European Safety and Reliability Association

Newsletter

http://www.esrahomepage.eu March 2019

Editorial

Marko Čepin
University of Ljubljana,
Faculty of Electrical Engineering
Slovenia

Dear ESRA Colleagues!

The year 2019 is the year of the ESREL 2019 in Hannover. The conference management team is fully busy. Michael Beer, Conference General Chair, Enrico Zio, Conference General Co-Chair, Edoardo Patelli, Technical Committee Chair, Stefan Bracke, Technical Committee Chair and Matteo Broggi, Local Organizing Committee Chair, are doing the best to conduct the organisation in an acceptable manner.

Spring is devoted to finalisation of the papers and when submitted, the reviewers are selected and they are kindly asked to review the papers on time. The quality of the papers and the quality of their review is essential for the quality of the conference.
Previous conferences including ESREL 2017 and ESREL 2018 have been successful and they are indexed in Scopus database. We count that the story will repeat with the ESREL 2019.

The discussions about further ESREL conference in the year 2020 have been realised with the International Association for Probabilistic Safety Assessment and Management (IAPSAM) and the conference preparation has started.

Another event is promoted by ESRA this year: International Workshop on Reliability and Safety Technologies, which is a part of the International Conference on Information and Digital Technologies 2019, June 25th - 27th, 2019, Zilina, Slovakia. Web page of the conference is the following. https://idt.conf.sk

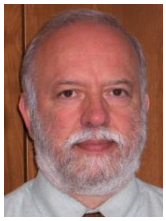
The deadline for the papers submittal is April 25, 2019.

The ESRA board has approved a new technical committee in the sector of Healthcare and Medical industry. The existing and future results in the risk analysis in surgeries and other healthcare services, and reliability analysis of medical equipment and treatment process will get some new visibility with the new technical committee. Yiliu Liu and Rasa Remenyte-Prescott are the persons in charge of the new technical committee. We wish them a good start.

We are open to the new ideas and if there is some interesting initiative, please do not hesitate to contact and of the board members of the society.

Chairman of ESRA
Marko Čepin

RESS News



Carlos Guedes Soares
Editor-in-Chief RESS
Instituto Superior Técnico,
Universidade de Lisboa

New Associate Editor

The increased acceptance of the Journal has reflected in an increased submission rate, which in turn increases the pressure on editors and reviewers to respond timely to the inflow of papers.

As a response to this situation, the number of Associate Editors have been increased with time, to the 3 current Associate Editors.

However, even with the increased number of Associate Editors the share of work is still high in this very demanding task. Therefore, it is not very surprising that after an initial period, some Associate Editors do not want to continue as the editorial work interferes with their academic duties.

This was the case with our colleague Mahesh Pandey, who terminated his initial mandate at the end of last year and did not want to renew his commitment to the Journal. Mahesh gave an important contribution to the Journal in the last few years, covering some specific subject areas, but he had to prioritize academic work, which required more of his time. I wish to express our thanks for his contribution and wish him all the best in the continuation of his academic career. We will continue relying in his continued support, now as member of the Editorial Board.

As new Associate Editor since the beginning of this year, I am happy to announce that we took onboard Marko Čepin, who I want to welcome, hoping that he adjusts well to the new tasks undertaken. Marko is an excellent addition to the team of Editors as he complements very well the technical areas of the other Editors.

Marko at the same time, as the present ESRA Chairman, will provide an even stronger connection of the Journal with ESRA, which is also most welcome.

PhD Degrees Completed

Condition-Based Maintenance Models: Application to Subsea Safety Systems

Yun Zhang
Supervisor: Prof. Anne Barros
Co-supervisor:
Prof. Antoine Rauzy
Norwegian University of Science and Technology, Norway

Subsea systems must be highly reliable for both environmental and economic reasons. Among available means to achieve improved reliability performance, maintenance is one of the solutions. However, maintenance cannot always compensate low availability. The risk and cost of maintenance including onshore testing, vessel costs, spare parts, personnel and production loss (due to planned shutdown), could be as prohibitively high as the production loss and risks induced by degradations and failures. Currently, there is increasing pressure on operators and maintenance managers to reduce unnecessary underwater inspections and perform cost-efficient preventive maintenance (PM) actions on subsea systems for its satisfying operational performance.

