



# The Hazards Forum Newsletter

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# **NEWSLETTER Issue no 53**

**Spring 2006**

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*Edited by Dr Ian Lawrenson OBE*

*Views expressed are those of the authors, not necessarily of the Hazards Forum*

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# 1. Viewpoint

## A Further Comment on 'The Blame Culture – Does it Hinder Industrial Safety?' by Hedley Jenkins

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I would like to offer a further comment on the article by John Bond in the Autumn 2005 Newsletter.

Reticence on the part of those involved in the 'justice' seeking process delays the learning of lessons and to that extent the 'blame' culture does undoubtedly hinder industrial safety. However the desire of the public to seek 'justice' and thereby assign blame in the event of an incident is unavoidable. Unfortunately the process is typically lengthy and the consequent delay in the dissemination of lessons learned from the investigation of the incident could result in a repetition elsewhere. A means of avoiding this delay without compromising the 'justice' seeking process is required.

The primary point of reference for those responsible for safe design and operation is the relevant technology/facility specific industry, national and international codes of good practice. Indeed the regulatory authorities (the HSE in the UK) typically demand that designers and operators acknowledge these code requirements. Accordingly the relevant code is the logical vehicle for disseminating lessons learned. To be effective the lessons from an incident need to be rapidly incorporated into the code and the designers and operators need to be alerted to the resulting code update. Unfortunately few if any codes are continuously updated so herein is a second obstacle to the rapid dissemination of lessons learned.

Means could be established to address both issues –

- Reluctance of those involved to disclose causation details until the 'justice' seeking process is complete – The regulatory authorities typically require rapid determination of the causes of all incidents and, in the case of major incidents, participate directly in this process. Accordingly the regulatory authorities, at a relatively early stage, are in a position to decide if the cause does represent new learning. Here in the U.K. the HSE typically participates in code compilation/revision and presumably its representatives are aware and mindful of latest knowledge. They could equally take on responsibility for alerting code custodians to a need for code amendment. They could in so doing relay the new found incident-related knowledge in a manner which does not compromise the 'justice' seeking process.
- Codes are infrequently updated – Code advice does not reference specific incidents so the issuing of amendment alerts need not compromise the 'justice' seeking process. Most custodians of codes of good practice would probably accept responsibility for the ongoing issue of amendment alerts if they were granted the necessary resources.

Elimination of the 'blame culture' and the associated reluctance on the part of those involved to disclose incident causation details is unlikely. The adoption of an obligation to issue code alerts triggered by the regulatory authorities would minimise consequent delays in the dissemination of lessons learned. The only real obstacle is ongoing code maintenance funding and resourcing.

## 2. Professor Alan Jennings 1932 - 2005

### Pioneering numerical analyst and structural engineer

Professor Alan Jennings, the former Head of the Department of Civil Engineering at Queen's University, who died last September, was one of the pioneers in the application of matrix methods within engineering. After graduating in Civil Engineering from Manchester University he was with English Electric from 1954–59 before returning in 1959 to his alma mater as a Lecturer in Aircraft Structures before becoming a Lecturer at Queen's in 1965. In 1978 he was promoted to Professor a post he filled with distinction until his retirement in 1997 – having been Head of Department from 1989-93.

Alan was an outstanding researcher and made many contributions to the advancement of numerical analysis – indeed he was one of the pioneers in this very important field having worked on the Manchester Atlas computer in the 1950s. His routines for processing sparse matrices were widely acclaimed and refinements of the techniques developed are still being used today in programs for the static and dynamic analysis of structures. Alan also developed effective computational methods for the analysis of suspension bridges and arches. He had a superb analytical mind and his published papers were models of scholarship and clarity.

In order to share his knowledge he introduced a cross-disciplinary MSc course in Engineering Computation at Queen's University Belfast, which was unique in the UK. Over 200 students have graduated from this course and many have made significant contributions to the profession over the past 20 years. He also authored two books on Matrix methods of Computation and both were highly regarded internationally. As recently as 2004 he completed an outstanding book 'Structures – From Theory to Practice' in which he shares his in-depth knowledge of structural behavior with students and professionals.

Alan made enormous contributions to the development of effective teaching methods in Civil Engineering and his highly innovative approach to 'Learning from Disasters' is still used at Queen's, Glasgow University and in other institutions.

