ESReDA
European Safety, Reliability & Data Association

Newsletter

www.esreda.org | Contribute | Influence | Change | April 2023 I Issue

Open Letter to ESReDA community from Cyp F.H. van Rijn

Dear all,

C(yp) F.H. van Rijn
Asset Management Consultancy
An ESReDA Founder
Beeckzanglaan 1F
1942 LS Beverwijk (NL)
Tel 0628580475

As one of the founding fathers, I was looking forward to meeting old and new ESReDA members at this seminar in the Netherlands. Unfortunately, I fell off a platform causing severe back pain. Hence I had to cancel my attendance. I had a series of emails with Mohamed Eid, who asked me to put this in the newsletter.

I still follow the organisation with great interest and admire the BoD for their effort to keep ESReDA going on to be the European meeting point for expertise in this area. I realise that, when Henri Procaccia, Hans Wingender and I started in 1992, we were lucky to have the backing of Industry and large European organisations, but that this dwindled over the years. It is remarkable that authorities and responsible managers keep on stressing the extreme importance of RAMS in general, but still take decisions / introduce systems based on scarce, shallow insight and badly monitored/secured in practice due to very imperfect feedback over a time horizon that conflicts with their average residence time!

The concept of “fragility “is new to me but may be more realistic than assuming we have a perfect mathematical model for stochastic decision making. Good idea for an organisation as ESReDA to launch such a project group! Here, the concept may be discussed between European experts thus leading to more effective research. But then… how do these goodies arrive at the engineer taking responsibility for such decisions, how does she/he evaluates the benefit, acquires the confidence an get the tools to defend decisions to the organisation? I realise that faculty members have problems in getting funding for PhD candidates who need to produce 3-4 accepted scientific publications to get their thesis but also that this information/ insight hardly ever reaches the real world.

At the ESReDA meeting in Linz 2019[1] compared reliability engineering with control engineering, now fully integrated in education and industrial practice:

- Observability; Control goals are well-defined, deterministic, measurable and control engineers are trained to deal with stochastic influences. Asset management goals are essentially of a stochastic nature and in practice rather ill-defined; the engineers involved have a quite deterministic background.
- Controllability is an essential pre-requirement in control design; which process variables have to be adjusted in what sense to reach the goal? The toolbox of the asset manager is restricted, maintenance actions cover various failure modes who, in (sometimes, difficult to grasp) logical combinations, lead to system failures.
- System dynamics are an essential part of control design (e.g. PID settings); control engineers realise that slow (in the order of hours) , multivariable processes are intrinsically difficult to control in many cases only by slowly adjusting control parameters (integral action). In reliability engineering the MTTF of critical failure modes lead to system dynamics covering 5 to 20 years. Information is restricted to, at best, regular inspections. Over such a period managers change their roles and new staff are inclined to come up with “radically innovative, better” means of control violating the stability criterion.

I had the pleasure to train some 300 devoted engineers in decision making in RAMS to a master level. Their common main hurdle is the lack of stochastic insight combined with lack of fundamental knowledge on failure processes aggravated by the (frequently, unknown) effect of operational decisions. Time was always too short to even acquire basic insight, the necessary underlying mathematics in fact drove them away from acceptance. Still, I felt pleased to see that making use of their team insight with simple analysis/simulation models, keeping mathematics at the background where possible, followed by solving decision support models led to a common understanding of their “power of control “/ the range of outcomes to be expected and, from there, to a better underpinning of decisions, e.g., on maintenance planning. The simulation results clearly increased their mental model of uncertainty.

[1] Cyp F.H. van Rijn, Risk and Reliability Engineering for Crisis Management: Using Experience from Asset Management. Proceedings of the 56th ESReDA Seminar, May 23-24, 2019, Johannes Kepler University, Linz, Austria

But it is unrealistic to assume that such an underpinned group decision considering the inevitable variance in outcomes stands up against the expectation of higher/operational management of taking firm/effective decisions. “Show us the (economic) value!!! We make the money, you are an inevitable cost factor.” And thus, the asset manager must live with the conflict between lack of control and uncertainty versus the strict deterministic requirements laid down in ERP systems like SAP which she/he realises are imperfect, sometimes even misleading.