In order to find a balance between high reliability and low maintenance induced costs, maintenance activities need to be planned based on the condition of the subsea systems. To this end, quite a few issues need to be considered: for instance, the move from traditional failure-time data analysis to degradation modelling of each component; the integration at the system level of the results obtained for parts; the maintenance interventions modularized by design; the maintenance delay corresponding to the mobilization of vessel; spare parts and crew, and the computational complexity of calculating relevant key performance indicators etc.. If such problem is well mastered for calendar- or time-based maintenance policies, it gets much harder for condition-based maintenance (CBM) policies.

To solve these key issues, we design models to assess and optimize the condition-based maintenance policies for some typical subsea safety systems in the arising context of digitalization.

Optimization mainly concerns the operation phase (e.g. the number and the frequency of maintenance operations, the maintenance decisions made during these operations given health indicators at hand).

The core research activity evolves two aspects of works: degradation modelling and maintenance models with delay. They are elaborated at two levels: single-unit and multi-unit systems. The modelling formalisms and assessment of model performance involve joint use of i) stochastic process as a basis for degradation modelling for unit, ii) state transition model as a candidate for top-down modelling approach, and iii) high level language AltaRica 3.0 as a candidate for bottom-up approach for system modelling, calculation and decision making. Three cases are elaborated to show the potentials of each of the proposed modelling methodologies and their added value for condition-based maintenance in a subsea context.

Case 1 is dedicated to CBM modelling for single-unit systems (Figure 1).

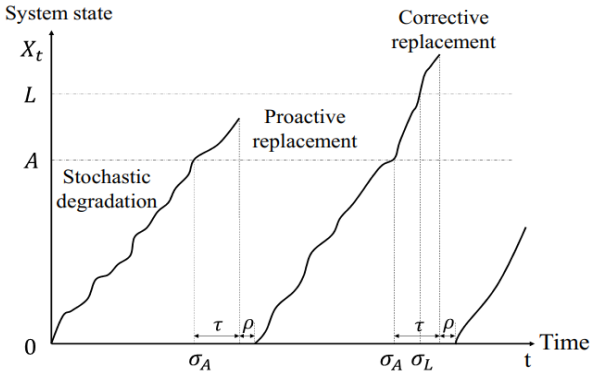


Figure 1 Sketch of degradation model and maintenance policy with stochastic process.

It explores the use of stochastic Gamma process to model the monotonic increments of deterioration of a unit over time. This provides basis for developing CBM model of delayed maintenance for a continuous monitored choke valve subject to gradual and stochastic degradation. To prevent failures and shorten the downtime, an alarm level is settled in addition to the failure level on the system degradation for triggering preventive maintenance plan and operation. Analytical formulations are developed to find the alarm level that minimizes the average unavailability. Numerical examples are given to illustrate the analytical results and simulations. We show for the use case of an oil and gas choke valve the interest of using intermediate condition to reduce uncertainty of failure time prediction, and the importance of proactive actions and their impacts on the average unavailability.

Case 2 is committed to CBM modelling for multi-unit systems with a "top-down" approach (Figure 2).

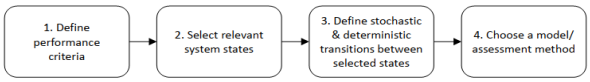


Figure 2 Steps of the top-down approach with piecewise deterministic Markov process.

This modelling approach saves effort at the beginning of the design by limiting the discrete states and transitions which we are interested in for specific performance assessment. An advanced Markov Process – Piecewise Deterministic Markov Process (PDMP) is introduced to develop CBM models based on graphs. PDMP is made of a set of differential equations (deterministic part) whose solution can experience random jumps (effect of stochastic events). It provides framework of modelling which is large enough for CBM in multi-unit subsea systems. We present both a numerical scheme of the model and computation of performance indicators through Monte Carlo simulation. Interesting results are presented in applying the approach to a control system structure, and some alternative maintenance policies can be employed.

Case 3 is used to show CBM modelling for multi-unit systems with a "bottom-up" approach (Figure 3).

