European Safety and Reliability Association

Newsletter

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Editorial

Marko Čepin
University of Ljubljana,
Faculty of Electrical Engineering
Slovenia

Dear ESRA Colleagues!

There is an old saying initiated by one of the pioneers in the safety field, Herbert William Heimlich, and often repeated by Trevor Kletz: "If you think safety is expensive, try an accident".

It represents the warning about the environment and society, about the technical systems and the related procedures, about the investments and expenditures, about how to spend resources properly in order to live safely. Firstly, it was oriented to safety systems in safety critical technologies, later its meaning was extended to other fields and disciplines.

It contributed to numerous safety improvements in terms of hardware and software systems, in terms of procedures and the overall safety culture.

It contributed significantly to understanding the safety, its meaning and its importance.

However, world history has always been in a such position that unexpected events surprised the world rarely, but largely.

These days we are all faced with COVID-19 (Corona Virus 2019), which has spread around the world. It affected different countries in a different timescale. It has been a severe threat to human lives immediately and it is a large problem, which changed the world, our habits, our way of living, in a large extent, in an extent significantly larger than we can imagine now in March 2020.

I sincerely hope, that after a while we will reconvene stronger and smarter, reconvene in a world where the safety and reliability will be acknowledged without serious accidents or significant events reminding us from time to time to think safe. In the meantime, I truly believe, that all of ESRA members live accordingly to the new rules in your environments and societies. I hope that you all stay healthy.

I wish that those of you who are in the medical field find your strength, which is needed now the most, to help others, that need help. I hope that those of you who can initiate and contribute to the research in the respected area, that you are successful doing it. For others, I hope you can find your own way to contribute to the better world now and after the time, when the COVID-19 will not be the first news.

We shall meet soon at the meeting of the decade, the joint Conference ESREL 2020/PSAM 15, which was initially scheduled to be held in Venice, in late June this year. Thus far, we have received an extraordinarily large number of contributions, a record number, and the reviewers, the track directors and all technical program committee have been working hard with the authors for improving and approving the papers submitted. The Conference status is being attentively followed in view of the evolution of COVID-19, and options are being considered: very likely, the conference will have to be postponed and a possible date being considered is Nov 1-6, 2020, if not later; or it could be held in remote, but this we shall see. Please, keep informed on this by visiting the Conference web page (www.esrel2020-psam15.org).

Marko Čepin
ESRA Chairman

Feature Articles

Pandemics and Public Health Interventions: To do or not to do, where is the question?

Lúcio Meneses-de-Almeida
Public Health Medicine Consultant
Regional Health Administration of Central Portugal

"Western health care systems have been built around the concept of patient-centered care, but an epidemic requires a change of perspective, toward a concept of community-centered care. What we are painfully learning is that we need experts in public health and epidemics, yet this has not been the focus of decision makers at the national, regional and hospital levels".

Nacoti M, Ciocca A, Giupponi A Brambillasca P, Lussana F, Pisano M et al. At the epicenter of the Covid-19 pandemic and humanitarian crises in Italy: changing perspectives on preparation and mitigation. NEJM, March 21, 2020 (DOI: 10.1056/CAT.20.0080)

Until the emergence of immunization, by Edward Jenner, communicable diseases prevention and control was, exclusively, enforced through non pharma-cological interventions (NPI), aka public health measures.

The medieval quarantine and the cordon sanitaire regain actuality as the World faces the COVID-19 pandemic. Although conflicting with a globalized society, based on individual rights and freedom of choice, NPI, which include respiratory etiquette and hand hygiene, are the sole available interventions, in the absence of a vaccine or specific treatment.

Social distancing measures, like patients' isolation or healthy contacts' quarantine, diminish exposure opportunities ("contact rate") between infectables (susceptible) and infectious (namely, diseased) and, by doing so, they reduce the incidence of secondary cases. Basic reproductive number (Ro) estimates the spreading potential (average number of secondary infectious cases per primary case), within a wholly susceptible population, of a communicable disease. It is composed of three variables: transmission probability (p); infectiousness duration (d); contact rate (c). By handling contact rate, through social distancing, the reproduction of the disease, within a population, is reduced.

