European Safety and Reliability Association

Newsletter

http://www.esrahomepage.eu June 2022

Editorial

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Dear ESRA Colleagues!

The year 2022 is an important milestone for the European Safety and Reliability Association (ESRA). Three quarters of management board is slowly reaching the end of their second two-year term serving as a chair of ESRA, a vice chair of ESRA and a treasurer of ESRA.

The call for applications for the next candidates has been issued and at ESREL 2022 in September, the exchange of duties is scheduled.

It is time to summarise the last four years of ESRA activities. The last four years have been extremely demanding for the leaders of any institution due to the pandemic situation, which suddenly changed many existing practices and turned the whole world a little bit around. This applies also to ESRA. After the relatively expected set of events and organizational change of ESRA with new leaders in the year 2018, the conference ESREL 2019 was exceptionally successful. Then, the next year, with joy, we expected the combined conference of ESRA and IAPSAM (International Association for Probabilistic Safety Assessment and Management) associations, which is traditionally a large and successful meeting organised every 8 years. Venice was selected as the venue in the heart of Europe and the organisation of the activities and the execution of the conference was due to the pandemic situation held remotely. The participation needed to be organised at a distance for the first time in the history of ESRA events. Participants had to use microphones and cameras and software for participation remotely, which was a huge change of practice comparing to previous conferences, but the organisers managed to conduct this well.

The next year situation with pandemic improved, but again the novelty was required. For the first time in history, the organisers of ESREL 2021 in Angers in France needed to organise a combined event. Many people could not travel and many people arrived to the venue of the conference. Apart from experience with online meetings, there was another new issue: to organise a hybrid meeting with some people present and some at a distance. Again, the organisers did an excellent job and the meeting was a success.

For the ESREL 2022, the preparations are well under way and the very large number of participants is expected in Dublin. Again, the hybrid meeting, with majority of people to arrive to the venue is expected.

Apart from the conferences, the activities included organisation of some new technical committees. Approximately one per year was added to the list. Other activities include renewal of web pages and regular issues of ESRA newsletter, seminars, webinars and supporting events, which are every year getting more interest.

We are sure that the milestone in the year 2022 will mean a further improvement of ESRA activities and we are looking forward to see the future ESREL conferences. Both, without doubt contribute to more reliable systems and processes and to a safer world.

ESRA Chairman
Marko Čepin

Feature Articles

Scoutbase: Preventing the past, shaping the future

Anna Wucher
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One of the most famous accidents, the sinking of the RMS Titanic occurred in April 1912, causing the deaths of thousands of people and costing millions in damages. Since then, shipping has made great progress in areas such as vessel engineering, navigational tools, and technology (Galieriková, 2019), so it would be easy to believe something like the Titanic sinking could not occur anymore. However, the reality is that almost to the day, a 100 years later, the Costa Concordia ran aground off an island in Italy, once again costing millions in damages and causing extensive environmental harm, as well as the deaths of several individuals. So, what do these two events have in common? What have we missed?

A study by the Allianz Insurance Group sheds some light on this question. Over 15 000 insurance claims over the span of 5 years were investigated to identify the causative factors in maritime accidents. The most important one? Human error. Human error was estimated to be involved in 75-96% of the accidents concerned. Although the causative factors in both Titanic and the Costa Concordia are likely complex, human error played an essential role in both incidents. So why has the shipping industry not been able to better understand and minimise human error in shipping?

Having a look at how other industries have attempted to gain insight into the effects of human error, one would likely encounter a model developed by Shappell and Wiegmann (2000) called the Human Factors Analysis and Classification System (HFCAS), which is strongly based on James Reason's Swiss Cheese Model (1990). It can also be applied to the maritime field (Galieriková, 2019). In a study by Campara et al. (2021), the six categories that were found to be the most important in 135 maritime accidents investigated were the condition of the operator, the organisational climate and organisational processes, routine violations, inadequate supervision, and software. These six factors alone made up 52% of the contributory factors. Due to this large impact, these are also some of the factors the Scoutbase company focuses on strongly.