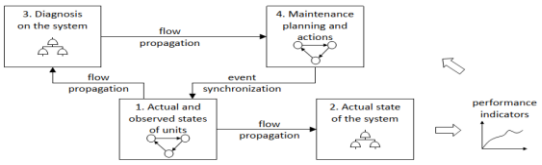


Figure 3 Architecture of the bottom-up approach with AltaRica 3.0.

This modelling approach starts from describing all the units' states and compute automatically overall states at system level. We pick up those states we are interested in to assess the system performance. A formal modelling language AltaRica 3.0 is chosen to design a model, from which different inspection, maintenance and other operational policies can be assessed on multi-unit systems. It focuses on definition and reuse of generic classes, which contain both the local variables (for describing states and transitions) and global variables (for propagating information and flows in the network of components). The assessment of such models is concerned with discrete event simulation of the formal modelling language that we choose (i.e. AltaRica 3.0). Maintenance optimization can be taken for both parametric (challenging input parameters of the model) and non-parametric (challenging maintenance or operation decision structure of the model). This approach is demonstrated through application to a High Integrated Pressure Protection System (HIPPS).

In summary, this work provides practitioners and researchers with a broader picture of some candidate formalisms (Gamma process, PDMP, AltaRica 3.0) and their procedures to model deterioration according

to the kind of systems to be handled. It also paves the way to the assessment of operational performance, and in particular of condition-based maintenance strategies, of subsea multi-unit safety systems. The originality of this work is an investigation into an area where little other researches have been performed. It provides systematic processes which have been adopted to explore the modelling increasing in complexity and establishing top-down and bottom-up approaches. The focus is put on systems with typical features used in industry and it has practical insights on the benefits of CBM.

This study arises some questions that may be studied for further research in several directions: 1) degradation modelling with alternative distributions, additional intermediate states, 2) monitoring efficiency considering abnormal readings and destructive inspection 3) model validation using other assessment tools and 4) algorithms and heuristics for maintenance and inspection optimization.

Coping with Uncertainty Linking Uncertainty-Based Risk perspectives and High Reliability Theory, with Implications for Risk Assessment and Management

Jahon Khorsandi
University of Stavanger, Norway

Jahon Khorsandi recently defended his PhD thesis at the University of Stavanger, Norway. His thesis aims to contribute to the further development of the foundations for understanding, assessing, and managing risk.

The research explores the foundations of contemporary views on risk, and their implications for risk assessment and management. More specifically, it addresses the need for, and challenges related to eliciting and transparently characterizing uncertainties in the assessment and management of risk. Insights from the engineering and risk analysis disciplines are integrated with insights from organization theory, namely research on high reliability organizations (HROs) to better understand the various underlying dynamics of uncertainties and ways to address their unique risk assessment and management challenges. The thesis consists of a total of five papers that address these themes, with their contributions briefly summarized below:

The first paper evaluates current risk assessment methodologies and practices, through the lens of the uncertainty-based risk perspectives. Triggered by inquiries into the Deepwater Horizon (Macondo) disaster, it focuses on the Norwegian offshore oil and gas industry's current risk assessment practices as a case study. The discussions are carried out against the backdrop of the Petroleum Safety Authority of Norway's (2016) recently adopted uncertainty-based definition of risk and its implications, which emphasizes the importance of seeing beyond estimated probabilities and providing a deeper understanding of the uncertainties involved in the assessments. Key topics addressed are the requirements for and use of quantitative risk assessments (QRAs), risk acceptance criteria and the ALARP principle, and the treatment of uncertainties related to the risk assessments.

The second paper turns to studies on High Reliability Organizations (HROs) to examine the theoretical foundations of the contemporary risk perspectives. The paper compares traditional views on risk conceptualized through probability, with broader uncertainty based views on risk focused on the characterization of uncertainties, and where attempts to understand risk are focused on understanding the uncertainties, which include but are not limited to probability estimates. By identifying links between the implications of the contemporary views on risk with the operational mindset of HROs, the paper concludes by suggesting that the uncertainty based risk perspectives are in line with, and thus better suited for developing a high reliability mindset for managing risk.

The third and fourth papers focus on developing and applying methods for the treatment of uncertainties in risk assessments, in line with the contemporary risk perspectives.

