Editorial

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Dear ESRA Colleagues!
The year 2018 has started well for ESRA and it is going to finish as well.

We have conducted a couple of webinars, which were well attended and they contributed notably to the dissemination of knowledge in the fields related to the safety and reliability.

The management meeting of ESRA technical committee chairs took place, where we agreed to be as active as possible within the technical committees. We started with two new technical committees, which filled the gaps in the fields of the innovative computing and the safety culture.

The new president, the new vice president and the new treasurer were elected at the yearly assembly of the association and we started our new positions after the four years of service of the previous board members.

The international conference ESREL 2018 was organised in Trondheim in Norway in June 17-21, 2018. The conference went on smoothly and was very well attended This has been proven by more than 400 happy participants at the Norwegian University of Science and Technology, who were presenting the

papers and communicating fruitfully with the other participants.

The preparation of the ESREL 2019 conference went on in parallel by the devoted team from Germany, because the 29th edition of the international conference will be held on September 22-26, 2019 at the iconic Welfenschloss, the heart of the Leibniz Universität Hannover. The initial activities by the conference participants have been required and a large number of abstracts have been submitted..

The discussions about further ESREL conference in the year 2020 have been realised with the International Association for Probabilistic Safety Assessment and Management (IAPSAM) to have again a common event as it happened successfully couple of times in the past.

The ESRA newsletter is issued three to four times per year and this is the last issue of this year. The information about new important projects is communicated. The short resumes of the new doctoral dissertations in the fields of safety and reliability are reported. The information about the conferences and other events important for the members of the association is communicated.

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.

For the new year 2019 we wish to the members of ESRA and the readers of the newsletter a happy and successful year.

Chairman of ESRA
Marko Čepin

PhD Degrees Completed

Development and application of a Human Reliability Analysis method for radiotherapy applications

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Radiotherapy treatment is a complex process that involves communication between multiple expertise and continuous interaction with human-machine interface systems, to ensure safe and efficient patient handling. These attributes present a risk of failure with the consequence that patient safety is compromised, and incidents or accidents may occur. Literature research of outcomes of retrospective analyses of incidents and accidents from global databases, literature, and reports, indicate humans to be dominant contributors in 82-97% incidents [1]. Recent safety guidelines point to the need of proactive risk assessment, building on and advancing beyond retrospective investigations. For this purpose, Failure Mode and Effects Analysis and Probabilistic Safety Assessment studies are conducted and have produced useful results; yet, when adopting these techniques, the systematic inclusion of possible human failures in the safety assessment is challenged by the lack of methods directly applicable to the specific radiotherapy domain. Indeed, as shown by literature research, Human Reliability Analysis (HRA) methods have been evaluated for their applicability to radiotherapy or healthcare in general to tackle and model human failures. Their application to these domains revealed that the existing methods do not address several human tasks specific to healthcare nor do they address the specificities of the radiotherapy context. Furthermore, the need to tailor HRA methods to specific domains is also supported by recent developments of HRA methods addressing domain-specific tasks and error producing conditions, e.g. railways, nuclear etc.

Therefore, the PhD thesis [2] develops the first HRA method for radiotherapy domain and applies the method to study failure sequences in the radiotherapy workflow of a specific therapy center, the Center for Proton Therapy at the Paul Scherrer Institute of Switzerland.

First, the thesis identifies and characterizes the taxonomies of factors influencing the radiotherapy personnel performance (performance influencing factors (PIF)) and tasks representative (Generic Task Types (GTTs)) of the radiotherapy domain that formed the building blocks of the HRA method [3]. A total of six GTT and nine PIFs with definitions are developed for the method. A generic methodology is proposed to systematically and traceably identify set of PIFs affecting a GTT. It includes direct use of a cognitive framework to progressively map GTTs to failure modes, failure causes, failure mechanisms and PIFs [4]. This provides a strong theoretical basis to the method. Then, the methodology is applied to the radiotherapy domain and develops GTT-PIF structures for the method. A total of eighteen GTT-PIF structures are developed for radiotherapy based on the proposed methodology. Further, these structures are validated against existing literature [3].

