



The Hazards Forum Newsletter

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1. VIEWPOINT

A Comment on 'The Blame Culture – Does it Hinder Industrial Safety?'

Reg Sell
Ergonomics Society

I would like to comment on the article by John Bond in the Autumn 2005 Newsletter, particularly from an ergonomics point of view.

There is no doubt that a blame culture does hinder the prevention of accidents. It is, however, going to be very difficult to avoid blame altogether. Traditionally there has been a great emphasis on the consequences of accidents rather than causes. Accident statistics have been based on a classification relating to results rather than causes. The problem with moving away from blaming the person on the spot, which is what this emphasis does, is that the blame will now rest with the designer of the equipment involved or the manager. This is maybe where it should be, but getting that accepted is likely to be difficult.

We know that most accidents result from a human error of some type. We also know that good ergonomic design of equipment will greatly reduce the risk of these 'errors' occurring. John Bond mentions the Heinrich pyramid and the need to look at unsafe practices and this is what we require from an ergonomics point of view.

This, however, is easier said than done. Errors can arise from bad man/machine interface design, such as inappropriate control/display relationships; bad environmental conditions, such as glare, or bad managerial practices, such as not acting upon legitimate reporting of unsafe situations. A task analysis based on all these areas is not easy for an untrained person to carry out.

John puts forward a need for a database relating to particular types of chemical plant but the issues do, of course, spread across all industries and activities. What we really need is a database across all types of working situations based on good ergonomic practice but tuned to the thinking of design engineers.

It is difficult to know how far one should go in not blaming those at the front line. Obviously one can not condone deliberate misbehaviour at the work place or sabotage, but what will organisations do when someone makes an error which has potential or actual serious consequences.

John mentions the airline reporting system. However, when a BA pilot some years ago attempted to land his plane on the A4 road parallel to, but some distance from, the runway the main thrust of the investigation was on the pilot with serious consequences for him. Things are, however, changing. When the Thames Trains driver went past a red light causing the Ladbroke Grove crash the emphasis of the investigation was on the ergonomics of the signal and the failure of management to do anything about the known problems with that signal rather than the driver's behaviour. It would have been much easier just to blame the driver, especially as he was one of those unfortunately killed. So we are learning.

We also have to be careful regarding incentives to increase safety. There is often a felt need to give some form of reward for achieving no accidents. This, of course, has the effect of covering up potentially dangerous situations. Even worse is when there is a scheme which rewards one shift rather than another. This results in the outgoing shift being tempted to leave a difficult situation for the incoming shift to deal with.

If incentives are to be offered then they should be for reporting errors or potentially dangerous situations but this is always going to be difficult because not only do we have the likelihood of a blame culture in the organisation, but we have the general public interest in failure rather than success encouraged by the media.

It is impossible to ignore politics. In the 1960s I was a member of a Human Element Faults committee in the CEGB which attempted to carry out the ideas covered in this and John Bond's papers. It collapsed, however, because those in the transmission system were less able to cover up errors than those in generation. If you operate a switch wrongly then it is obvious to people outside your own department: whereas errors inside a power station can be kept within that station. Thus almost all the errors reported were transmission ones, which was not acceptable.

It would be nice if we could have the kind of error analysis system outlined here and in John Bond's paper and I wish the railway industry success in its endeavours. But I am afraid that the political and organisational factors touched upon in this paper will make it very difficult to carry through. We learn, in fact, most about accident causation from analysing serious accidents after they have happened, rather than from ergonomic analyses at the design stage aimed at preventing the possibility of plant design-induced 'human errors' before they result in those serious accidents.

2. Forthcoming Hazards Forum Evening Events

The Hazards Forum will continue its series of evening events with two meetings in the first half of this year.

On Tuesday 7th March 2006, a meeting on the subject 'Natural Catastrophes including Floods' will be held immediately following the Annual General Meeting. On 20th June there will be one on 'Improving Risk Management of Critical Computer Based Systems'. Both meetings will be held in London, the first at The Old Library, Lloyd's Register, 71, Fenchurch Street, EC3M 4BS, the second at the Institution of Electrical Engineers, Savoy Place, WC2R 0BL.