Building on the findings of the first paper, the third paper examines whether the concept of stress testing, suitably implemented, can be a useful tool to enhance the safety level of petroleum activities. Following recent catastrophic events in the financial and nuclear industries, stress testing was applied to examine the robustness of an organization's risk management practices in the event of an extreme adverse scenario, and whether their practices comply with the highest safety standards. Drawing on the experiences of those industries, the paper examines some of the challenges and limitations of stress testing, and discusses some of the potential benefits, and how these tests could be related to existing risk assessment and management practices in the oil and gas industry.

The fourth paper presents an approach for the systematic treatment of assumptions involved in quantitative risk assessments (QRAs), with the aim of providing a stronger basis for risk-informed decision-making. The approach explicitly considers the risk related to deviations from assumptions underlying the risk assessments. The approach begins with identifying the safety objectives for which the QRA aims to support, and then identifies critical assumptions based on the magnitude of deviations required in those assumptions to violate the safety objectives, the

uncertainties related to the occurrence of such deviations, and an analysis of the knowledge-basis supporting the assessments.

Lastly, the firth paper returns to the concept of HROs to understand the implications of HRO theory for managing the risk of extreme adverse surprises, so called black swan events. Using a knowledge-based categorization of surprising (extreme) events, the paper explores the various dynamics of uncertainties and situations impacting the potential for surprises to occur, and reflects on the unique risk assessment and management challenges associated with each type. Notable strategies that have been credited to the success of 'High Reliability Organizations' (HROs) in managing complex and hazardous technologies are then examined, and lessons from HRO theory and practice are linked to the domains of each event type. The aim is to develop a framework for better understanding ways in which systems can be exposed to surprises, including important issues for consideration in the presence of potentially significant uncertainty, and the implications of HRO theory for addressing these challenges.

Wavelet and Instance-based methods for Non-Stationary Time Series Analysis

Francesco Cannarile
Supervisors: Prof. Piero Baraldi and Prof. Enrico Zio
Politecnico di Milano, Italy

In the Industry 4.0 era, an increasing quantity of time series data is collected from various real-world applications including, for example, healthcare, finance, weather forecasting, astronomy, manufacturing, reliability engineering. The motivation behind the present Ph.D. thesis work is Prognostics and Health Management (PHM) which is an interdisciplinary field of research and application aiming at detecting the degradation onset of industrial equipment, diagnosing its faults, predicting its Remaining Useful Life (RUL) and proactively managing its maintenance to improve system safety, availability and reliability. PHM requires monitoring a large number of equipment parameters to evaluate the health state of the equipment. The monitored parameters of practical interest are typically non-nonstationary time series, i.e., their statistical and frequency characteristics change with time. This is due to the fact that the monitored parameters are influenced by the environment in which the equipment operates, which is typically evolving as time passes, and by the equipment degradation which is an irreversible process which typically causes monotonic trends on the parameters. Another difficulty of PHM is that the information on the true equipment degradation level is not available in many applications due to the cost of its estimation. As consequence, the available data are incomplete, right-censored time series. These issues in PHM have motivated the development of time series analysis methods with following research objectives: *I*) development of an anomaly detection method for non-stationary time series; *II*) development of a classification scheme for non-stationary curves and *III*) development of a similarity-based regression method for time series prediction in presence of incomplete data. From a PHM perspective the three research objectives correspond to fault detection, fault diagnostics and fault prognostics, respectively. To achieve these objectives, we have considered wavelet and instance-based (also known as similarity-based) methods.

With respect to research objective *I*), we have developed a novel method for sensor data validation based on the analysis of data regularity properties through the joint use of Continuous Wavelet Transform (CWT) and image analysis. Anomaly detection is performed by comparing the similarity between the CWT scalogram obtained from the test signal with those obtained from historical data in nominal condition with a fixed threshold. The developed method has been successfully applied to temperature signals from a reactor coolant pump. Differently from the typical sensor data validation methods which detect sensor malfunctions by observing variations in the relationships among measurements provided by different sensors, the proposed solution can be systematically applied to a fleet of plants, without requiring sensor grouping.