Building on the developed qualitative assessment, the thesis addresses the quantification approach for the developed HRA method. To this aim, the Decision Tree (DT) methodology is chosen as the quantification methodology to compute the influence of the identified PIFs on the failure probabilities of the GTT-failure mode. Eighteen DTs are developed (one for each GTT-failure mode- PIF structure), in which (a) each branch point is the PIF and (b) each DT path represents the Human Error Probabilities (HEPs) due to the influence of a PIF or of a combination of PIFs [6]. Once developed, the HEPs are estimated for paths of the DTs via a structured elicitation of judgment from domain experts. The experts assess the importance of specific human factors on the failure probability by means of a qualitative scale. Expert inputs are converted into statements about the order of magnitude of the probability values; these statements are then combined via an expert aggregation method, developed specifically for HRA. The thesis validates the elicitation results against relevant applicable HEPs from existing HRA methods [4]. The results showed a good consistency with 16 out of 22 matchings lying between ratio bands of 5 and 1/5, see Figure 1.
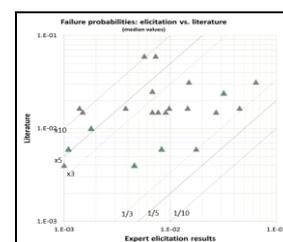

Figure 1: Elicitation results vs literature data

References:
[1]- World Health Organization. Radiotherapy risk profile. Technical manual World Health Organization, 2008.
[2]- Pandya D. Development and application of a Human Reliability Analysis method for radiotherapy applications. Dissertation no. 25467 ETH Zurich.
[3]- Pandya D et al. Developing the foundations of a cognition-based human reliability analysis model via mapping task types and performance-influencing factors: Application to radiotherapy. Proc IMechE Part O: J Risk and Reliability 2017; First published October 2: p. 1–35.
[4]- Pandya D et al. Quantification of a human reliability analysis method for radiotherapy applications based on expert judgment aggregation.
In review in Reliability engineering and system safety 2018, special issue.

Methods and approaches to apply for reliability and availability analyses in the early phase of novel subsea technologies

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Many industries, like the subsea oil and gas industry, relies on novel technologies and concepts to reduce costs and enhance safety. Reliability, availability and maintainability (RAM) analyses are essential for qualifying and maturing these novel technologies and concepts, to convince operators that they are fit for use in subsea operating environment.

Ideally, RAM analyses should be carried out as early as possible to provide valuable inputs to direct engineering efforts. At the same time, manufacturer report that the coordination between RAM analyses and other design discipline are is not always optimal. It is also difficult to select most suited methods to capture the main effects of *novelty* in the early design phase. In some cases, the novelty is to replace mechanical devices by programmed (software) functions, while in other cases the problem may relate to the application, for example that the access to the equipment is limited. Systems installed in a subsea environment must also consider the modularization of equipment, to ease and optimize installation and retrieval.

The interest from industry partners in a new research-based innovation center for Subsea Production and Processing (SUBPRO) (https://www.ntnu.edu/subpro) was therefore sufficient to initiate a PhD project in 2015, with the aim to investigate and develop new methods for RAM analyses aligned with the needs of early design phase. The research was carried out by PhD candidate Juntao Zhang and was completed in 2018, under the supervision of Professor Mary Ann Lundteigen and associate professor Yiliu Liu from the reliability, availability, maintainability, and safety (RAMS) research group at NTNU (https://www.ntnu.edu/mtp/research/rams. The PhD thesis was defended on December 13th 2018, and will be available on request after then.). The main deliverables from the project has been a new framework named RAM-SE for anchoring RAM analysis and its results in a subsea design process with systems engineering (SE) discipline.

The RAM-SE framework integrates models for decision-making from the two disciplines, to ensure that inputs and results of RAM analysis are well aligned with the subsea design process. In this respect, RAM analyses conform to SE analyses already made by design teams, thus the results are jointly evaluated in a subsea design process. The application has been demonstrated how RAM analysts appreciate the efforts by design teams and vice versa, through a design case (subsea fiscal flow metering system, a case study provided by Equinor).

