European Safety and Reliability Association

Newsletter

http://www.esrahomepage.org

November 2005

ESRA NEWS

Letter from the Chairman

Ioannis Papazoglou
Demokritos Institute, Greece

Dear ESRA fellow members,

First, I would like to thank you for your confidence and honour extended to me personally and to my fellow officers by electing us as the new ESRA management team.

It is the first time that the circumstances were such that 75% of the officers have been elected for the first time and 100% in new positions. This constitutes an additional challenge for us but we will try to approach the fine performance of our predecessors while at the same time we continue to count and rely on their continuing guidance and help.

We assume the leadership of ESRA at what we believe is a crucial point in its development and course. The prime objective of the ESRA since its conception has been the organization of the ESREL conferences as means to bring together the safety and reliability practitioners from all over Europe and facilitate the exchange of their experience, as well as, their new knowledge. Following fifteen successful annual ESREL conferences, I hope you would agree with us that ESRA has succeeded in establishing the ESREL conferences as the main scientific conference in Europe on the subjects of system reliability safety and risk management. We would like to sincerely thank the previous officers and the organizers of those conferences for their contribution to this end. And also thank very much you who with their participation and continuing support brought the ESREL conferences at their present status. We pledge to do our very best to continue this fine transition. At the same time we believe it is time we took some further steps; both in the direction of the Conferences but in some new directions, as well.

We believe it is time for ESRA to undertake a much more active role in the organization of the ESREL conferences. Until now ESRA was offering the name and the availability of name lists for potential participants and potential contributors to the organization of the conferences. The main responsibility and effort lied with the local organizers. We strongly believe it is time to move towards a much stronger and more substantial involvement in the organization of the ESREL conferences. One way of doing so is to actively pursue the goal of the previous officers that ESRA should completely assume the organization of the Technical Programmes of the ESREL conferences. The role of the Technical Committees should be instrumental in this effort. We will move towards the establishment of a permanent Technical Programme Committee (TPC) with the Technical Committees (TCs) as main pillars. The membership of the TPCs will be that of the TCs. The latter will be responsible year after year to attract new and original contributions in their respective areas of expertise for the conferences. Furthermore the TCs will be responsible for reviewing the submissions and organize the accepted papers into sessions. This more or less permanent TPC will collaborate with the local organizers to fine tune the TP into the needs and themes of each conference. Before the next ESREL in Portugal we will issue new draft guidelines for the organizations of the ESREL Conferences and we will make them available for comments. We, nevertheless, remain committed to the rotation of the conference site through out Europe and to the cooperation with other relevant international and/or national

organizations for joint conference and avoidance of conflicts.

The technical committees of ESRA have additional roles to play in the advancement of the ESRA objectives. One of them would be the issuance of position papers, monographs and books presenting the state-of-the-art in a number of issues in their areas of expertise. This has been tried in the past with no major success. We believe we can stimulate the TCs to achieve better in this respect because we can spend some of the funds accumulated through the successful past ESREL conference. Before the next ESREL in Portugal we plan to issue a call for proposals for small projects that would result in the publication of such documents. Details will be announced in one of the future newsletters.

The ESRA TCs should play a more active role in the research activities in the European Union. To this end they should become more active in organizing research projects and participate in various calls for proposals. One example for such an activity is the "*European Technology Platform on Industrial Safety"*, an initiative formally announced during ESREL 2005 in Poland. Details on this activity will be published soon in one of the next issues of the Newsletter and the TCs will be called to respond. TCs should also play a more active role in reviewing papers in scientific journals and organize special issues of those journals. Results presented in the ESREL conferences are specially suited for this task.

These are some of the ideas we have. We expect to hear more from you, the staff of the ESRA members. Although we are always ready and happy to accept new ideas from you at any time, we plan to launch a campaign for systematically asking your opinion about the activities of ESRA, what you would like to see changed, how and what additional services you would like ESRA to offer to make participating to it more valuable.

We feel we need to increase our membership with new members, mainly from the industry. To this end we plan to launch a campaign mainly in the form of a letter explaining what ESRA has to offer in its members while at the same time asking for suggestions of additional services. To make this campaign a bit more personal and effective we ask for representatives from the European countries to step forward and offer us suggestions of lists of potential members as well as ways for effectively reaching out to them. ESRA national chapters are natural candidates for this role but all suggestions are needed and of course welcome.