With respect to research objective *II*), we have developed a novel Functional Data (FD) based Empirical Classification System (ECS) for diagnosing the degradation level of industrial equipment. The developed ECS combines wavelet smoothing, elastic registration and Least Absolute Shrinkage Selector Operator (LASSO) and multinomial logistic regression. The proposed method has been successfully applied to case studies concerning solenoid valves mounted on train braking system and knives used in the packaging industry. The proposed solution which, at the best of our knowledge, is a novel approach in fault diagnostics, is shown to allow improving the classification performance with respect to traditional approaches of the PHM field.

Finally, with respect to research objective *III*), we have developed a novel direct RUL algorithm capable of exploiting the information provided by incomplete, right-censored degradation trajectories for effective RUL prediction and quantification of its uncertainty. The novel developed method combines similarity measure with Dempster-Shafer evidence theory. Its application to two case studies concerning turbofan engines and cutting tools used in the manufacturing,

has shown that it provides more accurate RUL predictions in comparison with a similarity-based regression method of literature. Furthermore, the proposed method allows properly quantifying RUL predictions uncertainty.
The obtained results show that the developed time series methods can be effective in PHM industrial applications and can support the development of condition-based and predictive maintenance strategies.
This research work has been developed as an Executive Ph.D. programme between the LASAR- Laboratory of Signal And Risk analysis, Politecnico di Milano, Energy Department (www.lasar.polimi.it) and ARAMIS- Advanced Reliability Availability & Maintenance for Industries and Services S.r.l (www.aramis3d.com) .

Contributions to component unavailability and human reliability modelling for risk informed nuclear power plant safety improvement

Pablo Martorell Aigües
Supervisors: Ana Isabel Sánchez Galdón and Sebastián Salvador Martorell Alsina
Polytechnic University of Valencia, Spain

"Safety always has been and always will be a priority in nuclear power plant operation to generate electricity. One of the major challenges of nuclear industry is the ageing of safety-related structures, systems and components (SSC). Presently, this fact gains relevance due to several reactors are reaching their design life, having to conduct a Periodic Safety Review (PSR) that assures safety operation for an additional period better-known as Long Term Operation (LTO) Probabilistic Safety Assessment (PSA) is an essential tool in an integral NPP safety management, both PSR framework and Risk Informed Decision Making (RIDM), being able to evaluate a risk increase or decrease for any specific change on the plant. However, current PSA models and data do not consider factors, which have an impact in the overall risk of the plant. On the one hand, they do not take into account the effect of ageing nor maintenance and testing program, in the case of reliability and unavailability modelling. On the other hand, human actions modelling and their asso-ciated error probabilities are characterized by its inaccuracy and uncertainty. This Ph. Dissertation aims to update and improve PSA models, in order to apply with-in the framework of PSR and RIDM. In this sense, two main objectives are estab-lished. Firstly, the development of a time dependent RAM (reliability, availability and maintainability) for safety-related components, fitted with a historical plant data and with enough level of detail to include the effects of testing and maintenance activities in the age of the component. Secondly, it shows PSA applications of new models in RIDM. In the first place, it defines an age-dependent risk model based on the RAM model previously formulated, which helps to select the best approach of maintenance and testing activities for a specific timeline. In the second place, to improve PSA modelling and human error probabilities (HEP) quantification, a methodology is pro-posed to evaluate the risk impact of human actions and TS changes, taking advantage of combining DSA and PSA insights.
The work of this thesis is part of the research supported by the Ministry of Economy and Business in the project ENE2016-80401-R, “Risk Informed Harmonization of Surveillance Requirements and Maintenance in Nuclear Power Plants”, and in the Doctoral Fellowship BES-2014-067602."

Past Reliability and Safety Events

Seminar series on system reliability, risk and resilience
Winter Seminar
19 December 2018
Politecnico di Milano, Italy
Author: Francesco di Maio