Attendance at evening events is by invitation, but anyone who would like to attend should contact the Secretariat, on 020 7665 2230

3. 2006 Annual General Meeting

The 2006 Annual general meeting will be held on Tuesday 7th March 2006 at The Old Library, Lloyd's Register, 71, Fenchurch Street, EC3M 4BS, at 4.00 pm, prior to the meeting on 'Natural Catastrophes including Floods'. Members should note this in their diaries!

4. Report of the Meeting 'Can Risk be Quantified? 29th September 2005

The third event in our 2005 series on risk was held at the Royal Society on 29th September when Professor John Uff CBE QC chaired a meeting which posed the question 'Can risk be quantified?'

53 guests were treated to three very technical presentations each delivered from a different perspective and each designed to attempt to answer the question. The Chairman opened by explaining that the subject for the evening had fascinated him since being involved in rail crash enquiries. He believed we are all aware of the actuarial approach and statistics which provide figures stating the chances, say, of being killed in a rail crash. However there are cases where a decision has to be taken between two courses of action with potentially different outcomes. In such circumstances the level of risk for each needs to be compared and the only way to do this is numerically because the use of words is insufficient. The three presentations were given by Dr Dougal Goodman FEng, Chairman of The Risk Group; Professor Chris Chapman, Emeritus Professor of Management Science, University of Southampton and Professor Michael Baker, Head of the Graduate School, Physical Sciences, University of Aberdeen.

Dr Goodman spoke of his experience from a business perspective, both in BP and in Insurance and the ways in which risk needed to be quantified in order for the respective industries to remain solvent. The business needed to be managed for the deep downside, the downside that could ruin the company. There were ways of doing this: eliminating the risk, but this was rarely possible; managing the risk through good practice; or transferring the risk through reinsurance. Both the second and third options could only be done if the extent of the risk was estimated accurately and there were models available to help to determine this.

Professor Chapman spoke from the perspective of risk efficiency and was at pains to explain how he defined and understood the concepts of risk and uncertainty. He then looked at the implications of using his definitions and explained that generally these were that uncertainty should be managed first and then risk. Remember that uncertainty embraces ambiguity as well as variability; both threats and opportunities can contribute to uncertainty; measuring uncertainty is feasible to the extent that it is useful and that it is possible to consider down side risk in terms of risk efficiency, maximising expected performance for a given risk level.

Finally Professor Baker gave an extensively illustrated presentation on risk evaluation in engineering structures and systems. He too emphasised the importance of clear definitions, classifying the uncertainties including uncertainties in modelling. He described reliability-based risk assessment and used two examples of research applications, one into failure by fatigue and fracture and another on shear in concrete bridge decks. As always the presentations were followed by an enthusiastic question and answer session. Two of the conclusions drawn from the event were that the Royal Society Reports on Risk may now be dated and will need to be re-considered; and the different definitions of risk used in the presentations prompts a need for the definition of risk to be re-examined.

The Hazards Forum is grateful to Lloyd's Register and Risk Management Solutions for generously sponsoring this event which enabled it to be held at the Royal Society. A report will eventually be sent to all those who attended and a copy posted on our web site www.hazardsforum.co.uk. However, due to the complex technical nature of the presentations this is taking a little longer than usual.

5. 'Accidents and Agenda'

The Royal Academy of Engineering has recently published a report, '*Accidents and Agenda*', that highlights the UK's relatively low incidence of major industrial and transport accidents (excluding road transport) but examines improvements to the established culture that can be made if the demands of the future are to be met.