As you can see we have a long list of plans. Let's only hope that the end of our term we will be able to present a half as long list of achievements. But to do this we need your active participation and support.

Once more we thank you for your confidence.

Letter from the General Secretary

Many Acknowledgements!

Pieter van Gelder, Technical University of Delft, Netherland

ESRA General Secretary

At the last General Assembly Meeting in Tri City, June 30th, 2005, two new management board members of ESRA had to be elected. Chairman Carlos Guedes Soares and Vice chairman Enrico Zio have been serving 2 consecutive terms for ESRA and their posts were vacant for new ESRA members. On behalf of the new ESRA management board, I would like to thank Carlos and Enrico for their time and devotion to running ESRA smooth in the past years.

Carlos served as Vice chairman 1 term and as Chairman 2 terms.

Enrico served as Treasurer 1 term and as Vice chairman 2 terms. Their enthusiasm in working for ESRA and their abundant ideas were invaluable for our association. Also from a personal point of view, it was always a great pleasure to work together with Carlos and Enrico in the management board and they have become very good friends. Luckily, Carlos and Enrico will not leave us. They keep very active within ESRA. Carlos as newsletter editor, chairman of the standing committee for publications and TC chairman and Enrico also as TC chairman. Two members with a heart for ESRA…!

Past Chairman and Past Vice Chairman of ESRA: Carlos Guedes Soares (left) and Enrico Zio (right); photo taken after the General Assembly in Tri City, June 30th, 2005

CONTRIBUTIONS FROM ESRA TECHNICAL COMMITTEES

Acceptable risk?

Prof. ir. J.K. Vrijling, Technical University Delft, Chair of Technical Committee on Safety from Natural Hazards

The disastrous consequences of the flooding in New Orleans USA illustrate the need of important choices of modern societies. For centuries human civilisations are threatened by natural disasters such as overabundant rainfall, earth quakes, storm floods, forest fires, etc. it involves the cost the lives of individuals or entire groups. Material damage and irreplaceable goods play a role with such disasters.

One of the choices of society is to which level the individual members and groups should be protected against natural disasters. The obligation to a choice is also the result of the enormous technical development which makes protection possible.

In the past the protection was improved *after* the disaster. Nowadays society tries to provide the protection if the risk is considered too high. By that protection, such as high dikes against storm floods and strong buildings against earth quakes one decreases the probability of serious or catastrophic consequences. Hence the risk as probability times consequence is smaller. The risk cannot be reduced to zero, although that seems desirable in first instance, because the protection requires investments.

At this point society has to make an appraisal: *How much money wishes society to spend on decreasing the probability of a disaster with considerable consequences?* Here it comes to a very difficult consideration as the consequences not only exist of quantifiable material components but also to less quantifiable matters as loss of lives and for example cultural heritage.

After the 1953 flood storm in the Netherlands the appointed Delta committee has made a written assessment by balancing the investments of dike strengthening against the reduction of material risk, the probability times the consequences were at that time estimated on approximately 10 billion Euros for the province of Zuid Holland.

The result was that a probability of flooding of once per 125,000 years economically seen was the most optimal one.

The committee did not dare to take into account the loss of lives. The result of the consecutive political decision taking was that the sea dikes in the Netherlands had to be designed to withstand a storm with a recurrence time of 10,000 years.

It is essential that the Netherlands (and possibly also other countries in Europe) take notice of the experiences in New Orleans as we also live and work for the major part below the sea level. Since after 1953 a flood in the Netherlands has not reappeared the mentioning of living below the sea level seems to be a cliché and a vast part of people in our country has lost sight on the enormous consequences of a flood. The quantifiable damage in New Orleans encompasses hundreds of victims and hundreds of billion dollars of direct economical damage. Additional to that were the societal disruption (looting and shooting) and the indirect economical effects (for example the impact on tourism, increase of oil prices). Possibly also a major pollution of chemical installations has to be faced. The rupture of gas pipe lines and gas fires should be a warning for us.

Attention for the events in New Orleans is also of importance because the Netherlands water policy is considered to follow the USA direction, by researching the reduction of the consequences, for example by individual assurance and by improvement of evacuation and disaster abatement and making compartments in polders. It is clear that less consideration is given to reduction of the flood probability which in the past was the central goal of the policy.