NPI effectiveness is related to the proportion of the target population, which is impacted by these measures. For a Ro of 1,53, geographic quarantine threshold for effectiveness corresponds to 80% of the whole population; an insignificant benefit exists when 60% of the population is impacted by those measures.

But it is also depending on a whole approach ("bundle"), by including alternative settings of social interaction. Another issue to consider is the amount of time of contact, specially indoors.

Ongoing epidemics' natural history is like a forest fire: trees are the susceptible and the forest (burnt and not burnt) the whole population. When the fuel is insufficient (i.e., most of the forest burnt out), the fire will self-extinguish. That means, epidemiologically, that the herd immunity threshold for the disease was reached (H=1-1/Ro). Immunization speeds up this process, by turning susceptible into immune (non-susceptible).

COVID-19 pandemic gave new life to NPI, amongst the armamentarium of epidemic control. In the absence of an effective vaccine, and considering a Ro of 2,282, almost 60% of global population has to be infected (and immunized).

Facing the current global epidemic, Portuguese health authorities (physicians), have been subjected to a growing pressure, by administrative authorities (mayors), in order to impose NPI – in spite of scarce epidemiological evidence of effectiveness and regardless of the associated disruption.

This pressure is due to a combination of two factors: the current societal phase of the COVID-19 pandemic; and the absence of pharmacological interventions, such as vaccine or antivirals. The apparent success of social distancing measures, enforced by Chinese authorities, also contribute to the former. China was the first epicenter of the pandemic, as its first wave coursed during January and February. Those measures included universal isolation (and treatment) of COVID-19 patients in hospital setting.

An epidemic unfolds, sociologically, within 3 acts. In the first one, denial prevails (reassurance), in order to protect social and economic interests; secondly, the problem is acknowledged (recognition) and explanations (scientific and moral) are pursued, along with scape goats. The final act, "as dramatic and disruptive as the disease itself", is related to public health response.

China's approach to the SARS-CoV-2 outbreak included a resolute clinical intervention and, simultaneously, the containing of imported cases, aiming to prevent the establishment of new chains of transmission.

Italy enforced the first public health measures (state of emergency) in January 31. As of that date, there were only 2 confirmed cases. Between February 21 and March 3, the number of cases exploded from 2 to 20366. New legal measures, growingly restrictive, were issued, but unsuccessfully, as the number of new cases continued to explode.

Pandemic response is based on two distinct strategies. Mitigation aims to reduce healthcare demand and mortality, amongst risk groups, without reducing the occurrence of new cases (cumulative incidence); from an epidemiological point of view, it results on a

flattening of the epidemic curve and of its displacement to the right ("to buy time"). On the contrary, suppression aims to revert the epidemic (extinction), by reducing incident cases.

One must stress that mitigation allows population to build herd immunity, in spite of the dissemination of new cases in a longer period of time. On the contrary, suppression keeps the population susceptible.

From the point of view of epidemic dynamics, the effective reproductive number (R), regarding a partially susceptible population, is kept above 1 regarding mitigation and bellow 1 when interventions seek to suppress (revert) the pandemic.

Although NPI must be kept in force for the longest period possible (at least, 3 months and, ideally, for 2/3 of the time until a vaccine is available), their premature implementation is likely to rebound, once they are lifted. This is particularly important regarding suppression: NPI must be kept until a sufficient quantity of vaccine is ensured for the population, aiming the herd immunity threshold/vaccine critical proportion, and that means, 12-18 months.

Within optimal conditions, mitigation reduces peak healthcare demand by 2/3 and the number of deaths by 50%. These figures must be cautiously interpreted, as, even in a best case scenario, critical care demand is 8 fold over and above the available surge capacity.

Finally, one should stress that a scenario is not a forecast, but only a predictor of a theorized reality – as it is based on models ("what ifs"), that simplify "true" reality.

Novel epidemics imply the absence of previous evidence, along with the sense of urgency that prevails. Practice, once evaluated, generates evidence by itself. When facing the absence of evidence of effectiveness, one must ensure plausibility evidence.

And the latter is also made available by historians, reporting former pandemics, like the 1918 pandemic, tragically unfolded in the current days: The history of epidemics offers considerable advice, but only if people know the history and respond with wisdom"3. Looking back to history books is getting part of the solution.