Scoutbase was founded to address the need for predictive data and information relating to causative factors in accidents concerning the working environment on board ships as well as the crew members functioning within such environments. The aim was to provide various stakeholders with valuable information that could then be used to prevent incidents and accidents from happening and build a safer, more productive working environment. Five years down the line, Scoutbase has grown to provide real-time, anonymous, and continuous data to shipping companies and customers, and thereby enabling a proactive, rather than reactive, approach to risk identification and minimization. Additionally, interventions and recommendations based on the analysis of the data collected have expanded the product into something that offers a clear identification of problem indicators as well as data-driven solutions to these, at an organisational and an individual level.

The Scoutbase technology is integrated into the crew Wifi on board and thus, does not require any app download or website access. This has resulted in a continuous engagement rate of more than 75% over the last few years. Any time crew members initiate an activity that requires internet connection, the Scoutbase mechanism is automatically triggered, and a short pop-up question will appear on the screen. Various levels of questions allow collection of quantitative as well as qualitative data, thereby further expanding the depth of understanding of the issues experienced at sea as well as allowing seafarers a safe space to voice their concerns and even possible solutions from their local rationality point of view. Due to the anonymous and confidential nature of the data, seafarers evidently display high levels of trust and honesty in the system. All data is then immediately fed into a cloud-based dashboard, where it is displayed in real time in a simple and clear manner. Any serious or minor concerns are calculated based on a threshold score and flagged accordingly. Data can be viewed across an entire fleet, per vessel, as well as for varying time spans. Most questions also allow free text responses, again providing more in depth and personal insights. In essence, Scoutbase is built to act as a warning system that is constantly analysing data for at-risk individuals, from a wellbeing point of view, or developing general trends on board a specific vessel or across the entire fleet. In the future, potentially even across the industry as a whole and thereby allowing a collective learning, which is unheard of today.

From further analysis of their data, Campara et al. (2021) claim that a 25% reduction in the strongest contributing

categories, i.e., Organisational Climate and Software, maritime accidents could be reduced by a huge 27%. Scoutbase can be a valuable tool in identifying various factors which may be contributing to higher rates of incidents or even accidents. It is not unusual for accidents to be extremely costly in a commercial and human sense, but also ecologically and environmentally. Thus, there is a strong business case to be made for a service such as Scoutbase to minimise impending risks and maximise the wellbeing and functioning of the crew, which will have direct consequences for the operation of the vessel. Furthermore, through the provision of improved working conditions and environments, aspects such as the attraction and retention of skilled crew members would also be influenced positively in the long-term. The multicultural and multilingual nature of crew, often bringing with it a vast array of stereotypes, racial and cultural perspectives, issues such as communication difficulties, relational tensions and misunderstandings can often be further exacerbated by the environmental factors such as noise, stress, and high temperatures (Dominguez-Pery et al., 2021). Thus, Scoutbase may also allow companies to effectively assess these indicators and establish a working culture that is safer, supportive, and sustainable to seafarer wellbeing and health.

Technology within shipping will continue to develop in the next few years. However, humans and their skills and knowledge will remain the main driver of the maritime industry. To enhance the impact of the human workforce further, we need to create an environment that is suited to do so. Scoutbase is here to further the understanding of how to do this impactfully.

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The illusion of risk assessment

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This research examined the reliability and applicability of published risk assessments used within the renewable industry environment. One hundred published task risk assessments were kindly supplied by four different renewable energy (wind) companies. Each task risk assessment contained a variety of individual risk assessments that evaluated the potential risk of a hazard realization. Each individual risk assessment contained a variety of risk reduction measures (1018 in total) intended to reduce the risks associated with a particular hazard and therefore demonstrate the risks are suitably and sufficiently managed. The risk reduction measures formed the basis of a Thematic Analysis described as descriptive method that reduces the data in a flexible way that dovetails with other data analysis models. (Vaismoradi, Turunen, and Bondas 2013)

With the aid of a random number generator 25 risk reduction measures were identified. Six individual open content coding categories were then created based on data similarities and differences. Austin and Sutton (2014), Corbin and Strauss (2008)