From 1986-1994 he was Associate Editor of the International Journal of Engineering Structures and he served on the Editorial Board of other Journals. He was Chairman of the NI Branch of the Institution of Structural Engineers in 1997-98. Alan had many outside interests including hill walking, Scottish country dancing, travel, bridge and photography.

He will be sadly missed by his wife Margery, their four children, and his six grandchildren. His many colleagues and friends at Queen's, in the professions and societies tender their sincere condolences to Margery and the extended family. Thousands of Civil Engineering graduates across the world will share in their grief.

**Professor A E Long, The Queen's University, Belfast**

**Professor Sir Bernard Crossland adds:**

Alan Jennings introduced a most imaginative and stimulating short course for undergraduate Civil Engineers on Disasters. This involved a few lectures from experts and people with experience of investigating disasters, including the Northern Ireland HSE, and small group investigations of examples of disasters. The Library provided a reference library of disaster reports and other information, to which the students could refer. Each group produced reports and made a verbal presentation, discussed by the class. Undergraduates like the course as they see it bringing them close to the responsibilities and challenges of engineering.

Alan adopted a similar approach in his recently published book - 'Structures - From Theory to Practice'. It is an excellent way of demonstrating the relevance of theory to practice, and in generating interest in the subject.

Alan's early death is a loss to teaching and the promotion of an engineer's responsibility for safety. He will be missed by all his colleagues.

## 3. International Risk Governance Council An update

by Peter Graham

*Dr Peter Graham was a member of the working group involved in setting up the IRGC. Since retiring from HSE, he has maintained contact with the IRGC and has contributed to projects. He is the author of the Annexes to the first IRGC White Paper (see article for more detail): these Annexes study the approaches to risk assessment and risk management in a range of organisations. He has also represented the IRGC on an International Standards Organisation (ISO) Working Group on a Risk Management Standard; this work, on a non-certifiable standard, is expected to be completed by 2008.*

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In Summer 2003, Professor Wolfgang Kröger, of ETH Zurich and also of the Paul Scherrer Institute, gave a presentation to the Hazards Forum on the then newly-established International Risk Governance Council (IRGC)<sup>1</sup>. This article reports on developments since then.

The aim of the IRGC is to be 'a unique platform for global debate and as a source of compiled, and if possible unified, scientific knowledge' with its focus being on newly emerging or re-emergent major risks. As explained at the Hazard Forum presentation, those responsible for the preparatory work on the IRGC recognised the need to look beyond the purely scientific aspects of risk and its management and to address issues such as perceptions, societal concerns and communication. IRGC intended to work with all major actors - the public sector (eg governments, regulators), industry, academia and the voluntary sector, primarily to facilitate the bridging of the sectorial, geographic and disciplinary boundaries that were adversely affecting the development and implementation of effective risk governance strategies.

An early need was to engage with a significant cross section of partners, both to generate the resources to enable the IRGC to achieve its mission and to give credibility to its efforts. The Board, under the Chairmanship of Professor Jose Mariano Gago, Minister for Science, Technology and Higher Education, Portugal<sup>2</sup>, has developed the funding of the IRGC with contributions now coming from the Swiss and US governments, Electricité de France, Swiss Re, E.ON and ATEL; in addition a number of organisations have contributed in-kind, notably the European Commission's Joint Research Centre (with which the IRGC concluded a collaboration agreement in 2004), Delft Technical University and the many organisations from which are drawn the members of IRGC's Board, Scientific&Technical Council and Advisory Committee.

### Members of the Board:

- **Dr. José Mariano Gago**, Minister for Science, Technology and Higher Education, Portugal (Chairman of the Board)
- **Pierre Béroux**, Group Risk Controller, Electricité de France
- **Ambassador Walter Fust**, Director-General, Swiss Agency for Development and Cooperation
- **The Hon. C. Boyden Gray**, Partner, Wilmer Cutler Pickering Hale and Dorr LLP, USA
- **The Hon. Donald J. Johnston**, Secretary-General, Organisation for Economic Co-operation and Development
- **Dr. Charles Kleiber**, State Secretary for Education and Research, Switzerland
- **His Excellency Dr. Liu Yanhua**, Vice Minister for Science and Technology, People's Republic of China
- **Prof. Dr. Wolfgang Kröger**, Director of the Laboratory for Safety Analysis, Swiss Federal Institute of Technology (Founding Rector) (Vice-Chairman of the Board)
- **Dr. Christian Mumenthaler**, Chief Risk Officer, Head of Risk and Knowledge and member of the Executive Board, Swiss Re
- **L. Manning Muntzing**, Energy Strategists Consultancy Ltd., USA (Vice-Chairman of the Board)