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RESS News

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

Foundations and Novel Domains for Human Reliability Analysis

The special issue on "Foundations and Novel Domains for Human Reliability Analysis" has been published in the issue of February 2020, with 18 papers. This special issue was guest edited by Luca Podofillini, from Switzerland and Ali Mosleh from USA, to whom go our thanks for the excellent work performed.

Human Reliability Analysis (HRA) is an important discipline as most systems involve operator performance as well as system behaviour models and thus reliability studies cannot restrict themselves to the hardware component. However, this subject has not occupied a very large percentage of the papers in the journal and I hope this special issue will help in increasing the visibility of this topic. This special issue aims at presenting the latest developments in the field and set the state-of-the-art, especially in relation to the empirical and theoretical foundations of HRA methods and the quantitative treatment of the human component to safety in areas where HRA is less established.

The Guest Editors note that "in recent years, new, long-term, data collection initiatives have been launched to strengthen the empirical foundations of HRA models as well as to reflect operative conditions of modern system, for example, in the nuclear domain, digitalized control rooms and procedural guidance. Applications outside the established areas have flourished: in the nuclear domain, to address strongly degraded performance conditions, e.g. due to fire, flood, seismic events as well as post-accidental situations; in other domains, to improve (and in some cases introduce) quantitative models in risk analyses."

Three groups of contributions can be distinguished in the special issue: advances in simulator data collection, advances in models, advances in method development and applications.

The on-going collection of data is important because newer methods emphasize the importance of the context as well as the cognitive component for human performance and the reference data needs to be updated correspondingly. The technological advance in the operating environments with modernized human machine interfaces, alarms and monitoring systems, electronic procedures significantly change the working conditions compared to those at the earliest times of HRA.

Methodological advances in the definitions and quantification of Performance Shaping Factors, (PSFs) are presented in several papers. A number of other papers shift the focus from HRA model development to HRA method development and applications to domains where the HRA discipline is not yet established. The present special issue includes contributions to transfer HRA practice to fields other than the nuclear power plant domain: petroleum industry, healthcare, aviation, maritime transportation.

ESRA News

5th Int "Computational Reliability Engineering (CRE)" Symposium 2019

Bologna, Italy

The CRE Symposium celebrated its 5th anniversary from 9th to 11th October 2019 in cooperation with one of the oldest universities in the world in Bologna.

In 2015, the "Computational Reliability Engineering in Product Development and Manufacturing (CRE)" Symposium was organized for the first time. In the following years, the CRE Symposium which was initiated by Prof. Dr.-Ing. Stefan Bracke and Dr.-Ing. Marcin Hinz became more and more popular within the reliability community also by making a major contribution to the internationalization of the University of Wuppertal. The event is always attended by international guests from science and industry. In addition, the venue, which changes every year, has an international character and is influenced by the cooperation with the respective local partner. The first four CRE symposia were held in Düsseldorf (Germany), Dresden (Germany), London (England) and Gdynia (Poland).

In 2019, the symposium celebrated its 5th anniversary in Bologna (Italy), in one of the oldest universities in the world. As in previous years, the organization was carried out by the Chair of Reliability Engineering and Risk Analytics of Prof. Dr.-Ing. Stefan Bracke and coordinated on site with a partner chair from the local university. The cooperation with the department of Professor Valerio Cozzani offered the possibility of holding the lectures and discussions in the historical hall "Sala Ulisse" of the University of Bologna. The symposium was sponsored and supported by the University of Bologna, Meiji University Tokyo (Japan), University of Wuppertal (Germany), diondo GmbH (Hattingen, Germany), Next Competence Network (NCN) GmbH (Willich, Germany) and the Institute for Analytics and Prognostics of Technically Complex Systems (IAP) (Cologne, Germany).

As every year, the international speakers, sponsors, organizers and partners came from the research world and from various companies. Science was represented by guests from the following universities: University of Wuppertal, University of Bologna, University of applied sciences Cologne (Germany), Meiji University Tokyo, University of Hannover (Germany), University of Huddersfield (England), University of Paderborn (Germany) and University of Liverpool (England). Business representatives came from Carl Zeiss AG (Germany), Continental AG (Germany), Daimler AG (Germany), diondo GmbH, Forschungsgemeinschaft Werkzeuge und Werkstoffe e.V. (FGW) (Germany), Next Competence Network GmbH, Robert Bosch Power Tools GmbH (Germany) and Valeo S.A. (France):

Participants of the 5th CRE Symposium 2019 at the Lamborghini manufacturing plant in Bologna

The three-day symposium had a very diverse program including lectures, discussions and an excursion. The core of the symposium was formed by the first two days, which included a total of 12 lectures on various topics in the field of reliability and risk analysis.