In the development of the RAM-SE framework, it has become clear that many subsea systems rely on advanced and complex control strategies, which may result control-related failures that beyond the scope of traditional methods. The RAM-SE framework has therefore adapted Systems Theoretic Process Analysis (STPA) based on system theory and control theory is recognized as a promising candidate for identifying control-related failure scenarios [1]. Yet, STPA abandons the probability aspects, which in turn increases the difficulty in interpreting its results in an engineering design. In this respect, we propose an approach that depicts a standard procedure to convert failure scenarios into state automata, thus it can be complied into stochastic Petri-nets model. The application has been demonstrated for a new design case developed inside SUBPRO called subsea gate box (SGB). The SGB is a new concept aiming at optimizing the draining of oil wells by combining boosting and separation at higher pressures. It has concluded the proposed approach can sufficiently identify control-related failure of such novel subsea system, and assess their impacts on system production and maintenance management.

For novel subsea technologies where historic data is limited, the failure rate prediction is a crucial step to provide the trust-worthy RAM analysis. Many models for failure rate prediction have been proposed,

however, they are not well suited for subsea design in early design phase. In this respect, we propose a practical approach for failure rate prediction based on Bayesian Networks (BNs). The BNs model can allow an early and flexible inclusion of data that is important for failure rate prediction. More importantly, the BNs model can update predicted failure rate when new data is available as design proceeds. These features make BN-based failure rate prediction well suited for selecting monitoring needs in the early design phase as well as building confidence in the prediction along with the maturing of design concept.

There are many techniques for modelling and calculation of RAM performance. They are different in terms of easiness of construction, model readability, and expressive powers. The improper selection of modelling technique may give rise to the uncertainty of calculated results, thus the confidence of RAM analyses is largely discounted. In this respect, we propose a new guideline for RAM modelling, considering various modelling issues related to subsea design and operation, such as modular subsea structure, delayed or inserted maintenance and test, mobilization of vessels and the like. The proposed guideline can be seen as an extension to the existing guidance provided in an international and well-recognized standard ISO/TR 12489 [2].

All the proposals are complementary to the existing standards and practices that reach their limits in the early phase of new subsea design. The future improvements include testing all the proposals against industry-size design case, as well as integrate the proposals into adopted industry practices, e.g. the existing technology qualification program documented in DNV-RP-A203 [3].

References:

[1].Leveson, N., Engineering a Safer World: Systems Thinking Applied to Safety. 2011: MIT Press.

[2].ISO/TR 12489, Petroleum, petrochemical and natural gas industries -- Reliability modelling and calculation of safety systems. 2013, Geneva: International Electrotechnical Commission.

[3].DNV-RP-A203, Qualification of New Technology. 2011, Høvik, Norway: DNV.

PhD candidate Anders Jensen defends his thesis on risk analysis in complex systems

On August 17, 2018, Anders Jensen defended his PhD thesis entitled Contributions to Hazard/threat identification and analysis in complex systems. His research included a number of new and improved methods for hazard/threat identification and risk analysis for complex systems.

The thesis' main objective was to contribute to the science of risk analysis by generating new knowledge on how to address and meet risk in complex systems.

In particular, the thesis addresses the following research questions:

(a) How we can understand complexity in a risk setting

(b) How we can identify hazards and threats in complex systems and

(c) How we can assess risk for complex systems.

For research question (a) the nexus between complexity and risk is further explored. In particular, the thesis proposes a new definition of complexity explicitly referring to "activities", "consequences" and "knowledge" which are key components in general conceptualizations of risk. In this way, the thesis provides new insights into the nexus between risk and complexity.

For research question (b) the thesis further develops a number of methods for hazard/threat identification, including the Anticipatory failure determination approach (AFD). A central aspect of AFD is the use of TRIZ, a so-called creative method to guide and support the analyst inventing new hazards and threats. However, there are numerous other creative methods in the literature, for instance the Osborne Parnes problem-solving model. The thesis investigates and illustrates how to use other creative methods in addition to or instead of TRIZ.

