long as the values in each row as you go down the graph are either equal or greater than the row before. Hidden in the software is linearisation that makes it simple for a computer but fails to give you a correct assessment for your application.

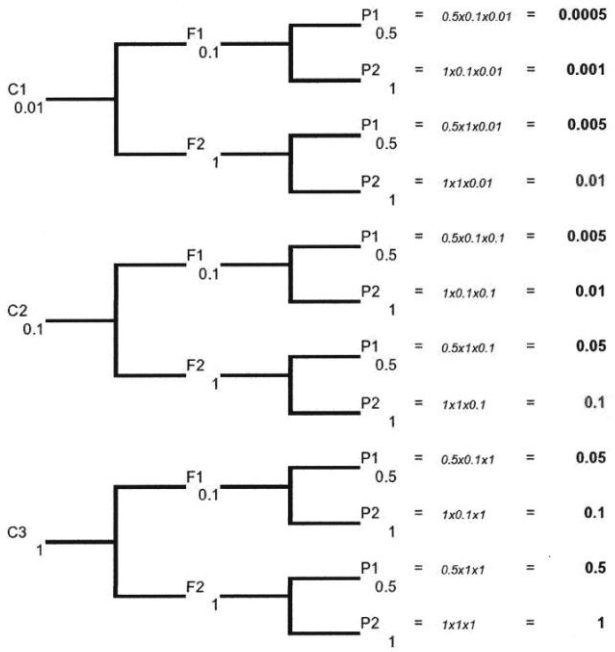
The mistake has occurred because part of the UKOOA (The United Kingdom Offshore Operators Association) guidance has included within their system a risk graph of this type for a preliminary assessment. It is appropriate to use that guidance for an offshore oil & gas application but that does not mean that it is appropriate to use it for every other industry or application. Remember that the objective is a proper assessment of YOUR risk. To show why this is a mistake consider this:

The risk graph structure offered is typically of this shape -



This looks fine until you put numbers into it to calibrate it for your own application. It is usual to grade the ultimate consequence of serious injury as a tenth of the value of one death and minor injury as 1/100th of one death (i.e. 1, 0.1 and 0.01). The F factor of F1 says there is only a 10% chance of someone being present (i.e. 0.1) whereas F2 says they are probably present (i.e. 1). Similarly P is the possibility of avoidance by the operator perhaps in response to an alarm or some warning sign. Hence P1 says the operator can avoid it (i.e. Risk reduction 0.5 for this illustration) and P2 says its difficult to avoid (i.e. 1).

Now insert the numbers:



As you look at each row the numbers are larger than the row before – or are they? Look at the numbers in red and blue. Notice that in the UKOOA type of risk graph (shown on the previous page) C3, F1, P1 is connected to give the same answer as C2, F2, P2 which is saying that the risk from C3, F1, P1 is equal to C2, F2, P2 - but when you apply the numbers shown above you find that for all real applications C3, F1, P1 always requires a lower SIL number than C2, F2, P2. That is until you try to make the software do that!

Then you find that the software prevents you from doing that. The software is preventing you from calibrating the graph for your applications.

It would be interesting to be a fly on the wall during the discussion in which an HSE inspector asks why you have chosen to apply the UK Offshore Operators Association's preliminary SIL assessment graph structure for the final SIL assessment of a water industry application or whatever industry yours is. Let's just say it would be difficult to devise a plausible answer.

Software packages can save you time but they cannot take away the requirement for you to know what you are doing with them and they certainly cannot relieve you of the responsibility of you finding the right calibrated risk assessment tool to properly assess the risk on your process. Trying to make your process look like an oil rig may be convenient but its not right!

Number 4 common mistake: All I need to do is buy certified products

All I need is SIL certified products to the required SIL number and the job is done.

Firstly there is NO SUCH THING as a SIL certified product. I am aware that the major German certification bodies offer such pieces of paper but they are meaningless - what the designer of the loop needs is the report showing the reliability data for the product so that the data can be altered and applied to your application. Exida and others do not offer certificates but offer safety manuals. SIRA and BASEEFA offer safety reports. These manuals and reports give the reliability data and the circumstances under which the data may be used – This is what the designer needs.

The SIL number applies to the loop NOT to any of the components in the loop. Imagine you had a group of components all of which showed a probability of failure on demand that is between 0.1 and 0.01. This means they might all be alleged to have a SIL 1 certificate – so doesn't that make a SIL 1 safety loop? No.

For example: I have a thermocouple in the line (0.02), a temperature transmitter (0.04), a loop power supply (0.03), a trip amplifier to trip against the setpoint (0.02), a relay to cut power to the solenoid that takes air off the valve in the pipe. The relay probability of failure (0.02), the solenoid valve (0.03) and the valve (0.05) all need a power supply (0.03).

All the components might have had a piece of paper that alleged they were SIL 1 certified but

the SIL1 applies to the loop. And is the loop SIL 1? 0.02+0.04+0.03+0.02+0.02+0.03+0.05+0.03 = 0.24 which is not between 0.1 and 0.01 – So the loop has failed to achieve any SIL at all.