Two groups of random volunteers were then chosen, each group had no knowledge of the renewable industry and no connections to any renewable energy businesses. The first group of 5 volunteers came from the Institute of Occupational Safety and Health (IOSH). The second group of five were friends or relatives of the safety professionals who had no formal health and safety knowledge. It has been shown that providing the volunteers are randomly chosen the resulting median is 93.75% accurate (Hubbard 2014). Each volunteer was given a list of the 25 randomly selected risk reductions

measures and simply asked to classify the wording. It should be noted that a 7th classification of 'unknown' was added to ensure each control and mitigation received a classification.

The initial results were then examined to identify the types of language and phraseology used and how the various controls and mitigations were classified by the two volunteer groups. The two data sets were then analysed to establish a level of inter-rater agreement using the Fleiss Kappa tool (Fliess et al 2003). The output of the Fleiss Kappa analysis was analyzed to establish if there was any correlation between the two sets of data using Pearson Coefficient which measures the strength of linear association between two variables (Leard Statistics 2020).

The Fliess Kappa result from the safety professionals, indicated a 0.512 Kappa result which is a moderate agreement between the health and safety professionals, the result falls between 0.41 and 0.60 (Landis and Koch 1977). With a 95% confidence interval and a Sig value of 0.00 the result is classed as statistically significant (Laerd Statistics 2019). The results for the non-safety professionals' volunteers indicated a 0.164 Kappa result described as a poor level of agreement as result is < 0.20 (Landis and Koch 1977. Results show a 95% confidence level and a Sig. value of 0.00 which is classed as statistically significant (Laerd Statistics 2019).

The full set of Kappa results was then analyzed for any correlation using the Pearson correlation coeficient. where, r is the Pearson Coefficient score, xi¬ and yi are the values of the variables in the two data sets, and $\bar{x}$ and $\bar{y}$ are the mean of the values of the two data sets, x and y respectively. The Pearson correlation coefficient between the two Kappa Fliess sets of results indicates a 0.249 correlation which is classed as a small strength of association being 0.1 and 0.3 (Laerd Statistics 2020). The results indicate that the language and phraseology used within the published risk assessments has little correaltion between the two groupings indicating differences in understandings and meanings.

Having identified the phrasology adopted when creating risk assessment documention is confusing and ambiguous a content analysis was undertaken to assertain how applicable the risk reductions were in reducing the risks associated with the particular hazard.

The largest classification of risk reduction measures fell under the category of instruction. In 45% of the risk assessment examined the end user was given additional instructions such as "Step ladders shall be fully opened and footed by a second person". In 15% of the examined risk assessments safety statements were made such as 'Use mechanical handling aid where reasonably practicable". In 11% of the risk assessments analyzed the end user was given options on how to proceed, for example" as required and where possible'. In 7% of risk assessments examined the end user was asked to refer to other documentation example being "Electrical testing equipment as specified in procedure xxx". In each of the examples above a risk reduction benefit was claimed within the risk assessments scoring mechanism, and that is the subject of ongoing research examining risk assessment scoring methodologies

In conclusion almost 80% of the phraseology adopted within traditional and routine risk assessments will have a minimally token effect in reducing the particular risk. The phraseology adopted and examined is frequently ambiguous, which potentially indicates that the quantity of risk reductions measures is preferable to the quality of the risk reduction measures. It is suggested that in order to reduce ambiguity and subsequent confusion and irrelevance which is found within the documentation, a clearly defined taxonomy for risk assessment be implemented such as the model below

References

Indicate: Heat/ pressure gauges – sense (smell / touch), experience

Interrogate: monitoring systems, limits, competence

Inform: - Alarms, warnings, competence

Interrupt: relief valves, tripping systems, automated isolations

Intervene: PPE, suppression systems, extinguishers

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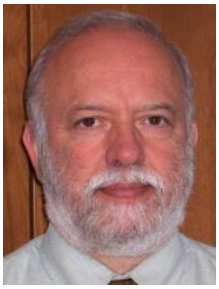
RESS News



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

New Impact factor

The results of the performance of RESS in 2021 are now available and they allow a balance to be made about the activity of the journal.