In real life Industry at large has lost the experience of engineers working decades for the same company in the same field; management now relies on hired-in engineering firms that must comply with service level contracts with big financial risks. For example, the Dutch Department of Waterways and Public Works transformed from an organisation with strong in-house knowledge with a large engineering workforce even dealing with the bolts and nuts of civil structures to an organisation completely outsourcing projects based on functional requirements and DBFM. A successful approach? We have seen already a number of projects where such engineering companies, even after reducing their risks via large commercial conglomerates, almost went bankrupt during realisation. And then, the Department had to find millions to get the work done, since there were no others who could do the job. Hiring in consultants? I met them at the Master course; “The company states that they must produce a full FTA, that’s why we hire you in. Where are the data? No idea, that is your job!!!” Data? That was one of the starting goals of ESREDA , but one of the major data collection efforts OREDA dwindles down, has lost the link with major oil companies. The EDF handbook?

We have to acknowledge that over many decades our scientific efforts to improve decision making in asset management have not lead to impressive effects in actual practice. At the same time, science will continue to move forward and produce papers of recognised scientific quality. Thus, the gap will increase.

I got backflashes of my conversations with James Reason, hired in by Jane Goodacre to solve safety problems in Stanlow Refinery. Every time I produced an “intelligent, scientifically based” remark he asked me “and what about the mechanic/operator, does he understand why?”. His simple butterfly model is now “gefundenes Fressen” at the working floor!

I wonder whether in this era of seductive computer games and a whooping AI hype, ESReDA could be instrumental in crossing this bridge. I could foresee a free, cheap ESReDA app that engineers enjoy playing with on their cell phones analysing realistic problems such as on combining team opinions into a Weibull description, to decide on inspection intervals, on planned maintenance, on the effect of failure modes at system level,… The software would lead to enhance their insight, almost “learning by playing”. On one hand, such an app would be an effective tool to distribute the academic effort to the real world, on the other hand, the on-line results of these “games” played by real problem owners may be fed back to academia. Certainly, this is no rocket science, is existing knowhow and does not easily fit in academic research but, if properly introduced, would be of great benefit to practical problem owners and may be also to somewhat frustrated academia “why am I doing this?”

Any volunteers? I am willing to share with you my experiences and (clumsy) software!

Cyp van Rijn,

Hon. President ESReDA

New ESReDa Project Group
RACI: Resilience Assessment of Critical Infrastructure (2023-2026)

Vytis Kopustinskas
European Commission,
Joint Research Centre
stoop@kindunos.nl

Research in resilience of infrastructure systems has been constantly increasing during the last decade and is expected to grow further. Although the term resilience originates from research in ecology back 70s, self-repairable computer systems being developed also in the same decade for space and defence applications, could be considered as the first examples of resilience applications in engineering. Resilience applications in technical systems domain have evolved most significantly during the last two decades and the term resilience was transferred also to the policy domain as Directive on the resilience of critical entities (CER Directive) went into force in January 2023 replacing 2008 Critical Infrastructure Directive.

The PG will focus on resilience applications in critical infrastructures, promoting cross-disciplinary collaboration and application of proven methods from one infrastructure domain (e.g. energy, NATECH systems) to other infrastructures. The PG partners will focus on the specific infrastructure domain they are working on and promote methodological exchange of successful methods or approaches.

The aim of the PG is to develop and propose an integrated approach for quantitative resilience assessment including management decisions (comparison of solutions for investment, maintenance) in a context of uncertain scenarios (global change and emerging threats).

Jean-Marc TACNET, University of Grenoble, France

Christophe BÉRENGUER, University of Grenoble, France

The Project Group would have the following 3 main objectives: (i) Develop a forum by which the leading researchers from both academia and industry can meet, exchange ideas and where appropriate work together on projects relevant to the area of Resilience Assessment.. (2) Produce a technical reference which will document the current state-of-the-art along with the advances made over the duration of the project group in the aspects of Resilience Assessment that have been the focus of the work.. (3) Disseminate the work conducted emphasizing its practical application in the ESReDA seminars and beyond.