On the first day, the University of Wuppertal presented the topic "Reliability and degradation analysis of smart material actuators". After the presentation "Automatic reliability analysis for robust design under uncertainty"

from the University of Liverpool, the Robert Bosch GmbH used a case study of Power tools to show the "Development of reliability requirements and specifications for new product generations based on field data monitoring, analytics and experiences". The last two presentations of the first day came from the University of Siegen "Uncertainty Quantification in Electromagnetic Compatibility Design: The Merging of Deterministic and Statistical Concepts" and the University of Warsaw "Assisting, knowledge based, systems supporting engineering activities in product design and development".

The second day began with a session of four presentations. Carl Zeiss AG showed the "Availability of Electronics in Next Generation EUV Lithography Technology". The University of Hannover discussed "Reliability Analysis of Dependent Networks Using Copulas". The University of Bologna presented "Streaming applications of Prognostic Health Management: From data acquisition to RUL prediction" before the Daimler AG discussed "Best lifetime variables for optimal failure prediction within the product usage phase" using an automobile case study. The second session of the day consisted of presentations from the University of Paderborn about "Condition monitoring of rubber-metal-elements considering different uncertainties", the University of Wuppertal "Reliability and safety concepts of electronic vehicles" as well as the Daimler AG about "Algorithmic driving condition detection in electric vehicles for the derivation of an event-based vehicle test". In the afternoon, the last presentation of the symposium came from the Meiji University discussing the "Consideration of reliability issues in provision plan and product architecture of upgradable product service system".

On the third day of the CRE Symposium, the participants visited the production facility of the sports car manufacturer Lamborghini and were able to see the current production lines in detail during a guided tour.

For further information, please contact: bracke@uni-wuppertal.de

PhD Degrees Completed

Whole System Approaches to Railway Asset Management

Jack Litherland

University of Nottingham, UK

Supervisors: Prof John Andrews and Dr Rasa Remenyte-Prescott

Resilience Engineering Research Group (RERG), University of Nottingham, UK

As the world population continues to grow, the demand for transport is increasing. The requirements on railway networks already at capacity continue to grow; increased usage is leading to faster degradation yet with more trains required to transport an ever-increasing volume of passengers the time available to perform maintenance is shrinking. In many places it is difficult to build new railway, as land is both limited and expensive. Innovative approaches to railway asset management are therefore required to maximise the performance of the existing network. The aim of this research was to create a whole system model for railway asset management to; demonstrate the feasibility, explore the possible benefits and find solutions to the issues discussed.

The research consisted of four parts: data analysis, development of individual asset models, construction of a system model using the individual asset models and an exploration of methods to solve large Petri net models for large systems.

Data analysis: Network Rail condition and maintenance records were analysed to determine deterioration rates, failure rates, the time to schedule maintenance, the time to complete maintenance and the effectiveness of maintenance.

Individual asset models: In order to create a whole system model Petri net models for a range of assets within the railway network were developed based on the analysis of Network Rail data, the literature and expert judgement. The assets considered were: track (rails, sleepers and ballast), switches and crossings, tunnels and the signalling system

System model: The Petri net models for the individual assets were combined using the hierarchical Petri net (HPN) approach to create a system model for a railway corridor. The system model was trialled on Bletchley Delivery Unit (BDU) (a 100-mile section of railway in the UK) as a case study. The BDU model contained; a master/control module, 849 track section modules, 849 sleeper modules (705 concrete, 53 timbers, 91 steel), 61 S&C modules, 21 tunnel modules and a module for the signalling system (see Figure 1).