The SIL number applies to the loop NOT to any of the components in the loop.

There is NO SUCH THING as a SIL certified product.

Number 5 common mistake: The contractor has an expert with a certificate.

If I use a certified expert then that's enough. This mistake is about competency. For a safety critical system EVERYONE involved needs to be competent to fulfil their role. Safety depends on it and it is not to be taken lightly. The person who designs the system (perhaps "the expert") needs to be competent. The person who builds the panel and system needs to build it competently. The person who installs the system has to install it competently, the person who maintains it has to maintain it competently. Everyone involved needs to be competent. The UKAS accredited scheme is the only one at the moment that covers everyone involved and its called CASS. There are not many CASS certified companies at present but it is growing.

Clive de Salis

September 2006

Clive de Salis is the Chair of the 61508 Association and a registered safety professional with the I.Chem.E as well as being a member of SIESO. He is the MD of Rowan House Ltd and can be contacted on 0121 422 3311.

CORRESPONDENCE

None received

ARTICLES IN THE NEXT ISSUE OF THE *LOSS PREVENTION BULLETIN*

The Loss Prevention Bulletin publishes safety articles and accident case studies in the process and chemical industry.

Issue 197, October 2007

- Loss prevention in aerosol filling plants. Part 2: Control measures
- Controlling the fire risks from composite IBCs
- Gasoline tank explodes
- Chlorine leak at hypochlorite (bleach) plant
- Fire in a powder drier
- Release of glycol to atmosphere from a dye plant
- Letter
- Bulletin briefing
- Events

For further information on the Loss Prevention Bulletin, or to purchase articles online, please visit www.icheme.org/lpb

ARTICLES IN THE NEXT ISSUE OF *PROCESS SAFETY & ENVIORNMENTAL PROTECTION*

(PSEP) is an unique journal focusing on how the process industries address the areas of process safety and environmental protection in a scientific and responsible way. PSEP is the official journal of the European Federation of Chemical Engineering (EFCE): Part B.

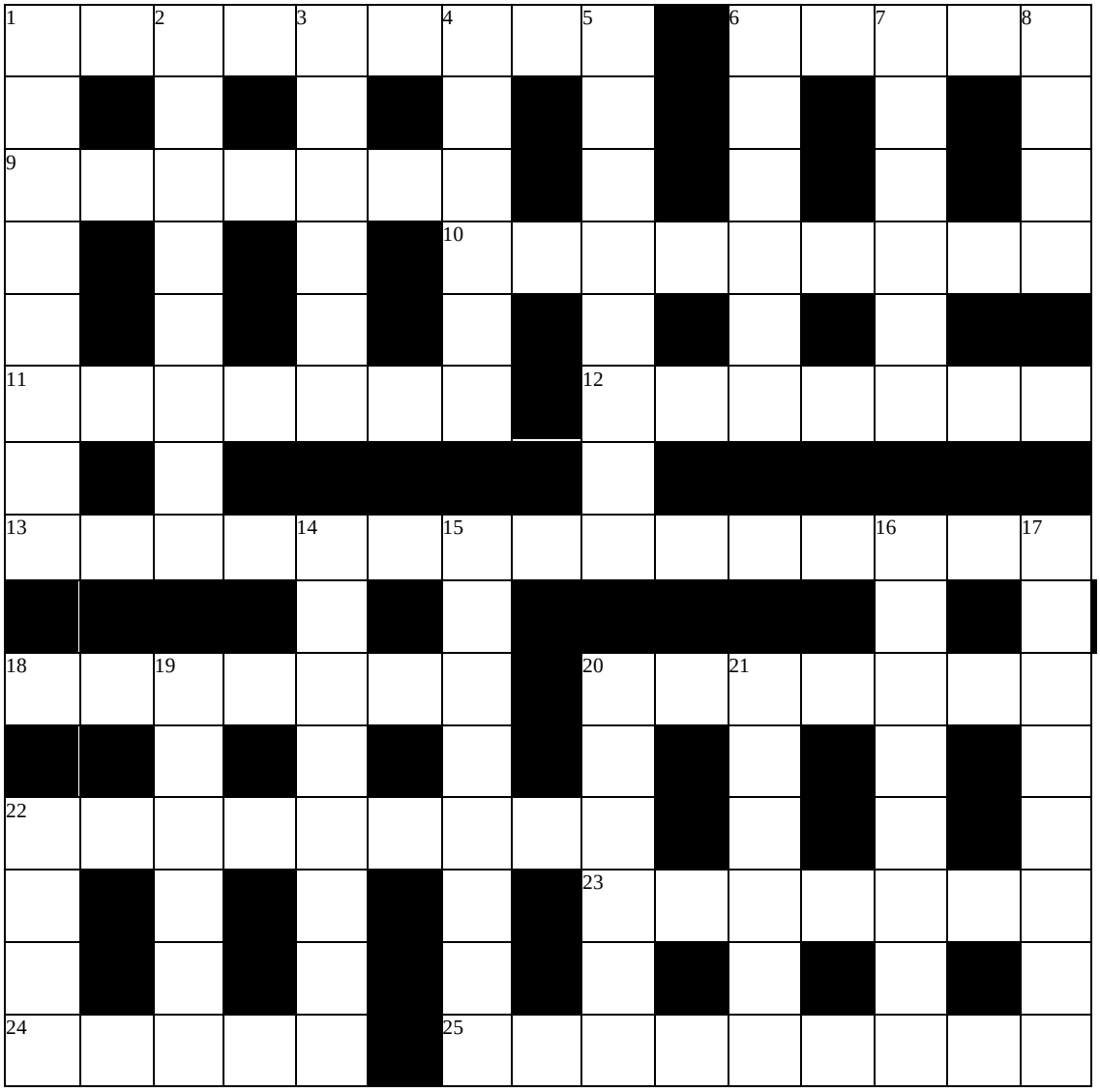
PSEP features papers from around the world that bring new perspectives to established principles, highlighting unsolved problems and showing directions for future research. The journal covers both experimental and theoretical research with fundamentals that influence practice.