The journal continues the steep expansion of the number of papers published, which have been 736 in 2021 as compared with 515 in 2020 and 372 in 2019. It is impressive how the number of papers has increased so much lately.

It is interesting to note that the main general areas in which papers have been published have not changed much from year to year. The main area according to the Web of Science classification is Safety & Maintenance varying from 48% to 50%. Then, it is followed by Testing & Maintenance with 13 to 14%, Climate change 4-6%, Friction & Vibration 2-6%, and 1-3% for Transportation, Knowledge Engineering, Artificial Intelligence & Machine Learning, Software Engineering, Supply Chain & Logistics and Concrete Science.

As concerns the impact factor, it jumped to 7.247 in 2021 as compared with 6.188 in 2020 and 5.040 in 2019, keeping a positive trend of increase.

The journal is indexed in the category of Industrial Engineering where it ranks 11th (out of 49) and in Operations Research and Management Science where it also ranks 11th (out of 89). In both categories, it is a Q1 journal.

The journal has presently several special issues still open for submissions, which may interest some authors:

Data-centric Approaches for Prognostics and Health Management

Guest editors: Ajith Kumar Parlikad and Marco Macchi

Advances in computation and modelling of risk and resilience of socio-technical and human-technical systems

Guest editors: Luca Podofillini and Edoardo Patelli

Statistical inference-based solutions for diagnostics

Guest editors: Enrico Zio, Shunyi Zhao, Hongtian Chen

System Reliability & Resilience Optimization

Guest editors: Yan-Fu Li and Mustapha Nourelfath

Structural Health Monitoring with Digital Twins

Guest editors: Zhixiong Li,and Haidong Shao

Safety, Reliability and Availability of Complex Systems and Structures

Guest editors: Ângelo P. Teixeira, Enrico Zio, Hong-Zhong Huang

ESRA News

Integrated system of monitoring and evaluating risk in maritime traffic (MoniRISK)

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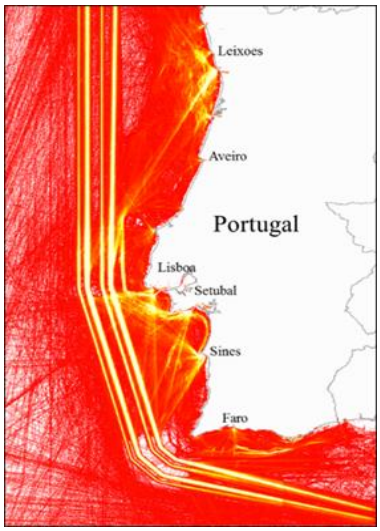
MoniRISK aims at developing an integrated system for maritime traffic monitoring and risk assessment to provide a more rational approach to maritime operations monitoring, planning and safety.

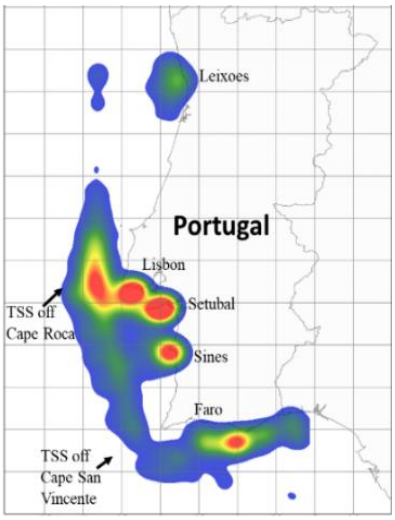
The system relies on the probabilistic characterisation of the maritime traffic patterns off the continental coast of Portugal from historical ship trajectory data provided by the Automatic Identification System (AIS). The knowledge extracted from historical maritime traffic allows for the definition of safe routes and operational profiles for different ship types that, once certified, have the potential to become one of the key enablers for future autonomous maritime traffic operations.