On 19th December 2018, at Politecnico di Milano the winter edition of the Seminar series on system reliability, risk and resilience was held. The event (supported by IEEE Reliability Society, the European Safety and Reliability Association (ESRA), Center for Reliability and Safety of Critical Infrastructures (CRESCI, China), Politecnico di Milano (Italy), and ARAMIS Srl) consisted in a lecture hold by Prof. Enrico Zio (Politecnico di Milano – Energy Department, MINES ParisTech / PSL Université Paris, Centre de Recherche sur les Risques et les Crises (CRC), Kyung Hee University - Department of Nuclear Engineering, Eminent Scholar). In the lecture, has been exploring the future of risk assessment, claiming that it must evolve for addressing the existing and future

challenges, and considering the new systems and innovations that have already arrived in our lives and that are coming ahead. Indeed, the rapid changes and innovations that the world that we live in is experiencing pose new challenges to the field of risk assessment. Digitalization brings opportunities but with it comes also the complexity of cyber-physical systems. Climate change and extreme natural events are increasingly threatening our infrastructures; terrorist and malevolent threats are posing severe concerns for the security of our systems and lives. These sources of hazard are extremely uncertain and, thus, difficult to describe and model quantitatively.

In the seminar, Prof. Zio has been presenting some research and development directions that are emerging, particularly thanks to the ever increasing computational capabilities and data availability. These include the use of simulation for accident scenario identification and exploration, the extension of risk assessment into the framework of resilience and business continuity, the reliance on data for dynamic and condition monitoring-based risk assessment, the safety and security assessment of cyber-physical systems.

The success of the seminar has encouraged planning a "Summer Edition" of the Seminar series on system reliability, risk and resilience, to be held in June 2019 in Politecnico di Milano (Italy).

Calendar of Reliability and Safety Events

38th International Conference on Ocean, Offshore and Arctic Engineering (OMAE2019)
Symposium on Structures, Safety and Reliability

Glasgow, Scotland
9-14 June 2019

OMAE 2019 is the ideal forum for researchers, engineers, managers, technicians and students from the scientific and industrial communities from around the world to meet and present advances in technology and its scientific support, exchange ideas and experiences while promoting technological progress and its application in industry, and promote international cooperation in ocean, offshore and arctic engineering.

Following the tradition of excellence of previous OMAE conferences, more than 900 technical papers are planned for presentation. The OMAE Congress in organised in about 12 Symposia each dealing with specific topics. The Structures, Safety and Reliability Symposium, as the name suggests, deals with offshore structures safety and reliability, having typically between 100-150 papers. Typical sessions include Probabilistic and Spectral Wave Models, Probabilistic Response Modelling, Reliability of Marine Structures, Fatigue Reliability, Reliability of Mooring and Risers, Reliability Renewable Energy Devices, Risk based Maintenance planning and Risk Analysis & Safety Management.

Conference Chairs:
Professor Atilla Incecik University of Strathclyde, UK
Technical Program Chair
Professor Krish Thiagarajan Sharman , University of Massachusetts Amherst (USA)

Safety and Reliability Symposium Coordinator
Professor Carlos Guedes Soares

Contacts
Specific questions can be addressed to the **Safety and Reliability Symposium Coordinator** at:
c.guedes.soares@centec.tecnico.ulisboa.pt
Conference Website: https://event.asme.org/OMAE

The International Conference on Information and Digital Technologies 2019 (IDT 2019)

25 – 27 June 2019
Zilina, Slovakia

The International Conference IDT'2019 is the annual event. The aim of the Conference is to bring together researches, developers, teachers from academy as well as industry working in all areas of digital technologies. Especially young researchers and postgraduate PhD students are greatly welcome to participate in this event. Beside the scientific field, several cultural and social events are planned for the enjoyment of the Conference attendees. Each paper will be evaluated for acceptance by at least two peer reviewers. Furthermore, paid registration to the Conference is mandatory for paper acceptance (one registration per paper). The conference proceeding will be indexed in IEEEXplore, Scopus and Web of Science.

The conference is organized in cooperation with European Safety and Reliability Association and the IEEE Czechoslovakia Section Reliability Society Chapter.

Special events
- Int. Workshop on Reliability and Safety Technologies
- Int. Workshop on Biomedical Technologies
- Int. Workshop on New Frontier Information Digital Technology
- Int. Workshop on Computer-aided Modeling: Theory and ApplicationsTopics

Topics
The conference makes is focused on a wide range of applications of computer systems according topics of special events.