The working group, which prepared this, looked at seven industrial sectors: aviation, rail, chemical, construction, marine, nuclear and offshore oil and gas, commissioning individual reports by experts in each sector. It questioned, but ultimately endorsed, the UK's current post-accident processes and sees no need for a radical change. It does, however, recommend that the Attorney General consider how the process of deciding whether to prosecute and whether the police or another agency should lead a particular accident investigation could be made faster and more transparent. As default before decisions are taken on prosecutions they recommend that the HSE, or the appropriate Accident Investigation Branch, should be the lead investigative agency in all major accident situations. The primary aim of any post-accident investigation must be to allow accidents with similar causes to be prevented in the future and this starts with an objective and thorough investigation.

The current UK accident rate is not a given or stable state. The increasing use of software to control plants and equipment makes understanding the associated risks of departures from the normal more difficult. Systems may behave unexpectedly when stressed in certain ways or operators may do things unintentionally that create instability. Meeting these challenges requires better education.

It used to be almost sufficient for engineers to receive one burst of formal education and then to rely on experience - but this is no longer the case. Experience still has its own value but designing, applying and managing complex computer control systems require focused education. The report believes that all engineers who aspire to professional qualifications should receive formal safety management and accident prevention training before they qualify plus formal education in the safety aspects of particular systems before they are expected to use them operationally.

The working group felt that the acid test was whether we prevent future accidents by applying what we have learnt. In the major incident area there is evidence that we do. In aviation a constant stream of innovations traces much of its background to accidents around the world. The Piper Alpha disaster and the subsequent public inquiry brought fundamental changes to the offshore oil and gas industry. However, a vast amount of indifference to learning and improvement still persists. Accidents happen time and again for reasons that we have already seen explained and understood. Better approaches to learning from the misfortunes of others are needed, from both actual accidents and from incidents that had safe outcomes - but might not have done. Alongside this we need to improve the culture of safety in companies and learn more generally that short cuts in safety are dangerous, expensive and bad for business.

[The report is available at £50, including a CD, or may be read or downloaded at the Royal Academy of Engineering's website, www.raeng.org.uk]

6. Report of Executive Committee Meetings 29 September and 8 December 2005

Since the last Newsletter there have been two meetings of the Executive Committee.

The September meeting concentrated on the organisation of and reporting on Evening Events as well as ways in which the Hazards Forum might be brought to the attention of prospective new members. Sir David Cox indicated that he was finding it difficult to attend meetings and suggested an alternative be sought as the Royal Society observer. In consequence the Committee was delighted to welcome Gordon Williams to the 8 December meeting as Sir David's replacement. Gordon is a Fellow of the Royal Society and The Royal Academy of Engineering as well as being a Professor of Mechanical Engineering at Imperial College of Science, Technology and Medicine.

The Committee recorded their thanks to Lloyd's Register and Risk Management Solutions, the sponsors of our event *Can Risk Be Quantified?* and to HSE and the Institution of Mechanical Engineering, the sponsors of *Designing for Risk Reduction in Construction, Operation and Maintenance*. Both events are reported separately elsewhere in this Newsletter. At the meeting on 8 December executive members also concentrated on the preparation of the Annual Report and Budget for the Annual General Meeting. This is to be held on 7th March 2006, at The Old Library, Lloyd's Register, 71 Fenchurch Street, EC3M 4BS.

Also as a consequence of these two meetings, the Hazards Forum has registered with the Inland Revenue as a Charity able to receive tax back from individual's subscriptions under the Gift Aid scheme. Those involved will have received advice when they received their subscription renewal letters. The scheme allows for claims to be backdated five years and the Hazards Forum hopes that all members eligible sign up to the scheme.

Evening Events: The December meeting continued planning of the evening event programme and discussed the arrangements for a meeting on 7th March 2006 on the subject of 'Natural Catastrophes including flooding' and also an event on 20th June 2006 on the subject of Improving Risk Management of Critical Computer Based Systems. This latter event will be chaired by Professor Philip Bennett, Distinguished Member of the Hazards Forum, and the three speakers will be Ron Bell from the Health and Safety Executive; Ron Pierce, Principal Consultant at CSE International Ltd; and Professor John McDermid from the University of York.