This project group (PG) continues the work done in the previous ESReDA project group "Resilience Engineering and Modelling of Networked Infrastructure", led by University of Nottingham (Dr. Rasa Remenyte-Prescott, Prof. John Andrews, Kate Sanderson) during 2018-2021 years. The PG work was accomplished by publishing a book "Modelling the Resilience of Infrastructure Networks" (Eds. Rasa Remenyte-Prescott, Vytis Kopustinskas) in late 2021.

Joint Project Group Leaders:

- Dr Vytis KOPUSTINSKAS, European Commission, Joint Research Centre
- Dr. Jean-Marc TACNET, University of Grenoble, France
- Dr. Christophe BÉRENGUER, University of Grenoble, France

Project Group Steering Committee:

- Prof. John ANDREWS, University of Nottingham, UK
- Prof. Giovanni SANSAVINI, ETH Zürich, Switzerland
- Dr. Rasa REMENYTĖ-PRESCOTT, University of Nottingham, UK
- Dr. Jean-Marc TACNET, University of Grenoble, France
- Dr. Christophe BÉRENGUER, University of Grenoble, France
- Dr. Gianluca FULLI, European Commission, Joint Research Centre, Italy
- Dr Vytis KOPUSTINSKAS, European Commission, Joint Research Centre
- Programme of events

On initiation of the project Group the following draft programme of activities is expected to take place:

- Project group meeting 1 (Ispra-Italy, Oct 24, 2023)
- ESReDA seminar on Resilience Assessment of Critical Infrastructure (Ispra-Italy, Oct 25-26, 2023)
- ESREL 2024 special session on "Advances in resilience assessment methodologies"

Knowledge based EsReDa cube also foresight tool in climate robust fishing vessel design process

Frans Veenstra senior PhD WUR-TU Delft "Sustainability and fisheries design processes"; march 2023
veenstrafishco@gmail.com

Since 2000 fishers should increasingly adapt to socio-political and ecosystem requirements for climate responsive fishing(vessels). Paris Climate Agreements (2015) and EU Green Deals (2030/'50) are becoming the newest North Sea fisheries change agents with consequently (re)design change drivers. New climate robust fishery (design) knowledge* has been developed in the context of the global North Sea policies: renewable energy, biodiversity, seafood security. Futureproof ship designs must become proactive/flexible/anticipative to prevent expensive retrofits/re-use in the vessel lifecycle.

The 3D ESReDa foresight safety model has been used as a tool to demonstrate and communicate feasible, credible and plausible artifact system changes and adaptations. With this approach the designer and fishermen get better in-/oversight in potential climate-sustainable design variables and business uncertainties in the long run. Through intertwining all change drivers the fishery design process becomes more prospective/transparent in the EsReDA context of multi-stakeholders, operational actors and novel design aspects.

Post-62nd Seminar: Resilience is still fuzzy in system engineering

ESReDA President Mohamed Eid

One of the major outcomes of the 62nd ESReDA seminar is to rediscover the large discrepancies in the use of the term "Resilience" within system engineering communities.

The concept of "resilience" has been showing a persistent rapid emergence in critical infrastructure protection and in global crisis management, during these last decades. The present paradigms of system resilience need to be revisited. The concept itself is not a recent one. Many scientific disciplines make frequent use of it.

Historically, the first use of the term "resilience" was introduced in mechanics and material sciences, in the 19th century. In material sciences, "resilience" is very well-defined and well-measured. Notably, Resilience is the ability of a material to absorb and release energy within the elastic range. Two metrics

EID Consultant / RiskLyse, France

are used to measure Resilience, in that sense. The “proof resilience” which is defined as “the maximum elastic energy absorbed by a given body, measured in Joule (J). Besides, the “resilience modulus” which is defined as “the maximum elastic energy absorbed per unit volume of a given body and measured in Joule per cubic meter (J/m3). In material sciences, it is just a matter of the ability to restore the initial state once the stressing phase is off. The resilient material should then become “as good as before stressing”. However, there is no concerns about “how long time the restoring would take”. In material science, two different materials are identical from material resilience standpoint if their “proof resilience” values are identical, even if one can be restored in 10 seconds while the other needs 10 minutes. In fact, this is the simplest concept of resilience for the simplest category of systems, in sciences. The “material resilience” concept is mathematically modelled and has precise metrics. But it is static.