MoniRISK has also developed unsupervised tools for maritime anomaly detection and collision risk assessment as well as a dynamic risk index for individual ships off the continental coast of Portugal that integrates in a probabilistic framework the influence of relevant external (e.g. weather and traffic conditions) and internal (e.g. ship type, age, flag) risk factors.

These tools combine historical and observed real-time ship trajectory data from the Automatic Identification System, providing a means for assessing the risk of individual ships and for developing early alerts to support maritime traffic monitoring and control tasks. Moreover, the geographical characterization of the risk of the maritime traffic provides an important tool for early warning and for planning of appropriate resources to improve both the prevention and the response to ship accidents.



The ultimate objective of MoniRISK is therefore to increase the efficiency and the safety of current and future ship operations.



More information at: monirisk.tecnico.ulisboa.pt

Coordination

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Calendar of Safety and Reliability Events

41st International Conference on Ocean, Offshore and Arctic Engineering (OMAE 2022) - Symposium on Structures, Safety and Reliability

Conference: 5-10 June, 2022
Exhibition: 6-9 June, 2022
Hamburg, Germany

OMAE Conferences are 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, the OMAE 2022 will be held at the Congress Centre Hamburg, in Hamburg, Germany on 5-10 June, alongside an Exhibition on 6-9 June, 2022.

The OMAE 2022 Congress will be composed of 12 Symposia, 11 of which dealing with specific topics, and this year the Symposium 12 will be an Honorary Symposium for Professor Günther F. Clauss on Hydrodynamics and Ocean Engineering.

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: Sören Ehlers, Hamburg University of Technology (TUHH), Hamburg, Germany
Conference Co-Chair: Walter L. Kuehnlein, Principal Advisor, Terra.blue, Germany
Technical Program Chair: Yiannis Constantinides, Chevron, USA

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

32nd European Safety and Reliability Conference (ESREL 2022) - Symposium on Structures, Safety and Reliability

Conference: 28 Aug -1 Sept., 2022
Dublin, Ireland

We are delighted to announce that the 32nd European Safety and Reliability Conference (ESREL 2022) will be held in Dublin, Ireland from 28th August - 1st September 2022, under the auspices of the European Safety and Reliability Association (ESRA).

For many of us, ESREL is not only a place of scientific excellence but also an occasion for our community of safety and reliability specialists to meet in a spirit of conviviality in the broadest sense. We hope to continue this tradition in Ireland, providing a sample of our famous Irish hospitality, as we are conscious that the real value of the event will come from our guests, invited speakers and contributors alike.

This year the conference will have a special focus on: ***"Understanding and Managing Risk and Reliability for a Sustainable Future".*** We therefore invite all of you to submit your contribution keeping this overarching theme in mind.
Authors are invited to submit a short abstract by 15 February. Accepted abstracts will be invited to submit a full paper or an extended abreact within Special Sessions or regular session that will be peer reviewed. Full paper will be also published in open access conference proceedings by Research Publishing Services, Singapore, and be indexed.
We have received over 25 Special Sessions on very interesting topics and the event this year will also have some joint events such as:

- 6th International Symposium on Human Mental Workload. H-Workload
- International Workshop on Autonomous System Safety: IWASS
- Joint ESReDA - ESRA Session on Advancements in Resilience Engineering of Critical Infrastructures

These joint sessions will complement the regular sessions and application areas. You will find full details of the topic areas and further information about submitting an abstract for the event at the website, www.esrel2022.com .

Key dates for the event are below:

- **Abstract submission:** 15 February 2022
- **Full paper/extended abstract submission:** 30 March 2022
- **Final Revised Papers:** 15 June 2022
- **Early Bird Registration:** 15 July 2022
- **Conference dates:** 28 August – 01 September 2022

A hybrid conference organization will be proposed, combining in-person and virtual presentations, according to the evolution of public health rules related to the COVID-19 pandemic. However, we hope to share a Guinness with many of you for real and not only virtually!