Keynote Presentation
- *Reliability of Smart Grids*, Marko Čepin, University of Ljubljana, Slovenia
- *Digital re-engineering for safety management*, Coen van Gulijk, University of Huddersfield, United Kingdom
- *Opportunities and Challenges of the Reliability of AI Systems*, Min Xie, City University of Hong Kong, Hong Kong

Important dates:
Full paper submission: 23 April, 2019
Paper acceptance notification: 13 May, 2019
Camera-ready papers: 31 May, 2019
Final program: 10 June, 2019
Conference website: http://idt.conf.sk

17th International Probabilistic Workshop
11 - 13 September 2019
Edinburgh, United Kingdom

The conference is intended for mechanical, civil and structural engineers and other professionals concerned with components, structures, systems or facilities that require the assessment of safety, risk and reliability. Participants could therefore be consultants, contractors, suppliers, owners, operators, insurance experts, authorities and those involved in research and teaching.
Key topics:
Safety, Risk, Probabilistic Modelling and Computation, Reliability, Structural Safety, Risk Analysis, Natural Hazards, Uncertainties.
Organisation:
Chair: Assoc. Prof. Dr. Daniil Yurchenko
IMPEE, Heriot-Watt University, Edinburgh, United Kingdom
Organizing Committee
- Prof. D. Val.
EGIS, Heriot-Watt University, Edinburgh, United Kingdom
- Prof. V. Demyanov.
EGIS, Heriot-Watt University, Edinburgh, United Kingdom
- Prof. D. Flynn,
ISSS, Heriot-Watt University, Edinburgh, United Kingdom
- Dr. Gordon Thomson.
IMPEE, Heriot-Watt University, Edinburgh, United Kingdom
Dr.-Ing. Dirk Proske
University of Natural Resources & Applied Life Sciences, Vienna, Austria
Bern University of Applied Sciences, Burgdorf, Switzerland

Conference Secretary
Dr. Gordon Thomson
IMPEE, Heriot-Watt University, Edinburgh, United Kingdom
E-mail: grt2@hw.ac.uk

Conference Language: English
Deadlines:
Submission of abstract: February 15 2019,
Notification of acceptance of abstract: February 28 2019,
Submission of full paper: April 19 2019,
Notification of acceptance and mandatory changes: May 17 2019
Submission of final manuscript: May 31 2019 (no extensions possible)
Deadline for presenting author registration: June 21 2019

Further information:
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Save the Date for ESREL 2019 – 29th European Safety and Reliability Conference
22 - 26 September 2019
Leibniz Universität Hannover, Hannover, Germany

The annual European Safety and Reliability Conference (ESREL) is an international conference under the auspices of the European Safety and Reliability Association (ESRA). The 29th edition of the conference will be held on 22 - 26 September 2019 at the iconic Welfenschloss, the heart of the Leibniz Universität Hannover. The objective of ESREL 2019 is

to provide an all-round inspiring environment and a multi-disciplinary forum for the exchange of knowledge and expertise on theories and methods in the field of risk, safety and reliability, and on their application to a wide range of industrial, civil and social sectors and problem areas. The interplay among technological, societal and financial aspects is attentively considered in addressing the demands and challenges that evolve from today's rapidly changing world and its digitalization. While the occurring changes enable innovative developments, such as smart cities and systems or autonomous transportation, they also introduce newly arising, yet potentially unknown, hazards and risks, e.g. related to and challenging cybersecurity, data security, big data, complexity and interdependencies of systems, cascading failures across systems and sectors, resilience of infrastructures, and more. Clearly, there is a strong need for evolution and advancement of the field of reliability, risk and safety to cope with these challenges for arriving at taking the right decisions in the design and operation of technological and industrial systems. We, the organizers, are very much looking forward to a vivid exchange of ideas and visions in this context, with a broad thematic coverage. Papers presented at ESREL 2019 will be published in open access conference proceedings by Research Publishing Services, Singapore, and be indexed.

Organisers:

Conference General Chair:
Prof. Michael Beer - Leibniz Universität Hannover, Germany.

Conference General Co-Chair:
Prof. Enrico Zio - Politecnico di Milano, Italy

Important dates
Abstract Submission: The Abstract submission system will open shortly after the ESREL 2018 conference in Trondheim
Abstract deadline: October 31, 2018

Conference Website: https://esrel2019.org/#/

7th International Conference on Risk Analysis and Crisis Response (RACR, 2019)

15-19 October, 2019
Athens, Greece

We are pleased to announce and invite you to participate in the 7th International Conference on Risk Analysis and Crisis Response (RACR,2019).