For research question (c) the thesis argues that strong system understanding is essential. One approach for obtaining such system understanding is the functional resonance analysis method (FRAM), a method often used in resilience engineering. However, a number of authors have called for more explicit judgements and assessments of risk and uncertainties in FRAM. The thesis looks into this issue and proposes to extend FRAM to include qualitative risk and uncertainty judgements.

From the left: Professor Terje Aven, Professor Eirik Abrahamsen, Dr. Olga Fink, Anders Jensen, Dr. Giovanni Sansavini and Dr. Roger Flage

The work was carried out at the University of Stavanger under the guidance of supervisor Professor Terje Aven and co-supervisor Associate professor Roger Flage.

The dissertation committee consisted of first opponent Dr. Giovanni Sansavini of ETH Zurich, second opponent Dr. Olga Fink of ZHAW School of Engineering and third opponent Professor Eirik Abrahamsen from the University of Stavanger.

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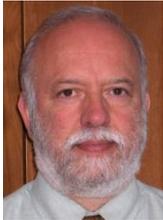
Carlos Guedes Soares
Editor-in-Chief RESS
Instituto Superior Técnico,
Universidade de Lisboa

We are finishing one more year of publication of the Journal and we can make a balance of its performance. For some years now, the publication schedule of the issues has been advanced with respect to time, a situation much different from what happened about 10 years ago. Therefore, by the end of 2018, RESS had already about 100 papers published in issues with the copyright of 2019 and it was possible to know before the end of the year exactly how many papers were published in 2018.

During 2018 RESS published 349 papers, an increase over the 314 papers of 2017. However, at present there are about 80 papers in press, which reflects the various Special Issues that are under preparation. These special issues have the advantage of collecting papers on a specific topic providing easy access to the subject area diversity. However, they have the disadvantage of delaying a bit the publication, as the authors that complete the first set of papers need to wait for the contributions of the late papers. This is the reason why so many papers are in the state of "in press", i.e they are available and can be referred with the "doi", but have not yet been incorporated in an issue.

In the early part of 2019 we can expect to see the publication of various special issues that are presently almost complete:

Impact of Prognostics and Health Management in Systems Reliability and Maintenance Planning
Complex Systems RAMS Optimization: Methods and Applications
Sensitivity Analysis of Model Output
Quantitative Security Analysis of Industrial Facilities
Foundations and novel domains for Human Reliability Analysis

Elsevier provides the option of Virtual Special Issues in which the papers are not physically in one issue, but are published as they are finished and the virtual issue collects them in one web location, as they would be seen in a printed physical issue.

Our special issue may evolve to this format so as not to delay the publication of the papers of the special issues.

ESRA News

Continuing education course: "RAM&PHM 4.0: Advanced methods for Reliability, Availability, Maintainability, Prognostics and Health Management of industrial equipment"
10 - 13 December 2018
Politecnico di Milano, Milan, Italy
Author: Francesco Di Maio

The 2018 professional one-week training course: "RAM&PHM 4.0: Advanced methods for Reliability, Availability, Maintainability, Prognostics and Health Management of industrial equipment" took place at Politecnico di Milano, Milan (Italy) on December 10-13. The course was the XXI edition of the series. Its goal has been to provide participants with advanced methodological competences, analytical skills and computational tools necessary to effectively operate in the areas of reliability, availability, maintainability, diagnostics and prognostics of industrial equipment. The course presents advanced analytics to improve safety, increase efficiency, manage equipment aging and obsolescence, set up condition-based and predictive maintenance.

Since the beginning, the course has been officially supported by ESRA and since 2005 official scholarships have been offered. The 2018 edition of the course has been supported by ESRA with two scholarships covering the registration fee. The 2018 scholarships have been offered to two Ph.D students, one of Politecnico di Milano (Milano, Italy) and the other of the University of Liverpool (Liverpool, UK).