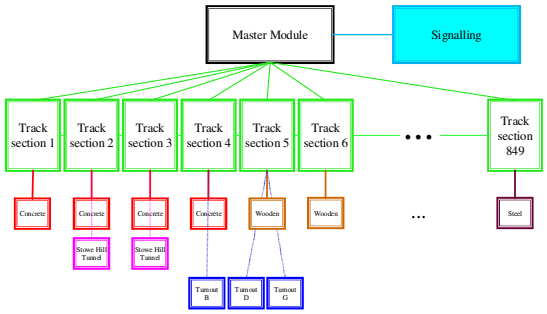

Figure 1: HPN Structure

The system model allowed some dependencies between asset condition to be explored as well as a wide range of maintenance dependencies; including opportunistic work and grouped work across multiple asset classes.

Solving large Petri nets: The Petri net model for BDU was solved using Monte Carlo simulations. Due to the size of the BDU model, computational resources (time and memory required) were a consideration. The final part of the research explored a range of means to reduce the memory and time requirements for the simulation of large Petri net models. A range of techniques were explored including improving the Petri net solution algorithm, parallel processing, GPU accelerating and increasing the convergence rate of the model. The research also investigated the benefits of using heterogeneous programming, which combines CPU (central processing unit) and GPU (graphics processing unit) computing power, this led to an approximate eight times speed up factor compared to a single threaded approach.

The research concluded that it was possible to develop a system model for railway asset management and that the model could be solved in a reasonable period with standard computer resources. It was concluded that there was significant benefit to using a whole system approach; however, further work is needed to improve the understanding of the interactions between assets and to quantify the uncertainty.

Safety in Norwegian Fish Farming – Concepts and Methods for Improvement

Siri Holen, Department of Marine Technology, Norwegian University of Science and Technology, Trondheim, Norway
Supervisor: Prof. Ingrid Bouwer Utne.
Co-supervisors: Prof. Bjørn Egil Asbjørnslett, Dr. Arne Fredheim

The majority of Norwegian fish farm production takes place in the fjords along the coast, in production facilities which are designed with limited protection from environmental forces. The dynamic nature of fish farm production offers a scope for many potentially hazardous scenarios. Rapid changes in weather, the large volumes of the submerged fish farm structures under the sea, and the large quantities of fish per farm add to a complex risk and make safety and risk management challenging. The industry has experienced several incidents and accidents with severe consequences for personnel, fish and the environment.

The overall aim of this Ph.D. thesis, which was defended in March 2019, was to identify, categorize, and analyze the safety challenges in the Norwegian fish farming industry, and suggest approaches for improving safety in operations. This aim was fulfilled through five research objectives addressed in six scientific articles. The work was funded through the research project SustainFarmEx (210794/O70). Data for the project were collected from the industry through interviews, a workshop, and work meetings discussing and validating the work.

Safety challenges in the fish farming industry have been identified through accident data from three different accident registries [1],[2]. These were analyzed and accident rates, trends, and characteristics were derived. The results give a new and comprehensive overview of safety challenges in the fish farming industry through numerical trends and the characteristics of the consequences of occupational incidents and accidents. This provides input to the knowledge base on safety challenges for targeted safety management and risk reduction in fish farming. A potential for learning from accidents is also identified, given the currently inadequate details of accident reporting.

Even though the Norwegian fish farming industry has safety challenges also beyond occupational accidents, concepts explaining mechanisms behind more complex accident scenarios such as major accidents have not been applied so far in this industry. Based on characteristics of major accidents from other industries and the risk dimensions of fish farming, a definition of major accidents in fish farming was proposed [3]. The concept of major accidents, as used in the Norwegian offshore oil and gas industry, implies that a more holistic and systematic approach towards preventing accidents is needed. This is increasingly relevant when seen in relation to the shift towards more exposed fish farming in offshore locations in Norway.

Based on the need for more holistic and systemic approaches towards improving safety in fish farming, two methods were proposed: the first is a novel framework for identifying safety indicators based on systems thinking (Systems Theoretic Process Analysis) [4]. Secondly, by applying both a sequential and a systemic accident model to a capsizing incident in fish farming, we found that the two methods complement each other in providing guidance and structure not previously shown for accident investigation in fish farming [5].