However, the concept of resilience is still fuzzy in system engineering. Its use in risk assessment and system operability-failure analysis is recent and not well-established yet. Engineers and risk analysts find great difficulties to come up not only with a universal view of resilience but also with some local proto models. Even a sectorial consensus limited to circumstantial engineering applications, needs and/or operational environment did not emerge yet.

The growing complexity of the modern systems pushes for the emergency of an elaborated resilience concept. Modern systems are more and more heterogeneous, distributed, interdependent, smart, active, and proactive. This growing complexity gave birth to the notion of “system of systems”. Accordingly, classical risk management should integrate in some way the concept of resilience. Notice that the most complex systems created by Nature are the living beings and their ecosystems.

What if we go to see what happens in the sciences investigating these complex systems of systems?

Ecological Resilience has been introduced into the ecological sciences in 1973 by C. S. Holling. He writes: “If we are examining a particular device designed by the engineers to perform specific tasks under a rather narrow range of predictable external conditions, we are likely to be more concerned with consistent invariable performance in which slight departures from the performance goal are immediately counteracted. A quantitative view of the behaviour of the system is therefore essential. With attention focused upon achieving constancy, the critical events seem to be the amplitude and frequency of failures. But if we are dealing with a system profoundly affected by changes external to it, and continually confronted by the unexpected, the constancy of its behaviour becomes less important than the persistence of the relationships. Therefore, attention shifts to the qualitative and to questions of existence or not.”. Holling does clearly focus on the system “being” not on the system “doing/behaviour”, in presence of an extreme external and existential aggression. Subsequently, qualitative measure receives the highest intention. But Holling recognises also that if the menace is not existential then “A quantitative view of the behaviour of the system is, therefore, essential”!

On the other hand, psychological Resilience does largely investigate crisis management issues. It switches to societal (community) resilience. It is viewed as a process where communication plays the major role in restoring an individual or a group of individuals after a traumatic crisis. Researchers distinguish between two kinds of resilience: individual resilience (microscopic) and community one (macroscopic). If system engineering opts for the communication-oriented resilience concept, in global crisis, we will then look in the direction of the psychological resilience. Psychological resilience seeks to understand why some individuals can withstand – or even thrive on – the pressure they experience in their lives while some others are not. In psychological and behavioural sciences, specialists will rather describe “resilience” not as a “quality/ability” but as a process. They may describe resilience as: “the process of effectively negotiating, adapting to, or managing significant sources of stress or trauma”. Some others refer to it as a “dynamic process encompassing positive adaptation within the context of significant adversity”. We may note that this dynamic process has a non-deterministic quality. That means: the dynamic process does not encompass the same adaptive pattern in response to a repetitive action of the same stressing vector on the same individual. The absence of the “deterministic” quality lets us suppose that it is a “stochastic” process.

The resilience concept in behavioural psychology is in fact systemic and uses qualities such as: elasticity, dynamic and stochastic. These are the qualities that engineers and researchers consider in modelling system resilience. But it stays qualitative. They use descriptive patterns not analytical models.

I believe that engineering science has much to learn from ecological and psychological sciences about resilience conceptualisation and modelling.

I am grateful to all the experts who have shared their experiences about resilience in system engineering sciences during the 62nd ESReDA seminar. That was very inspiring and fruitful. Our community still have a long way to make together. Luckily, I would say!

Forthcoming event: 63rd ESReDA Seminar

The 63rd ESReDA Seminar

Chairwoma
Kristine VLAGSMA
(European Commission, Joint Research Centre)

Principal Organiser
Vytis Kopustinskas
European Commission, Joint Research Centre
stoop@kindunos.nl

Resilience assessment: Methodological challenges and applications to critical infrastructures 25-26 October 2023, JRC, Ispra – Italy.

Research in resilience of infrastructure systems has been constantly increasing during the last decade and is expected to grow further. Resilience applications in technical systems domain have evolved most significantly during the last two decades and the term resilience has already been transferred to the policy domain, as the Directive on the Resilience of Critical Entities (CER Directive) went into force in January 2023 and replaced the Critical Infrastructure Directive, published in 2008.