(Secretary's note: All Hazards Forum members are invited to put forward proposals for evening events that they would like to be considered and included in the programme. Names of potential sponsors for these events are also welcome. Just contact the secretariat.)

Membership. Applications from the following new members were approved:

Chris Elliott, Individual Member, Pitchill Consulting,
Brian Rofe, Individual Member, Retired Consultant to Arup Water,
City University, London, Associate Member

7. 'Climate Change Futures: Health, Ecological and Economic Dimensions'

The Center for Health and the Global Environment at Harvard Medical School, along with co-sponsors Swiss Re and the United Nations Development Programme, has released the results of a study showing that climate change will significantly affect the health of humans and ecosystems and that these impacts will have economic consequences. The study, entitled 'Climate Change Futures: Health, Ecological and Economic Dimensions,' surveys existing and future costs associated with climate change and the growing potential for abrupt, widespread impacts. The study reports that the insurance industry will be at the centre of this issue, absorbing risk and helping society and business to adapt and reduce new risks.

It found that 'impacts of climate change are likely to lead to ramifications that overlap in several areas including our health, our economy and the natural systems on which we depend. A comparable event would be the aftermath of flooding, contamination and homelessness witnessed after Hurricane Katrina hit the US Gulf coast in August. Analysis of the potential ripple effects stemming from an unstable climate shows the need for more sustainable practices to safe-guard and insure a healthy future.'

'Imagining the unmanageable' was to be the subtitle for the Climate Change Futures report. But the devastating series of intense, immense fall hurricanes besetting the United States displaced it. What were once extreme scenarios for the US have occurred, and the consequences have cascaded across the physical landscape, overwhelming the capacities of health, ecological and economic systems to absorb, adapt to and manage the change.

Hurricane Katrina killed over 1,000 people, displaced over a million people, and spread oil, toxins, micro-organisms and deep losses throughout the US Gulf Coast. It revealed deep-seated inequities and vulnerabilities, and the shock waves have reverberated through all sectors of society. The need for prevention has become embedded into our future political landscape.

While no one event is diagnostic of climate change, the relentless pace of unusually severe weather since 2001 – prolonged droughts, heat waves of extraordinary intensity, violent windstorms and more frequent '100-year' floods – is descriptive of a changing climate.

The reasons for the changed weather patterns are well understood. Five years ago, the US National Oceanic and Atmospheric Administration reported that the world's oceans had warmed to a depth of two miles in five decades. It was reported in 2005 that the oceans had absorbed 84% of the globe's warming and that the warming pattern is unmistakably attributable to human activities. Because of the natural cycles on which global warming is superimposed, the overall frequency of hurricanes ebbs and flows. But, since the 1970s, tropical storm destructiveness (peak winds and duration) and the frequency of category 4 and 5 storms have essentially doubled.

[The complete report may be viewed at www.climatechangefutures.org]

8. Report of the Meeting ‘Designing for Risk Reduction in Construction, Operation and Maintenance’, 8th December 2005

The final 2005 event in our risk series was hosted by the Institution of Mechanical Engineers on 8th December. We were delighted that Mr Gordon Masterton, President of the Institution of Civil Engineers, was able to chair the meeting and our thanks to the Health and Safety Executive for co-sponsoring it.

Although the attendance was disappointing, 25 guests heard excellent and fascinating presentations by Pam Waldron, Head of Operations, Yorkshire and North East, HSE; David Greenhalgh, Director, Osprey Mott MacDonald; and Colin Smith, Director for Safety, Health, Environment and Quality with Balfour Beatty Construction.