The results of the research work may serve as a basis for the industry to improve safety as areas of concern in occupational injuries, fatalities, and major accidents are highlighted. The methods for monitoring safety through safety indicators and investigation of accidents give structured approaches for expanding the perspective on safety from the traditional sharp-end focus. Safety management aspects such as maintenance planning, training and resource allocation are also controlled for adequate design and updating. The methods applied in the thesis are new to the fish farming industry and serve as initial conceptual tools that allow for a more holistic approach to understanding, assessing and communicating about safety in fish farming. Both technical, human and organizational factors are assessed when applying the systems thinking methods. While the main focus of this thesis is occupational safety, other types of losses were also included, such as fish mortality events and incidents with environmental consequences [3],[6].

In conclusion, the thesis contributes to an increased knowledge of the main safety challenges regarding occupational injuries, fatalities, and major accidents in fish farming. Methods and approaches for improved

safety have been proposed through application and adjustment for a fish farming context. Further research is however needed for more extensive testing and detailing of the concepts and approaches proposed in this thesis.

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PhD at University of Stavanger Norway, Ingrid Årstad

Ingrid Årstad
University of Stavanger, Norway
Supervisors: Prof. Terje Aven
Co-supervisor: Prof. Ole Andreas H. Engen

On 7th of March 2019, Ingrid Årstad presented and defended successfully her PhD thesis titled "Preventing major accidents – Conditions for prudence" at the University of Stavanger, Norway. The members of the judging committee were Professor Henrik Tehler, Lund University, Sweden, Dr. Linda J. Bellamy, White Queen BV, The Netherlands, Associate Professor Roger Flage, University of Stavanger. Ingrid has been supervised by Professor Terje Aven, with Professor Ole Andreas H. Engen as co-supervisor.

The thesis addresses the assumptions and expectations that are embedded in current management practices supporting the intention to prevent major accidents. It proposes a framework for challenging the framing of existing practices and identifying possible over simplifications and limiting beliefs about what is deemed relevant and significant for preventing major accidents. This framework is relevant for any industry where a major accident can occur.

Given that major accidents are commonly experienced as surprises, it seems pertinent to consider that there might be blind zones in existing management practices, something missing without being missed. If this is the case, then some questions arise. How would we find out whether there was something dysfunctional in what we believe, how we think, what we do by habit? If what we do today is the reference for what we improve, how do we know that we do not perpetuate something that should be changed? This work outlines different approach angles for clarifying whether there are habits to reconsider and whether the foundations of existing practices are updated in the light of current knowledge.

In this work, the concept of prudence is used as an instrument for challenging current practices, which are commonly associated to an operationalisation of the safety concept. The concept of prudence pervades the Norwegian petroleum legislation and relies on the idea that the outcomes of what we do in the present are uncertain, and we must therefore be able to justify why we believe that what we do may yield the outcomes we aim at. We must be able to defend that what we do is justified, not merely because it is required but because it is the right thing to do in the actual context and in the light of the results we want to achieve.

Shifting focus from safety to prudence makes provision for asking unfamiliar questions about the tools, models and concepts pervading management practices. A focus on safety tends to direct attention to past or future performance, while focus on prudence directs attention to what can be controlled in the now, i.e. the conditions for an intended future performance. Existing practices tend to emphasise technical and operational aspects and assume a short distance between risk sources and harmful consequences. Focus on prudence adds value by also taking into account management and governance issues, recognising that significant risk sources may be remote from a major accident, both in space and time.

The concept of prudence supports a way of thinking which is adapted to issues that follow from dynamic interactions between technical and social systems. Current knowledge suggests that major accidents emerge from such interactions and the prevention of major accidents depends on such interactions. By supporting systems thinking in the context of accident prevention, a focus on prudence promotes realistic expectations about what can be known and controlled, a balanced view on what incidents and non-compliances inform about, and a critical eye on why current practices are considered functional. By emphasising what is functional in context, management attention can shift from merely seeking compliance with pre-defined constraints to demonstrating consistency with the intention to prevent major accidents under dynamic conditions. It makes provisions for paying attention to the gap between an idealised management of pre-defined risks and the complexity of real management issues, with real people, under real conditions.