The first part of the course has been devoted to the presentation of advanced methods for the availability, reliability and maintainability analysis of complex systems and for the development of Prognostics and Health Management (PHM) and Condition-Based Maintenance (CBM) approaches. In this respect, the basics of Monte Carlo Simulation, nonlinear regression and filter models (Artificial Neural Networks, Principal Component Analysis, Auto-Associative Kernel Regression, Ensemble Systems, Hilbert Huang and Wavelet transforms) and evolutionary optimization methods (Genetic Algorithms) have been illustrated. In the second part of the course, exercise sessions on Monte Carlo simulation, Artificial Neural Networks and Genetic Algorithms provided the participants with the opportunity of directly applying the methods to practical case studies. Finally, in the last part of the course, real applications of the advanced methods have

been illustrated. The applications range from the evaluation of maintenance costs taking into account the reliability and availability of equipment, to the application of Monte Carlo Simulation for system availability analysis and condition-based maintenance management, to the use of regression and classification techniques for fault detection, classification and prognosis in industrial equipment.

The 2019 edition of the course fill take place at Politecnico di Milano, Milan (Italy) on November 2019.

Past Safety and Reliability Events

3rd International "Computational Reliability Engineering (CRE)" Symposium
19 October – 20 December 2017
University of Liverpool ,UK
Author: Marcin Hinz

The "Computational Reliability Engineering in Product Development and Manufacturing (CRE)" Symposium was organized by the chair for reliability engineering and risk analytics of Univ.-Prof. Dr.-Ing. Stefan Bracke already for the third time. In order to extend the international character of the symposium, especially regarding the event location, for the first time it took place outside Germany. Due to the cooperation with the University of Liverpool, the event took place in the historical buildings of the London campus of the University of Liverpool in England. The CRE symposium was supported by Meiji University in Tokyo, the European Safety and Reliability Association (ESRA), the University of Wuppertal in Germany, the University of Liverpool as well as the Institute for Analytics and Prognostics of technical complex systems (IAP) from Cologne in Germany. The guests from the industry and academic world discussed, as usual, the current topics related to the product reliability and risk analysis. Academics were represented by attendees from Meiji University (Tokio, Japan), the University of Electro-Communications (Tokio, Japan), the University of Liverpool (GB), Technical University Delft (Netherlands), the University of Huddersfield (GB), University Paderborn (Germany), Leibniz University Hannover (Germany), University Siegen (Germany), the Technical University of Cologne (Germany), and the University of Wuppertal(Germany).

The industrial attendees came from Valeo S.S (France), Carl Zeiss SMT GmbH (Germany), Brockmann & Büchner GmbH (Germany), and diondo GmbH (Germany).

On the first day of the symposium (19th of October) all attendees were participating the meeting in the campus of the University of Liverpool in the London City. Topics of the discussions were focused on the product and process reliability, risk analytics, uncertainty analysis, testing of technical products, sustainability engineering, and physics of failure. The Meiji University presented a new method for the calculations of uncertainties based on robust design. The University of Liverpool discussed the topic of uncertainties from the simulation perspective along the product development process whereas the University of Electro-Communications showed the challenges of reliability of sustainable products in the era of Trump and Brexit. University Paderborn presented the development of reliable and intelligent systems and the University of Wuppertal showed the development of new mathematical approaches for the optimization of product reliability. diondo GmbH was discussing new possibilities of reliability growth by means of the usage of computer tomography. Finally, Valeo S.A. concluded the presentation day with a talk about low-cycle fatigue of engine cooling radiators.

On the second day of the symposium (20th of October) the excursion to the Greenwich Royal Observatory museum took place. The observatory was set as a reference for the zero meridian (sometimes also called the Greenwich meridian) and used for the measurement of the longitudes. Primarily, clocks and astronomy as well navigation instruments were developed in the observatory, according to which the Greenwich Mean Time (GMT), a standardised time specification, was introduced. Many technical discussions regarding the technological development and practicability of the time measurement were conducted with the attendees of the symposium and the employees of the observatory. Hence, the excursion provided the chance to discuss about the history of the development of navigation tools as well as the theory and practice of high precision manufacturing of measurement systems.

The fourth CRE symposium with the University of Wuppertal as organiser will be held in September 2018 in Danzig, Poland in cooperation with the Gdynia Maritime University from Poland.

The organisers would like to thank the sponsors, the European Safety and Reliability Association (ESRA), Meiji University in Tokyo, the University of Wuppertal in Germany, the University of Liverpool as well as the Institute for Analytics and Prognostics of technical complex systems (IAP GmbH) from Cologne in Germany, which supported this annual symposium.