The havoc in New Orleans illustrates clearly what the meaning is of a policy dedicated to the reduction of the consequences of a flood (less drowned people, material damage remains). That insight is necessary to make a choice for a new policy as described above that gives preference to minimising the probability.

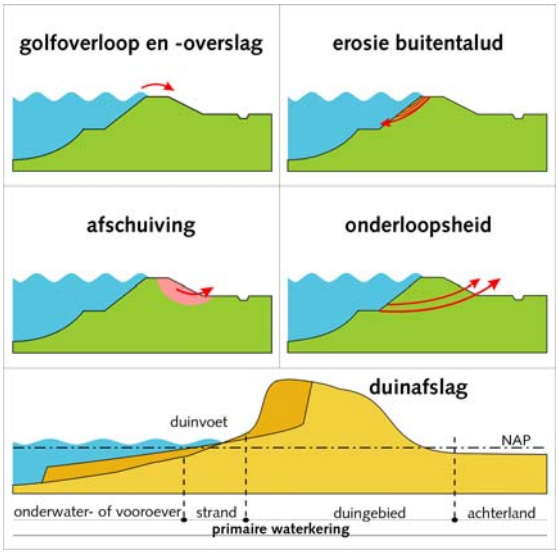
This debate is more than topical as the Ministry recently has published the results of the calculations of the real flood probabilities of 16 dike ring areas in the Netherlands. The probabilities appear to be much higher as the most of the non-insiders thought.

Area	Prob. per year	Damage in 10^6 €	Risk per year in 10^6 €
Zuid-Holland	1/2500	290	0,116
Noord-Holland	<1/500	58	0,116
Noordoostpolder	1/900	9	0,010
Betuwe	>1/100	18	0,180
De Maaskant	>1/100	18	0,180

The number of deaths to be feared

Area	Prob. per year	Deaths
Zuid-Holland	1/2500	30 - 6100
Noordoostpolder	1/900	5 - 1400
De Maaskant	>1/100	5 - 800

Variable	Distribution	Average	Standard deviation
T	Normal distribution	3000 m^3	100 m^3
P	Normal distribution	80 m^3/h	10 m^3/h
D	Normal distribution	2 days	Half a day



The publication of these results is a fine success for the probabilistic ones amongst us. The challenge is now to guide the public discussion about the level of acceptable risk and in which way that has to be realised.

FEATURES

A Reliability Problem

Theo Logtenberg
The Netherlands Society for Risk Analysis and Reliability (NVBR)

The Netherlands Society for Reliability and Risk Analysis issues a newsletter with all kind of information for our members. As the editors very often ask for contents material one of the members (mr. Pieter van Gelder) came up with a reliability problem. The editors took the decision to introduce the problem as a sort of contest to see how many of the members would come up with a correct answer. The response was a bit disappointing, and we questioned ourselves whether the ESRA-members would do better? Below is your challenge. The solution will be published in the next ESRA-newsletter, together with the names of the ones that gave the correct description and result to solve the problem.

Problem
In order to build a bridge over the river it is necessary to remove in total about 3,000 m^3 of clay soil with a dragline. The average production of the dragline is estimated on 80 m^3/h. The engineering company decides to hire a dragline for a period of 7 days (one work day is 8 hours). However, the excavation production of the dragline varies; hence it may be necessary that the duration of the excavation is more than 7 days.

An additional risk within the project is the possibility to hit a Second World War bomb that may be hidden somewhere under the soil's surface. The probability of hitting a bomb is estimated on 1 %, taking into account the total area of the project. Consequently, the delay would be a few days.

The following stochastic variables apply:

T: The total amount of excavated clay [m^3]
P: The production of the dragline [m^3/h]
D: The delay because of detection of the bomb [days]

with the distributions types and parameters:

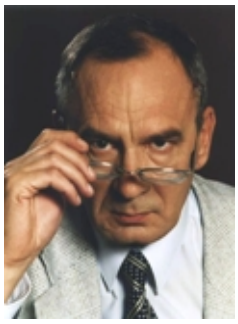
The engineering company would like to have an assessment of the probability that the excavation work is not completed within 7 days. So the following questions were asked:

- Determine the probability of not completing the project within seven days.
- Which variable is most influential on the uncertainty of the delay?

Mail your solution to: algemeen@nvrb.nl in order to obtain an honourably mention (provided the solution is correct) in the next ESRA-newsletter.