This work aims at improving risk management practices by considering existing practices as a risk

source. This brings attention to framing issues, contextual issues and agency issues, including how interactions between different agents may affect the foundations of existing practices and their evolution. Being concerned with blind zones in existing practices may contribute to improving management provisions for handling issues that cannot be planned, cannot be predicted, where solutions cannot be pre-determined and where decision-making processes are not auditable. This work may be used for improving reflections and assessments at many levels of the different organisations directly or indirectly influencing the prevention of major accidents in any high-risk industry. It may also help improve self-assessments and get a better understanding of both own and others' roles. This may allow for mobilising a wider range of agents and promote more relevant and effective actions, both individually and in conjunction to each other. It may be used for improving pro-active controls of existing practices, including internal and regulatory audits. It is particularly suited for identifying oversimplifications that may lead to blindness or misunderstanding about what requires management attention. This work may also be used in investigations for identifying eventual systemic issues, i.e. common issues across installations, operations, organisational levels and/or geographical areas.

Calendar of Reliability and Safety Events

39th International Conference on Ocean, Offshore and Arctic Engineering (OMAE 2020) - Symposium on Structures, Safety and Reliability

28 June - 3 July 2020
Fort Lauderdale, USA

OMAE 2020 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 11 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 Chair: Professor Manhar R. Dhanak, Institute for Ocean and Systems Engineering, Florida Atlantic University, USA
Conference Co-Chair: Professor Ronald W. Yeung, University of California, USA
Technical Program Chair: Professor Antonio C. Fernandes, COPPE/URFJ LOC, Federal University of Rio de Janeiro, Brazil
Safety and Reliability Symposium Coordinator
Professor Carlos Guedes Soares, Instituto Superior Técnico Universidade de Lisboa, Portugal.
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

11th IMA International Conference on Modelling in Industrial Maintenance and Reliability (MIMAR)

14 - 16 July 2020
Nottingham, United Kingdom

You are warmly invited to participate at the 11th IMA International Conference on Modelling in Industrial Maintenance and Reliability (MIMAR), which will take place in Nottingham, in the UK from 14-16 July, 2020.
Conference Chair:
Rasa Remenyte-Prescott, University of Nottingham, UK
Conference Co-Chair:
John Andrews, University of Nottingham, UK
Jacqueline Bishop
Phuc Do, University of Nottingham, UK
Scientific committee
Chair: Philip Scarf, University of Salford, UK
Co-Chair : Shaomin Wu, University of Kent, UK
Important Deadlines:
Abstracts of 100-200 words via https://my.ima.org.uk: 2nd March 2020
Notification of abstract acceptance: 16th March 2020
Optional paper submission for conference proceedings: 15th May 2020

Final deadline for acceptance for conference proceedings:15th June 2020
Submission of extended papers for consideration for fully refereed special issue of Journal of Risk and Reliability: 1st November 2020
Contact Information: conferences@ima.org.uk
Conference Website: https://ima.org.uk/12183/11th-ima-international-conference-on-modelling-in-industrial-maintenance-and-reliability-mimar/

18th International Probabilistic Workshop – IPW 2020

23 - 25 September, 2020
Guimarães, Portugal

The 18th International Probabilistic Workshop (IPW2020) will take place in September 23-25, 2020, at University of Minho, Guimarães, Portugal. This workshop aims at providing an international forum for the debate on topics such as the resilience, robustness and redundancy of infrastructure systems, risk assessment and management, climate change and loading uncertainties, novel decision-making frameworks, and many other topics related to the fundamentals and application of probabilities. The IPW series was founded in 2003 in Dresden, Germany, and since then it was hosted by many other European countries, as Austria, Belgium, the Netherlands, Poland and the United Kingdom. It has been a place to bring together experts on different engineering and science fields, and doctoral students looking for broad knowledge. Expect a very open and friendly atmosphere, perfect for knowledge exchange, discussions and multidisciplinary collaboration.
Audience: 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.
Conference Language: English
Organisation:
José C. MatosUniversity of Minho, Portugal, Co-Chairman
Paulo B. Lourenço, University of Minho, Portugal, Co-Chairman
Dirk Proske, Bern Unviersity of Applied Sciences, Switzerland, Co-Chairman
Deadlines:
Submission of abstract: November 30 2019,
Notification of acceptance of abstract: December 31 2019,
Submission of full paper: February 29 2020,
Notification of acceptance and mandatory changes: May 15 2020
Deadline for presenting author registration: June 15 2020
Conference Venue:
Campus de Azurém, University of Minho, Guimarães, Portugal
Further information:
Universidade do Minho
Departamento de Engenharia Civil
Campus de Azurém
4800-058 Guimarães
Portugal
Tel.: +351 253 510 748
Fax: +351 253 510 217
secretariat@ipw2020.com

ESREL 2020 PSAM 15: Covid-19 Update !!