For further information please contact:
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Faculty of Mechanical and Safety Engineering
University of Wuppertal, Germany

Workshop: "Computational Challenges in the Reliability Assessment of Engineering Structures"
24 January 2018
Delft, The Netherlands

Structural reliability and remaining service life assessment of engineering structures can be a daunting task. The main issue is that these assessments often involve computationally expensive physical models (e.g. NL-FE models) combined with a large number of random variables (e.g. due to random fields) and concern small failure probabilities (1e-3 to 1e-6). Practical examples of such conditions can be found in many fields, e.g. civil engineering, aerospace, or automotive engineering.

To face this challenge and come up with workable solutions, the Department of Structural Reliability at TNO has organized a workshop on this topic. The aim of the workshop was to bring together researchers, practitioners, and software developers from all over the world to share experience, learn from each other, and to jointly find ways of solving these challenges.

The workshop day
The workshop was held on the 24 January in Delft, The Netherlands. With about 50 participants, the interest in the workshop has far exceeded our initial expectations. The participants were practitioners and researchers from various branches of engineering. They came from 10 different countries and affiliated with 22 different institutes/companies.

11 lectures were presented during the workshop, many of these by leading researchers in the field.

The first part of lectures dealt with state-of-the-art reliability methods (advanced subset simulations, hyper-spherical importance sampling, etc.). The second part focused on the latest developments and challenges in engineering practice.

Each of the lectures was recorded and along the lecture slides made publicly available on a designated website: www.reliabilitytno.com.

The outcomes
During the entire workshop there were lively discussions on the presented methods and future challenges. In the final discussion session this yielded to a clear agreement that a comparison of these methods is needed on the basis of carefully selected benchmark studies that are representative of realistic engineering problems. This can give insight to the performance and limitations of these methods.

Call
The methods are intended to be compared, measured against each other via a competition. TNO will take the lead in this by drafting the first proposal and facilitating the process.
The proposal will include the guiding principles for the competition, as well as the practical and scientific requirements to the selected benchmark problems.

We invite all interested parties to assist TNO in the facilitation of the process.
For further information, please contact arpad.rozsas@tno.nl.
Website: www.reliabilitytno.com

Reliability in French Statistical Society
28 May – 1 June 2018
Saclay, France

The annual French Statistical Society conference took place in Saclay, May 28th to June 1th, hosted by Electricity of France. Two sessions were devoted to reliability problems and uncertainty evaluation in calculations methods. The main focus was on reliability in computing codes of complex system simulators. These codes have a large number of input parameters where their values are subject to uncertainties.
To have a fair and good analyse of the outputs it is necessary to apply probabilistic methods to measure the impact of the parameters uncertainties on the results. The confidence bounds on output data permit to evaluate the risk in decision making. Concerning complex system simulators, another popular topic was about powerful simulating methods to generate rare events. The second theme highlighted in several presentations concerned deterioration modeling considering the impact of a harsh and random environment. Stochastic processes such as Diffusion or Semi-Markov processes were proposed and their application on case studies by statistical point of view were discussed. Furthermore, new and more general classes of lifetime distributions were introduced and their utility was discussed. The PHM Challenge was also organized by Electricity of France and two groups of PhD students won the first prices.

16th International Probabilistic Workshop Conference Report
12 -14 September 2018
University of Natural Resources and Life Sciences, Vienna, Austria

The 16th International Probabilistic Workshop took place in Vienna from 12 to 14 September 2018 at the University of Natural Resources and Life Sciences. In total there were 4 keynote lectures and 32 presentations.
Posters were also exhibited for the first time. As usual, there were no parallel sessions, but the conference took place in one lecture hall. A total of 55 visitors attended the conference.
The visitors came from more than 10 countries such as Austria, Belgium, Czech Republic, Germany, Italy, Netherlands, Portugal, Slovak Republic, Switzerland, U.K. and the U.S.