SAFETY AND RELIABILITY EVENTS

ESREL 2005 - An Excellent Safety and Reliability Event is Over



Krzysztof Kołowrocki

ESREL 2005 Conference Chairman

The 16th European Safety and Reliability Conference, ESREL 2005, was held in Tri-City (Gdynia-Sopot-Gdańsk), Poland, on June 27-30, 2005. ESREL 2005 was organised jointly by ESRA and PSRA, the Polish

Safety and Reliability Association (PSRA) with Gdynia Maritime University as the Local Organiser. The Programme of the Conference and the related Conference Proceedings sought to present the state of the art and the new trends in safety and reliability methods along with its various technical applications. The Conference was a great opportunity for all participants to exchange their practical experience and knowledge of safety and reliability issues and to discuss new trends in the field

The main Conference items were technical sessions, special technical sessions organised mainly by the members of the Technical Programme Committee (TPC) and by the ESRA Technical Committees, plenary lectures, tutorials, workshops, training courses, panels, meetings, exhibitions and social events.

The Conference International TPC has performed very carefully the evaluations of all contributions in two successive review stages. At the first stage abstracts have been selected and classified according to the following Conference Thematic Blocks and Areas of Applications:

Thematic Blocks

B1: Methods of Hazard and Risk Analysis
B2: Analytical Methods for System Safety and Reliability
B3: Monte Carlo Methods in System Safety and Reliability
B4: Bayesian Methods in System Safety and Reliability
B5: Dynamic Reliability
B6: Maintenance Modelling and Optimisation
B7: Reliability and Safety Data Collection and Analysis
B8: Structural Reliability and Safety
B9: Software Reliability and Security
B10: Reliability of Network Systems
B11: Uncertainty and Sensitivity Analysis
B12: Expert Methods in System Safety and Reliability
B13: Human and Organisational Factors in Safety and Reliability
B14: Safety and Reliability Management and Decision Making
B15: Decision Support Systems and Software Tools for Safety and Reliability
B16: Safety Standards and Regulations
B17: Safety and Reliability Education and Training
B18: Accident and Incident Investigation
B19: Occupational Safety
B20: Emergency Foreseeing and Planning
B21: Consequence Modelling
B22: Risk Perception and Communication
B23: Fault Identification and Diagnostics
B24: Integrated Safety and Reliability Concepts
B25: Information Systems for Safety and Reliability
B26: Other Safety and Reliability Topics

Areas of Applications

A1: Aeronautics and Aerospace
A2: Agriculture and Food Industry
A3: Chemical Process Industry
A4: Civil Engineering
A5: Coastal Engineering
A6: Construction Industry
A7: Electrical Engineering
A8: Electronic Industry
A9: Energy Production and Distribution
A10: Hydro-Technical Structures
A11: Information Technology and Telecommunication
A12: Insurance and Finance
A13: Manufacturing
A14: Mechanical Engineering
A15: Medicine and Health
A16: Motor-Car Industry
A17: Natural Hazards (Fire, Flood, Seismic, etc)
A18: Natural Resources and Environment
A19: Nuclear Engineering
A20: Offshore and Marine Engineering
A21: Surface Transportation
A22: Waste Management
A23: Waterborne Transportation
A24: Other Application Areas

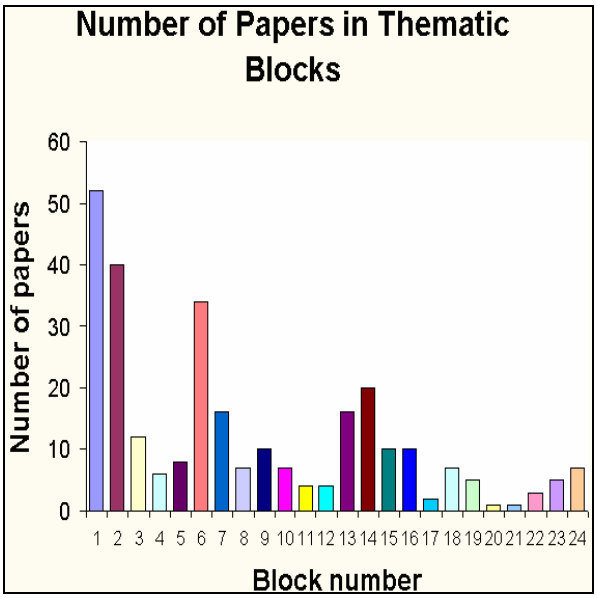


Figure 1. Number of Papers in Thematic Blocks

At the second stage the papers full texts have been evaluated, each one by at least two reviewers, who have helped the authors to improve their contributions. After these two stages 299 papers out of 392 contributions have been accepted by the Conference Technical Programme Committee for presentation during the Conference and for publication in the Conference Proceedings. Finally, 287 of the accepted papers have been included into the Proceedings "Advances in Safety and Reliability" (edited by K. Kolowrocki), A. A. BALKEMA PUBLISHERS, Volume 1-2, 2005).