Pam Waldron spoke of her experience from the perspective of the regulator, illustrating her talk with photographs of both good and bad design practice; introducing humour to what is otherwise a very serious subject. David Greenhalgh then spoke from the perspective of a Project Manager working on behalf of a client. His talk featured the construction of Portsmouth’s Spinnaker Tower, a unique iconic structure presenting design challenges for which there was no past history on which to make a risk assessment. Describing each problem faced in turn Mr Greenhalgh explained how design in the early stages had helped to reduce hazards, particularly falls from height. This was a Millennium Commission Project attracting considerable publicity and therefore it was essential that accidents were reduced to the absolute minimum. Colin Smith concluded the formal presentations by speaking from the Constructor’s viewpoint. The Construction, Design and Management Regulations were quoted as having played a big part in improving safety and health. He questioned the hundreds of man-hours spent on producing the written design and risk assessment and pre-tender health and safety file, suggesting that such time may be spent on more beneficial aspects. While this and other barriers exist, he nevertheless assured everyone that the whole process could be used to advantage by targeting key issues, developing a Project Policy and managing the issues right through the process. The sorts of target areas he identified were working at height; temporary stability; cables and services; traffic and transport; vibration and finally manual handling. Examples of these areas were then illustrated before the meeting was opened for general discussion. A report will be sent to all those who attended and a copy posted on our web site www.hazardsforum.co.uk.

9. World Disasters Report 2004

Supporting community resilience is the key to reducing the impact of disasters. The resilience and capacity of disaster-affected people to cope with apparently hopeless situations is the main theme of the World Disasters Report 2004, which was released recently by the International Federation of Red Cross and Red Crescent Societies.

The Report, now in its 12th year of publication, highlights the impressive capacity of people from across the developing – and developed – world to cope with even the worst situations. The Report underlines the necessity for the aid community to put a much stronger emphasis on assessing local strengths and resources, rather than focusing just on need or vulnerability. Failure to include communities in disaster mitigation and response can undermine their resilience to risks.

The capacity for resilience in the face of adversity shines through all this year's stories. People continually adapt to crisis, coming up with creative solutions. Supporting resilience means more than delivering relief or mitigating individual hazards. Local knowledge, skills, determination, livelihoods, cooperation and access to resources are all vital factors enabling people to bounce back from disaster.

The Bam (Iran) earthquake, in December 2003, killed some 30,000 people, injured another 30,000 and destroyed 85 per cent of the city's buildings. While 34 international rescue teams found 22 people alive, local Red Crescent volunteers saved nearly 160 lives. Neighbours and volunteers from other provinces and local organizations saved hundreds more.

In Gujarat the poor were the first and most active investors in their own recovery after the earthquake that devastated the Indian town of Bhuj in 2001. By 2003, 9,800 families in low-income areas of Bhuj had invested around US\$ 290,000 into strengthening their homes and livelihoods. As one of the residents put it: 'I do not want relief or compensation. If I can run my business well, that is my best coping'.

Tuti is a highly flood-prone island on the Nile in Khartoum (Sudan). To protect themselves, local people have elevated the entrances of their homes, plastered walls with water-resistant mud, and shored up riverbanks with sandbags and trees. When river waters rise, a flood committee organises 24-hour patrols, while volunteers use drums and the mosque's megaphone to warn the population.

Through well-organised coping, Tuti's people have withstood flooding without suffering major casualties or depending on external aid.

The Report underlines that the time has come to dispel the myth of helpless victims. After decades of rhetoric it believes it is now time for action: aid organizations must build on the resources and resilience found in disaster-prone communities or risk undermining those capacities further.

(The report is available price £17.95 plus p&p from Eurospan, 3 Henrietta Street, Covent Garden, London WC2E 8LU (Tel 020 7240 0856, e-mail orders@edspubs.co.uk, www.eurospan.co.uk).

10. 'Science in Parliament'

As a member of the Parliamentary and Scientific Committee the Hazards Forum receives a copy of the Committee's journal 'Science in Parliament', which is published quarterly. As it is not feasible to circulate the journal widely, the main part of the contents is shown in the Hazards Forum Newsletter. Any member who wishes to see any of the articles should contact the Editor at ilawrenson@iee.org