The organising committee includes the General Chairs:

- Simon Wilson. President of the Irish Statistics Association. Simon is Professor in statistics at Trinity College Dublin and lead of the Insight Centre for Data Analytics.
- Maria Chiara Leva, Environmental Health Sustainability Institute TU Dublin, Ireland co-Chair of the HRA and HF committee in ESRA

And, General Co-Chairs:

- Terje Aven, Center for Risk Management and Societal Safety, University of Stavanger, Norway
- Enrico Zio, Dipartimento di Energia, Politecnico di Milano, Italy / Laboratoire Genie Industriel, Ecole Centrale Supelec.
- Marko Cepin, Chair of ESRA, University of Ljubljana.

While the Technical Program Committee Chairs are:

- Edoardo Patelli, Head of the Centre for Intelligent Infrastructures University of Strathclyde, UK
- Luca Podofillini, Vice-chairman of ESRA, senior scientist Paul Scherrer Institute Switzerland

Full details of the event and information about submitting an abstract can be found at the website:

www.ESREL2022.com

Looking forward to welcoming you to Dublin!

2nd International Workshop on Reliability Engineering and Computational Intelligence Intelligence Intelligence (RECI)

14-15 November 2022
Delft, the Netherlands

Excellent papers for the 1st RECI workshop demonstrated strong synergy between Reliability Engineering and Computational Intelligence but scientific differences remain. The 2nd RECI workshop attempts to address further integration by a) presenting papers on RECI topics, b) panel discussions about future RECI research and c) a curriculum discussion for an international RECI curriculum.

The workshop is organized by University of Žilina, TNO, Delft University of Technology, and the University of Huddersfield and will be supported by the projects:

- Advanced Centre for PhD students and young researchers in informatics (ACeSYRI) (Project EACEA.CBHE no.: 610166-EPP-1-2019-1-SK-EPPKA2-CBHE-JP)
- New methods development for reliability analysis of complex system APVV-18-0027, the Slovak Research and Development Agency
- Safety Enterprise Architecture, TNO project 060.51672/01.03: Occupational Safety Innovation/Huddersfield

Participation
The workshop RECI 2022 will be a hybrid event: we facilitate contributions in-person and online from Delft University of Technology. The organizers believe that the 200 Euro fee for in-person should not be prohibitive for in-person participation On-line participation will be free of charge. TUDelft hosts the event at the event location 'X' on Mekelweg 8, 2628 CD, Delft, THE NETHERLANDS.

Publication
The workshop presentations will not be published as papers. The abstracts of presentation will be accepted at the workshop web-page. Authors of all presentation will be invited to publish papers in the journal CERES (http://ceres-journal.eu).
Authors of selected presentations will be invited to prepare the contributions for the book "Reliability Engineering and Computational Intelligence" which will be published by Springer in series of Studies in Computational Intelligent.

Topics
The workshop develops RECI as a research domain by calling papers on current research. Examples include, but are not limited to:

- Mathematical & computational methods for risk analysis
- Computational intelligence for risk estimation
- Digital technologies for reliability engineering
- Software solutions for testing fault-tolerant systems
- Data mining and Knowledge discovery
- Methods based on Artificial Intelligence
- Accident and incident investigation
- Human reliability analysis
- Risk and hazard analysis
- Software reliability
- Hardware and software solutions
- Education, e-learning
- Trends in RECI

Important dates
Abstract submission 13 October 2022
Presentation of accepted abstracts 14-15 November 2022
Full paper submission 25 October 2022
Notification of acceptance 10 January 2023
Camera ready format submission 25 January 2023

Submission of contributions
The presentation title, authors, their affiliations and abstract of 1,000 symbols should be submitted to the submission system
https://easychair.org/conferences/?conf=reci2022.

For further details, please contact:

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Continuing Education Courses

Fundamentals of Quantitative Risk Assessment

20-24 June 2022
Politecnico di Milano, Milano, Italy

The second edition of the professional training course: "Fundamentals of Quantitative Risk Assessment" from 20-24 June 2022 at the Department of Energy, Politecnico di Milano, Campus Bovisa-La Masa, 20156, Milano, Italy.

The course is mainly dedicated to risk analysts and engineers, resilience engineers, technical designers of industrial plants, safety and maintenance managers, asset managers, technicians and operators of surveillance, protection and control of the safety of a facility, researchers and PhD students in the area of Reliability Analysis and Risk Assessment.