The distribution of papers among Thematic Blocks is illustrated in Figure 1.

The distribution of paper authors' nationality is illustrated in Figure 2.

Slightly different from the above is the distribution of conference participants' nationality illustrated in

Figure 3. The conference was attended by 309 participants from 34 countries. Poland was represented by 67 participants. A lot of the Conference participants were young people what allow us to think optimistically about our future activity in safety and reliability field. This fact has inspired me and my colleagues from ESRA to initiate one-week Summer Safety and Reliability Seminars – SSARS organised annually in Jurata the most elegant resort placed at the Hel Peninsula in Poland.

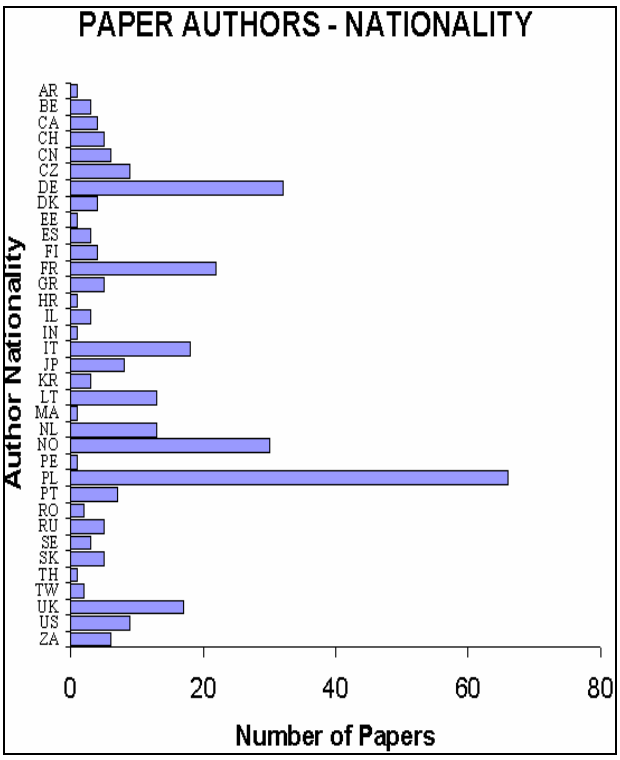


Figure 2. Author Nationality

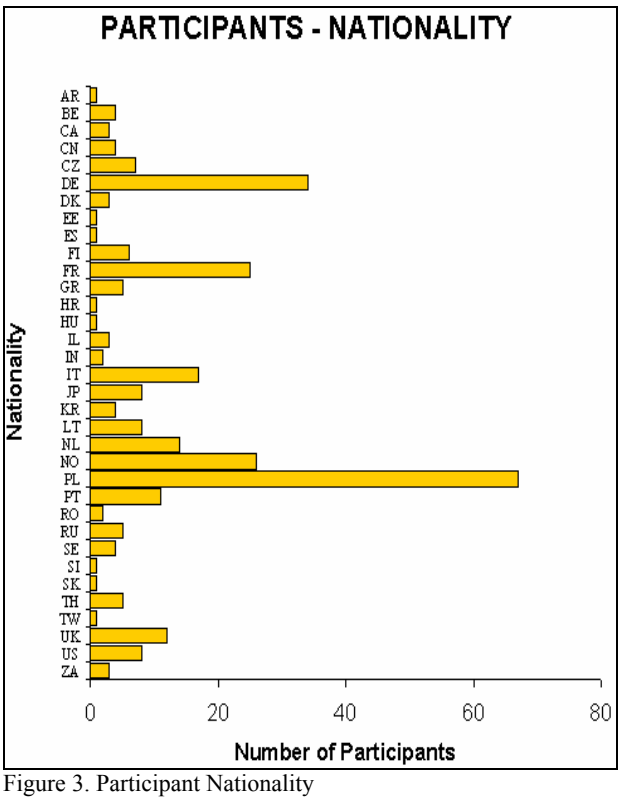


Figure 3. Participant Nationality

The structure of the Conference was filled in Plenary Lectures (*Everyday Morning*) - 4 Papers, Regular Sessions (*Everyday, 4 Parallel Streams*) - 211 Papers (+2 late papers), Poster Sessions (*2 days*) - 32 Papers, Special Sessions (*Everyday*, *7 Sessions*) - 40 Papers and 1 Workshops.

An excellent and important part of the Conference were Social Events that included Reception, Picnic, Sopot at/by Night Dinner, Conference Dinner, Farewell Party Lunches and Coffee/Tee Brakes. The Conference participants interested in visiting some famous places in and around the Tri City had the Tourist Agency Desk at the Conference area for their disposal.

The Associated Events, namely European Project SAFERELNET Meeting (*3 days*), RIMAP Project Conference and Workshop (*2 days),* Technology Platform on Industrial Safety – Launching Event (*1 day*) and several Exhibitions, were the Conference scientific and organisational complement.

This hard and an excellent work has been done jointly by the Authors, by the Conference Chairmen, by the Members of the Conference Programme Technical Committee and the Conference Organizing Committee. The members of these bodies have done a huge effort in making ESREL 2005 a very fruitful and successful European safety and reliability event in 2005.

It was an honour and a great pleasure to have the opportunity to co-operate with these excellent individuals and teams.

ESREL 2005 Website: http://esrel2005.am.gdynia.pl

In Memorium

Prof. Dr. Dumitru Cezar Ionescu

University "Politehnica" of Bucharest, Faculty of Power Engineering

The Reliability Laboratory "Professors Vasile Nitu and Cezar Ionescu" held an invited session on "Reliability, Maintenance and Risk" in Bucharest, October 20th, 21st, 2005.