The conference proceedings were published as a special edition of the journal Beton- und Stahlbetonbau. The conference proceedings are Open Access and can be viewed at https://onlinelibrary.wiley.com/toc/14371006/current.
This includes not only the full papers, but also the contributions which were only printed as extended abstract in the conference proceedings, but which are available as full papers on the Internet.
The topics of the conference ranged from natural hazards, such as flashfloods, to the safety of buildings, such as the development of partial safety factors, to safety in transportation, such as possible safety improvements in rail traffic. Of particular importance were the keynote lectures by Prof. Robby Caspeele on the topic of reassessment of existing structures, by Prof. Peter Mark on the evaluation of uncertainty in the lifetime evaluation of bridges, by Prof. Konrad Bergmeister on very rare events with major consequences and by Prof. Dan Frangopol on the longevity of civil engineering structures. With this conference the IPW conference series could be continued successfully after conferences in Dresden, Berlin, Ghent, Darmstadt, Delft, Szczecin, Braunschweig, Stuttgart, Brno, Weimar and Liverpool. The conference series was supported several times by the ESRA. Next year the conference will take place in Edinburgh (Scotland) and in 2020 in Guimarães (Portugal).
The conference series is characterised by a very friendly and open atmosphere. This was confirmed again this year by the participants.
The conference is therefore particularly suitable for young scientists who are presenting their work to an audience for the first time.
The organisers would like to take this opportunity to thank the participants once again for creating this pleasant atmosphere.

Calendar of Safety and Reliability Events

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 Biomedical Technologies
-Int. Workshop on Reliability Technologies
-International Workshop on New Frontier Information Digital Technology

Topics
The conference makes is focused on a wide range of applications of computer systems. Topics of interest include, but are not limited to:
-Circuit theory and its applications
-Digital signal processing
-Multimedia
-Communication and control systems and networks
-Measurement systems and instrumentations
-Hardware and software solutions
-Innovative eHealth, Applications and Producits
-Electronic Health Records and Medical Databases
-Medical Image Analysis and Biomedical Visualization
-Computer-Aided Diagnosis
-Telemedicine, Telehealth and Remote Monitoring
-Reliability analysis and risk estimation
-Testing and fault-tolerant systems
-Accident and incident investigation
-Human factor
-Risk and hazard analysis
-Software reliability
-Computational Intelligence
-Data mining and Knowledge discovery
-Education, e-learning

Important dates:
Full paper submission:25 March, 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 2017 (no extensions possible)
Deadline for presenting author registration: June 21 2019

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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/#/

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

1.3 Companies
- TAMROCK Voest Alpine, Austria
- IDA Kobenhavn, Denmark
- VTT Industrial Systems, Finland
- Bureau Veritas, France
- INRS, France
- Total, France
- Commissariat á l'Energie Atomique, France
- DNV, France
- Eurocopter Deutschland GMBH, Germany
- GRS, Germany
- SICURO, Greece
- VEIKI Inst. Electric Power Res. Co., Hungary
- Autostrade, S.p.A, Italy
- D'Appolonia, S.p.A, Italy
- IB Informatica, Italy
- RINA, Italy
- TECSA, SpA, Italy
- TNO Defence Research, The Netherlands
- Dovre Safetec Nordic AS, Norway
- PRIO, Norway
- SINTEF Industrial Management, Norway
- Central Mining Institute, Poland
- Adubos de Portugal, Portugal
- Transgás - Sociedade Portuguesa de Gás Natural, Portugal
- Cia. Portuguesa de Producção Electrica, Portugal
- Siemens SA Power, Portugal
- ESM Res. Inst. Safety & Human Factors, Spain
- IDEKO Technology Centre, Spain
- TECNUN, Spain
- TEKNIKER, Spain
- CSIC, Spain
- HSE - Health & Safety Executive, UK
- Atkins Rails, UK
- W.S. Atkins, UK
- Railway Safety, UK
- Vega Systems, UK