Two fundamental points in resilience domain to be addressed by the Seminar are:

- The methodological development of resilience assessment from a conceptual framework to modelling approaches.
- The metrics for resilience assessment and development of quantitative tools for decision making.

The 63rd ESReDA seminar will be a forum for exploring these points and other related questions. We aim to discuss theories, concepts, and experiences of resilience assessment methodologies and applications. Authors are invited to present their proposals and discuss successes and/or failures and to identify future needs in resilience research. We want to encourage new ideas, scientific papers, conceptual papers, case studies and cross-sectoral research on this topic with examples and applications of infrastructures exposed to both technological and natural threats, hazards. This seminar will bring together researchers, practitioners, and decision-makers.

Authors wishing to present a paper at the Seminar are invited to submit an abstract/paper online by Easychair platform.

Extended abstracts are an alternative to full papers. An extended abstract should be at least one page in length, and it should include a list of most relevant references (5 or 6). Both extended abstracts and full papers will be published in the Seminar proceedings.

Abstract submission: June 23. Details in ESReDA webpage. https://www.esreda.org/events/

Past ESReDA SEMINARS

The 62nd ESReDA Seminar

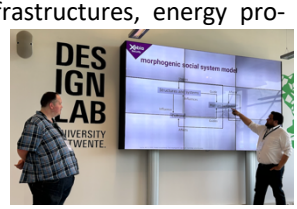
Alberto Martinetti
University of Twente, the Netherlands

The 62nd ESReDA Seminar on Managing the unexpected: designing systems to embrace disorder for increasing asset reliability

April 12th – 13rd, 2023, University of Twente, the Netherlands 62nd ESReDA Seminar

Understanding and dealing with unexpected events and the unknown are a major challenge in asset management. Unexpected drifts from normal working conditions pose several concerns about the decrease of safety levels as well. This was the main topic of the 62nd ESReDA seminar held on April 12-13, 2023, hosted by the chairman Dr. Alberto Martinetti at the University of Twente, The Netherlands.

The aim of the seminar was thus to discuss the state of the art and on-going developments in dealing with unexpected events for complex systems (i.e. infrastructures, energy production), presenting new techniques and methodologies and to discuss their strength, weakness, and uncertainties in order to improve reliability.



15 papers from international academics were presented to try to shed a light on these problems, suggesting novel methods for embracing disorder.

3 keynote speakers helped the audience to navigate through unexpected events and real situations (Marinus J. Kuivenhoven and Edzo A. Botjes – Xebia Security and Prof. Dr. Ira Helsloot, professor of the Governance of Safety and Security at the Radboud University) for creating a more “antifragile” future

The 61st ESReDA Seminar

Micaela Demichela
Politecnico di Torino, Italy

The 61st ESReDA Seminar on Advances in Modelling to Improve Network Resilience

22-23 September 2022, Torino, Italy. 61st ESReDA Seminar

Climate change and the delays in adopting the necessary measures to manage it is increasing the number of disrupting events triggered by natural events. Sudden failures or gradual deterioration of system components due to natural events can bring to malfunctions, loss of containment and disruptions, whole likelihood is going to increase in the next future.

In recent years several methodologies and techniques have been proposed, able to take into account explicitly and in realistic way NaTech events, able to support the decision making in terms of prevention, protection, adaptation and management. NaTech events have also another dimension to be considered, that is the territorial one, again in terms of prevention, management, and resilience.

The aim of the seminar was thus to discuss the state of the art and on-going developments in the NaTech risk assessment techniques and methodologies and to discuss their strength, weakness, and uncertainties in the assessment of the safety and resilience of complex systems.

The 60th ESReDA Seminar



Rasa Remenyte-Prescott
Kate Sanderson
John Andrews
Univ. of Nottingham, UK




Christophe Berenguer,
Sylvie Perrier,
Jean-Marc Tacnet
Julien Baroth
Univ.Grenoble Alpes, FR

The 60th ESReDA Seminar on Advances in Modelling to Improve Network Resilience, 4-5/5/2022, Grenoble, France