Cezar Ionescu handled the organization of all these symposia for the last 15 years. He did not retire from that until declining health forced him to do so. He gave over two decades of superlative work to the reliability profession. He was a talented professor and an enjoyable counselor– you could depend upon him. It is not for any of these qualities that the Reliability

Laboratory is named in his honour. It is because he had all of them.

There was ample time for presentation of topical, realistic and modern issues in the field, as "*Semi-Markov Chains in Reliability: Modelling and Estimation", "Stationary Phase Merging Scheme in Reliability Problems", "Automated dependability analysis of complex systems with the KB3 workbench: the experience of EDF R&D", "Boolean logic Driven Markov Processes (BDMP): definition and application to the dependability assessment of electrical system via the KB3 workbench", and "Méthodes d'optimisation des stratégies de maintenance"*.

The invited lectures have been included in a CD-ROM published in memoriam. The contributed papers have been presented in the Conference Proceedings CIEM 2005.

We wish to thank again the supporting organizations EDF, UTC, UPB, MENER, and Faculty of Power Engineering and the participants. We are especially grateful to our invited lecturers: Marc Bouissou (EDF), Antoine Despujols (EDF), and Nikolaos Limnios(UTC).

The organizing committee,
Adrian Badea & Paul Ulmeanu
University "Politehnica" of Bucharest, Faculty of Power Engineering

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CALENDAR OF SAFETY AND RELIABILITY EVENTS

SEIF-CV - Safety and Security of Energy Infrastructures in a Comparative View

14th-16th November, 2005

Brussels, Belgium

Organised by:

- European Commission, European Commission, Directorate General Joint Research Centre, Institute for Energy
- Directorate General Joint Research Centre, Institute for Energy and Transport

Conference Website:
http://www.energyrisks.jrc.nl/

PSAM 8 - International Conference on Probabilistic Safety Assessment and Management

14th-19th May, 2006

New Orleans, Louisiana, USA

Conference Website:
http://www.psam8.org/index.html

OMAE 2006 – Safety and Reliability Symposium

4th-9th June, 2006

Hamburg, Germany

Hamburg is the host of OMAE-2006. Following on the tradition of excellence of previous OMAE conferences, OMAE-2006 will be held to advance the development and exchange of information regarding ocean, offshore and arctic engineering. It will be the ideal forum for researches, engineers, managers, technicians, and students, to discuss new and advanced technology developments and their applications in industry. It will also help promote international cooperation.