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<sup>1</sup> 11 June 2003. Report of the meeting available at [www.hazardsforum.co.uk](http://www.hazardsforum.co.uk)

<sup>2</sup> In addition to the below list of Board Members see <http://www.irgc.org/> for detailed background information on each Member

- **Björn Stigson**, President, World Business Council for Sustainable Development, Switzerland

A key milestone was the establishment in June 2004 of IRGC's Scientific & Technical Council (S&TC). It is in charge of the prioritisation and delivery of the overall work agenda, establishing the programme of key projects (which S&TC members lead) and managing the formal review of documents and reports prior to their publication. Members from the UK are **Professor Fotis Kafatos**, Chair Professor, Insect Immunogenetics, Imperial College, **Professor Joyce Tait**, Director of INNOGEN, the ESRC Centre for Social and Economic Research at the University of Edinburgh, and **Dr Timothy Walker**, until September the Director General of the HSE.

#### Members of the IRGC Scientific and Technical Council:

- **Prof. Dr. M. Granger Morgan**, University and Lord Chair Professor in Engineering and Head, Department of Engineering and Public Policy, Carnegie Mellon University, USA (Chairman of the S&TC)
- **Dr. Lutz Cleemann**, Director of the Allianz Technology Centre, Ismaning, Germany
- **Prof. Jean-Pierre Contzen**, Chair Professor, Technical University of Lisbon, Chairman, Von Karman Institute for Fluid Dynamics, Belgium, and Chairman, Institute of Advanced Studies, UN University, Japan
- **Academician Konstantin Frolov**, Director, Mechanical Engineering Research Institute, Russian Academy of Sciences, Russian Federation
- **Prof. Dr. Manuel Heitor**, Secretary of State for Science, Technology and Higher Education Portugal
- **Prof. Dr. Hou Yunde**, Director, State Centre for Viro-Biotech Engineering and State Key Laboratory for Molecular Virology and Engineering, Beijing, People's Republic of China
- **Prof. Dr. Fotis Kafatos**, Chair Professor, Insect Immunogenetics, Imperial College of Science, Technology and Medicine, London, UK
- **Prof. Dr. Wolfgang Kroger**, Director of the Laboratory for Safety Analysis, ETH Zurich, Switzerland (IRGC Founding Rector)
- **Dr. Patrick Lagadec**, Director of Research, Ecole Polytechnique, Paris, France
- **Dr. Jeff McNeely**, Chief Scientist, World Conservation Union, Switzerland
- **Prof. Dr. Norio Okada**, Disaster Prevention Research Institute, Kyoto University, Japan
- **Prof. Dr. Ortwin Renn**, Chair of Environmental Sociology at the University of Stuttgart and Director of the non-profit Research Institute "DIALOGIK", Germany
- **Dr. Mihail Roco**, Chairman of the National Science and Technology Council's sub-committee on Nanoscale Science, Engineering and Technology and Senior Advisor for Nanotechnology at the National Science Foundation, USA
- **Prof. Dr. Joyce Tait**, Director of INNOGEN, the ESRC Centre for Social and Economic Research on Innovation in Genomics, University of Edinburgh, UK
- **Dr. Bernard Tinturier**, Scientific Advisor to the President, Electricité de France
- **Prof. Dr. Hebe Vessuri**, Head of the Department of Science Studies at the Venezuelan Institute of Scientific Research, Venezuela
- **Dr. Timothy Walker**, former Director General, Health and Safety Executive, UK

Members of both IRGC's Board and S&TC, as well as the full-time staff at the Geneva-based Secretariat, are all involved in IRGC efforts to liaise with other organisations and promote the IRGC's work.