The seminar has been organized by the University Grenoble Alpes under the Risk@UGA Idex project framework and hosted by Grenoble INP ENSE3. It has been a forum for exploring issues related to engineering resilience against different threats, such as failures of aging infrastructure, natural disasters and climate change, intentional attacks (cyber-security and terrorism), and emerging threats, met by different industries, critical infrastructures and urban settlements. This seminar closed a 3 years project group "Resilience Engineering and Modelling of Networked Infrastructure", managed by the University of Nottingham, particularly J. Andrews and R. Remenyte-Prescott (in the center of the group picture). Contributions have covered a wide range of topics concerning several stakeholders, from practitioners to researchers (industrialists, regulators, safety boards, universities, R&D organisations, engineering contractors and consultants, training specialists) who presented their work in sessions about resilience of Electrical Networks, transport networks and Smart Cities, Infrastructure Networks… Theories, concepts, and experiences of methods for improved network resilience have been discussed. Authors have been invited to present their research and experience and discuss challenges in enhancing resilience through modelling. Papers have been published soon in JRC Technical Notes.

The proceedings can be downloaded here.

ESReDA Project Groups - News

Siegfried Eisinger
PG Leader
Siegfried.Eisinger@DNV.com

ESReDA TCIS Project Group: Trustworthy Complex and Intelligent Systems

Webinar Series on "Trustworthy Complex and Intelligent Systems"
In 2021 ESReDA arranged 8 successful webinars on this theme, in collaboration with ETH Zürich and DNV. Due to changes in the team the webinars were discontinued, but DNV thinks that the subject is important and still interesting enough to try to pick up the activity. With the recent discussions on ChatGPT, EU AI standardization efforts and how AI-based systems should be risk analysed and controlled we see that notion clearly confirmed. We need presenters who can make a contribution

to the series. DNV would also welcome partners who want to arrange these webinars together with us.
Therefore: Please contact Siegfried.Eisinger@DNV.com if you have ideas about interesting presenters or if you want to be part of our team.


Eric Marsden
eric.marsden@foncsi.org

Myrto Konstantinidou
myrto@ipta.demokritos.gr

ESReDA RKM project group: Risk, Knowledge and Management

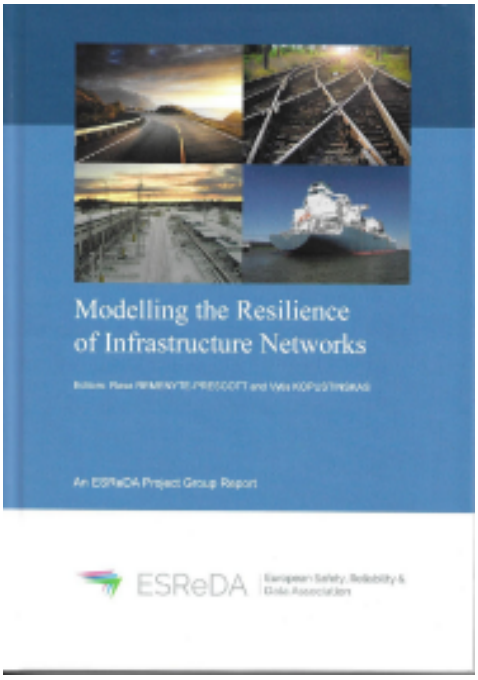
The Risk Knowledge and Management Group is continuing its activities. During the last group meeting on the 22nd of February 2023 there was a shift-over of the Group Leader from Eric Marsden to Myrto Konstantinidou and an updating on the status of the discussion papers. Currently, we have 14 discussion papers under preparation and another 6 under discussion. One is ready to be published in June 2023 and the rest will be published eventually until February 2024. The first one is entitled "Delegation of safety oversight" and it has been prepared by Eric Marsden. We are also planning to host a workshop and ESReDA Seminar in 2024, probably in Athens.


Rasa Remenyte-Prescott
University of Nottingham, UK

John Andrews
University of Nottingham, UK

ESReDA Project group on Resilience Engineering and Modelling of Networked Infrastructure

Findings from the project group have been published in a book entitled "Modelling the Resilience of Infrastructure Networks", edited by Rasa Remenyte-Prescott and Vytis Kopustinskas.



This book is a selection of contributions written by members of the Project Group and concentrates on the themes of transportation and utilities. The papers intend to provide an insight into the state of the art of resilience modelling with a focus on Networked systems. The book is aimed at both an industrial and academic readership with interests in the resilience of engineering systems.