1.4 Educational and Research Institutions
- University of Innsbruck, Austria
- University of Natural Resources & Applied Life Sciences, Austria
- AIT Austrian Institute of Techn. GmbH, Austria
- Université Libre de Bruxelles, Belgium
- University of Mining and Geology, Bulgaria
- Czech Technical Univ. in Prague, Czech Republic
- Technical University of Ostrava, Czech Republic
- University of Defence, Czech Republic
- Tallin Technical University, Estonia
- Helsinki University of Technology, Finland
- École de Mines de Nantes, France
- Université Henri Poincaré (UHP), France
- Laboratoire d'Analyse et d'Architecture des Systèmes (LAAS), France
- Université de Bordeaux, France
- Université de Technologie de Troyes, France
- Université de Marne-la-Vallée, France
- INERIS, France
- Fern University, Germany
- Technische Universität Muenchen, Germany
- Technische Universität Wuppertal, Germany
- University of Kassel, Germany
- TU Braunschweig, Germany
- Institute of Nuclear Technology Radiation Protection, Greece
- University of the Aegean, Greece
- Universita di Bologna (DICMA), Italy
- Politecnico di Milano, Italy
- Politecnico di Torino, Italy
- Universita Degli Studi di Pavia, Italy
- Universita Degli Studi di Pisa, Italy
- Technical University of Delft, The Netherlands
- Institute for Energy Technology, Norway
- Norwegian Univ. Science & Technology, Norway
- University of Stavanger, Norway
- Technical University of Gdansk, Poland
- Gdynia Maritime Academy, Poland
- Institute of Fundamental Techn. Research, Poland
- Technical University of Wroclaw, Poland
- Instituto Superior Técnico, Portugal
- Universidade de Coimbra, Portugal
- Universidade Nova de Lisboa - FCT, Portugal
- Universidade de Minho, Portugal
- Universidade do Porto, Portugal
- University Politechnica of Bucharest, Romania
- University of Iasi, Romania
- Slovak Academy of Sciences, Slovakia
- University of Trencin, Slovakia
- University of Ljubljana, Slovenia
- Asociación Española para la Calidad, Spain
- PMM Institute for Learning, Spain
- Universidad D. Carlos III de Madrid, Spain
- Universidad de Extremadura, Spain
- Univ. de Las Palmas de Gran Canaria, Spain
- Universidad Politecnica de Madrid, Spain
- Universidad Politecnica de Valencia, Spain

- Institute de Matematica y Fisica Fundamental (IMAFF), Spain
- University of Castilla-La Mancha, Spain
- Luleå University, Sweden
- World Maritime University, Sweden
- Institut f. Energietechnik (ETH), Switzerland
- Paul Scherrer Institut, Switzerland
- City University London, UK
- Liverpool John Moores University, UK
- University of Aberdeen, UK
- University of Bradford, UK
- University of Salford, UK
- University of Strathclyde, Scotland, UK

1.5 Associate Members
- Federal University of Pernambuco, Brazil
- Fluminense Federal University, Brazil
- Pontificia Universidade Católica, Brazil
- European Commission - DR TREN (Transport and Energy), in Luxembourg
- Vestel Electronics Co., Turkey

2. ESRA Officers

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Chairmen of the Standing Committees
Antoine Grall, University of Technology of Troyes, France
C. Guedes Soares, Instituto Superior Técnico, Portugal

3. Standing Committees

3.1 Conference Standing Committee
Chairman: A. Grall, University of Tech. of Troyes, France
The aim of this committee is to establish 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.

3.2 Publications Standing Committee
Chairman: C. Guedes Soares, Instituto Sup. Técnico, Portugal
This committee has the responsibility of interfacing with Publishers for the publication of Conference and Workshop proceedings, of interfacing with Reliability Engineering and System Safety, the ESRA Technical Journal, and of producing the ESRA Newsletter.

4. Technical Committees

Methodologies

4.1 Accident and Incident modelling
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4.3 Foundation of risk and reliability assessment and management
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4.10 Risk Management
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4.11 Simulation for Safety and Reliability Analysis
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4.12 Structural Reliability
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4.13 System Reliability
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4.14 Uncertainty analysis
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4.15 Innovative Computing Technologies in Reliability and Safety
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4.16 Organizational factors and safety culture
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Application Areas - Technological Sectors

4.17 Aeronautics and Aerospace
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