The IRGC has now hosted two major conferences. Its Inaugural Conference was held in Geneva in June 2004. There were a range of distinguished speakers including Donald Johnston (Secretary General of the OECD), Philippe Busquin (then EU Commissioner for Research), Swiss Federal Councillor Pascal Couchepin, Liu Yanhua (Chinese Vice Minister for Science and Technology), Rajendra Pachauri (Chairman of the UN's Intergovernmental Panel on Climate Change) and John Graham (previously head of the Harvard Centre for Risk Analysis and, at the time, Administrator of the US Office of Information and Regulatory Affairs). The conference's 170 delegates included a strong representation from the UK.

A second conference was held in Beijing in September 2005. This was hosted by the Chinese Government, indicative of both China's interest in risk governance and its support for the work of the

IRGC. The conference's theme was 'Implementing a Global Approach to Risk Governance', and the agenda included sessions on

- Transboundary risk (and why a new approach was needed),
- Climate Change (and decision making under irreducible uncertainty),
- Critical Infrastructures (and participative multi-stakeholder decision making),
- Risk Governance for emerging technologies (and the problems of managing highly uncertain risks),
- Understanding and managing new challenges for human health, safety and the environment (and, particularly, a potential influenza pandemic),
- Natural disaster risk management.
- Risk governance and sustainable development in the People's Republic of China.

There was also a session devoted to risk governance itself, which was the official launch of the IRGC's White Paper on Risk Governance (see also below).

More details on both conferences are available on the IRGC web site, [www.irgc.org](http://www.irgc.org).

In addition to broader contributions to risk debates, the IRGC has begun its programme of project work. These address both specific risk problems and crosscutting issues where new learning can support how specific problems are managed.

The first project focuses on the crosscutting issue of risk governance. It began by examining the range of **approaches to risk assessment and risk management** used in key international and national organisations and, then, **developed an integrated analytical framework for risk governance**. The results have been published in IRGC's White Paper on 'Risk Governance: Towards an Integrative Approach'<sup>3</sup> in September 2005. The paper includes the following:

- A model or framework for Risk Governance, embracing pre-assessment, appraisal and management phases as well as risk communication; see diagram on page 13 for an overview (copy at the end of this article). The framework supports a classification of risks by such factors as their complexity, high unresolved uncertainty, and ambiguities about how to interpret evidence about a risk, and suggests how risk management strategies, including the level and form of stakeholder participation, may need to change as a result of the risk's dominant characteristic. The framework also includes advice on how and when to assess a risk's tolerability or acceptability.
- Summaries of internationally accepted approaches to risk assessment and risk management in 19 different contexts; the risks range from those stemming from physical sources (infectious diseases, chemicals, radiation, major hazard industries) through those associated with international trade and banking to those concerning governments or business in the delivery of their services.
- Two overviews of risk terminology – by terms and by organisations / publications.

The first project addressing a specific problem field focuses on critical infrastructures. The subject was chosen in part to develop work already done by the OECD on systemic risks<sup>4</sup>, that is those risks that affect the systems on which modern society depends. IRGC's interest in this work was given added urgency by the electric power failures in the autumn of 2003 in the North Eastern United States and Canada and in Italy which, in addition to the physical failures involved in those events, also drew attention to the interdependent nature of the electricity supply system, both as a combination of a range of private and public bodies as owners and operators and its deep integration with other infrastructures, particularly ICT. The project began by examining the interdependence between the electricity and ITC systems, and is now working on an approach to assessing the relative criticality of five coupled critical infrastructures – electricity, gas, water, rail and ICT.

IRGC is also undertaking a project which seeks to develop guidance for governance of the risks associated with Nanotechnology. There is a great deal of work by many organisations around the world being done on the potential and the possible hazards of nanotechnology, and to ensure that it

<sup>3</sup> A pdf version of the White Paper is available on [www.irgc.org](http://www.irgc.org): click *downloads and links* in left hand column on home page, then *project descriptions*, then *White Paper No 1 on risk governance*