The course is stimulated by the evidence that In recent years, concern related with population and environment safety issues has been growing, and their role for social, economic and industrial growth and development has been recognized. Accordingly, the skills necessary to deal with complex safety issues are now a "must-have" in all sectors where safety analysis is needed to support processes/systems design, since in many sectors a systematic approach to the design and management of systems within established safety limits is unavoidable.

The determination of the risks associated with a given industrial activity and the evaluation of the effectiveness of the protections and barriers in place require a multidisciplinary approach that allows to:

- identify the sources of potential danger;
- determine the evolution of the accident scenarios;
- evaluate the frequency of occurrence of accident scenarios starting from the reliability data of the components and protection systems involved;
- evaluate the consequences of the accident scenarios.

Therefore, the identification, understanding and management of industrial risks, and their interaction with environmental systems, require the knowledge of appropriate analysis methodologies.

In this sense, the course intends to consider the safety problems deriving from modern industrial activities and to present the methodologies that allow the assessment and control of associated risks. In particular, the course intends to offer adequate technical-scientific knowledge on critical safety issues, risk analysis, reliability engineering and provide the basic methodological tools for their rigorous treatment.

The first part of the course is devoted to the presentation of the basic concepts of reliability and risk analysis.

Essential notions of probability and statistics will be first introduced with focus on failure time distributions, and failure and repair parameters estimation (Maximum Likelihood Estimation (MLE) method, Bayesian method). In the second part of the course, methods for reliability analysis and risk assessment will be illustrated, including Fault Tree, Event Tree, Bow-Tie, Markov modelling, Dependent/common cause failures models and importance measures. Hands-on sessions provide the participants with the opportunity of directly applying the methods to practical case studies (some of these will be held using MATLAB). Finally, in the last part of the course, real applications of the concepts and methods illustrated in the course are presented. Course participants will also be given the opportunity to discuss their experience and technical problems, related to methods and applications.

The European Safety and Reliability Association (ESRA)) supports the course with two scholarships to be awarded to PhD students. Scholarships will be assigned considering the affinity of the research to the topics of the course, the quality of the CV and the number and impact of publications in the field.

Course directors:
Prof. Enrico Zio
Prof. Francesco Di Maio (francesco.dimaio@polimi.it)
To register:
https://www.corsoriskassessment.energia.polimi.it/

Reliability and Maintenance of Dynamic Systems: Advanced Methods and Recent Developments

43rd International Summer School
of Automatic Control
5-9 September, 2022
Grenoble, France

The objective of this one-week summer school is to introduce the participants to the different approaches recently developed in the field of dependability of dynamic systems, in response to recent evolutions both in the addressed systems and in the used disciplines and tools. Approaches to dependability have been indeed confronted with a paradigm shift, due to increasingly complex, monitored and controlled systems and to the emergence of the use of new disciplines (eg artificial intelligence) in reliability and maintenance.

This paradigm shift has profoundly modified the vision of systems reliability and dependability, leading to the emergence of new approaches: PHM (Prognostic and Health Management), Predictive Maintenance, RxM (Prescriptive Maintenance), Reliability-Aware Control or Degradation-Aware Control, Post-Prognosis Decision Making, etc.

The participants will be trained in the tools and methods on which these approaches are based and the school will consist of a series of surveys, lectures and research talks taught in English, completed by a series of applications sessions on the following themes:

- Reliability, maintenance and safety: old problems, classical methods and new challenges
- Dynamic reliability modelling with application to the resilience of critical infrastructures
- Prognostics and health management: from monitoring to post-prognostics decision-making
- Artificial intelligence approaches to reliability and predictive maintenance
- Reliability and degradation aware control, RUL control and reliability adaptive systems
- Reliability and safety of autonomous systems
- Advances methods for stochastic deterioration and (imperfect) maintenance modelling
- Structural Health Monitoring (SHM) and damage aware active control

The school is mainly intended for PhD students, researchers and industrial participants wishing to initiate, consolidate or reorient their research project in the field of reliability and maintenance of dynamic systems.