RACR, launched by the Risk Analysis Council of China Association for Disaster Prevention in 2007 and taken over by SRA-China since 2011, is a series of biennial international conferences on risk analysis, crisis response, and disaster prevention for specialists and stakeholders.
In the Internet age, more and more data can support a large number of models for risk analysis. The simple, transparent, and reliable risk models are been favored by researchers. The assessment of integrated risks in complex systems is towards practical use. Risk analysis based on data is winning subjective judgment. Meanwhile, the world is increasingly turbulent. The black-swan events occur more frequently, and a crisis of undercoordination, such as the debt crisis of 2008, might suddenly erupt. Crisis response beyond knowledge is increasingly testing people's intelligence.
RACR provides a unique international forum to discuss these issues from a scientific and technical point of view and also in terms of management, services or usages.RACR provides a unique international forum to discuss these issues from a scientific and technical point of view and also in terms of management, services or usages.

Theme: Risk Analysis Based on Data and Crisis Response Beyond Knowledge

Conference Topics
1. Applying Risk Science based on data
2. Stakeholder engagement to manage risks
3. Risk analysis related to black-swan events
4. Responding to a crisis of undercoordination
5. Reliability and safety in industrial systems
6. Modern trends in crisis management
7. Internet of Intelligences and risk radar
8. Nanotechnology safety
9. Safety in transport domain
10. Progress in occupational health and safety
11. Natural Hazards inducing tech. accidents (NATECHs)
12. Human Factors in the industrial environment
13. Life-cycle analysis of units
14. Legal aspects in Major Accidents Prevention
15. Disaster risks in line with "Belt and Road"
16. Risk analysis in project investment and finance
17. Risk analysis related to black-swan events
18. Terrorist attack and crisis response

Important Deadlines
Special Session Proposal : December 1, 2018
Abstract Submission: February 1, 2019
Full Paper Submission : April 1, 2019
Final Paper Due: May 15, 2019
We invite proposals for workshops and special topics in conjunction with RARC. Proposals for consideration must be sent to racr2019@ipta.demokritos.gr prior to December 1,2018.

Conference Venue: National Center for Scientific Research "Demokritos"

Conference
Website:https://mssg.ipta.demokritos.gr/racr2019/#

Contact Information: racr2019@ipta.demokritos.gr

ESRA Information

1. ESRA 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
- Danish Society of Risk Assessment, Denmark
- SRE Scandinavia Reliability Engineers, Denmark
- ESReDA, France
- French Institute for Mastering Risk (IMdR-SdF), France
- VDI-Verein Deutscher Ingenieure (ESRA Germany), Germany
- The Netherlands Society for Risk Analysis and Reliability (NVRB), The Netherlands
- Polish Safety & Reliability Association, Poland
- Asociación Española para la Calidad, Spain

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- TAMROCK Voest Alpine, Austria
- IDA Kobenhavn, Denmark
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- DNV, France
- Eurocopter Deutschland GMbH, Germany
- GRS, Germany
- SICURO, Greece
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- Autostrade, S.p.A, Italy
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- IB Informatica, Italy
- RINA, Italy
- TECSA, SpA, Italy
- TNO Defence Research, The Netherlands
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- SINTEF Industrial Management, Norway
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- TECNUN, Spain
- TEKNIKER, Spain
- CSIC, Spain
- HSE - Health & Safety Executive, UK
- Atkins Rails, UK
- W.S. Atkins, UK
- Railway Safety, UK
- Vega Systems, UK

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- University of Innsbruck, Austria
- University of Natural Resources & Applied Life Sciences, Austria
- AIT Austrian Institute of Techn. GmbH, Austria
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- University of Mining and Geology, Bulgaria
- Czech Technical Univ. in Prague, Czech Republic
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- Tallin Technical University, Estonia
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- Institute of Fundamental Techn. Research, Poland
- Technical University of Wroclaw, Poland
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ESRA is a non-profit international organization for the advance and application of safety and reliability technology in all areas of human endeavour. It is an "umbrella" organization with a membership consisting of national societies, industrial organizations and higher education institutions. The common interest is safety and reliability.
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