<sup>4</sup> *Emerging Risks in the 21<sup>st</sup> Century*, OECD 2003

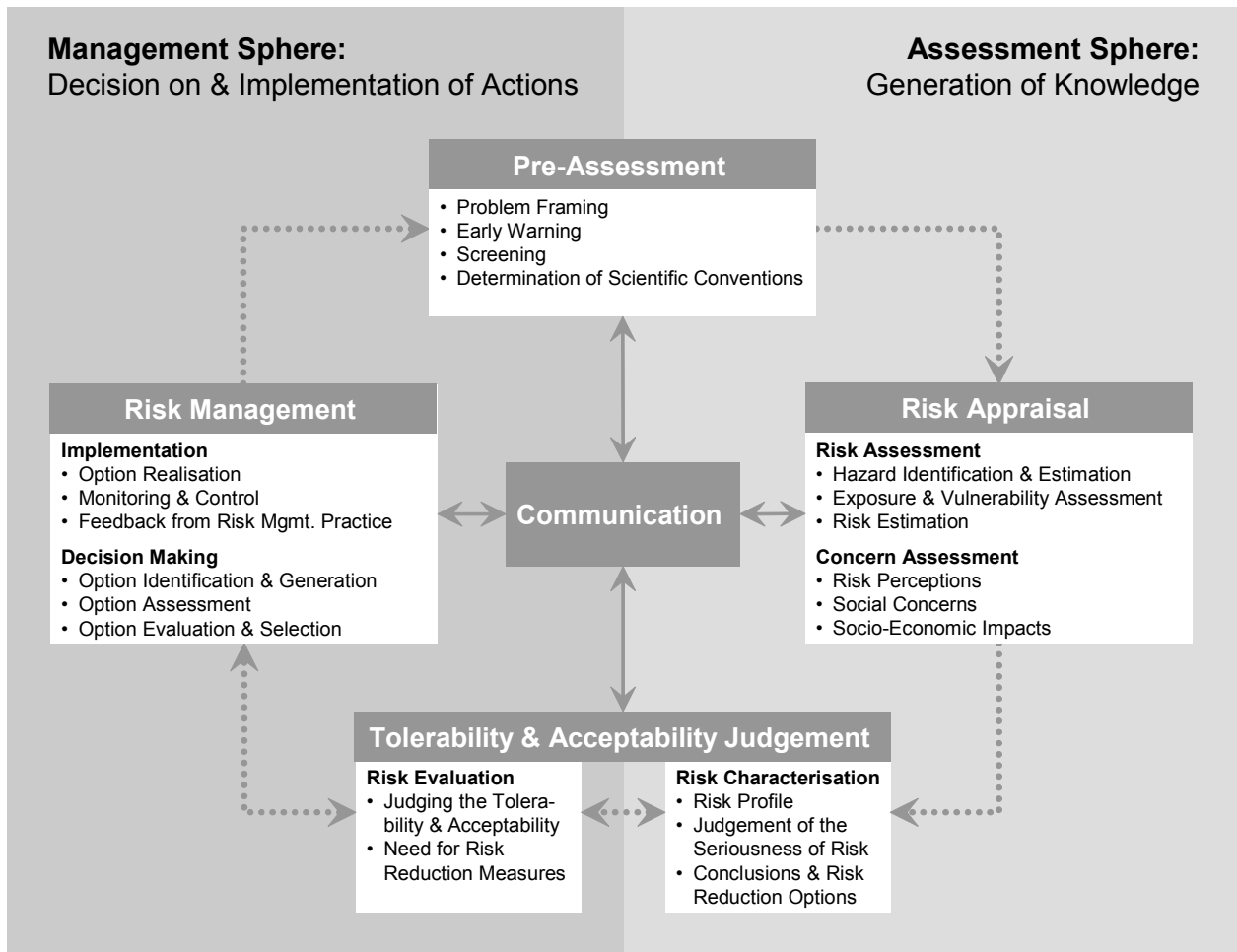
does not duplicate such work IRGC is concentrating on developing guidelines for the governance of some of the key risks. Using its own framework, IRGC has framed these risks in two ways. The first takes the context of classic technology assessment and the need to look into the impacts of the application of nanoparticles and other passive nanostructured materials within current and impending products. For the second frame, the context is that of the social desirability of innovations and looks at processes of modernization, changes in the interface between humans and machines/products and ethical issues such as the boundaries of intervention into the environment and the human body. For both, IRGC will develop its recommendations in collaboration with experts drawn from academia, industry, government and NGOs.

IRGC is shortly to begin a fourth project, focusing on the potential influenza pandemic that has rightly attracted so much recent attention. In order to assure a unique and value-adding contribution, IRGC will focus on strategic preparedness for a potential influenza pandemic originating in developing countries. The emphasis will be on China and South East Asia as this region was where several of the pandemics of the 20<sup>th</sup> Century originated (1957, 1968 and 1977) and is where the combination of animal husbandry techniques and human lifestyle appear to offer a greater potential for the emergence of a new flu pandemic with zoonotic origins.