1-6 November, 2020
Palazzo del Cinema, Venice, Italy

The ESREL2020 PSAM15 Conference will be held in Italy, Venice, in 2020. Through the abstract submission system, opened in October of last year, more than 1400 abstracts have been collected. As a result of the excellent review work by the members of the Technical Program Committee, more than 500 abstracts have been accepted for presentation and an additional 800 have turned into the submission of full papers. The papers accepted will be presented at the conference and included in indexed proceedings.
The program of the Conference is planned to last 5 full days to accommodate plenary lectures, keynotes and some 80-100 parallel technical sessions.
In consideration of the latest developments of the CoViD-19 pandemic, the decision has been taken to postpone the ESREL2020 PSAM15 Conference to November 1-6, 2020, keeping the same venue in beautiful Venice, Italy. The platform for the registration to the conference will be opened in the next weeks.
In recognition of the importance of the timely dissemination of the knowledge advancements and groundbreaking results of the conference contributors, the Technical Committee is working to make it possible that the accepted papers of registered participants be made available with open access on the conference website starting from the original Conference opening date of Monday, June 22, 2020.
Furthermore, it has been decided to launch a second call for abstracts/full papers to provide another opportunity to those who want to submit a paper or want to transform their abstract-only contribution into a full paper:

- May 1, 2020: submission opening
- July 15, 2020: submission deadline
- August 15, 2020: notification of acceptance

Grasp this other chance and share your latest research results and technical work!

Finally, the Conference remains "condition-based" and we will continue "condition monitoring" the situation, keeping flexible to consider adequate options to confront any new situation that may arise.
We continue to count on the support and participation of all the ESRA members and ESREL affiliates, and expect all contributions necessary to make yet another very successful conference in spite of the uncertainty and risk that we are living in, today.
Let us grasp this opportunity of the Conference to exchange and reflect together on what we are doing for the safety of our World and what we are not doing. What is missing?
Prof. Enrico Zio
ESREL 2020 PSAM 15 Conference Chairman
For more information, visit the conference website:
www.esrel2020-psam15.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
- Pontifícia 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
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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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E-mail: Stig.O.Johnsen@sintef.no; nicola.paltrinieri@ntnu.no

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E-mail: John.Andrews@nottingham.ac.uk; nicolae.brinzei@univ-lorraine.fr

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E-mail: marko.cepin@fe.uni-lj.si; henrik.hassel@risk.lth.se

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E-mail: nicola.pedroni@ecp.fr; edoardo.patelli@liverpool.ac.uk

4.12 Structural Reliability

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E-mail: jana.markova@klok.cvut.cz; martin.krejsa@vsb.cz

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E-mail: gregory.levitin@iec.co.il; serkan.eryilmaz@atilim.edu.tr

4.14 Uncertainty analysis
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E-mail: emanuele.borgonovo@unibocconi.it; roger.flage@uis.no

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E-mail: radim.bris@vsb.cz

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Application Areas - Technological Sectors

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E-mail: darren.prescott@nottingham.ac.uk

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E-mail: valerio.cozzani@unibo.it; gabriele.landucci@unipi.it; nkhakzad@gmail.com

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E-mail: sansavig@ethz.ch; enrico.zio@ecp.fr

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E-mail: benoit.iung@univ-lorraine.fr; francois.peres@enit.fr

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E-mail: p.h.a.j.m.vangelder@tudelft.nl; .Kolen@tudelft.nl

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E-mail: smartore@iqn.upv.es; francesco.dimaio@polimi.it

4.28 Occupational Safety
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E-mail: ben.ale@xs4all.nl; genserik.reniers@uantwerpen.be

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E-mail: sissel.h.jore@uis.no; zdenek.vintr@unob.cz; genserik.reniers@uantwerpen.

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.
For more information about ESRA, visit our web page at http://www.esrahomepage.eu
For application for membership of ESRA, please contact the general secretary Coen van Gulijk E-mail: c.vangulijk@hud.ac.uk.
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