We would like to thank the authors for their contributions to this publication, and our colleagues at DNV for their practical support with printing and distribution.

For information on how to purchase a copy please contact ajguillen@us.es ESReDA General Secretary, Antonio J. Guillén (Ingeman, Spain).

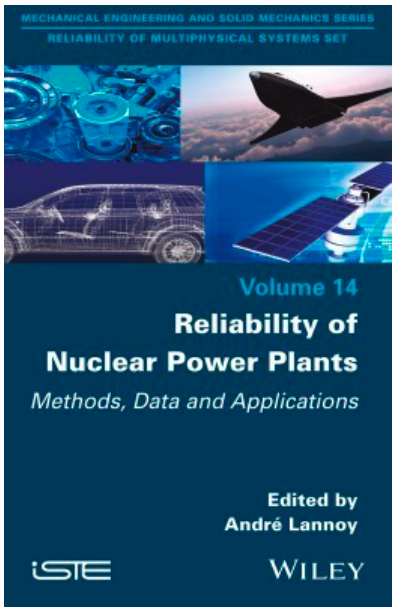
Book Purchase Order is joint to the newsletter

ESReDA community recommended books

ESReDA
Honoray President
Jean-François Raffoux

Reliability of Nuclear Power Plants Methods, Data and Applications

Abdelkhalak El Hami



Since the 1970s, the field of industrial reliability has evolved significantly, in part due to the design and early operation of the first generation nuclear power plants. Indeed, the needs of this sector have led to the development of specific and innovative reliability methods, which have since been taken up and adapted by other industrial sectors, leading to the development of the management of uncertainties and Health and Usage Monitoring Systems.

In this industry, reliability assessment approaches have matured. There are now methods, data, and tools available that can be used with confidence for many industrial applications. The purpose of this book is to present and illustrate them with real study cases. The book addresses the evolution of reliability methods, experience feedback and expertise (as data is essential for estimating reliability), the reliability of socio-technical systems and probabilistic safety assessments, the structural reliability and probabilistic models in mechanics, the reliability of equipment and the impact of maintenance on their behavior, human and organizational factors, and the impact of big data on reliability. Finally, some R&D perspectives that can be developed in the future are presented.

Written by several engineers, statisticians and human and organizational factors specialists in the nuclear sector, this book is intended for all those who are faced with a reliability assessment of their installations or equipment: decision-makers, engineers, designers, operation or maintenance engineers, project managers, human and organizational factors specialists, experts and regulatory authority inspectors, teachers, researchers, and doctoral students.

The book can be ordered here.

Forthcoming Conferences & Seminars

Rasa Remenyte-Prescott
University of Nottingham, UK

The University of Nottingham
UNITED KINGDOM · CHINA · MALAYSIA

UNIVERSITÉ DE LORRAINE

12th IMA International Conference on Modelling in Industrial Maintenance and Reliability (MIMAR) 4-6 July 2023, Nottingham, UK

The 12th International Conference on Modelling in Industrial Maintenance and Reliability (MIMAR) will take place in Nottingham, UK from 4-6 July 2023. This event is the premier maintenance and reliability modelling conference in the UK and builds upon a very successful series of previous conferences. It is an excellent international forum for disseminating information on the state-of-the-art research, theories and practices in maintenance and reliability modelling and offers a platform for connecting researchers and practitioners from around the world.

The scope of the conference includes:

- Engineering Economy and Cost Analysis
- Life cycle/performance analysis
- Maintenance and Reliability Modelling
- Prognostics and Health Management
- Reliability and Maintenance Engineering
- Safety, Security and Risk Management
- Spare Parts Supply Chain Management
- Warranty Management and Data Analysis
- Machine learning for reliability engineering and maint. optimization

Presentations are encouraged on the theory or application of maintenance and reliability for:

- Autonomous Systems
- Cyber-physical systems
- Data Mining and Machine Learning
- Decision Analysis and Methods
- Expert Elicitation
- Operational Research
- Production Planning and Control
- Quality Control and Management

- Human Factors
- Information Processing and Engineering
- Manufacturing Systems
- Resilience Engineering
- Sustainability
- Smart Technologies
- Systems Modelling and Simulation