### Conclusion

The IRGC has made significant progress in the past two and a half years. Its resources are limited and it has, therefore, to be selective in the issues and projects it pursues. But it is clear from the interest in its early work that its ability to bridge sectorial, geographical and political boundaries is very welcome and provides a constructive context in which to analyse, discuss and, perhaps, better manage those risk issues which are and will become core to our modern society. IRGC still needs to further develop its networks and build on its already significant contacts in the UK. If others in the Hazards Forum would like to contribute to its work, or indeed would like to know more about IRGC, please contact the Secretariat via [info@irgc.org](mailto:info@irgc.org).

### IRGC Risk Governance Framework





## 4. Early warning systems in Tanzania

### The International Team, the Met Office, 2006

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On 5<sup>th</sup> January, 2006 a tropical depression (Tropical Depression number 7) that affected the Mozambique Channel was threatening to disrupt severely the southern province of Gaza. However, thanks to warnings issued via a television system donated by a UK government agency, people in the town of Xai-Xai evacuated to safer areas and/or adopted measures to minimise the impacts. Fortunately the town was spared the strong winds, but it was still hit by heavy rainfall, which, if mitigating action had not been taken could have resulted in major fatalities.

After the event, Mozambique's weather service – INAM – was commended by the country's media. However, INAM's national director Filipe Domingos Freires Lúcio, said it was only possible with support from international organisations such as the UK Met Office.

Helping in the prevention and mitigation of natural disasters is a major priority for the Met Office, and it is recognised that a fundamental element in disaster preparedness is an efficient and effective early warning system.

Countries such as Mozambique are highly vulnerable to natural disasters of a hydro-meteorological origin. One of the most devastating disasters was in 2000, when a cyclone hit the country, causing three weeks of floods, in which 700 people died and more than 100,000 had to be evacuated. Every year at least three tropical depressions or cyclones, or at least one flood, affect some part of the country. Droughts occur every three to four years.

Due to the country's vulnerability to disasters, over the years INAM has had to find new ways both to improve weather forecasts and early warnings, and to disseminate that information to those at risk. In the past INAM has used the radio and newspapers to disseminate warnings, but following the 2000 disaster concerns were raised about the effectiveness of that process.

Mr Lúcio explains: 'The effectiveness of these means has been limited due to the fact that the quality of the radio signal is generally very poor away from the major urban areas, and that newspapers are only read by a very small fraction of the population that is mostly illiterate. Following the floods stakeholders met to assess what worked and what didn't, and to decide a way forward.'

As a result of the consultation process, INAM, in collaboration with the National Institute for Disaster Management, and with funding from USAID, created a Tropical Cyclone Early Warning System, which provides information of lead-time and intensities of tropical cyclones. To ensure wider dissemination of meteorological information and early warnings, it was recommended that weather information also be broadcast on national TV.

Using a system donated by Met Office, INAM has set up a media weather studio. Here they prepare tapes of the forecast, which includes a presenter and graphics. Twice a day the forecasts are broadcast on the national television station, TVM. The original system was donated in 2001, through the World Meteorological Organization Voluntary Co-operation Programme. The Met Office upgraded it in December 2005.

INAM has also hosted a WMO training workshop for weather presenters from 23 African weather services. The trainers included presenters from the Canadian Broadcasting Company, the BBC and CNN, plus a Met Office graphic designer.

*(continued on p9)*

Helder Sueia, INAM meteorologist said: 'The incorporation of satellite pictures on TV presentations – particularly during periods when tropical cyclones are approaching or affecting the country – has had a significant impact on the audience, as they can see what we are talking about, and it helps to build peoples' confidence in our forecasts.' Mr Lucio said the action taken by residents of Xai-Xai proves it is working: 'The appreciation and use of meteorological information and warnings has markedly increased.'

While natural hazards may not be avoided, integration of risk assessment and early warnings, with prevention and mitigation measures, can prevent them from becoming disasters.