The September issue of PSEP – Vol 85 (B5) is devoted to biodiesel, other alternative fuel products and their preparation.

To view abstracts of these articles free of charge, and to purchase individual articles online, visit www.icheme.org/journals and follow the 'View PSEP online' link. You can sign-up to receive an email giving you details of the contents of each issue as soon as it is published online by clicking on the 'add to my alerts button'.

For further information on *Process Safety and Environmental Protection*, or to subscribe, visit www.icheme.org/journals or e-mail journals@icheme.org

CROSSWORD PUZZLE No. 24



ACROSS

1. Do a cyclic reconfiguration of a smelly liquid. (9)
6. Handy numeral. (5)
9. First rabid animal sent back for having scales. (7)
10. It converts moisture to help medicinal 16. (9)
11. Posh school in first class surroundings is solvent. (7)
12. Chilly hazard to shipping. (7)
13. Limiting another alternative to heat induced combustion. (7, 8)
18. Part of the oldest royal family will wipe out the rest. (7)
20. Not an easy covering but a safe one. (4, 3)
22. Sweetlt valuable when 23. (9)
23. Editing out some self-denial. (7)
24. They get plastered in the house building industry. (5)
25. Oddly enough, sea grunge can oil those hard to reach places. (6, 3)

DOWN

1. American colouring substance. (8)
2. All together now, contend with inside Left. (8)
3. Foreign footballer team produces electrical energy. (6)
4. Calapillars are mostly volcanic. (6)
5. Cutting the harvest. (8)
6. P.M. who said "Protection is not a principle but an expedient." (8)
7. Not an eco-friendly way to deal with gasoline. (6)
8. Travel around endless French city. (4)
14. Boggy methane. (5, 3)
15. Laying about the Queen for propagating plants. (8)
16. Natural process to be avoided in e.g. a gasometer. (8)
17. Gas containing its own description. (8)
19. Singular footwear and French device for holding plug. (6)
20. Some clutch and lever themselves up by using it. (6)
21. State checks out what can hold things together. (6)
22. Leak-proof marine creature. (4)

Answers to Crossword Puzzle No. 23 in Issue 34

Across

1. Modicums
5. Parsec
9. Chlorine
10. Lignin
12. Out do
13. Lavoisier
14. Saturated oils
18. Non-technical
21. Beerstain
23. Amine
24. Laptop
25. Muriatic
26. Convex
27. Plug flow

Down

1. Micron
2. Delete
3, 4. Corporate manslaughter
6. Alibi
7. Sun Visor
8. Controls
11 Aviation fuels
15 Emanating
16. Anabolic
17. Underpin
19. Distil
20. Moscow
22. Smoke

DIARY OF SAFETY EVENTS

GROUP	TITLE OF MEETING	PLACE AND CONTACT	DATE
NW Branch	Buncefield - The Lessons Learnt	Cheshire Russell Spriggs 07720 896417 R.Spriggs@cedl.co.uk	26 September 2007
S&LP Subject Group	Good as New – Managing the Risks of Aging Process Plant	London Dr. Panos Topalis +44 2077166506	17 October 2007
SIESO	15th SIESO/HSE COMAH Workshop Societal Risk & Responsibility Buncefield & Texas City	 Manchester Derek Heathcote sec@sieso.org.uk	22 October 2007
NW Branch	HAZARDS XX and Workshops “Process Safety and Environmental Protection” Harnessing knowledge – Challenging Complacency	Manchester Mike Adams mikeadams@rawgreen.fsworld.co.uk	14-17 April 2008
Future Programmes of the S&LP SG	Management of Alarms and Trips		
	Learning from Others – managing and monitoring of risks	 London	
	Occupied Buildings		

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