For more information please visit :
ESRA website at https://esrahomepage.eu/home,
or the website at
http://www.gipsa-lab.fr/summerschool/AUTO22/,
or Christophe BERENGUER
(christophe.berenguer@grenoble-inp.fr).

Continued Education Course:

Advanced Quantitative Risk and Resilience Assessment

October, 2022
Politecnico di Milano, Milan, Italy

The first edition of the professional training course: “Advanced Quantitative Risk and Resilience Assessment” organized by Politecnico di Milano (Milan, Italy) took place ONLINE from 12/10/2021 to 18/11/2021 (each Tuesday and Thursday from 14:00 to 18:00 (Rome time)).

The course was the I edition of the series. Its goal has been to provide the 32 participants (23 from university/research center and 9 from industry) with methodologies that allow the integrated assessment of risk and resilience. In particular, the course intends to offer adequate technical-scientific knowledge on advanced risk and resilience assessment methods and provide the most recent methodological tools for their rigorous treatment.

The course has been officially supported by ESRA with two scholarships covering the registration fee of two PhD students. The 2021 scholarships have been offered to two

PhD students, one from Poznan University of Technology (Poland) and the other from Sapienza, Università di Roma (Italy).

The first part of the course was devoted to the presentation of the classical Monte Carlo simulation methods for risk and resilience assessment and management, and advanced concepts on uncertainty (probabilistic, fuzzy, interval) and sensitivity analysis (variance- and distribution-based). In the second part of the course, advanced methods for risk and resilience assessment were illustrated, including Bayesian Networks and Dynamic Bayesian Networks, Artificial intelligence and Evolutionary algorithms, complex systems and Human factors modelling. Hands-on sessions have provided the participants with the opportunity of directly applying the methods to practical case studies (some of these will be held using MATLAB). Finally, in the last part of the course, participants have also been given the opportunity to discuss their experience and technical problems, related to methods and applications.

The next edition of the course fill take place at Politecnico di Milano, Milan (Italy) on October 2022.

Course directors:
Prof. Enrico Zio & Prof. Francesco Di Maio
francesco.dimaio@polimi.it

To register:
https://www.corsoriskassessment.energia.polimi.it/

ESRA Information

1. ESRA Membership

National Chapters

- ESRA Norway

Professional Associations

- DBI - The Danish Institute of Fire and Security Technology, Denmark
- ESReDA, France
- IDA Risk – Technical Network for Risk Assessment under the Danish Society of Engineers, Denmark
- KAERI (Korea Atomic Energy Research Institute), Korea
- Machinery Reliability Institute (MRI), USA
- NVRB, The Netherlands
- Polish Safety & Reliability Association, Poland
- SINTEF AS, Norway
- The Safety and Reliability Society, UK
- VDI - Society Product and Process Design, Germany
- VTT, Finland

Companies

- BQR Reliability Engineering Ltd., Israel
- DNV GL, Norway
- Safetec Nordic AS, Norway
- TNO Research, The Netherlands

Educational and Research Institutions

- "Gheorghe Asachi" Technical University of Iasi, Romania
- Bergische Universität Wuppertal, Germany
- CentraleSupélec, Université Paris Saclay, France
- Czech Technical University in Prague, Czech Republic
- ETH Zürich, Switzerland
- Federal University of Pernambuco, Brazil
- Gdynia Maritime University, Poland
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- Helsinki University of Technology, Finland
- INSA – LMDC, France
- Institute of Nuclear & Radiological Sciences & Technology, Energy & Safety, Greece
- Institute of Sustainable Development (INE)/ZHAW, Switzerland
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- Las Palmas de Gran Canaria University, Spain
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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 Journal that is published in Association with ESRA, and of producing the ESRA Newsletter.

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ESRA is a non-profit international organization for the advance and application of safety and reliability technology in all areas of human endeavour. It is an "umbrella" organization with a membership consisting of national societies, industrial organizations and higher education institutions. The common interest is safety and reliability.
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