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## **5. Report of the Meeting 'Coastal Flood Risk – does the New Orleans Catastrophe hold Lessons for London?'**

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The first 2006 event in our risk series was held immediately after the Annual General Meeting at The Old Library, Lloyd's of London. It was chaired by the Hazards Forum's Vice-Chairman, Dr Dougal Goodman FREng, and some 100 guests, easily the best attendance for an event so far, heard excellent presentations from Dr Robert Muir-Wood, Dr Scott Freedman and Tim Reeder.

The 2004 and 2005 hurricane seasons have revealed the vulnerability of people and properties in the Caribbean and US coastal floodplains – most notably in the flooding of New Orleans following Hurricane Katrina. Significant coastal development during previous decades of low storm activity has placed many areas at risk under emerging conditions of increased storminess – potentially linked with global warming. The challenge set to the three speakers and for the subsequent debate was to explore how coastal flood is modelled within the insurance industry, review what has been learnt about the performance of the flood defences in New Orleans and then consider the lessons for modelling and managing risk in London and the Thames Gateway. Dr Muir-Wood of Risk Management Solutions Ltd described modelling techniques, Dr Scott Steedman of Scott Steedman Associates described his first hand experience of the New Orleans catastrophe and Tim Reeder, Climate Change Regional Manager (Thames) from the Environment Agency drew parallels from his experience of the flood risk to London and surrounding areas. It was a fascinating event with some animated visual aids as well as excellent presentations. A report will eventually be sent to all those who attended and a copy will be posted on our web site [www.hazardsforum.co.uk](http://www.hazardsforum.co.uk). However, some of the visual aid material is confidential and can not be included in the report. This means that those who were lucky enough to attend the event were given a unique opportunity to gain an insight into the problems and potential solutions.

The Hazards Forum would like to thank the four sponsors who made this event possible: The Lighthill Risk Network; Willis; Risk Management Solutions Ltd; and the Natural Environment Research Council.

## 6. Munich Re Annual Review 2005

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*The Munich Re Group has published Topics Geo, its annual review of Natural Catastrophes for 2005. The full report may be downloaded from the Munich Re website, [www.munichre.com](http://www.munichre.com)*

Roughly half of all the loss events recorded in 2005 were windstorms, with costs to be borne by the world's economies exceeding US\$ 185bn. However, the most severe human catastrophe was triggered by an earthquake that in October in the border area between Pakistan and India and, with a death toll of 88,000, was one of the five most destructive quakes of the last 100 years.

Overall losses exceeding US\$ 210bn set a new record. More than one hundred thousand people were killed as a result of natural catastrophes last year. Such a large number of fatalities has been recorded only twice in the last 25 years: in 1991, following a storm surge in Bangladesh, and 2004, following the tsunami in South Asia. Consequently, it is not surprising that insured losses also reached unprecedented dimensions. The year's overall balance for the insurance industry was US\$ 94bn, doubling the previous record set in 2004.

### Windstorms

As in previous years, windstorms dominated the insurers' loss figures. In January, Winter Storm Erwin crossed Scotland and southern Scandinavia at up to 120 km/h on a path that took it as far as Russia. The hurricanes in the United States, the Caribbean, and Mexico alone destroyed insured values exceeding US\$ 83bn. In the Atlantic, 27 tropical storms and hurricanes broke all meteorological and monetary records. For the first time since its introduction in 1953, the official list of 21 names was not long enough and had to be supplemented by the first six letters of the Greek alphabet.

Katrina was the sixth strongest hurricane since recordings began in 1851 - and losses amounting to US\$ 60bn made it the most expensive natural catastrophe loss in history. Rita, the fourth strongest hurricane ever registered, reached mean wind speeds of up to 280 km/h. Stan progressed at a relatively slow speed but carried enormous amounts of rain into Middle America, causing thousands of landslides, under which more than 800 people were buried. Wilma was the strongest hurricane ever registered in the Atlantic, with overall losses amounting to approx. US\$ 18bn. At the end of November, Delta became the first tropical cyclone ever to be registered in the Canaries

### Geological events

In the past year, 70 damaging earthquakes and 13 volcanic eruptions were registered around the world. The overall loss came to approximately US\$ 6bn.