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11. Calendar of Events

Date	Event	Venue	Contact/further information
2006			
FEBRUARY			
15	'Software: Mankind's Most Dangerous Artefact' organised by the Institution of Electrical Engineers	Weston Theatre University of Manchester 6.30 pm	Deborah McKenzie T: 0161 973 3812 e: dmckenzie@iee.org.uk
MARCH			
9	'Sustainability Seminar: Energy Use and Abuse', organised by the IMechE	IMechE London	Stephanie Love T: 020 7973 1312 e: s-love@imeche.org.uk
7	Annual General Meeting followed by 'Natural Catastrophes including Floods', a Hazards Forum Evening Event	Lloyd's Register London	T: 020 7665 2202 www.hazardsforum.co.uk
28-30	'Hazards XIX; Process Safety and Environmental Protection'; organised by IchemE, North West Branch	University of Manchester	Mike Adams T/F: 01539 732845 e:mikeadams@rawgreen.fsworld.co.uk www.icheme.org/hazardsxix
APRIL			
4-5	International Rail Accident Investigation Conference, organised by the IMechE	IMechE London	Stephanie Love T: 020 7973 1312 e: s-love@imeche.org.uk
MAY			
15-19	Workshop on the Conduct of Seismic Hazard Analyses for Critical Facilities	Abdus Salam ICTP Trieste	T: +39 0404 2240355 F: +39 040 2240585 e: mailto:smr1747@ictp.it www.ictp.it/
JUNE			
6-8	The System Safety Conference	Savoy Place London	T: 01438 765653 F: 01483765659 e: eventsa3@iee.org.uk
20	'Improving Risk Management of Critical Computer Controlled Systems', a Hazards Forum Evening Event	IEE London	T: 020 7665 2202 www.hazardsforum.co.uk
SEPTEMBER			
25 – 7 October	Workshop on Three-Dimensional Modelling of Seismic Waves Generation, Propagation and their Inversion	Abdus Salam ICTP Trieste	T: +39 0404 2240355 F: +39 040 2240585 e: mailto:smr1755@ictp.it www.ictp.it/
OCTOBER			
4	'Cost of Safety through Life', seminar organised by the IMechE	IMechE London	Zoe Thomas T: 020 7973 1291 e: z_thomas@imeche.org.uk

Membership of the Hazards Forum 2006

Distinguished Members

Professor P A Bennett, FREng
Professor Sir Bernard Crossland, CBE FRS FREng
Dr A C Paterson, CBE FREng

Dr S N Mustow, CBE FREng
Professor P O Wolf, FREng
Professor Sir Frederick Warner, FRS FREng

Institutional, Corporate and Individual Members include:

British Computer Society
British Hydrological Society
British Psychological Society
City University
Cranfield University
Ergonomics Society
Eurogears Ltd
Geological Society
Institute of Measurement and Control
Institution of Chemical Engineers
Institution of Civil Engineers
Institution of Electrical Engineers
Institution of Mechanical Engineers
Institution of Materials, Minerals & Mining

Institution of Occupational Safety and Health
Institution of Structural Engineers
Lancaster University
Meteorological Office
National Health and Safety Groups Council
Risk Management Solutions
Risk Support Ltd
Royal Academy of Engineering
Royal Society of Chemistry
Safety and Reliability Society
Society of Industrial Emergency Service Officers
University of East Anglia
University of Nottingham
University of York

BP plc
CSE International Ltd
DuPont De Nemours (Luxembourg) sárl
DSTL
Health and Safety Executive

Lloyd's Register
NEBOSH
Rail Safety and Standards Board
Shell UK Ltd
United Utilities

Mr Ade Adeyemo
Dr John Bond
Mr Iain Carter
Mr Nigel Cheetham
Mr Frank Crawley
Mr Graham Dalzell
Mr Chris Elliott
Mr David Eves CB
Mr Robert Foster
Mr Robert Gilchrist
Mr Peter Graham
Mr Peter Livock

Dr P Mackinnon
Dr J McQuaid CB
Mr Mark Paradies
Mr Fred Pell
Mr Brian Rofe
Mr Michael Selfe
Mr Gordon Senior CBE
Mr Ed Spence
Mr Brian G J Thompson
Mr Simon Turner