More than 400 technical papers are expected to be presented at the conference distributed in various symposia, one of which is:

- Safety and Reliability

Also, industry workshops, special sessions and keynote lectures will be included in the technical program. National and international companies are expected to sponsor and participate in the conference.

Conference Website:
http://www.ooae.org/omae/omae2006/omae2006.htm

Third International ASRANet Colloquium Integrating Structural Analysis, Risk and Reliability

10th-12nd July, 2006

Glasgow, UK

Following the success of the second ASRANet International Colloquium held in Barcelona, Spain in July 2004, which attracted around 70 delegates from 17 countries around the world, the Organising Committee now invites papers from researchers and practitioners in Structural Analysis, Risk and Reliability for the third Colloquium, to be held in Glasgow on 10-12 July 2006.

Conference Website:
http://www.asranet.com

ESREL 2006 – The European Safety and Reliability Conference

18th – 22nd September, 2006

Estoril, Portugal

The purpose of the conference is to present and discuss innovative as well as traditional methods and applications for improving the design and operation of products, processes, equipment and installations from a safety point of view, while taking into account also the realistic constraints on the available physical and economical resources. Consideration is also given to the societal factors influencing the use of risk assessment and risk management methods. Safety and Reliability Workshops will also be organized to provide additional forums for an open exchange of ideas.

Authors are encouraged to submit an abstracts directly to the ESREL 2006 Conference Secretariat or through the dedicated webpage. The abstract should be divided into three separate sections presenting context, innovative aspects and results of the proposed paper.

The abstracts will be accepted after a reviewing process performed by the members of the Conference Technical Program Committee. The template and an exemplary abstract are given at Conference Website.

Thematic Areas

- Methods of Hazard and Risk Analysis
- Monte Carlo Methods in System Safety and Reliability
- Analytical Methods for System Safety and Reliability
- Dynamic Reliability
- Maintenance Modelling and Optimisation
- Reliability and Safety Data Collection and Analysis
- Software Reliability and Security
- Uncertainty and Sensitivity Analysis
- Human and Organizational Factors in Safety and Reliability
- Decision Support Systems and Software Tools for Safety and Reliability
- Safety and Reliability Education and Training
- Accident and Incident Investigation
- Emergency Natural Risks Planning
- Fault Identification and Diagnostics
- Consequence Modelling
- Risk Perception and Communication
- Information Systems for Safety and Reliability

Industrial & Service Sectors

- Aeronautics and Aerospace
- Chemical Process Industry
- Civil Engineering
- Energy Production and Distribution
- Environmental Engineering
- Food Industry
- Health and Medicine
- Information Technology and Telecommunications
- Insurance and Finance
- Manufacturing
- Natural Hazards (seismic, fire, flood, etc)
- Nuclear Engineering
- Offshore Oil and Gas
- Security and Protection
- Surface Transportation (road and train)
- Waterborne Transportation
- Waste Management

Conference Website:
http://www.esrel2006.com/

4th International Probabilistic Symposium

12 -13th October, 2006

Berlin, Germany

The series of probabilistic conferences for safety and risk, which originally started in Dresden with the 1 Dresdner Probabilistik Symposium, continues th this year with the 4th Probabilistic Symposium on the 12 - 13 October 2006 in Berlin. The conference will take place at the BAM (Federal Institute for Material Research and Testing) in Berlin, Germany and will be organized by the BAM, the University of Natural Resources and Applied Life Sciences Vienna and the Maritime University of Szczecin, Poland.

Whereas the last conference in Vienna heavily focused on natural risks, this year the main topic will be uncertainty of material properties and material behavior. One day is scheduled for this topic.

In addition, on the second day the discussion of other topics of safety and risk, such as natural risks, technical risks and risk perception will be continued.