In February 2005, a 6.5-magnitude earthquake occurred in Iran. Although the region affected is only sparsely populated, more than 600 people were killed. In March, an 8.7-magnitude earthquake occurred off the coast of Sumatra, demolishing thousands of houses on the island of Nias and killing 1,700 inhabitants. The earthquake that hit the border region between Pakistan and India in October 2005 triggered one of the worst human catastrophes of the last one hundred years. It only lasted 50 seconds, but more than 2,000 settlements were almost completely destroyed and 88,000 people were killed. Thousands of landslides blocked the roads to the areas with the greatest devastation and thus prevented international aid organisations from taking prompt and effective action.

### Floods

In August 2005, profuse rainfall caused floods in nearly all Alpine countries.. Mumbai, the megacity on the west coast of India with over 15 million inhabitants, was swamped by extreme rainfalls in July 2005. A precipitation depth of 944 mm was recorded within 24 hours, almost as much as the annual average.

### Wildfires, heatwaves, and droughts

In August, the scene in the Alps was dominated by floods and flash floods, whereas southern Europe had to contend with wildfires and droughts. Portugal experienced one of the most extreme dry periods of the last 100 years, Spain and France were forced to introduce water rationing, and the agricultural sector was confronted with widespread crop failures. The overall loss is estimated to exceed US\$3bn. Brazil's Amazon Basin went through its worst drought far more than 60 years. Many stretches of river dried up, resulting in losses for the shipping industry, agriculture, and fishery.

All loss records were broken in 2005, which finally led to the climate change debate taking on a new quality. Munich Re has long been warning that increasing global warming will be accompanied by extraordinary weather related natural catastrophes and explaining why there is a likelihood of greater loss potentials.

## 7. Report of Executive Committee Meeting, 7 March 2006

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1. After first approving the application from a new individual member, Mr Brian Neale, the committee spent some time preparing for the afternoon Annual General Meeting reported elsewhere in this Newsletter

2. Evening Events. The meeting then turned its attention to future evening events and ways in which sponsors could be encouraged to support them. (If there is any organisation who wishes to offer sponsorship please contact the secretariat). The 20<sup>th</sup> June meeting on Risk Management of Critical Computer Based Systems was the next event and more or less complete. Future events on Design and Risk, a joint meeting with the Design Industries Association, and Financial and Other Risks in Company Reporting were likely to be held later in 2006 with Standard Risk Management, Safety Culture in Railways, Contractual and Legal Matters Relating to Risk and Design, possible for 2007. (Members' suggestions for other topics are always welcome; please contact John Lee or the secretariat.)

3. Learning from Accidents. It was reported that the follow-up action promised after this event, delayed awaiting the publication of a Royal Academy of Engineering Report related to the topic, would now take place on the 13<sup>th</sup> March. Sally Brearley would lead some dozen representatives from various stakeholders in a brainstorming meeting with a view to determining, if possible, a way forward. Notes of the meeting were taken by John Bond and a report can be expected in the next Newsletter.

4. Joint Meetings. The Hazards Forum has been approached by the Engineers Affairs Committee of the Royal Academy of Engineering and also the Geological Society, which holds its anniversary in 2007, with a view to holding joint meetings with them. These approaches were welcomed by the Committee. While on the subject of joint meetings it was suggested that a joint meeting with the Radiological Protection Board on the subject of storing radioactive waste might provoke some topical interest, and risks faced by Formula 1 racing as it performed at the limits of technology and risk in the motor industry.

5. The Annual Charity Commission return was presented to the trustees and signed by the Chairman. This was to be sent to the Charity Commission together with a copy of the Annual and Financial Reports.

6. Dates for future meetings were set for 20<sup>th</sup> June, 28<sup>th</sup> September and 7 December. Members wishing to draw any matter to the Executive's attention for discussion at one of these meetings should contact the secretariat.

**John Lee**

## Calendar of Events

Date	Event	Venue	Contact/further information
<b>2006</b>			
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/
25	'Fit for Purpose; Safety Cases in a Changing Nuclear Industry'; seminar organised by the IMechE and the INucE	Austin Court Birmingham	Candice Macdonald T: 020 7973 1260 e: c_macdonald@imeche.org.uk
JUNE			
6-8	The System Safety Conference	Savoy Place London	T: 01438 765653 F: 01483765659 e: eventsa3@iee.org.uk
20	<b>'Improving Risk Management of Critical Computer Controlled Systems', a Hazards Forum Evening Event</b>	<b>IEE London</b>	<b>T: 020 7665 2202 www.hazardsforum.co.uk</b>
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

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