Publication

Conference Proceedings: authors are invited to submit their paper for publication in the proceedings. All submissions will be peer reviewed and accepted papers will appear in the conference proceedings. The conference proceedings will be indexed by DOI system. Special Issue: selected authors will be invited to submit an extended version of their papers to a Special Issue in Reliability Engineering and System Safety, guest edited by the conference chairs. For more information, please visit 12th IMA International Conference on Modelling in Industrial Maintenance and Reliability (MIMAR) - IMA

SSARS 2023

17th Summer Safety & Reliability Seminar – SSARS 2023, 9th – 14th July 2023, Kraków, Poland

The annual Summer Safety and Reliability Seminars are organised to advance the methods for the safety and reliability analysis of complex systems and processes and to disseminate the newest achievements in the field. The subjects of the Seminars, different from year to year, are chosen by the Seminars Board in an effort to dynamically represent the methodological advancements developed to meet the newly arising challenges in the field of safety and reliability. This year the emphasis is addressed but is not limited to the following subjects: Safety and Security Management, Safety and Reliability of Complex Systems and Processes, Risk Assessment, Reduction and Accident Consequences Mitigation of Process Industry and Transport Critical Infrastructures, Cybersecurity, Warning Systems, Food Safety, Product Safety, Safety and Resilience Training. More details are available here.

Horizon Europe

Infoday et Brokerage Event Cluster 3, 2023

Horizon Europe Cluster 3 Info-day and Brokerage Event, June 27 - June 28, 2023 | Brussels, Belgium

The event is organized by the Network of Security National Contact Points – SEREN5, in close cooperation with the European Commission's Directorate-General Migration and Home Affairs and the European Research Executive Agency.

The Horizon Europe "Civil Security for Society" calls offer research and innovation funding opportunities to research institutions, universities, industries, SMEs, civil society organizations and other security stakeholders.

Participation in the event is free of charge: https://cluster3-infoday-brokerage-event.b2match.io/

Asset Performance Conference: 25 & 26 October 2023 in Antwerp, Belgium

Asset Performance is an initiative of BEMAS, Belgian Maintenance Association vzw-asbl, a not-for-profit organisation for professionals in maintenance & asset management. We help asset intensive organisations on the road to world class maintenance and management of technical equipment and infrastructure. BEMAS counts more than 585 member companies. BEMAS organizes more than 150 seminars and training courses every year. BEMAS is a valued member of EFNMS. More information on www.bemas.org.

Conference Registration is open here: https://www.assetperformance.eu/

ESReDA Members, you are kindly invited to contribute to the ESReDA newsletter sharing news, announcement of events, your experiences, ideas, etc. You are supposed to elaborate proposals to create new Project Groups, host ESReDA Seminars or initiate collaborative activities.

ESReDA European Safety, Reliability & Data Association

ESReDA Book Order Form

Delivery Data

Name, Surname : ..... [Miss., Mrs, M.]

Affiliation... : .....

Address (1). : .....

Address (2). : .....

City/State ... : .....

Zip..... : .....

Country ..... : .....

Phone/Mobile : .....

E-mail..... : .....

Order description

	Book Title	€/unit	Quantity	Total (€)
1	Modelling the Resilience of Infrastructure Networks* *Editors: Rasa Remenyte-Prescott and Vytis Kopustinskas*	90		
2				
3				
	Total of the order			

* ESReDA Project Group on "Resilience Engineering and Modelling of Networked Infrastructure" has successfully published its final report. The report title is "Modelling the Resilience of Infrastructure Networks", ©2021 by ESReDA, IBSN 978-2-930928-11 (EAN IBSN 9782930928111).

Date **Signature**

One copy of each ESReDA report is offered once to each ESReDA member and co-author for free otherwise the participation in the edition-costs is 90€.
Delivery costs by the ordinary postal services in the EU continental zone is included in the announced contribution. For different zones, estimated additional fees should be expected for the postal transport.

Please send your book order form to: Antonio Jesus Guillen (ajguillen@us.es), with Siegfried Eisnger (siegfried.eisinger@dnv.com) and Micaela Demichela (micaela.demichela@polito.it) in Cc.