Organization:

Dr.-Ing. M. Mehdianpour
Federal Institute for Material
Research and Testing (BAM)
Unter den Eichen 87
12205 Berlin, Germany
milad.mehdianpour@bam.de

Dr.-Ing. D. Proske
University of Natural Resources and
Applied Life Sciences,
Institute of Mountain Risk
Peter Jordan-Strasse 82
1190 Wien, Austria
dirk.proske@boku.ac.at

ESRA INFORMATION

1 Membership

1.1 National Chapters

- French Chapter
- German Chapter
- Italian Chapter
- Polish Chapter
- Portuguese Chapter
- Spanish Chapter
- UK Chapter

1.2 Professional Associations

- The Safety and Reliability Society, UK
- The Danish Society of Risk Assessment, Denmark
- ESReDA
- French Institute for Mastering Risk, France (IMdR-SdF)
- ESRA Germany
- The Norwegian Risk and Reliability Association (ESRA Norway)
- SRE Scandinavia
- The Netherlands Society for Risk Analysis and Reliability (NVRB)
- Polish Safety & Reliability Association, Poland
- Asociación Española para la Calidad, Spain

1.3 Companies

- TAMROCK Voest Alpine, Austria
- ARC Seibersdorf Research GmbH, Austria
- VTT Industrial Systems, Finland
- Bureau Veritas, France
- INRS, France
- Total, France
- Commissariat á l'Energie Atomique, France
- GRS, Germany
- VEIKI Institute for Electric Power Research Co., Hungary
- Autostrade, S.p.A, Italy
- D'Appolonia, S.p.A, Italy
- IB Informatica, Italy
- TECSA, SpA, Italy
- SINTEF Industrial Management, Norway
- Adubos de Portugal, Portugal
- Central Mining Institute, Poland
- Transgás - Gás Natural, Portugal
- Companhia Portuguesa de Producção Electrica, Portugal
- Siemens SA Power, Portugal
- Caminhos de Ferro Portugueses, Portugal
- ESM Research Institute Safety & Human Factors, Spain
- IDEKO Technology Centre, Spain
- TNO Defence Research, The Netherlands
- HSE - Health & Safety Executive, UK
- Railway Safety, UK
- W.S. Atkins, UK

1.4 Educational and Research Institutions

- University of Innsbruck, Austria
- Université Libre de Bruxelles, Belgium
- University of Mining and Geology, Bulgaria
- Technical University of Ostrava, Czech Republic
- Technical University of Liberec, Czech Republic
- Tallin Technical University, Estonia
- École de Mines de Nantes, France
- Faculté de Polytechnique de Mons, France
- Henri Poincaré University, France
- ISI, France
- LAAS, France
- Université de Bordeaux, France
- Université de Technologie de Troyes, France
- Université de Marne-la-Vallée, France
- Technische Universität Muenchen, Germany
- Technische Universität Wuppertal, Germany
- National Centre for Scientific Research 'Demokritos', Greece
- DICMA, Italy
- Politecnico di Milano, Italy
- University of Rome "La Sapiensa", Italy
- Universita Degli Studi di Pavia, Italy
- Universita Degli Studi di Pisa, Italy
- Technical University of Delft, The Netherlands
- NTNU, Norway
- University of Stavanger, Norway
- Gdansk University, Poland
- Gdynia Maritime Academy, Poland
- Institute of Fundamental Technological Research, Poland
- Technical University of Wroclaw, Poland
- Instituto Superior Técnico, Portugal
- Universidade de Coimbra, Portugal
- Universidade Nova de Lisboa, Portugal
- Universidade de Minho, Portugal
- Universidade do Porto, Portugal
- University Politechnica of Bucharest, Romania
- University of Strathclyde, Scotland
- Institute of Construction and Architecture of the Slovak Academy of Sciences, Slovakia
- Institute "Jozef Stefan", Slovenia
- Universidad D. Carlos III de Madrid, Spain
- Universidad de Cantabria, Spain
- Universidad de Las Palmas de Gran Canaria, Spain
- Universidad Politecnica de Madrid, Spain
- Universidad Politecnica de Valencia, Spain
- Consejo Superior de Investigaciones Científicas, IMAFF, Spain
- Lulea University, Sweden
- City University London, UK
- Liverpool John Moores University, UK
- University of Bradford, UK
- University of Portsmouth, UK
- University of Salford, UK

1.5 Associate Members

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3 Management Board

The Management Board is composed of the ESRA Officers plus one member from each country, elected by the direct members that constitute the National Chapters.

3.1 Conference Standing Committee

Chairman: Krysztof Kolowrocki, Gdynia Maritime Academy, Poland
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This committee aims at establishing the general policy and format for the ESREL Conferences, building on the experience of past conferences, and to support the preparation of ongoing conferences. The members are one leading organiser in each of the ESREL Conferences.

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